International Journal of Accounting Research, 10(2),2025, 103-108
ISSN: 2617-9954
Open Access Journal

International Journal of Accounting Research

Research Article

Homepage: www.j.arabianjbmr.com

The impact of policy trilemma trade-off on Nigeria economic growth

[1]Olugbon, B.S., [2]Bosede Esther Akanbi and [3]Anthony Dotun Oladipo
[1,2,3]Department of Economics, Osun State University, Osogbo, Nigeria. Corresponding email : anthony.oladipo@uniosun.edu.ng

ABSTRACT

This study investigates the implication of policy trilemma – trade-off among free mobility of capital, monetary policy autonomy, and exchange rate stability on Nigerian economic growth from 1981 to 2023. The data was sourced from the World Bank and Central Bank of Nigeria (CBN) statistical database, Stationarity of the series were ascertained with augmented dickey-fuller, Phillip-perron and ZA structural break unit roots test technique. The study utilizes the Autoregressive Distributed Lag (ARDL) model in analyzing both short- and long-run associations among the trilemma variables and real GDP growth. The study found that exchange rate stability combined with capital mobility (coefficient 0.6859; t-stat: 2.0811) is statistically significant and positively impact economic growth. This implies that if a country chooses to fix its exchange rate and allow free capital mobility, it must give up monetary independence which aligns with the prediction of policy trilemma. Which means the condition of Mundel Fleming is met in Nigeria Therefore, Policymakers need to understand how the degree of monetary autonomy is affected by the chosen exchange rate regime and the level of capital mobility accordingly to support long-run economic health.

ARTICLE INFO

Keywords:
economic growth,exchange rate, policy trilemma, mundel-fleming

Received: 14 Sep 2025 | Accepted: 25 Nov 2025
Published: 09 Dec 2025

1. INTRODUCTION

Nigeria faces numerous challenges in implementing its economic development initiatives, despite being the largest economy in Africa. Nigeria's oil and gas industry has produced foreign exchange earnings, but the country's economic growth has been lackluster, leading to rising poverty and economic hardship. Nigeria's economy has grown slowly, despite the foreign exchange profits from its oil and gas industry. This has led to rising poverty and economic hardship. This is very different from any sovereign country's primary goal, which is to raise living standards and encourage economic growth by managing economic policies well (Madaki, 2024). This includes Nigeria. The policy trilemma Nigeria has experienced highlights the challenging trade-offs that macroeconomic management of the Nigerian economy entails. Nigeria's economic policy history can be understood through understanding of the "policy trilemma" or "impossible trinity" concept, which suggests that a country cannot simultaneously achieve three objectives: fixed exchange rates, free capital movement, and an independent monetary policy. So, it is a great challenge to accomplish all three goals simultaneously. Since independence, Nigeria has experimented with various trilemma configurations ever since gaining its independence. Nigeria preserved some monetary autonomy between the 1960s and 1970s by keeping a fixed exchange rate and limiting capital flows. Nigeria's early post-independence fixed exchange rate system was intended to preserve currency stability, but it needed strict capital controls to function well (Iyoha, 2004).

During the period of the 1980s and 1990s, the Structural Adjustment Program (SAP) was introduced in 1986, representing a significant shift, the SAP was Nigeria's attempt to concurrently liberalize its exchange rate and capital account, which inevitably compromised monetary policy independence (Ekpo, 2015). Nigeria maintained a managed float exchange rate regime with partial capital controls from 2000 to 2023. In contrast, the years 2020–2024 were characterized by economic volatility. In Q2 2024, the finance and oil and gas sectors led growth after a recession in 2020, which was followed by a recovery and a slowdown. With highs and lows of 12.12%, Nigeria's GDP growth rate has been extremely volatile, averaging 0.66% between 2010 and 2024, with highs and lows of 12.12% in Q3 2020 and -16.10% in Q1 2024 due to the 2023-naira devaluation, which caused Nigeria to drop to third place in Africa, behind South Africa and Egypt (CBN, 2024). Furthermore, IMF projections point towards a 3.34% GDP growth rate in 2024 but anticipate Nigeria falling to fourth place by the end of the year. Ozigbu (2019) submitted that Nigerian central bank foreign exchange market interventions attempt to regulate the exchange rate while maintaining some degree of monetary independence, thereby inducing tensions under the trilemma framework. Economists hold mixed views on the mundel fleming policy trilema to stimulate long-run economic growth. For instance, Oni and Akinlo (2020) examined periodic implementation of capital mobility controls and discovered that provision of short-term stability of capital controls decreased foreign direct investment inflows obligatory for sustained economic growth. Nevertheless, Anderson and Jordan (1968) (as cited in Madaki, 2024) contends that monetary policy has a substantial and speedy effect on economic activity and propose greater dependence on monetary measures in stabilisation policy. Understanding the impossible trinity impact requires needs for investigating how different policy choices affect economic outcomes within Nigerian settings. In addition, Hsing (2019) submits that maintaining a fixed exchange rate might potentially provide stability for trade and investment, but it could also restraint the central bank's strength to react to domestic economic shocks. On the other hand, allowing free capital flows can fascinate foreign investment, but it also unearths the economy to volatile capital movements and potential financial instability (Tümtürk, 2019). Despite extensive research on the impact of policy trilemma choices on diverse economic indicators in Nigeria (e.g., Zakaria, Maski, Saputra & Annegrat, 2023; Asogwa et al., 2016; and Hoque et al., 2017), a consensus remains elusive. Central banks and other policymakers in Nigeria are consistently concerned about which of the mutually consistent policies is most suitable for achieving effective and inclusive growth in the country? And how have Nigerian policymakers utilized the available policy choices within the Mundell-Fleming framework to guide the country's economic prosperity? These questions, along with the ongoing debate surrounding the Mundell-Fleming "impossible trinity" in the context of Nigeria's structural development paths, motivate further inquiry. Therefore, this study investigates the policy trilemma and its implications for Nigeria's economic growth.

