Rethinking the Economic Development Implications of Trinity Policy Trade-offs in Nigeria: A Focus on GNI Per Capita Growth

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study deepens the understanding of the dynamic relationship between trinity policy trade-offs and GNI per capita in Nigeria between 1980 and 2020. The external reserve is introduced to the empirical model in recognition of its role in stimulating the effectiveness of trinity policy goals. Data for the variables were sourced from the National Bureau of Statistics, CBN Statistical Bulletin and World Bank World Development Indicators (WDI) among others. Descriptive statistics, Phillips-Perron unit root test, bounds cointegration and ARDL model as well as Tado-Yamamoto causality form basis for data analysis. The unit root test results reveal that the variables are mixed integrated. This necessitates the application of the bounds cointegration test. As observed from the results, a long-run relationship exists between GNI per capita and trinity policy indexes. It was found from the ARDL estimates that monetary autonomy and capital mobility have a significant positive effect on GNI per capita in both the short and long run. This suggests that more monetary policy sovereignty and openness of the financial architecture yield positive benefits of improved living standard. The result further showed evidence of long-run causality flowing from external reserve to GNI per capita.

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This finding explains why policymakers in Nigeria have continued to prioritize external reserve build-up for sterilized intervention and stimulating policy effectiveness. Given the findings, this study recommends that policymakers should strive to maintain appreciable monetary autonomy and gradually collapse restrictions on cross-border capital flows to improve economic well-being in Nigeria.

1. INTRODUCTION

There has been growing recognition of the development implications of the trinity policy trade-offs in development and international economics literature. This could be linked to the centrality of policies guiding exchange rate, money supply and capital mobility in macroeconomic policy formulation. Essentially, the thrust of the trinity policy trade-offs defined as the inability of the policymakers to simultaneously achieve the goals of monetary autonomy, exchange rate stability and free cross border capital transactions draws support from the to the Mundell-Fleming hypothesis credited to Mundell [1,2] and Fleming [3]. In other words, only two out of the three policy goals are mutually consistent. Thus, embracing monetary autonomy and free capital flows entails allowing for exchange rate flexibility. Additionally, implementing monetary independence and a fixed exchange system entails restricting capital flows while monetary autonomy will be given up to maintain a fixed exchange rate and free capital mobility. Goshit [4] observes that monetary authorities across the globe strategically embrace monetary policy to sustain low inflation and robust growth while promoting financial stability.

It is worthy of note that the successful combination of any two trinity policy goals is fundamental to foster growth, mitigate the volatility of output and improve the process of socio-economic development. Hsing [5] argues that an appropriate combination of any two of the trinity policy goals is important for mitigating output and exchange rate volatility, reduce sluggish growth and mobilize foreign investment from the rest of the world. This can provide a road map for a sustainable reduction in poverty and income gap while creating opportunities for productive employment. Majumder & Nag [6] attests to the effectiveness of trinity policy goals in shaping economic outcomes in India. Similarly, Ihnatov & Capraru [7] are of the view that trinity policy goals, especially financial integration plays important role in mitigating macroeconomic volatility in Central and Eastern Europe (CEE) countries.

Nigeria has continued to make policy choices to keep the economy on the path of growth and create better opportunities for socio-economic development. Policymakers and relevant authorities, especially the Central Bank of Nigeria (CBN) are faced with the challenge of deciding the country's policy priority for employment as well as a sustainable reduction in poverty and income gap. Ajogbeje, Adeniyi & Egwaikhide [8] opine that policymakers in Nigeria have, in recent time, embraced appreciable monetary autonomy and financial integration while allowing for various forms of managed float exchange rate regime. This is intended to offer rapid and sustained opportunities for economic stability, productive investments and socioeconomic development amongst others. It is however a paradox that very often the onset of a new government in Nigeria translates into an abandonment of policy initiatives of past governments. Thus, most of the policies of the previous government will only exist on paper as they are never implemented to actualize the set objectives.

