Fiscal Instability and Economic Growth in Nigeria: Evidence from a Vector Error Correction Model

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Abstract

Oil-dependent developing countries like Nigeria are often subjected to fiscal instability. Invariably, fiscal instability is deleterious to rapid and steady economic growth. The main aim of this paper is to investigate the relationship between fiscal instability and economic growth in Nigeria using the technique of vector error correction modelling covering the period of 1982 to 2021. The results of the multivariate co-integration test based on Johansen's co-integration technique confirm the existence of co-integrating equations among the variables. Since the variables are co-integrated, the existence of a stable long-run relationship between the growth rate of real GDP, exports, exchange rate, and real investment is confirmed. The error correction model parameter (ECM) is negatively signed and less than unity in absolute value as required. However, the parameter is not significantly different from zero at the 5% level. Real investment is positively signed and passes the significance test at the 5% confidence level. The coefficient of fiscal instability is positively signed but not significantly different from zero at the 5% level. The coefficient of exchange rate is positive and highly significant, easily passing the significance test at the 5% confidence level. However, the coefficient of exports, though positively signed as required, does not pass the significance test at the 5% level. Thus, the study recommends that, fiscal discipline is required to ensure a sustainably stable economic growth in Nigeria.

Keywords: Fiscal Instability, Economic Growth, Vector Error Correction Model

Introduction

Many developing economies have been facing the problem of huge fiscal, monetary and trade deficits, which Nigeria is inclusive. Fiscal instability is ruinous to rapid and steady economic growth, this is more prominent in oil-dependent developing countries like Nigeria (Adegboyo *et al*, 2021). The conventional perception of fiscal deficits is basically the difference between government revenue and expenditure (including government expenditure and investment). The accrued value of the deficits over time represents the gross national debt. The bothersome aspect of continued overall deficits is that, except the deficit is limited, the private sector would be crowded out; government debt would build up to a point where it will become unsustainable and eventually damage the economy by causing inflation, payments arrears, and reduction in economic growth. Rising fiscal deficits, regardless of the mode of financing, can be inevitably

inimical to economic growth. The effect of budget deficit on economic growth is one of the widely disputed issues in economics. Clearly, the concern about crowding out is closely related to the concept of intergenerational equity. Indeed, there is no consensus among economists on this issue either theoretically or empirically (Amusa *et al*, 2019). The conventional wisdom is that budget deficit is a source of economic instability. Empirical studies, however, do not conclusively support this conventional wisdom as results are mixed and controversial across countries, data and methodologies. On one hand, a strand of the argument, following Keynes, is that budget deficits accelerate capital accumulation and growth (Krishnamurty & Pandith, 1985). The emphasis here is that enlarged budget deficit as a result of public sector investment, particularly in infrastructure, tends to encourage growth in the private sector. Increasing public investment within an appropriate policy framework, would give the private sector adequate latitude and incentives to invest, leading to overall economic growth. Also, as articulated by (Bernheim, 1989), the Neo-classical school envisions farsighted individuals planning consumption over their own life cycles. Through budget deficits, individuals raise total lifetime consumption by shifting taxes to subsequent generation. If economic resources are fully employed, increased consumption implies decreased saving and interest rates must then rise to bring capital markets into balance. Thus, persistent deficits crowd out private capital accumulation and can be highly detrimental to the economy.

Theoretical conclusions regarding the relationship between budget deficit and economic growth are contentious. While the Keynesians opine that there is a positive relationship between these two variables, the neo-Classical have argued the opposite. Meanwhile, the Ricardian equivalence hypothesis claims that there is a neutral relationship between budget deficit and economic growth. The differences in terms of opinions and analyses are mainly due to various factors including time dimension, the level of economic development of the countries, forms of government administration and method of analysis as well as the level of budget deficit (Briotti, 2000 & 2004). Generally, three macroeconomic policy instruments have been identified in the literature; they are fiscal, monetary and exchange rate policies. Fiscal policy involves the use of government spending, taxation and borrowing to influence the pattern of economic activity and the level and growth of aggregate demand, output and employment in an economy. It is also used to stimulate the economy during recession. Usually, developing countries are persuaded to engage in tight fiscal policy in order to maintain investors' confidence. This would however result in lower GDP Taylor (1993). Fiscal deficits are discouraged because they crowd out private investment and are inflationary. However, they could be growth-enhancing in the long run if channelled into productive investments. Additionally, evidence exists of complementarities between public investment and private investment through improved infrastructure that will have a crowding-in effect.