2. LITERATURE REVIEW

Many researchers have examined the trilemma policies in connection to diverse issues within the context both in the developing, emerging and developed countries. Among these researchers' work is reviewed below:

Hsing (2019) used an extended trilemma to Australian statistics and found that the implementation of fiscal policy (i.e. expansionary) does not impact output as expansionary monetary policy increases the level of output. The GARCH model was employed in empirical work to correct for auto-regressive conditional heteroscedasticity. The results revealed that there was a higher real value of the stock price; a lower real oil price or a lower expected inflation rate would increase output. The findings were a validation of the postulations of the Mundell-Fleming model as regards the Australian economy. The work of Berthold and Stadtmann (2019) presents contrasting findings within the premise of the Mundell-Fleming trilemma. The monetary authority, that is, the Swiss National Bank (SNB), in Switzerlands is not in full independence of the fixed exchange rate and the floating exchange rate regime. Real exchange rate movements are not constant because the short-term assumption of purchasing power parity (PPP) is not met. Olumuyiwa et al. (2018) evaluated the spillover effects of US monetary policy on GCC countries' monetary policy whilst using oil price as an additional factor. Their study used a panel vector auto-regression (fixed

effect) model and discovered that the liquidity position of the local banking industry in GCC countries can be impacted by oil price thereby change how US monetary policy affects GCC economies' non-oil output. The study used the Bayesian panel to test the Mundell-Fleming trilemma, which argues that the monetary policy of fixed exchange rate regimes and unfettered capital mobility are interdependent.

Ito and Kawai (2014) studied the determinants of trilemma policy combination in an extensive sample of 78 countries. They discovered that the trilemma constraint was binding. They also discovered that when a currency, banking, or debt crisis occurs, the policy combination happens to violate the trilemma constraint. This suggests that if the policy combination deviates from the trilemma constraint, it will lead to policy stress, which will manifest in crises unless it is adjusted to conform to the constraint. Hosny et al (2015) examined the trinity policy on developing and developed countries during the gold standard period, Bretton woods periods and post-Bretton Woods period. To this end, it focused on the path of monetary independence over time and domestic interest rate behavior relative to the base country's interest rate. They also tested the speed of adjustment of interest rates in the base country to interest rate disequilibrium in the base country. They established that exchange rate regimes and capitals control played a role in monetary independence. The results further revealed that the volatility of domestic interest rates is more pronounced in non-fixed periods than in pegged periods.

According to Rey (2015), There is a global financial cycle in capital flows, asset prices and in credit growth. The study used VAR method analysis which suggests global banks' leverage in the global financial system, loan expansion, and capital flows are all impacted by this policy. Every time capital is freely transportable, the global financial cycle constrains national monetary policy, regardless of the exchange rate regime. The study found that a country with an open capital account cannot shelter its domestic economy regardless of the exchange rate system used. Zakaria, Maski, Saputra, and Annegrat (2023) examined the combination of the Mundell-Fleming trilemma in middle-isncome countries from 1995 to 2017 with the panel Autoregressive. This research work discovered that the Mundell-Fleming trilemma tended to converge in the short run. Distributed Lag (ARDL) model. While in the long run, middle-income nations tend to have monetary autonomy and financial integration, resulting in an unstable exchange rate. Ella (2020) examined enduring truth: the Mundel-Flemingtrilemma in emerging economies. The study used regression method to investigate with a new prism. First, we consider that monetary policy independence is not only control over interest rates but also over real economy's variables – such as credit. Second, the study look at interactions between the three corners of the triangle: what is the best policy mix? What combination of regimes and barriers should countries choose? The study finds that, in emerging economies, the trilemma still holds to a certain extent. Even when economies with fixed exchange rate regimes impose capital controls, flexible exchange rate regimes offer more protection against external forces.

The Mundell-Fleming trilemma in emerging economies is another fact that Ella (2020) explored. Firstly, the study considers that monetary policy independence is not only control over interest rates but also over real economy variables—such as credit. Second, the study focuses at relationships between the three corners of the triangle: What combination of policies works best? What combination of regimes and barriers should countries choose? The study has discovered that the trilemma exists to an extent in emerging markets. It shows that economies that practise floating exchange rate protect economies that are practising fixed exchange rate regime even with capital control from foreign influences. Tümtürk (2019) examined the applicability of the trilemma hypothesis and different trilemma policy configurations between monetary autonomy, financial openness, and exchange rate stability in Turkey from 1970 to 2014. Zellner's apparently unrelated regressions (SURE) approach was employed in the investigation. Between 2001 and 2014, Turkish authorities soughts a combination of capital mobility and monetary autonomy, proving the validity of the trilemma constraint. The results show that the trilemma constraint and the combination of monetary autonomy and capital mobility, which Turkish policymakers pursued between 2001 and 2014, are valid. The study was found to have violated the trilemma's recommendations and pursued exchange rate stabilization measures. End (2024) examined how capital transfers affected recipient developing and emerging countries. The study made use of Ordinary Least Squares (OLS) and found a significantly beneficial effect of loan and bond inflows on economic performance. The findings also showed investment inflows cause significantly positive effects on real GDP growth in the short run, which dissipate after two years.

