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Nigerian Economy and Medium-Term Expenditure (MTEF) Framework: A Structural Vector Autoregressive Analysis

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Abstract

The operations of medium-term expenditure framework(MTEF) in Nigeria in the recent years has revolved around the adoption of an oil-priced based fiscal rule and complete adherence to that rule in budget initiation and implementation. The focus of this paper is on the examination of MTEF on economic growth. The structural vector autoregressive model [SVAR] approach was adopted in achieving this objective between the period 1970 to 2020 using data and proxy variables sourced from the Central Bank of Nigeria (CBN), National Bureau of Statistics[NBS], African Development Database [AfDB, 2020] and the World Bank Development indicator (WDI,2020). The variables used include, real GDP, the dependent variable; fiscal balance as percentage of GDP, total government debt, total government expenditure, broad money supply and exchange rate as explanatory and control variables. The framework was anchored on the Barro (1996) economic growth framework. The key findings show that total government expenditure on real GDP accounted for 49% and 42% of the shocks respectively on economic growth. From the result also, the shock of fiscal balance on economic growth ranges from 60% in the 1st quarter to 5% in the 2nd quarter. This implies that the shock of fiscal balance on real GDP may be temperate and may have short term effect on economic growth. The findings further reveal that inflation shock resulting from oil price accounted for about 2% and as such fluctuation in oil price may cause inflationary pressures on the economy in the short-run. Diversification is germane to the export growth of the Nigerian economy; hence, the paper reiterated the importance of diversifying the Nigerian economic base so as to reduce the shock of MTEF on economic growth in the medium to the long term.

Keyword: Fiscal governance, fiscal rule, Medium term expenditure framework, Nigeria, SVAR

JEL Codes: H21, H11, E5

Introduction

Medium-term expenditure framework (MTEF) has been implemented in most developed and developing countries. The need for MTEF perspective as against the short horizon of an annual budget was the compelling rationale behind the increasing use of MTEF. Following, Jena (2018), the features of MTEF has aided in establishing fiscal discipline and providing avenue for better resource prioritization and resources allocation in both developed and developing countries. The MTEF envisages two critical compartments of post- fiscal crisis budget reform; namely- fiscal consolidation and expenditure prioritization. It is a relevant budgetary framework and process that enables adherence to

fiscal rule targets, as it provides institutional focus to budgetary decisions over 3 to 5 years period. The MTEF, in consonance with the yearly budget contains forecast on economic growth and revenues, targets on aggregate spending and possibly limits for the spending ministries, departments and agencies [MDAs] of the government, and helping them to prioritize better.

MTEF constitute an approach to budgetary and public financial management (PFM) that addresses well-known shortcomings of annual budgeting (Wildavsky, 1986). Nurudeen and Usman (2010) equally observed copiously that MTEF allows the level and composition of public expenditure to be determined in light of emerging needs and development aspirations based on available resources. Vian and Bicknell (2013) commenting further on the relevance of MTEF averred that MTEF seems to be appropriate framework that supports the budgetary process and institutions for effective national plan and which ensures: extended time frame for budgeting over three years time period; eradicating delays in budgeting process, approval and which promotes benchmarking, fiscal discipline and prudence (Yelwa, 2010; Kighir, 2012). It again, provides greater macroeconomic balance among other uses.

Despite these benefits, the usefulness of MTEF is without some shortcomings. As noted by Obafemi and Shokefun(2009), MTEF is still undergoing an experimentation process in developing countries of Africa, more particular Nigeria, as it has not being realistic in budget indicator forecast and that the 3-year framework seems to be hampered by macroeconomic shocks like oil prices, upon which the framework is built for oil producing economies and inflation dynamics. Again, the influence of economic crisis with second-round and contagion effects has undermined the impact of MTEF on the economies. The MTEF was established in Nigeria in 2009 to help streamline the budgetary processes following the budgetary delays in formulation and implementation by the necessary government institutions and enhancement of macroeconomic balance, fiscal discipline and budgetary predictability (World Bank, 1998; Okpala, 2014). This paper uses fiscal balance to measure MTEF/fiscal rule. Fiscal rule refers to budgetary institutions or a set of rules and regulations according to which budgets are drafted, approved and implemented. In a more narrow sense, the term refers to legislative restrictions on fiscal policy that set specific limits on fiscal indicators such as the fiscal balance, debt, expenditure, or taxation (Alesina & Perotti, 1999)