Additionally, the progress made so far in terms of socio-economic development has been relatively sub-optimal considering the poor inclusiveness of the growth process as evidenced in unacceptable poverty and unemployment, unstable growth of per capita gross national income (GNI) and low HDI score. These reflect a disappointing level of development and overall poor quality of life. Consequently, the controversy in policy debate regarding the effectiveness of the trinity policy mix in supporting governments' efforts to foster social and economic development as well as improve the overall quality of life has intensified. As the controversy continues to grow with varying empirical evidence, this study sets out to specifically examine trinity policy trade-offs affect GNI per capita growth in Nigeria.

2. REVIEW OF RELATED LITERATURE

2.1 Theoretical Framework

Mundell [1,2] and Fleming [3] offered the theoretical background for the trinity policy trade-offs. The basic assumption of this hypothesis is that a small open economy cannot simultaneously implement the macroeconomic policies of monetary independence, fixed exchange rate system and free mobility of capital across the national boundaries. Thus, the three macroeconomic goals are mutually exclusive as only two out of the three policy objectives can be achieved at a time. The postulations of this theory are useful tools to gauge the effect of economic policy based on the exchange rate regimes in a country [9].

The Mundell-Fleming model is, to a large extent, more appropriate for describing the global economy as it was developed after the collapse of the Bretton Woods system, which is characterized by high financial integration and floating exchange rates than the economic reality of the times in which the model was originally developed. Besides its contributions to the development of international economics literature, the Mundell-Fleming model has suffered many criticisms over time. For instance, Branson & Buiter [10] criticize the Mundell-Fleming framework for overlooking the asset market dynamics in their analysis. The model is equally criticized for its assumption of perfect mobility of capital which is unrealistic in real-world scenario.

2.2 Empirical Literature

Akcelik, Cortuk & Turhan [11] relied upon the VAR framework in modelling the trilemma configuration of the Turkish economy between 2002 and 2011. The study specifically calculates the trilemma indices and regressed them on a constant. This approach was extended as the study applied a Kalman filter to the classical linear regression to capture the time-varying importance of policy decisions. It was found from the estimated VAR model the role of central bank foreign reserves and required reserves in mitigating trilemma tradeoffs through their relation with trilemma residuals. The result further revealed that the foreign reserves to GDP ratio and the required reserve ratio have a positive significant impact on the residuals, thus making the policy tradeoffs smaller. The study, therefore, concludes that foreign reserves and

required reserves have a role in mitigating the trilemma tradeoffs in Turkey.

Kole [12] examined the nexus between the policy trilemma and its effects on real output in Nigeria. The study employed annual data spanning from 1990 to 2017. The international reserve has been included in the model due to its importance as noted in the literature. Following Hsing [5] and Ajogbeje *et al.* [8], ARDL bound test for cointegration was used. Data for the study was obtained from Aizenman, Chinn & Ito [13], CBN Statistical Database and IMF International Financial Statistics Database. The study found mix significant results between exchange rate stability and real GDP. The study further revealed that both monetary policy independence and capital account liberalization independently exert a significant and positive impact on real GDP but interactively they significantly reduce the level of real output in the economy. The nexus between the international reserve and real GDP was positive and significant. Therefore, the study recommends that for Nigeria to feel the positive impact of her trilemma choice on the economy, policymakers should strive to pursue the policy combination consistently and buffered the economy with a robust external reserve to cushion the effects of abrupt change in capital flow and exchange rate shocks.

Ihnatov & Căpraru [7] offered some insights into the empirical implications of the trilemma policies on the volatility of macroeconomic variables in selected countries in Central and Eastern Europe (CEE), members of the European Union. The metrics used for the study is the trilemma indexes built by Aizenman, Chinn & Ito (2011). They are applied in a multiple regression framework to test the consequences of the policies on inflation and output volatility. It was observed from the results that capital mobility has a positive impact on reducing the macroeconomic volatility in Central and Eastern Europe. The study, therefore, concluded that the trilemma hypothesis offers opportunities for stable output growth.