Qin (2019), using an interacted panel vector auto-regression (PVAR) model, tested the trilemma validity and possible remedial effects of macroprudential policy and capital control on 45 key advanced and emerging economies during 1999-2016. The study found that exchange rate flexibility remains effective in lowering the domestic monetary response to US interest rate shocks, especially in emerging economies, and capital controls are not necessary. Additionally, it found that by lessening the domestic monetary sensitivity to U.S. shocks, macroprudential regulations can grant policy autonomy in advanced economies. Evidence from Nigeria Ajogbeje, Adeniyi, and Egwaikhide (2019) used secondary data from 1997 to 2017 to investigate the Mundell-Fleming trilemma policy orientation on interest rates in Nigeria. The Zivot-Andrew (ZA) structural break unit roots test procedure was used to ascertain stationarity of the data, while the bounds test cointegration method was used to verify the cointegrating characteristics of the variables. The results of this study demonstrated that capital mobility affects interest rate baseline models over the long term and can be effectively buffered using external reserves to lower interest rates. Interest rates can be optimally lowered by using the trilemma policy in conjunction with other policy trilemma factors, and foreign reserves can be used as an istrument for economic stability.

In their study on macroeconomic trilemma and central bank intervention in Nigeria, Ayinde and Bankole (2018) looked at how the Central Bank of Nigeria manages the trilemma restrictions and the consequences of doing so. The quarterly period from 1981 to 2017 is included in the sample duration. The stability requirements of Zivot-Andrew unit-root test data with structural breaks prompted the analysis approach to be Markov Switching Dynamic Regression. The study discovered that the monetary authority's independence is sacrificed to maintain the trilemma constraints on the Nigerian economy. Being the policy tool of the Central Bank of Nigeria, the exchange rate was perceived to be directed by two fixed and managed-float regimes. Asogwa et al. (2016) examined the validity of the policy trilemma on the Nigerian economy. The analysis was conducted utilizing CBN data, which covered the years 1970–2012. The VAR model and Granger causality test were used. The results from the VAR model revealed that the Fleming condition is met and can be useful for the Nigerian economy. The study, however, shows that the causality test revealed that net exports Granger-caused FDI without feedback, and no causality exists in other variables. Kole (2020) conducted an empirical investigation on the connection between the policy trilemma and the implications for Nigeria's actual output. Time series annual data from 1990 to 2017 were used in the study. International reserves have been incorporated into the model due to their importance highlighted in the literature. The Vector Auto-regression (VAR) model and the Autoregressive Distributed Lag (ARDL) bound test for co-integration were employed. The study found mixed significant results between exchange rate stability and real GDP. The analysis also revealed that while capital account liberalization and monetary policy independence both had a considerable and favorable effect on real GDP on their own, when combined, they significantly reduced the rate of economic growth. The relationship between international reserves and real GDP was positive and statistically significant.

On the other hand, Okotori and Ayunku (2020) use monthly data from 1981 to 2018 to examine the Mundell-Fleming Trilemma's effects on the CBN and the financial market.The Vector Autoregressive (VAR) model was used for data estimation. The findings demonstrate how the CBN's policy implications can be observed in the way the bank may decide to affect the expansion of economic sectors like the financial markets This current study departed from these existing studies especially the work of Kole (2020) by investigating the policy trilemma implications of different combination of mundel-fleming predictions (i.e free capital mobility and monetary independence; exchange rate and free capital mobility; exchange rate and monetary independence) for economic growth in Nigeria as it is evident in the literature that most studies on trilemma policies relate to output volatility, interest rate, inflation volatility and financial stability. This investigation on policy choices will assist the nation's apex monetary authority in selecting mutually consistent policy objectives under the trilemma hypothesis that will foster inclusive economic growth

3. METHODOLOGY

The policy trilemma theory, which holds that an economy cannot simultaneously accomplish three important goals, serves as the theoretical foundation for the model formulation. The model specifications for this research is based on the arguments made by other pertinent studies in the literature as well as the theoretical framework. In order to examine the implication of trilema policy trade-offs on economic growth, this study improves on earlier studies (Hsing, 2012, Ihanatov& Capraru, 2014; Ajogbejeet al, 2018; Kole, 2020) by focusing attention on the implications of policy trilema on Nigeria real output. The model set up which is anchored on the Mundel-Fleming hypothesis is compactly expressed as:

RGDP=f (EXR,MI,FCM) ..... (1)

The model is augmented with the introduction of foreign reserves (FR) as part of the explanatory variables due to its dynamism in the trilemma as pointed out in the literature which is expressed as follows:

RGDP=f(EXR,MI,FCM,FR,EXR*MI,FR*FCM,CM*MI) .....(2)

Where: RGDP = real gross domestic product, EXR = exchange rate stability, FMI = monetary independence, FCM= free capital mobility and FR

= foreign reserves, EXR*MI = interaction of exchange rate and monetary independence, EXR*FCM = interaction of exchange rate and free capital mobility and FCM*MI = interaction of free capital mobility and monetary independence,

Equation (3) expresses real economic growth as a function of the surrogates of policy trilemma and other explanatory variables to capture the focus of this study which can be specified econometrically as:

$\ln RGDP = \alpha_0 + \alpha_1 \quad EXR + \alpha_{2F} MI + \alpha_3 \quad FCM + \alpha_4 FR + \alpha_5 EXR*MI + \alpha_6 EXR*FCM + \alpha_7 CM*MI + \varepsilon i$.....(3)

Equation 3 thus augmented into the following Models:

Model 1: $\ln RGDP = \alpha_0 + \alpha_1 \ln EXR + \alpha_2 MI + \alpha_3 CM + \alpha_4 \ln FR + \alpha_5 EXR*MI + \varepsilon i$.....(4)

Model II: $\ln RGDP = \alpha_0 + \alpha_1 \ln EXR + \alpha_2 MI + \alpha_3 CM + \alpha_4 \ln FR + \alpha_5 EXR*CM + \varepsilon i$.....(5)

Model III: $\ln RGDP = \alpha_0 + \alpha_1 \ln EXR + \alpha_2 MI + \alpha_3 CM + \alpha_4 \ln FR + \alpha_5 CM*MI + \varepsilon i$.....(6)

are coefficients estimated to show the implications of policy trilemma on the real economic output= is an error term that is assumed to be randomly and normally distributed. Cointegration tests examine the possibility of a long run relationship among non stationary series. In the case where all the variables are I(1), i.e, variables that are stationary at first difference, the Engle-Granger (E-G) and Johansen co-integration techniques are appropriate to capture the possibility of a long run equilibrium. in a case of mixture of I(0) and I(1) variables in a model, the bound testing method for co-integration put out by Pesaran et al. (2001) and Pesaran and Shin (1998) (as cited in Ajogbeje, Adeniyi & Egwaikhide, (2019)) is appropriate. The test is also efficient for small sample size. The bounds test is incorporated within the auto-regressive distributed lag (ARDL) model. The general ARDL model can be written as:

A general Autoregressive Distributed Lag (ARDL) model for one dependent variable (yt) and four independent variables (x1t,x2t,x3t,x4t) can be specified as follows:

$yt = \alpha 0 + \sum^{p}_{i=1} \phi_i y_{t-i} + \sum^{q1}_{j=0} \beta_{1jx1,t-j} + \sum^{q2}_{j=0} \beta_{2jx2,t-j} + \sum^{q3}_{j=0} \beta_{3jx3,t-j} + \sum^{q4}_{j=0} \beta_{4jx4,t-j} + \epsilon t$

Where:

yt: The dependent variable at time t.

α0: The constant term (intercept).

p: The maximum lag order for the dependent variable yt.

ϕi: The coefficients for the lagged values of the dependent variable (yt−i).

xt: The k-th independent variable at time t (where k=1,2,3,4).

q: The maximum lag order for the k-th independent variable (xkt). Note that each independent variable can have a different lag order.

βj: The coefficients for the current (j=0) and lagged (j>0) values of the k-th independent variable (x,t−j).

ϵt: The error term, which is assumed to be white noise.

MODEL I

$RGDP = \delta 0 + \sum^{k}_{j=1} \phi j GDP_{t-j} + \sum^{pi}_{j=0} \psi_{1,j} EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2,j} MI_{tj} + \sum^{p3}_{j=0} \psi_{3,j} FCM_{t-j} + \sum^{p4}_{j=0} \psi_{4,j}\ FR_{t-j} + \sum^{p5}_{j=0} \psi_{5,j}\ EXR\_MI_{t-j} + ut$

Where:

k,p1,p2,p3,p4,p5 are the optimal lag orders for GDPpct, EXR_t, MI_t, FCM_t, MS_t, and EXR_MI_t respectively, determined through model selection procedures.

The reparameterized ARDL model, or ECM form, is derived by taking first differences of the variables and incorporating the error correction term. This form highlights the speed of adjustment to long-run equilibrium.

$\Delta RGDPt = \lambda 0 + \sum^{k1}_{j=1} \gamma_{1,j} \Delta RGDPpc_{t-j} + \sum^{p1}_{j=0} \gamma_{2,j} \Delta EXR_{t-j} + \sum^{p21}_{j=0} \gamma_{3,j} \Delta MI_{t-j} + \sum^{p31}_{j=0} \gamma_{4,j} \Delta FCM_{tj} + \sum^{p4-1}_{j=0} \gamma_{5,j} \Delta FR_{t-j} + \sum^{p5-1}_{j=0} \gamma_{6,j} \Delta EXR\_MI_{t-j} + \kappa ECT_{t-1} + vt$

Model II

$RGDP = \delta 0 + \sum^{k}_{j=1} \phi j GDP_{t-j} + \sum^{pi}_{j=0} \psi_{1,j} EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2,j} MI_{tj} + \sum^{p3}_{j=0} \psi_{3,j} FCM_{t-j} + \sum^{p4}_{j=0} \psi_{4,j}\ FR_{t-j} + \sum^{p5}_{j=0} \psi_{5,j}\ EXR\_FCM_{t-j} + ut$

The reparameterized ARDL model, or ECM form;

$\Delta RGDPt = \lambda 0 + \sum^{k1}_{j=1} \gamma_{1,j} \Delta RGDPpc_{t-j} + \sum^{p1}_{j=0} \gamma_{2,j} \Delta EXR_{t-j} + \sum^{p21}_{j=0} \gamma_{3,j} \Delta MI_{t-j} + \sum^{p31}_{j=0} \gamma_{4,j} \Delta FCM_{tj} + \sum^{p4-1}_{j=0} \gamma_{5,j} \Delta FR_{t-j} + \sum^{p5-1}_{j=0} \gamma_{6,j} \Delta EXR\_FCM_{t-j} + \kappa ECT_{t-1} + vt$