It is well known that fiscal policy in oil producing developing countries like Nigeria can be greatly affected by oil revenue uncertainty and volatility. Optimally, good policy formulation should factor in the exhaustibility of natural resources and attempt to reduce oil revenue volatility passed on to the rest of the economy. Unfortunately, in Nigeria, fiscal policy has

generally not been successful in achieving this objective as both revenue and expenditure have been quite volatile, basically mimicking world oil price developments. Nigeria's case clearly demonstrates the difficulties of executing fiscal policy in an environment of exceedingly volatile oil revenue flows. Indeed, over the years, there has been a clear deficit bias and a discernable pro cyclicality in fiscal policy, obviously driven by world oil price developments. It is thus clear that, though the significance of fiscal policy towards the attainment of economic growth and sustainable development cannot be overemphasised, its potentials are yet to be fully achieved in Nigeria economy. With fiscal instability in the economy and given the present country's scenario, it is evidently clear too that there is in an increasing trend in the inefficiency of macroeconomic operations in the economy. The main aim of this study is to investigate the relationship between fiscal instability and economic growth in Nigeria using the technique of vector error correction modelling. Next is section II which presents the literature review while section III gives the model and methodology. Section IV displays the empirical results while section V (the final section) offers a summary and conclusion of the study (what happen to section I).

Literature Review

The theory of fiscal policy owes much to northern European economists such as Jan Tinbergen, Bent Hansen, Leif Johansen and others who five decades ago developed it. In spirit, if not in geography, Richard Musgrave could be placed among this group. There were obviously contributors from North America, such as Alvin Hansen, Lawrence Klein, Abba Lerner, Robert Solow, Paul Samuelson and others, but, in their writing, they focused mostly on the stabilization role of fiscal policy because this role was considered the most important in the 1950s and 1960s. However, Keynesian stabilization policy is only a part, though an obviously important part, of the modern theory of fiscal policy. In the conception of this theory, especially well developed in (Musgrave's, 1959) and (Koopmans, 1965) treatises, the goals of fiscal policy extend beyond stabilization because fiscal tools can be used also for redistributing income and for reallocating resources in desired ways.

The use of fiscal policy is discernable in every society most especially in the less developed countries (LDCs) as a major tool for stabilization and for development to be continuous. Fiscal policy as in many texts and literatures could mean the government actions affecting its receipts (revenue) and expenditure which is taken as ordinarily a measure by the government's net receipts, its surplus or deficit. Simply put, when the government uses government revenue and expenditure policies to regulate and stabilize the economy toward development, the action is fiscal policy. It thus serves as an economy's "shock absorber" in specific areas of development. Fiscal policy is essentially concerned with manipulating the financial operations of the government with a view to furthering certain economic policy objectives.

Fiscal policy was not generally recognized as important until the birth of Keynesian Economics in the mid-nineteen thirties which enhanced its significance as a policy tool to overcome the economic depression of Western Europe and North America, (Keynes, 1930). The threat of

inflation in the immediate post-war years and the desire to maintain continuous full employment following World War II has also meant the continued use of fiscal policy in these same economies. In more recent years, however, the general disenchantment over the limited success in the achievement of the above objectives has brought into sharp focus the question of the effectiveness of fiscal policy in relation to other policies especially monetary policy and the consideration as to whether or not the continued heavy reliance on fiscal policy as an economic stabilization tool is desirable (Samuelson, 1970). While in the developing economies, the economic policy objectives of fiscal policy have been pursued to a greater or lesser degree, the one and overriding objective, the furtherance of which has relied greatly on fiscal policy, is economic development, defined not only as a continuous and sustained growth in total output as well as in output per head, but also as the structural transformation from the basically underdeveloped agricultural economies to fully industrialised ones. The reliance on fiscal policy in developing economies for the achievement of the economic development objectives in particular and other objectives in general, has been particularly great in relation to the use of other policies such as monetary policy.

Ubong and Okijie (2021) investigated the influence of fiscal imbalance on inflation and economic growth in Nigeria for the period 1981 to 2019 using the ordinary least squares (OLS). Their empirical result showed that, fiscal imbalance has a positive and significant effect on economic growth. However, the effect of fiscal imbalance on inflation was negative and statistically significant. The policy implication of these findings for national development is that fiscal imbalance should be augmented with the appropriate discretionary monetary policy to achieve to economic growth and price stability simultaneously.