Using a dynamic panel analysis of the difference generalized method of moments (GMM) and system GMM, Gabriel & David [14] explored the individual and joint effects of trade openness and financial openness on economic growth in sub-Saharan African (SSA) countries over the period 1980-2017. The SSA countries are divided into two broad categories-low income countries and middle-income countries. The empirical findings

for low-income countries show that trade openness has a significant positive impact on economic growth. However, financial openness and joint trade and financial openness do not have a significant positive impact on economic growth. In the case of middle-income countries, the effect of trade openness on economic growth is mixed. However, both financial openness and joint trade and financial openness do not foster economic growth. Overall, the study concludes that there is no evidence of simultaneous openness hypothesis in SSA economies. The study, therefore, recommends that it is imperative to ensure that appropriate and productive foreign direct investments are mobilized to the SSA economy.

3. RESAERCH METHODOLOGY

3.1 Model Specification

To examine the development implications of trinity policy in Nigeria, this study improves on earlier studies [7,8,12] by focusing attention on it affects GNI per capita. The model is augmented with the introduction of the external reserve. The model set up which is anchored on the Mundell-Fleming hypothesis is compactly expressed as:

$$GNIP = f(ERS, MAT, CBM, ETX) \qquad (1)$$

The ARDL model representation of equation (1) is provided as:

$$GNIP_t = \alpha_0 + \sum_{i=1}^{m} \psi_{1i} \Delta GNIP_{t-1} +$$

$$\sum_{i=1}^{p} \psi_{2i} \Delta ERS_{t-1} +$$

$$\sum_{i=1}^{p} \psi_{3i} \Delta MAT_{t-1} + \sum_{i=1}^{p} \psi_{4i} \Delta CBM_{t-1} +$$

$$\sum_{i=1}^{p} \psi_{5i} \Delta EXT_{t-1} + ß_{1i}GNIP_{t-1} + ß_{2i}ERS_{t-1} +$$

$$ß_{3i}MAT_{t-1} + ß_{4i}CBM_{t-1} + ß_{5i}EXT_{t-1} + e_{4t} \qquad (2)$$

Where: α_0 = constant parameter

ψ_1 - ψ_5 = short run dynamic coefficients of the predictor variables

$ß_1$ - $ß_5$ = long run multipliers

e_{1t} - e_{4t} = random disturbance terms

Δ = first difference operator

m and p = optimal lag order to be included in each of the models

i and t denote country of study and timeframe respectively

As observed from equation (2), GNI per capita is the dependent variable while trinity policy goals [exchange rate stability (ERS), monetary autonomy (MAT) and cross-border capita mobility (CBM)] and external reserve build-up (EXT) are the dynamic regressors lagged for various periods.

It is expected that exchange rate stability will impact negatively on poverty and unemployment, and positively on GNI per capita. Theory suggests that stability in exchange in small open economies like Nigeria will help to reduce exchange rate variations and offer opportunities for pro-poor growth and improved human welfare. Hsing [15] found that more exchange rate stability boosts real GDP growth, thus offers a roadmap for economic development. Goshit [4] outlines that countries strategically embrace monetary policy autonomy to sustain low inflation and robust growth while promoting financial stability. These are imperative for improved GNI per capita. However, open cross-border capital mobility represented by financial market openness is expected to have an ambiguous impact on GNI per capita. The theoretical ambiguity on the macroeconomic effects of financial market openness is well documented in the literature. For instance, Xu & Gui [16] argue that open financial markets tend to adversely affect the power of government in the management of the economy. This poses risks of instability due to reduced regulations and supervision of the financial market and in turn the tendency of adverse implications on socio-economic development. Sami [17] opines that international financial integration improves income level, thereby redistributing income. As depicted in the a priori predictions, external reserve accumulation is expected to boost GNI per capita. Theoretically, larger amounts of foreign reserves build-up can allow policymakers to fight against external shocks and achieve economic stability. Ito & Kawai [18] argue that external reserve accumulation helps monetary authorities conduct sterilized interventions more actively.