MODEL III

$RGDP = \delta 0 + \sum^{k}_{j=1} \phi j GDP_{t-j} + \sum^{pi}_{j=0} \psi_{1,j} EXR_{t-j} + \sum_{j=0}^{p2} \psi_{2,j} MI_{tj} + \sum^{p3}_{j=0} \psi_{3,j} FCM_{t-j} + \sum^{p4}_{j=0} \psi_{4,j}\ FR_{t-j} + \sum^{p5}_{j=0} \psi_{5,j}\ FCM\_MI_{t-j} + ut$

The reparameterized ARDL model, or ECM form;

$\Delta RGDPt = \lambda 0 + \sum^{k1}_{j=1} \gamma_{1,j} \Delta RGDPpc_{t-j} + \sum^{p1}_{j=0} \gamma_{2,j} \Delta EXR_{t-j} + \sum^{p21}_{j=0} \gamma_{3,j} \Delta MI_{t-j} + \sum^{p31}_{j=0} \gamma_{4,j} \Delta FCM_{tj} + \sum^{p4-1}_{j=0} \gamma_{5,j} \Delta FR_{t-j} + \sum^{p5-1}_{j=0} \gamma_{6,j} \Delta FCM\_MI_{t-j} + \kappa ECT_{t-1} + vt$

Where:

Δ denotes the first difference operator (e.g., $\Delta RGDPt = RGDPt - RGDP_{t-1}$).

γj,i are the short-run coefficients for the differenced variables.

ECTt−1 is the Error Correction Term (ECT) lagged by one period, which captures the long-run equilibrium relationship.

κ is the coefficient of the ECT, representing the speed of adjustment towards the long-run equilibrium. It is expected to be negative and statistically significant.

vt is the white-noise error term.

In essence, the reparameterized ARDL (ECM) allows for the simultaneous estimation of short-run dynamics and the long-run equilibrium relationship, making it a powerful tool for analyzing cointegrating relationships among variables.

4. EMPIRICAL RESULTS AND INTERPRETATION

4.1 Descriptive Statistics Analysis

As depicted in table 1, LRGDP Mean is around 10.02, median 9.99, which suggests central tendency. It is slightly right-skewed with a moderate dispersion (std. dev. 0.42) and is normally distributed.the minimum and maximum (Max and Min) values range between 9.46 and 10.97. LEXR Mean is 1.03, but median much higher at 1.56, which suggests strong left skewness. std. dev. (0.99) is not normally distributed. Max and Min values stretch from -2.19 to 1.80. LMI mean of 1.77 and median of 1.80 are close, suggesting a reasonably symmetric distribution. It has a widespread (std. dev. 0.94) and is likely to be normally distributed.

Table 1: Descriptive Statistics of the Variable

	LRGDP	LEXR	LMI	LCM	EXTR
Mean	10.01553	1.029902	1.768833	2.320519	5.978446
Median	9.985943	1.556762	1.800325	2.295399	7.078277
Maximum	10.97130	1.800463	4.187488	3.145947	7.996058
Minimum	9.456449	-2.186561	-0.084217	1.436714	1.261501
Std. Dev.	0.423746	0.991525	0.935221	0.381982	2.009445
Skewness	0.755557	-1.733150	-0.102462	-0.202499	-1.122004
Kurtosis	2.560318	5.032498	3.154678	2.728123	3.032998
Jarque-Bera	4.334372	28.25601	0.115359	0.416396	8.814160
Probability	0.114499	0.000001	0.943952	0.812046	0.012191
Sum	420.6524	43.25588	74.29097	97.46178	251.0947
Sum Sq. Dev.	7.361979	40.30802	35.86019	5.982317	165.5526
Observations	42	42	42	42	42

Values stretch from -0.08 to 4.19. LCM mean of 2.32 and median of 2.30 are very close, suggesting a symmetric distribution. It has a smaller spread (std. dev. 0.38) than the others and is normally distributed. Max and Min values ranges between 1.44 and 3.15. EXTR lower mean of 5.98 than median of 7.08 indicates left skew. It has a large spread (std. dev. 2.01) and is not normally distributed. Max and Min ranges between 1.26 and 8.00. Briefly, LRGDP, LMI, and LCM show evidence of normality, but LEXR and EXTR do not. LEXR is very negatively skewed with a wide range, and EXTR also leans towards a negative skew with a widespread. LRGDP and LCM have more central clustering around their means.

4.2 The Unit Root (Stationarity) Results

The need to ascertain whether mean reversion is a characteristic of each variable using Augmented Dickey-Fuller (ADF), Philips-perron and ZA structural break unit root tests became paramount. This was conducted

using drift only and drifts with trend specifications of unit roots at levels and first differences of the series. It was found that most of the variables were non-stationary at levels but became stationary at first differencing I(1) except for RGDP and MI that were stationary at level I(0) across. Having established that all variables were integrated at an order one and zero, we applied the bounds test for cointegration analysis in the model.