Onwioduoiki and Onye (2019) recently carried out a comprehensive study of the fiscal deficit-economic growth nexus in countries of the West African Monetary Zone, using data for the 2000 through 2016 period. They utilized the dynamic panel system GMM technique of Blundell and Bond and the difference GMM technique popularized by Arellano and Bond. They found that apart from broad money stock, the macroeconomic variables that impact economic growth included the fiscal deficit, inflation rate, investment, interest rate and trade openness. In particular, they found that the fiscal deficit had a negative (but weak) effect on economic growth in the West African Monetary Zone.

Amusa *et al* (2019), examine the relationship between fiscal policy and economic growth in Nigeria from 1990 to 2017. The study employed the Autoregressive Distributed Lag (ARDL) model and Error Correction Model (ECM) to address its objective. The main findings from their study show that, result of ECM term confirmed that about 39% of the total disequilibrium in the previous year would take about two (2) years for the system to adjust back to its long run equilibrium path. The estimated result shows that economic growth and government revenue have a significant positive relationship in Nigeria in the short run, but the relationship becomes negative in the long run.

Idris, Bakar and Ahmad (2018) adopted ARDL model to examine the effects of fiscal operations on the economic growth and stability from 1980 to 2015. The estimated model is sub-divided into two: The Baseline model and the Alternative model. While the former measures the effects of economic growth, the latter accounts for the effects of economic stability. The overall results indicate that fiscal operations lead to economic growth as shown by the Baseline model; and it also leads to economic stability as revealed by the Alternative model. The study concluded that any meaningful spending with corresponding taxation will improve the public sector performance and produce a desirable outcome on output growth and strengthen the capability of fiscal operations in terms of economic management.

Hlongwane *et al* (2018), investigates the impact of fiscal policy on economic growth of South Africa from 1960 to 2014 through a co-integrated Vector Auto regression approach. The estimated result of the study shows that the long run estimates revealed that government tax revenue has a positive and significant long run influence on economic growth. While government gross fixed capital formation and budget deficit have a negative impact on real GDP.

Ubesie (2016) investigated the effect of fiscal policy on economic growth in Nigeria using descriptive statistics and the ordinary least squares (OLS) multiple regression technique. The results from the analysis revealed that total government expenditures is significantly and positively related to government revenue, with expenditures climaxing faster than revenue. Investment expenditures were much lower than recurrent expenditures evidencing the poor growth in the country's economy.

Abubakar (2016) investigates the effect of fiscal policy shocks on output and unemployment in Nigeria under the Keynesian framework. The study employed the Structural Vector Autoregression (SVAR) methodology from 1981 to 2015 to analyse annual series on the relevant variables. Estimate from the SVAR model shows a positive and significant effect of both public expenditure and revenue on output growth, hence consistent with the theoretical implication that fiscal policy exerts a positive effect on economic growth.

Ismaila and Imoughele (2015) examined the effect of fiscal policy variables on economic growth in Nigeria over the sample period of 1986 to 2012 using Johansen cointegration test and the error correction model. The result shows the presence of long-run and positive relationship between fiscal policy variables (except budget deficit) and economic growth. Therefore, fiscal policy has the ability to induced economic growth in Nigeria through government expenditure and investment

Igwe, Emmanual and Ukpere (2015) examined the impact of fiscal policy variables (government expenditure and taxation) on economic growth in Nigeria. The study adopted a growth accounting framework that specifies economic growth as a function of the fiscal policy

variables. Using a time series data for the period spanning 1970 to 2012, estimated findings show the presence of long-run and positive relationship between fiscal policy components and economic growth.

Abdon, Estrada, Lee and Park (2014) investigated the relationship between fiscal policy and economic growth in developing Asia covering period of 1990 to 2011 and adopted a descriptive approach to present the argument. The findings show that both the components of fiscal policy (expenditure and tax) established a positive and significant impact on economic growth.