Table 1. A priori expectations on the signs of the regressors

	GNI per capita
Exchange rate stability (ERS)	+
Monetary autonomy (MAT)	+
Cross-border capita mobility (CBM)	-/+
External reserve build-up (EXT)	+

Source: Authors' summary of a priori predictions based on theoretical considerations and findings of the past empirical studies

Note: -/+ denotes theoretically ambiguity

3.2 Method of Data Analysis

The dynamic ARDL model proposed by Pesaran & Shin [19] is utilized to examine the short and long run implications of trilemma policy mix on GNI per capita. The rationale for adopting ARDL emanates from its application notwithstanding whether the variables are all I(0), I(1) or a combination of I(0) and I(1). Giles (2013) asserts that the ARDL model allows for easy application and interpretation as it involves a single equation set-up and provides room for assigning different lag to different variables in the model. In addition to estimating the ARDL, descriptive statistics and direction of causality among the variables were examined with the application of the Toda & Yamamoto [20] modified Wald test. Neuman & Kreuger [21] argue that descriptive statistics enable a researcher to show numerical data in an accurate, structured and summarized manner. On the other hand, testing for long-run causality among variables of interest has remained a widespread practice in economics and financial analysis.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

The descriptive statistics was performed to provide insight into the basic statistical properties of each of the variables over the study period. The results are reported in Table 2.

The descriptive statistics revealed that Nigeria's GNI per capita varied between a minimum value of -13.015 per cent and a maximum value of 11.539 per cent during 1980-2020. The average value of GNI per capita for Nigeria during the period covered stood at 0.734 per cent. This is a pointer that Nigeria has in the past thirty-nine years witnessed a low standard of living and has remained in the category of low human development. This is quite unfortunate despite various policy initiatives, public investments programmes, public-private partnership initiatives and aid inflows, amongst others, that were geared toward improving the standard of living and overall human development outcomes in Nigeria. Additionally, the trajectory of the exchange rate stability index revealed that it varied between a minimum value of 0.025 and a maximum value of 1.00. The result, therefore, showed that the exchange rate stability index averaged 0.497 between 1980 and 2020. Similarly, the monetary autonomy index averaged 0.523. It varied between a minimum value of 0.259 and a maximum value of 0.791. This is a pointer that Nigeria enjoys appreciable sovereignty in the conduct of monetary policy. The financial integration index has a mean value of 0.204 and becomes maximized at 0.3003. This indicates that Nigeria maintains some levels of restriction on cross-border capital control. As a percentage of GDP, external reserve varied between a minimum value of 1.0195 per cent and a maximum value of 18.624 per cent. Its mean value over the study period averaged 8.407 per cent. The standard deviation for each of the variables is less than their corresponding mean values. This indicates that the observations for each of the variables clustered around their respective mean values. In addition to the standard deviation, the probability values of each of the Jacque Bera statistics revealed that all the variables except financial integration are normally distributed at 5 per cent significance level.

4.2 Unit Root Test Results

The unit root test results are summarized in Table 3.

The Phillips-Perron unit root test results in Table 3 revealed that external reserve holding and GNI per capita are stationary at levels. This is because the corresponding probability values of their respective PP test statistics are less than 0.05. Thus, this necessitates the rejection of the

null hypothesis of unit root at levels. In other words, the two variables (external reserve and GNI per capita) are integrated of order zero [I(0)]. On the contrary, it was found from the levels test results that the other variables for investigation were not stationary given that the associated probability values of their respective PP statistics exceed 0.05. However, the levels of non-stationary variables were found to be stationary at the first difference test given that the corresponding probability values of their respective PP statistics were less than 0.05. It,

therefore, follows from the Phillips-Perron unit root test results that the variables are mixed integration [I(0) and I(1)]. This is consistent with Pesaran & Shin [19] theoretical conditions for the application of the ARDL estimation method.