4.3 ARDL Bounds Test for Co-integration Relationship

From the estimated bounds F-statistics presented in table 3, the three variables i.e.real gross domestic product, exchange rate, monetary independence, capital mobility and external reserve, co-move in the long run (have long run relationships). The F-statistics (model A(4.3640>2.86, 4.01), B(4.1895 > 2.75, 3.69), C(4.048 >2.62,3.79)) exceeds the critical values of both lower and upper bounds at all levels. Hence, the null hypothesis of no co-integration is rejected, implying that long-run co-integration relationship exists among the variables in this model. With this finding, there is a need to assess the real gross domestic product dynamics and its relation to exchange rates, monetary independence, capital movement and external reserve

Table 2: ADF, PP and ZA Unit Root Test Result

Variables	ADF t-statistic critical value	Prob.	Philips-perron t-statistic critical value	Prob.	ZA struct break test (critical value)	Prob	Level of integration
LRGDP	-3.9048	0.0029	-12.436	0.0001	-3.459442	0.004422	I(0)
EXR	-5.6586	0.0000	-5.6598	0.0000	-7.473476	0.006508	I(1)
MI	-7.6705	0.0000	-7.4327	0.0000	-9.202901	0.001376	I(0)
CM	-7.1434	0.0000	-7.1449	0.0000	-3.805880	0.001467	I(1)
EXTR	-3.7906	0.0062	-3.3615	0.0185	-5.954127	0.005890	I(1)

Source: Author's Computation

Table 3: ARDL Bounds Test for Co-integration results

	Model I		Model II		MODEL III	
Test statistics	Value	K	Value	K	Value	K
f-statistic	4.3640	5	4.1895	5	4.0488	5
significance	1(0) Bound	1(1) Bound	1(0) Bound	1(1) Bound	1(0) Bound	1(1) Bound
5%	2.86	4.01	2.75	3.69	2.62	3.79

Source: Author's Computation: Notes: computed Bounds Test is the ARDL co-integration test and asymptotic critical value bounds are automatically generated from Eviews 9.0.

4.4 Long-run Dynamic Analysis

MODEL I: The coefficient EXR (-0.2195) with the p-value 0.4628, which is greater than 0.05 is statistically not significant. And this negative sign suggests that an increase in the exchange rate is associated with a decrease in GDP. The coefficient of MI (0.0546) with a high p-value of 0.8396 is statistically insignificant. the positive sign suggests a positive relationship with GDP, but again, this is not statistically reliable. The coefficient of FCM (0.5635) with a p-value of 0.0249, which is less than 0.05 is statistically significant at the 5% level.This suggests a positive and statistically significant relationship: an increase in the log of capital movement is associated with an increase in the log of real GDP. The coefficient of LFR is 0.1833 with a p-value of 0.2884 is statistically insignificant. the positive sign suggests a positive relationship with GDP, but this is not statistically reliable. EXR*MI coefficient (-0.0096) with a very high p-value of 0.9587 is also statistically insignificant. This suggests that the interaction between the log of the exchange rate and the log of monetary independence does not have a statistically significant effect on GDP. The exchange rate and monetary independence interaction means a more depreciated exchange rate, combined with monetary independence, can stimulate economic growth, possibly under a managed float exchange rate regime.

MODEL II: EXR coefficient is -1.8546 with a p-value of 0.0333, which is less than 0.05 is statistically significant at the 5% level. This indicates a statistically significant negative relationship that is an increase in the exchange rate associated with a decrease in the real GDP. The magnitude of the coefficient is larger than in Model I, suggesting a stronger negative impact. MI coefficient is -0.0031 with a very high p-value of 0.9716 is statistically insignificant. This negative sign suggests a negative relationship with GDP, but this is not statistically reliable. CM coefficient is 0.5179 with a p-value of 0.0339, which is less than 0.05 is statistically significant at the 5% level. This confirms a positive and statistically significant relationship. An increase in the capital movement associated with an increase in the real GDP. The magnitude is slightly smaller than in Model I. FR coefficient is 0.0887 with a p-value of 0.0248, which is less than 0.05. is statistically significant at the 5% level. This suggests a statistically significant positive relationship: an increase in the foreign reserves is associated with an increase in the real GDP. lEXR*CM coefficient (0.8368) with a p-value (0.0450), which is less than 0.05 is statistically significant at the 5% level. This suggest that the interaction between the exchange rate and the capital movement has a statistically significant positive effect on GDP. This goes with Mundel-Fleming proposition on policy trilemma. The significant coefficients in Model II indicate that both the exchange rate and capital flows have independent and interacting effects on GDP, underscoring the trade-offs inherent in the trilemma. when a country chooses to peg its exchange rate and have free capital mobility, it will be forced to sacrifice monetary sovereignty

Model III: The coefficient of EXR is -0.2237 with a high p-value of 0.4217 which is statistically not significant. the negative sign suggests a negative relationship with GDP, but this is not statistically reliable. MI coefficient is 0.5343 with a p-value of 0.3234 and statistically not significant. the positive sign suggests a positive relationship with GDP, but this is not statistically reliable. CM coefficient is 0.8802 with a p-value of 0.0444, which is less than 0.05 and is Statistically significant at the 5% level. This confirms a positive and statistically significant relationship that an increase in the capital movement associated with an increase in the log of real GDP. The magnitude is the largest across the three models. lFR coefficient is 0.1831 with a p-value of 0.2010 is statistically insignificant. the positive sign suggests a positive relationship with GDP, but this is not statistically reliable. MI*CM (Interaction Term) coefficient is -0.2109 with a p-value of 0.3532 is statistically insignificant. This suggests that the interaction between the monetary independence and the capital movement does not have a statistically significant effect on GDP.