Akanni and Osinowo (2013) examined the effect of fiscal instability on economic growth in Nigeria for the period of 1970-2010. They measured the cyclical effect of fiscal spending components using the Hodrick Prescot (HP)-filtered fiscal spending components and output with the correlation technique. The Results indicated that between 1970 and 1985, both the real gross domestic product and real total fiscal spending were highly volatile. However, total fiscal spending appears to be countercyclical between 197 and 1986. But from 1987 to 2010, the variation in total fiscal spending was relatively stationary while real output was still relatively unstable. The study recommended that, fiscal discipline is required to ensure a sustainably stable economic environment in Nigeria.

Ogbole, Amadi, and Essi (2011) wrote on fiscal policy and its impact on economic growth in Nigeria (1970-2006). The study involved a comparative analysis of the impact of fiscal policy on economic growth in Nigeria during regulation and deregulation periods. Econometric analysis of time series data from Central Bank of Nigeria was conducted. Results showed that there is difference in the effectiveness of fiscal policy in stimulating economic growth during and after regulation period. Appropriate policy mix, prudent public spending, setting of achievable fiscal policy targets, and diversification of the nation's economic base, among others, were recommended

Chuku (2010) used quarterly data to explore the monetary and fiscal policy interactions in Nigeria between 1970 and 2008. The study examines the nature of fiscal policies in Nigeria using a vector auto-regression (VAR) model. The evidence indicates that monetary and fiscal policies in Nigeria have interacted in a positive manner for most of the sample period (1980-1994), while at other periods, no symmetric pattern of interaction between the two policy variables was observed

Adefeso and Mobalaji (2010) wrote on the fiscal-monetary policy and economic growth in Nigeria. Their major objective was to re-estimate and re-examine the relative effectiveness of fiscal and monetary policies on economic growth in Nigeria using annual data from 1970 to 2007. The error correction mechanism and co-integration technique were used to analyze the data and draw policy inferences. Their results showed that the effect of monetary policy is much

stronger than fiscal policy. They suggested that there should be more emphasis and reliance on monetary policy for the objective of economic stabilization in Nigeria.

Model and Methodology

In order to fully investigate the relationship between fiscal instability and economic growth in Nigeria, this study makes use of the technique of Vector Auto regressions and in particular a restricted VAR, more commonly known as a vector error correction model. In addition, the study carries out Unit roots tests of all variables and Pair-wise Granger Causality Tests. Forecast Variance Decomposition (FEVD) and Impulse Response Functions (IRFs) are applied to examine interrelationships between the variables in the VAR system. Basically, this study posits a 5-variable VECM model in which real gross domestic product, fiscal balance, real gross domestic investment, exports, and the exchange rate are simultaneously interrelated. This study utilizes annual time series data, and it covers a period of 39 years (1982 through 2021). These data were sourced from Nigeria data agencies, specifically the Central Bank of Nigeria (CBN). Thus, the model is specified as:

$$\Delta R_t = \alpha + \sum_{j=i}^{p} F_i \Delta R_{t-i} + ECM_{t-i} \quad + U_t .$$

Where: ECM_{t-i} is the error correction term, while the VECM representing the empirical

$R_t = (RGDP, FB, INV.XPORT, EXRT)$

R_t = is the vector of real gross domestic product, fiscal balance, export, exchange rate and aggregate investment.

α = Intercepts of autonomous variables

F_i = is the matrix of coefficients of all the variables in the model.

R_{t-1} = is the vector of the lagged variables.

U_t = is the vector of the stochastic error terms.

Empirical Results

This study presents the descriptive statistics summary results, unit root tests, Johansen Co integration test, Pairwise Granger Causality Test, Forecast Error Variance Decomposition and the Impulse Response Function. The unit root test provides information on the stationarity properties of the variables, and it was conducted using the Augmented Dickey- Fuller (ADF) test. Next is the co-integration test, which provides information on the existence of a long run and stable relationship between the dependent and explanatory variables and the Granger causality test, concentrated on examining the causal relationships between the growth rates of gross domestic product, fiscal balance, export, investment and exchange rate in Nigeria. To further examine the short-run dynamic properties of the variables, the study further employs

the forecast error variance decomposition. Let's begin by presenting and discussing the descriptive statistics and correlation matrix of the variables utilized.