4.3 Bounds Test Cointegration Results

The results of the bounds cointegration test are reported in Table 4.

Table 2. Summary of basic statistical properties of the series

	GNIP	ERS	MAT	CBM	ETX
Mean	0.734	0.496	0.523	0.204	8.407
Median	0.773	0.378	0.514	0.254	8.581
Maximum	11.519	1.000	0.791	0.3003	18.624
Minimum	-13.015	0.025	0.259	0.000	1.0195
Std. Dev.	4.954	0.347	0.146	0.1169	5.136
Jarque-Bera	0.644	4.019	1.388	6.279	2.121
Probability	0.725	0.134	0.499	0.043	0.346
Observations	39	41	41	41	41

Source: Authors' computation based on consistent time series data for the variables

Table 3. Phillips-Perron (PP) unit test results

Null hypothesis: Variable has a unit root				
Levels test results		First difference test results		Order of Integration
Variable	PP test statistic	Variable	PP test statistic	
GNIP	-4.148 (0.0001)	NA	NA	I(0)
ERS	-3.273 (0.0855)	D(ERS)	-10.755 (0.0000)	I(1)
MAT	-2.423 (0.1421)	D(MAT)	-8.198 (0.0000)	I(1)
CBM	-2.138 (0.5095)	D(CBM)	-5.665 (0.0002)	I(1)
ETX	-3.847 (0.0241)	NA	NA	I(0)

Source: Authors' computation based on consistent time series data for the variables
Note: Figures in parenthesis are the corresponding probability values of PP statistics; bandwidth for PP test was chosen based on Newey-West selection procedure using Bartlett kernel NC denotes not available due to evidence of stationarity at the levels test result

Table 4. ARDL bounds test cointegration result

Null Hypothesis: No long-run relationships exist		
Series: GNIP ERS MAT CBM ETX		
Test Statistic	Value	K
F-statistic	9.275	4
Critical Value Bounds		
Significance	Lower [I(0)] Bound	Upper [I(1)] Bound
10 percent	2.45	3.52
5 percent	2.86	4.01
1 percent	3.74	5.06

Source: Authors' computation based on consistent time series data for the variables
Note: K depicts number of explanatory variables in the model

The bounds cointegration test result for the GNI per capita model reported in table 4 was performed at 5 per cent level of significance. The computed f-statistic (9.275) is higher than the critical value (4.01) at 5 per cent level. This is a pointer that GNI per capita has a long-run relationship with the trilemma indexes and external reserve. Consequently, the null hypothesis that no long-run relationships exist among the variables is rejected. With evidence of cointegration among the variables, the empirical precondition for fitting the dynamic short and long-run regressions is fulfilled.

4.4 Estimated ARDL Regression

The estimated ARDL regression offered insights into the dynamic short and long run effects of trinity policy trade-offs and foreign reserves on GNI per capita. The results are summarized in Table 5.

As observed from its contemporaneous and lagged values, the short-run effect of monetary sovereignty on GNI per capita is mixed increases the growth of GNI per capita. Whilst contemporaneous and second lag of monetary autonomy has a significant positive relationship with GNI per capita, its first and third lag is negatively linked to GNI per capita. The positive impact of monetary independence on GNI per capita is consistent with prior predictions and mirrors the relative effectiveness of monetary policy in fostering the growth of GNI per capita. It equally supports Goshit [4] prediction that

countries strategically embrace monetary policy autonomy to boost robust growth while promoting financial stability. Similarly, the short-run effect of the cross-border capital transaction on GNI per capita is positive and significant. However, exchange rate stability has an insignificant positive impact on GNI per capita. This finding is similar to the work of Zaini & Indraswari [22] which showed that higher exchange rate stability positively, but insignificantly affected economic growth in both the short and long run. Again, in the short result, the error correction coefficient (-0.889) has a negative sign and it is highly significant at 1 per cent, which is a corroboration of the fact that GNI per capita is cointegrated with the trilemma indexes and external reserves. Its coefficient of approximately -0.89, indicates that for every short-run disequilibrium in the system, about 89 per cent of that disequilibrium is corrected each year.