4.5 Short-Run Dynamic Analysis

Model I depicts that coefficient for the first lag of the differenced capital mobility (D(CM(-1))) is positive and statistically significant (coefficient = 0.001, p = 0.0427). This implies a short-run positive relationship between changes in capital mobility and the dependent variable in Model I. *The interaction term between the lagged change in the exchange rate and monetary independence (D(EXR*MI)) is positive and statistically significant (coefficient = 0.0119, p = 0.0386). This suggests that the effect of past exchange rate changes on the current dependent variable in Model I is conditional on the level of monetary independence. A higher degree of monetary independence might amplify the positive impact (or dampen the negative impact) of past exchange rate deprecation on the current dependent variable in this model.

Model II: The interaction term between the lagged change in the exchange rate and capital mobility (D(EXRCM)) is positive and statistically significant (coefficient = 0.00191, p = 0.0188). This indicates that the effect of past exchange rate changes on the current dependent variable in Model II is influenced by the level of capital mobility. Higher capital mobility might strengthen the positive impact (or weaken the negative impact) of past exchange rate deprecation on the current dependent variable in this model.

Model III: Lagged Change in Monetary Independence (D(MI(-1))): The coefficient for the first lag of the differenced monetary independence (D(MI(-1))) is negative and statistically significant (coefficient = -1.3883, p = 0.2513). This implies a short-run negative relationship between changes in monetary independence and the dependent variable in Model III. An increase in monetary independence in the previous period tends to lead to a decrease in the current period's dependent variable in this model.*The interaction term between the lagged change in monetary independence and capital mobility (D(MI*CM)) is negative and statistically significant (coefficient = -0.0010, p = 0.1290). This suggests that the effect of past changes in monetary independence on the current dependent variable in Model III is conditional on the level of capital mobility. Higher capital mobility might amplify the negative impact (or dampen the positive impact) of past increases in monetary independence on the current dependent variable in this model. Error Correction Mechanism (ECM(-1)): The error correction term (ECM(-1)) is statistically significant and negative in Model I (coefficient = -0.1690, p = 0.0022), Model II (coefficient -0.1783, p = 0.0022) and Model C (coefficient = -0.1690, p = 0.0047). A negative and significant ECM(-1) indicates the presence of a long-run equilibrium relationship. The coefficient suggests the speed of adjustment back to this long-run equilibrium after a shock. In Models I and III, approximately

16.9% of the disequilibrium from the previous period is corrected in the current

Table 4: Long-run Dynamic Results for model I, II and III

	Model I			Model II			Model III		
Variab	Coeff	t-stat	Prob	Coeff	t-stat	Prob	Coeff	t-stat	Prob
lEXR	-0.2195	-0.7426	0.4628	-1.8546	-2.2179	0.0333	-0.2237	-0.8133	0.4217
lMI	0.0546	0.2039	0.8396	-0.0031	-0.0358	0.9716	0.5343	1.0021	0.3234
lCM	0.5635	2.3473	0.0249	0.5179	2.9694	0.0339	0.8802	2.0872	0.0444
lFR	0.1833	1.0784	0.2884	0.0887	3.6834	0.0248	0.1831	1.3038	0.2010
lEXR*MI	-0.0096	-0.0522	0.9587						
lEXR*CM				0.8368	2.0811	0.045			
lMI*CM							-0.2109	-0.9413	0.3532

*Source: Author's Computation: Notes: *** denotes statistical significance at 1% level.*

Table 5: Short-run Dynamic Results for model I, II and III

	Model I			Model II			Model III		
Variab	Coeff	t-stat	Prob	Coeff	t-stat	Prob	Coeff	t-stat	Prob
D(EXR(-1))	-0.5901	-0.1821	0.0028	-0.6340	-0.2060	0.004	-0.5439	-0.1953	0.0089
D(MI(-1))	1.3359	1.5164	0.3849	-0.9068	-1.3887	0.5184	-1.3883	-1.1883	0.2513
D(CM(-1))	0.001	0.1000	0.0427	0.0010	0.1011	0.5943	0.1100	0.0211	0.1087
D(FR(-1))	0.1331	0.1023	0.2028	0.0214	0.0974	0.8272	-0.0245	0.0960	0.7998
D(EXR*MI)	0.0119	0.0021	0.0386						
D(EXR*CM)				0.00191	0.0101	0.0188			
D(MI*CM)							-0.0010	0.1000	0.1290
ECM(-1)	-0.1690	-0.0507	0.0022						
ECM(-1)				-0.1783	-0.0541	0.0022			
ECM(-1)							-0.1690	0.0532	0.0047

4.6 Post Estimation Tests and Results

Table 6 showed the diagnostic and stability post estimation test of the results and findings of this study. Its essence and need is the confirmation of the robustness and reliability of the results, observations and findings derived in the estimation technique and test conducted earlier on in the study. Thus, based on the probability values of the F-statistic and its values which are greater than 5% (0.05) threshold as seen in all the post estimation tests results in Table 6, we can conclude emphatically that the model specified for this study and its entire results, observations and findings are reliable and do not suffer auto-correlation, mis-specification and heteroskedasticity problems that are usually associated with time series data, implying that the model was correctly specified and stabled as confirmed by the Ramsey Reset and other stability/diagnostic tests adopted in this study.