Table 1: Descriptive Statistics

	RGDP	FB	EXRT	INV	XPORT
Mean	931.587	-42.241	82.786	17.177	4429.269
Median	444.649	-5	92.693	17.146	1309.543
Maximum	3080.317	32.049	305.790	26.826	15262.010
Minimum	153.076	-301.402	0.610	8.800	7.503
Std. Dev.	921.563	81.857	80.406	3.677	5367.485
Skewness	1.1992	-2.0856	0.714	0.029	0.884
Kurtosis	2.916	6.267	2.868	3.536	2.271
Jarque-Bera	8.879	43.278	3.167	0.448	5.637
Probability	0.012	0	0.205	0.799	0.060
Sum	34468.730	-1562.910	3063.092	635.549	163882.900
Sum Sq. Dev.	30574043	241221.1	232746.5	486.8395	1.04E+09
Observations	37	37	37	37	37

Source: Author's computation 2022

Summary descriptive statistics of RGDP, fiscal balance, exports, investment, and exchange rate are reported in Table 1. Normality test uses the null hypothesis of normality against the alternative hypothesis of non-normality. If the probability value is less than the Jacque Bera chi-square at the 5% level of significance, the null hypothesis of the regression is not rejected. All the variables are normally distributed since all the probabilities are less than the Jarque Bera chi-square distribution. We utilize the mean-based coefficient of skewness and kurtosis to check the normality of all the variables used. Skewness measures the direction and degree of asymmetry. The Skewness coefficient indicates normal curves for all the variables with the values ranging between –3 and +3. The positive Kurtosis indicates too few cases at the tail of the distribution.

Table 2: Summaries of Unit Root Tests: at 5% Level

VARIABLES	ADF	REMARKS	VARIABLES	ADF	REMARKS
RGDP	2.95	NS	D(RGDP)	2.95	DS
FB	2.94	NS	D(FB)	2.94	DS
EXRT	2.94	NS	D(EXRT)	3.67	DS
INV	2.94	NS	D(INV)	2.94	DS
XPORT	2.95	NS	D(XPORT)	2.95	DS

Source: Author's computation 2022

Note: The test was carried out at 5% level of significance N.S = non stationary D.S = difference stationary D = the first difference of the variable

The results of the unit root test using Augmented Dickey-Fuller (ADF) tests as reported in Table 2 showed that all the variables are non-stationary in their levels; however, they are stationary at first difference. Hence, this permits us to carry out the co-integration test, to identify whether long run equilibrium exits among the variables. Thus, a multivariate Johansen co-integration was estimated to establish the existence of a long run equilibrium relationship between the dependent and independent variables.

Co-integration Tests

Having established the time series properties of the data, the study proceeds to conduct the Johansen multivariable co-integration test by first determining the number of co-integrating relations in the model. The results of the multivariate co-integration test based on Johansen's co-integration technique reveal that both the trace statistic and maximum Eigen-value statistic confirm the existence of co-integrating equations among the variables. Since the variables are co-integrated, the existence of a stable long-run relationship between the growth rate of real GDP, exports, exchange rate and investment are confirmed.

Table 3: Results of Unrestricted Co-integration Rank Test (Trace)

Hypothesized No. of Co-integrating Equations (r)		**Eigen value**	**Trace test statistic** K = 2		**Prob.****
Ho	**HA**		**(λ trace)**	**Critical Value (0.05)**	
r ≤0	r > 0	0.782337	107.9287	69.81889	0.0000
r ≤1	r > 1	0.529880	56.08519	47.85613	0.0070
r ≤2	r > 2	0.348828	30.42311	29.79707	0.0423
r ≤3	r > 3	0.335535	15.83776	15.49471	0.0444
r ≤4	r > 4	0.055446	1.939451	3.841466	0.1637

Source: Author's computation, 2022.

Note: The Trace test indicates 4 co-integrating equation(s) at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 (5%) level; r represents number of co-integrating vectors; k represents number of lags in the unrestricted VAR model **MacKinnon-Haug-Michelis (1999) P-values.

Table 4: Results of Unrestricted Co-integration Rank Test (Maximum Eigenvalue)

Hypothesized No. of Co-integrating Equations (r)		**Eigen value**	**Max-Eigen Statistic** K = 2		**Prob.****
Ho	HA		**(λ Max)**	**Critical Value (0.05)**	
r = 0	r = 1	0.782337	51.84352	33.87687	0.0001
r = 1	r = 2	0.529880	25.66208	27.58434	0.0863
r = 2	r = 3	0.348828	14.58535	21.13162	0.3190
r = 3	r = 4	0.335535	13.89831	14.26460	0.0570
r = 4	r = 5	0.055446	1.939451	3.841466	0.1637

Source: Author's computation, 2022

Note: Max-Eigenvalue statistic indicates 1 co-integrating equation at the 0.05 level; *denotes rejection of the hypothesis at the 0.05 (5%) level; r represents number of co-integrating vectors; k represents number of lags in the unrestricted VAR model. **MacKinnon-Haug-Michelis (1999) P-values.