More importantly, the long-run result revealed that monetary autonomy and capital mobility positively and significantly affect GNI per capita in the long. This finding implies that more monetary independence and expansion of the financial boundaries provide a roadmap for improving the standard of living. Specifically, financial integration which facilitates the expansion of the financial boundaries promote the flow of funds including remittances inflows, and invariably boost domestic money supply help to foster rapid and sustained growth of GNI per capita in Nigeria.

Table 5. Short and long run regressions results

Dependent Variable: GNIP				
Short run result				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ERS)	3.656	1.959	1.867	0.0728
D(MAT)	22.036***	5.668	3.888	0.0006
D(MAT(-1))	-23.314***	8.146	-2.862	0.0080
D(MAT(-2))	16.215**	7.686	2.109	0.0443
D(MAT(-3))	-14.683***	5.519	-2.660	0.0130
D(CBM)	10.808**	4.984	2.168	0.0391
D(ETX)	-0.094	0.148	-0.631	0.5332
CointEq(-1)	-0.889***	0.137	-6.477	0.0000
Long run result				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ERS	4.113	2.426	1.695	0.1015
MAT	32.285***	8.124	3.974	0.0005
CBM	12.157**	5.618	2.164	0.0395
ETX	-0.105	0.172	-0.611	0.5462
C	-19.251***	4.823	-3.992	0.0005

Source: Authors' computation based on consistent time series data for the variables
*Note: *** and ** denote significant at 1 percent and 5 percent respectively*

This finding aligns with the claim by Kohler (2002) that international capital integration offers unmatched gains in human welfare via increased productivity and inward foreign investments. In comparison, the significant positive effects of monetary independence and financial integration on GNI per capita are similar to the work of Kole (2020) and Ihnatov & Căpraru [7]. The findings, however, conflicted with the results of Srithilat, Sun & Thavisay [23] Hsing [15] and Zaini & Indraswari [22]. Overall, the short and long-run results provide appreciable empirical evidence that trilemma mix in the form of financial integration and monetary policy independence is appropriate for rapid and sustained growth of GNI per capita in Nigeria. Although exchange rate stability is positively related to GNI per capita in the short run, it is not significant at the conventional 5 per cent level. On balance, the result revealed that trilemma policy strategies of monetary and financial openness are good for high levels of GNI per capita in the short run. At the same time, the long-run effect of capital mobility on GNI per capita is positive and significant at 5 per cent level. This implication of these findings is that more monetary autonomy and free capital mobility facilitate the growth of GNI per capita.

In furtherance of the empirical validity of estimated ARDL result for the GNI per capita model, relevant post-estimation diagnostics tests were conducted at 5 per cent level. The first row of Table 5 shows the normality test result and it was found that the probability value (0.7276) of the Jarque-Bera statistic (0.636) exceeds 0.05. This is a pointer that the residuals are normally distributed at 5 per cent level. Hence, the null hypothesis was accepted. The Breusch-Godfrey LM Test for serial correlation was performed to examine if there is serial correlation in the residuals. The result showed that the Chi-square

statistic (6.013) is associated with a probability value of 0.1110, which is greater than 0.05. This finding indicates that the residuals are not serially correlated. In a like manner, the ARCH heteroscedasticity test result reported showed that the probability value (0.6621) of the chi-square statistic (0.191) is greater than 0.05. This is a pointer that the variance of the residuals is constant over time. It is also found from the Ramsey RESET test result there is enough evidence for retaining the null hypothesis of no functional form misspecification in the model. This is based on the fact the associated probability value (0.3895) of the F-statistic (1.048) is higher than 0.05. It, therefore, follows from the diagnostics tests results that the estimated GNI per capita model conforms to basic Gauss-Markov assumptions and can be relied upon for policy formulation and macroeconomic forecast.