Table 6: Summary of post-diagnostic test

	Model I		Model II		Model III	
	f-stat	Prob	f-stat	prob	f-stat	prob
Breush-Godfrey LM Test For Serial Correlation	0.322304	0.2267	1.46822	0.5126	1.3041	0.7612
Heteroskedasticity Test: Breush-Godfrey	1.6818	0.1648	1.9411	0.1486	1.218	0.1126
Jarque-Bera Normality Test	0.6066	0.064	0.4016	0.0722	0.1411	0.7432

5. CONCLUSION AND POLICY IMPLICATIONS

The dynamic long-run outcomes throughout the three models all capture the inherent trade-offs embedded in the policy trilemma. The strong impacts on long-run GDP experienced for exchange rate and capital mobility highlight the point that there cannot be a country with fixed exchange rate, open capital mobility, and non-dependent monetary policy all at the same time without consequences on long-run economic performance. The long run dynamic results showed that, a depreciating exchange rate negatively impacts economic growth in Nigeria , while greater free capital mobility and larger foreign reserves are associated with higher real economic growth; importantly, the significant positive interaction between the exchange rate and capital mobility provides empirical support for the Mundell-Fleming trilemma in Nigeria. The trilemma policy goals concluded that an increase in exchange rate and capital mobility interaction is followed by a decrease in the monetary independence. That is, there exists a trade-off among three macroeconomic policy goals. The weighted predictions of various trilemma policy combinations showed that actual trilemma policy configurations have changed over time, and the policy configuration of exchange rate and capital mobility has become more dominant in both long and short run in Nigeria; this further suggests that the Mundel-Fleming condition was met for Nigeria. This result is line with the work of Asogwa et al. (2014).

REFERENCES

Ajogbeje, A., Adeniyi, O., & Egwaikhide, F. (2019). The effects of trilemma policy on interest rates in Nigeria: An empirical analysis. *Central Bank of Nigeria Economic and Financial Review, 57*(2), 75–100.

Ayinde, A., & Bankole, B. (2018). The macroeconomic trilemma and central bank policy in Nigeria. *CBN Journal of Applied Economics, 10*(2), 50–75.

Asogwa, K., Okafor, C., & Musa, A. (2016). The impact of monetary policy on domestic demand in a fixed exchange rate regime: The case of Nigeria. *Journal of Nigerian Economics, 12*(2), 45–62.

Berthold, K., & Stadtmann, G. (2019). The Mundell–Fleming trilemma: A systematic review of the literature. *Journal of International Money and Finance, 95*, 174–197. https://doi.org/10.1016/j.jimonfin.2019.03.001

Central Bank of Nigeria. (2024). *Real gross domestic product (GDP)*. Retrieved April 4, 2025, from https://www.cbn.gov.ng/rates/RealGDP.asp

Ekpo, U. N. (2014). The nexus of macroeconomic policy, investment, and economic growth in Nigeria. *IOSR Journal of Economics and Finance, 3*(4), 12–22.

End, E. (2024). The impact of capital flows on emerging economies: A shift-share approach. *Journal of International Economics, 150*, 102–125.

Ella, V. (2020). Enduring truth: The Mundell–Fleming trilemma in emerging economies. *Journal of International Money and Finance*, Article 102098. https://doi.org/10.1016/j.jimonfin.2019.102098

Hsing, Y. (2019). Fiscal and monetary policy effects under the extended trilemma: Evidence from Australia. *Australian Economic Review, 52*(2), 120–140.

Hosny, A. S., Kishor, N. K., & Bahmani-Oskooee, M. (2015). Understanding the dynamics of the macroeconomic trilemma. *International Review of Applied Economics, 29*(1), 32–64. https://doi.org/10.1080/02692171.2014.933788

Ihnatov, I., & Capraru, B. (2014). Trilemma policies and macroeconomic volatility in Central and Eastern Europe. *Procedia Economics and Finance, 15*, 853–857.

Ito, H., & Kawai, M. (2014). *Determinants of the trilemma policy combination* (ADBI Working Paper No. 456). Asian Development Bank Institute.

Iyoha, M. A. (2004). *Applied econometrics* (Rev. ed.). Mindex Publishing.

Kole, A. (2020). Trilemma policy paths and real output nexus in Nigeria. *International Journal of New Economics and Social Sciences, 11*(1).

Madaki, I. J. (2024). Effect of macroeconomic variables on economic growth in Nigeria: 1990–2024. *Journal of Agripreneurship and Sustainable Development, 7*(2). https://www.jasd.daee.atbu.edu.ng

Okotori, T. W., & Ayunku, P. (2020). The Mundell–Fleming trilemma: Implications for the CBN and financial markets. *MPRA Paper No. 103880*. https://mpra.ub.uni-muenchen.de/103880/

Olumuyiwa, O., Al-Thani, F., & Rahman, A. (2018). U.S. monetary policy spillovers to GCC countries: The role of oil prices. *Journal of International Money and Finance, 75*, 150–170.

Ozigbu, J. C. (2019). Trilemma of macroeconomic policy and structural reforms in Nigeria. *International Journal of Developing and Emerging Economies, 7*(2), 27–44.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289–326.

Qin, Q. (2019). Testing the trilemma hypothesis with a panel VAR model. *International Economic Review, 60*(2), 200–220.

Rey, H. (2015). Global financial cycle. *National Bureau of Economic Research Working Paper*. https://doi.org/10.3386/w22448

Tümtürk, İ. (2019). Testing the trilemma hypothesis and policy configurations in Turkey: 1970–2014. *Applied Economics, 51*(1), 1–18.

Zakaria, Z., Maski, M., Saputra, S., & Annegrat, A. (2023). The Mundell–Fleming trilemma in middle-income countries: A panel ARDL analysis. *Journal of International Economics, 160*, 120–145.