The results of multivariate co-integration test based on Johansen and Juselius co-integration technique reveal that both the trace statistic and maximum Eigenvalue statistic confirm the existence of co-integrating equations among the variables of interest. It is evident that the trace test indicates four co-integrating equations while maximum Eigenvalue test reveals one co-integrating equation in the model. Thus, the null hypothesis of no co-integration (r = 0) is rejected. Since the variables are co-integrated, this satisfies the convergence property and a vector error correction model is warranted.

Table 4: Results and Analysis of the Vector Error Correction Estimation (VECM).

SYSTEM EQUATIONS

VARIABLES	D(RGDP)	D(EXRT)	D(INV)	D(XPORT)	D(FB)
ECM	-0.278231	0.010336	-0.002286	1.515626	0.097891
	(0.18773)	(0.01302)	(0.00288)	(1.08455)	(0.03929)
	[-1.48207]	[0.79372]	[-0.79481]	[1.39747]	[2.49132]
D(RGDP(-1))	0.101254	-0.006108	-0.002183	-0.209437	0.025848
	(0.22380)	(0.01552)	(0.00343)	(1.29294)	(0.04684)
	[0.45243]	[-0.39342]	[-0.63672]	[-0.16198]	[0.55180]
D(RGDP(-2))	-0.209997	0.026881	0.002729	-2.767857	-0.073658
	(0.23243)	(0.01612)	(0.00356)	(1.34278)	(0.04865)
	[-0.90349]	[1.66721]	[0.76643]	[-2.06129]	[-1.51409]
D(EXRT(-1))	10.85126	-0.170684	-0.059236	33.93182	1.153042
	(4.10144)	(0.28451)	(0.06283)	(23.6946)	(0.85844)
	[2.64572]	[-0.59992]	[-0.94279]	[1.43205]	[1.34319]
D(EXRT(-2))	2.492181	0.243167	0.117411	-20.57773	-4.621342
	(4.44354)	(0.30824)	(0.06807)	(25.6710)	(0.93004)
	[0.56085]	[0.78889]	[1.72483]	[-0.80160]	[-4.96897]
D(INV(-1))	31.42093	-0.163365	-0.107847	133.5621	-2.959938
	(14.1364)	(0.98062)	(0.21656)	(81.6679)	(2.95877)

	[2.22270]	[-0.16659]	[-0.49801]	[1.63543]	[-1.00039]
D(INV(-2))	-6.594373	0.386410	0.191651	-40.71567	0.634269
	(15.5666)	(1.07983)	(0.23847)	(89.9302)	(3.25811)
	[-0.42362]	[0.35784]	[0.80368]	[-0.45275]	[0.19467]
D(XPORT(-1))	0.006713	-0.002815	-0.000949	0.814646	0.036530
	(0.05254)	(0.00364)	(0.00080)	(0.30355)	(0.01100)
	[0.12777]	[-0.77225]	[-1.17863]	[2.68369]	[3.32162]
D(XPORT(-2))	0.067815	-0.004925	-0.000633	0.338212	0.019625
	(0.05970)	(0.00414)	(0.00091)	(0.34491)	(0.01250)
	[1.13590]	[-1.18910]	[-0.69160]	[0.98059]	[1.57056]
D(FB(-1))	1.300762	-0.091539	-0.004499	4.803921	0.115182
	(0.87557)	(0.06074)	(0.01341)	(5.05829)	(0.18326)
	[1.48562]	[-1.50714]	[-0.33545]	[0.94971]	[0.62852]
D(FB(-2))	0.495704	0.002746	0.026160	-3.024079	-0.592910
	(0.86556)	(0.06004)	(0.01326)	(5.00048)	(0.18116)
	[0.57270]	[0.04573]	[1.97286]	[-0.60476]	[-3.27278]
C	-57.74308	9.622880	0.274010	133.7444	5.321300
	(54.5213)	(3.78206)	(0.83522)	(314.977)	(11.4114)
	[-1.05909]	[2.54435]	[0.32807]	[0.42462]	[0.46631]
R-squared	0.503499	0.490781	0.292294	0.537101	0.658712
Adj. R-squared	0.255249	0.236172	-0.061558	0.305651	0.488068
Sum sq. resids	1197439.	5762.041	281.0096	39964907	52456.37
S.E. equation	233.3003	16.18366	3.573957	1347.808	48.83012
F-statistic	2.028191	1.927587	0.826034	2.320596	3.860157
Log likelihood	-226.2226	-135.4996	-84.14839	-285.8555	-173.0473
Akaike AIC	14.01309	8.676446	5.655788	17.52091	10.88514
Schwarz SC	14.55181	9.215161	6.194503	18.05963	11.42385