4.5 Causality Test Results

The causal links between the trinity policy trade-offs and GNI per capita was examined using Tado-Yamamoto causality test. The results are summarized in Table 6.

The causality test results showed that unidirectional causality between the external reserve and GNI per capita, which strictly runs from external reserve to GNI per capita. This finding is an indication that external accumulation has important predicting power for the growth of GNI per capita. It also supports the prior prediction that the accumulation of international reserves is good for boosting the growth of GNI per capita. The result further revealed that there is no joint causality from all the regressors to GNI per capita.

Table 5.1. Post-estimation diagnostics tests results

Test type/Null Hypothesis (H_0)	Test-statistic	Prob. value	Decision
Residual Normality test	Jarque-Bera stat. (0.636)	0.7276	Accept H_0
H_0: Residuals are normally distributed			
Breusch-Godfrey Serial Correlation test	Chi-square stat. (6.013)	0.1110	Accept H_0
H_0:No serial correlation in residuals			
ARCH heteroscedasticity test	Chi-square stat. (0.191)	0.6621	Accept H_0
H_0:Residuals are homoscedastic			
Ramsey's RESET	F-stat. (1.048)	0.3895	Accept H_0
H_0: No functional form misspecification			

Source: Source: Authors' computation based on consistent time series data for the variables

Table 6. Causality test results

Null Hypothesis (H$_0$): No causality in the series
Series: GNIP ERS MAT CBM ETX

Direction of causality	Chi-square (X^2) Statistic	P-value	Decision
ERS $\rightarrow$ GNIP	0.127	0.7216	Accept H$_0$
GNIP $\rightarrow$ ERS	1.624	0.2026	Accept H$_0$
MAT $\rightarrow$ GNIP	0.055	0.8150	Accept H$_0$
GNIP $\rightarrow$ MAT	0.217	0.6414	Accept H$_0$
CBM$\rightarrow$ GNIP	0.00077	0.9778	Accept H$_0$
GNIP $\rightarrow$ CBM	1.072	0.3004	Accept H$_0$
ETX$\rightarrow$ GNIP	3.907	0.0481	Reject H$_0$
GNIP $\rightarrow$ETX	0.689	0.4066	Accept H$_0$
ERS, MAT, CBM and ETX $\rightarrow$GNIP	5.3959	0.2490	Accept H$_0$

Source: Authors' computation based on consistent time series data for the variables
Note: $\rightarrow$ shows direction of causality

5. CONCLUDING REMARKS

In this study, the dynamic relationship between trinity policy trade-offs and GNI per capita was examined to deepen the understanding of how exchange rate stability, monetary autonomy and financial integration affect GNI per capita growth. The role of external reserves in buffering the trinity policy mix towards boosting the growth of GNI per capita was equally recognized. The findings reveal that monetary sovereignty and financial integration yield positive benefits of the growth of GNI per capita. This is a pointer that increased monetary sovereignty and open financial architecture provide opportunities for an improved standard of living. This study also provides evidence of unidirectional causality flowing from external reserve to GNI per capita. This finding supports the prior prediction that the accumulation of international reserves is good for boosting the growth of GNI per capita. Based on the findings, this study concludes that the prediction of impossible trinity holds sway for Nigeria given that exchange rate stability, monetary autonomy and financial integration are not mutually consistent in explaining changes in GNI per capita. It, therefore, follows from the findings that the twin goals of monetary autonomy and financial integration are preferable trinity policy mix for bolstering the growth of GNI per capita. To this end, this study recommends that policymakers should promote appreciable monetary autonomy and gradually collapse restrictions on cross-border capital flows to improve economic well-being in Nigeria. This study contributes to knowledge by establishing that Nigeria can leverage appreciable monetary sovereignty and financial market openness to foster rapid and sustainable growth of GNI per capita.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Mundell RA. A theory of optimum currency areas. The American Economic Review. 1961;51(4):657-665.
2. Mundell RA. Capital mobility and stabilization policy under fixed and flexible exchange rates. The Canadian Journal of Economics and Political Science / Revue Canadienne d'Economique et de Science Politique. 1963;29(4):475–485.
3. Fleming JM. Domestic financial policies under fixed and under floating exchange rates. Staff Papers. 1962;9(3):369-380.
4. Goshit GG. Monetary policy and inclusive growth in Nigeria: Theoretical issues, challenges and prospects. Journal of Economics and Sustainable Development. 2015;6(20):55-69.
5. Hsing Y. Effects of the trilemma policies on inflation, growth and volatility in Bulgaria. Theoretical and Applied Economics. 2012;4(4):49.
6. Majumder SB, Nag RN. Policy trilemma in India: Exchange rate stability, independent monetary policy and capital account openness. Global Economy Journal. 2017;17(3).
7. Ihnatov I, Căpraru B. The trilemma policies and macroeconomic volatility in Central

and Eastern Europe. Procedia Economics and Finance. 2014;15:853-857.

8. Ajogbeje K, Adeniyi OA, Egwaikhide FO. Policy trilemma and interest rate behaviour in Nigeria. CBN Journal of Applied Statistics. 2018;9(2):17-41.

9. Okotori TW, Ayunku P. The Mundell-Fleming Trilemma: Implications for the CBN and the financial markets; 2020.

10. Branson WH, Buiter WH. Monetary and fiscal policy with flexible exchange rates. Economic interdependence and flexible exchange rates, ed. Bhandari JS and Putnam BH, Cambridge: Massachusetts institute of technology press. 1982;251-285.

11. Akcelik Y, Cortuk O, Turhan I. Mitigating Turkey's trilemma tradeoffs. Emerging Markets Finance and Trade. 2014;50(6):102-118.

12. Kole A. Trilemma policy paths and real output nexus in Nigeria. International Journal of New Economics and Social Sciences (IJONESS). 2020;11(1):315-330.

13. Aizenman J, Chinn MD, Ito H. The "impossible trinity" hypothesis in an era of global imbalances: Measurement and testing. Review of International Economics. 2013;21(3):447-458.

14. Gabriel AA, David AO. Effect of trade openness and financial openness on economic growth in sub-Saharan African countries. African Journal of Economic Review. 2021;9(1):109-130.

15. Hsing Y. Effects of the trilemma policies on inflation, growth and volatility in Bulgaria. Theoretical and Applied Economics. 2012a;4(4):49.

16. Xu G, Gui B. From financial repression to financial crisis? The case of China. Asian-Pacific Economic Literature. 2019;33(1):48-63.

17. Sami SAF. The impact of financial integration on macroeconomic performance, financial fragilities, and poverty in emerging market economies. University College London (UCL); 2016.

18. Ito H, Kawai M. Determinants of the trilemma policy combination. ADBI Working Paper No. 456; 2014. Available:https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2388505

19. Pesaran MH, Shin Y. An autoregressive distributed lag modelling approach to cointegration analysis. Chapter 11 in S. Strom (ed.), Econometrics and economic theory in the 20th Century: The ragnar frisch centennial symposium. Cambridge University Press, Cambridge; 1999.

20. Toda HY, Yamamoto T. Statistical inference in vector autoregressions with possibly integrated processes. Journal of Econometrics. 1995;66(1-2):225-250.

21. Neuman WL, Kreuger L. Social work research methods: Qualitative and quantitative approaches. Allyn and Bacon; 2003.

22. Zaini AM, Indraswari KD. The effect of trilemma toward economic growth of newly industrialized economy in Southeast Asia. In proceedings of international academic conferences (No. 0100742). International Institute of Social and Economic Sciences; 2014.

23. Srithilat K, Sun G, Thavisay M. The impact of monetary policy on economic development: Evidence from Lao PDR. Global Journal of Human-Social Science. 2017;17(2):9-15.