Mean dependent	49.38959	8.972528	0.131431	411.1953	-0.964836
S.D. dependent	270.3396	18.51736	3.468785	1617.481	68.24672

Source: Author's computation 2022

In what follows, the study concentrates on the results relating to the RGDP, reported in the first column of Table 4. The equation has an R-squared value of 0.503, indicating that over 50 per cent of the systematic variation in real GDP is explained by the vector error correction model. It is noted that ECM, the error correction parameter, is negatively signed and less than unity in absolute value as required. However, the parameter is not significantly different from zero at the 5% level. Real investment is positively signed and passes the significance test at the 5% confidence level. The coefficient of fiscal instability is positively signed but not significantly different from zero at the 5% level. The coefficient of exchange rate is positive and highly significant, easily passing the significance test at the 5% confidence level. However, the coefficient of exports, though positively signed as required, does not pass the significance test at the 5% level.

Results of the Forecast Error Variance Decompositions (FEVDs)

The FEVDs of the respective variables enable the study to examine the short run dynamic properties of the variables, showing the share of FEVD for each variable that is attributed to its own innovations or shock, and to innovations or shocks in the other variables. Consider the results in Table 5. A careful analysis of the Forecast Error Variance Decomposition of real GDP confirms that the amount of variation reported is largely accounted for by its "own shock", ranging from a high of 100% in the first period and falling to approximately 47% at the end of the time horizon.

Table 5: Variance Decomposition of RGDP

Period	S.E.	RGDP	EXRT	INV	XPORT	FB
1	233.3003	100.0000	0.000000	0.000000	0.000000	0.000000
2	375.0388	76.00540	13.06877	8.148962	2.238452	0.538418
3	538.3430	63.81605	17.87962	8.154936	9.629973	0.519422
4	687.4377	57.23067	22.40622	10.12350	9.525675	0.713929
5	770.0838	52.17136	27.13020	11.58926	8.365936	0.743249
6	812.5213	49.36011	30.18951	11.95340	7.677996	0.818980
7	847.2470	46.61590	32.33742	11.50378	8.643095	0.899805
8	875.8891	45.33956	33.56269	11.04893	9.152487	0.896321
9	911.3455	46.03542	33.84141	10.81113	8.460502	0.851536
10	977.9001	47.10360	32.78626	10.77308	8.561300	0.775754

Source: Author's computation 2022

An examination of Table 6 also shows that the Forecast Error Variance Decomposition of the exchange rate is dominated by its "own shock". Notice that the amount of variation accounted for by its own shock is as high as 93.8% in the first period and then gradually falls to 48.3 % at the end of the ten-period horizon.

Table 6: Variance Decomposition of EXRT

Period	S.E.	RGDP	EXRT	INV	XPORT	FB
1	16.18366	6.177805	93.82219	0.000000	0.000000	0.000000
2	24.71557	18.33242	78.91729	0.143711	1.615215	0.991365
3	33.90451	30.45912	56.52575	0.916254	10.37878	1.720094
4	42.44199	38.10307	42.95930	2.532073	14.37803	2.027534
5	46.42412	38.76038	40.99026	3.942808	13.70961	2.596943
6	48.56912	36.27707	43.27286	3.801512	13.26651	3.382056
7	52.64268	30.89939	43.54716	3.428283	18.42736	3.697802
8	58.20713	25.38154	43.69634	3.519924	24.01243	3.389768
9	62.53814	22.15036	46.29184	3.571623	24.85836	3.127815
10	65.63571	22.79135	48.26205	3.275887	22.62898	3.041735

Source: Author's computation 2022

An examination of Table 7 again shows that, with respect to aggregate investment, the proportion of variation in the Forecast Error Variance Decomposition accounted for by "own shock" is the greatest; it attains a high of 83.7% in the first period and then fluctuates downward to 75,2% at the end of the horizon.

Table 7: Variance Decomposition of INV

Period	S.E.	RGDP	EXRT	INV	XPORT	FB
1	3.573957	13.24802	3.057449	83.69453	0.000000	0.000000
2	5.111686	24.53938	3.229264	71.93247	0.000101	0.298784
3	6.259600	26.98423	2.789799	68.94026	0.570753	0.714958
4	6.974837	25.38963	2.316146	70.85757	0.531764	0.904884
5	7.842669	21.14710	2.497793	74.20677	1.400764	0.747572
6	8.748163	18.33938	2.579541	76.16354	2.254329	0.663206
7	9.496831	16.99078	2.308099	77.24737	2.628377	0.825376
8	10.13089	16.40217	2.061614	78.15651	2.414505	0.965200
9	10.78359	17.21915	2.040354	77.57388	2.225597	0.941015
10	11.44428	19.06826	2.328188	75.16017	2.539373	0.904017

Source: Author's computation 2022

The results for Exports are reported in Table 8. An examination of this Table confirms that the amount of variation in the Forecast Error Variance Decomposition accounted for by Exports attains 37.5% in the first period and falls to 34.9% at the end of the horizon.

Table 8: Variance Decomposition of XPORT

Period	S.E.	RGDP	EXRT	INV	XPORT	FB
1	1347.808	58.13181	2.117392	2.211920	37.53887	0.000000
2	2478.512	47.81144	17.15181	8.845146	25.20755	0.984059
3	3189.700	36.90719	29.88612	10.94817	21.03921	1.219308
4	3516.528	31.26088	38.28982	11.55436	17.42616	1.468786
5	3897.701	26.68493	39.38773	9.650693	22.80105	1.475595
6	4348.932	23.90812	35.12523	7.939605	31.75078	1.276268
7	4597.000	21.70601	33.61375	7.344003	36.16898	1.167255

8	4695.576	21.96431	34.89343	7.077629	34.94119	1.123439
9	5098.218	24.98419	33.76229	7.288987	32.99233	0.972197
10	5841.822	26.70692	31.51149	8.418638	32.53877	0.824186

Source: Author's computation 2022

Consider Table 9 which gives the results of the Forecast Error Variance Decomposition for Fiscal Balance. Notice that Fiscal Balance again accounts for the largest share of the Variance Decomposition, amounting to 46.5 % in the first period and falling to 25.3% at the end of the horizon.

Table 9: Variance Decomposition of FB

Period	S.E.	RGDP	EXRT	INV	XPORT	FB
1	48.83012	5.567013	20.97648	1.662927	25.32244	46.47114
2	83.75670	28.72894	7.981908	3.089632	18.44642	41.75309
3	102.8942	37.36392	5.589692	2.349867	17.99002	36.70651
4	120.4655	30.92831	6.039234	1.919185	27.72132	33.39195
5	145.1379	21.55774	4.374473	1.703660	41.10598	31.25814
6	170.9942	16.12720	3.172569	2.327737	50.10203	28.27046
7	191.8154	13.42230	2.932498	2.260160	55.96402	25.42102
8	207.0549	12.14695	3.282694	2.148758	58.23843	24.18316
9	218.3452	13.06135	3.121115	2.044072	57.11788	24.65558
10	228.5830	16.24839	2.849938	1.867425	53.76270	25.27154

Source: Author's computation 2022

Conclusion

This study has used a vector error correction model, a restricted VAR, to estimate the relationship between economic growth, fiscal balance, investment, exports, and exchange rate in Nigeria between 1982 and 2021. The RGDP equation had an R-squared of over 50%. All the variables had the expected signs. The coefficient of ECM satisfied the expectations of sign and magnitude, but it was not significantly different from zero at the 5% confidence level. The exchange rate variable was highly significant suggesting that setting an appropriate exchange rate would be highly beneficial to economic growth in Nigeria.

Recommendations

Based on the findings, this study made this recommendation;

i. For a sustainable economic growth, there is need to adhere to fiscal discipline in the country.

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