Nigeria's real quarterly gross domestic product(GDP) growth, as at Q4 2019 stood at 2.25% and that brought the 2019 GDP growth rate to 2.27% -the highest since the 2016 recession. This is less than the targeted 4.5% projected in the Economic Recovery and Growth Plan (ERGP) of the current administration and even less than the 2019 budget target of 3.5%. Since 2016, Nigeria has continued to provide expansionist budgets, with its budget having risen from the NGN4trn mark in early 2010s to above NGN6trn since 2016. However, this does not transcend to Nigeria having significant improvement in its revenue position at its revenue-to-GDP is still less than 8 % (BudgiT, 2020). The 2021 budget was presented amidst the global pandemic that has not only claimed over 1.2 million lives globally but has also caused economic losses to citizens and companies in Nigeria. Available data and statistics haves shown that Nigeria's GDP declined by 6.10% in Q2 2020(the peak of the lockdown) with a high unemployment rate of 27.1% and a

corresponding high poverty rate. Nigeria also faces constraint of weak revenue growth with its revenue per capita less than 8%, among the least in sub-Saharan Africa (SSA). The country has not been able to mobilize private capital as its budget cannot plug an infrastructure deficit that requires $100bn annually for the next decade (BudgiT, 2021). The fiscal rule for the 2021 budget, aptly tagged " The Budget of Recovery and Resilience" premised on the ravaging effect of COVID-19 has oil price of $40 per barrel, oil production of 1.86 barrel per day and GDP growth rate of 3%. Pragmatically, these macroeconomics forms the budget benchmark in Nigeria. The paper uses the real GDP growth rate to measure the Nigerian economy from 1970 to 2020 and contributes to an empirical understanding of medium term expenditure framework in the context of the Nigerian economy and by extension to the literature. The focal questions of the paper follows: What is the effect of fiscal balance on economic growth in Nigeria? What are the challenges of MTEF in promoting economic growth in Nigeria? What are the policy options available to policy makers in promoting economic growth through the fiscal balance of medium term expenditure framework?

The rest of the paper is organized as follows: following the introduction is the empirical evidence presented in section two. Section three is on the theoretical framework, methodology and data sources while section four is on empirical results and discussion and policy implication of results. The last section is on the summary of the paper, conclusion and policy recommendations.

Empirical Evidence

This section reviews the empirical literature. The aim of the section is to identify the gap in the literature as well as to show how the current paper relates to the previous papers. It should that noted that since fiscal rule, is related to the MTEF, empirical evidence on fiscal rule other than MTEF was reviewed. Alesina and Bayoumi(1996) investigated the costs and benefits of fiscal rule in the U.S states from 1965 to 1992, using the linear regression approach. The variables used are fiscal controls, primary surpluses, total surpluses and real output variability. The result showed that American states balanced budget rules are effective in enforcing fiscal discipline but they have no costs in terms of increased output variability. The result further showed that tighter fiscal rule is associated with larger average surplus and lower cyclical variability of the budget balance. Obinyeluaku and Vigi (2005) examine fiscal policy rule for managing oil revenues in Nigerian between 1980 and 2004 using Monte Carlo simulation. The result shows that the fixed surplus rule when real interest rate is relatively high and the ability to adjust government expenditure is limited. Ibironke (2007) investigate the comparison between the level of the effectiveness of the Nigerian oil price-based fiscal rate introduced in 2004 and the Norwegian 2001 stabilization reform because of their similarities in objectives using the GARCH-M model dummy approach. The result of the comparison confirms the effectiveness of the Nigerian fiscal rule and reveals that the stabilization reform has significantly lowered volatility in the Norwegian economy. Afonso and Jalles (2012) explored the relevance of fiscal rules for growth in European Union countries using panel data approach. Findings show that fiscal rule foster growth, while stricter fiscal rules mitigate the adverse impact on growth from

big government. Moreover, the result shows that EU member states have gained the implementation of fiscal rule.

Bergman and Hutelison (2014) investigated the efficacy of fiscal rules in reducing the pro-cyclical nature of fiscal policy in 81 advanced, emerging and developing countries over 1985-2012 employing panel data econometrics. The findings show that fiscal rule are very effective in reducing pro-cyclicality of policy once a minimum threshold of government efficiency and quality has been reached. Further findings show that supranational rules have mainly effective in reducing pro-cyclicality in countries with weak government efficiency. Saachi & Saloth (2015) examine the impact of national fiscal rules on the stabilization function of fiscal policy in 20 OECD countries over the 1985-2012 periods using the annual panel data. The paper finds that the aggressive use of discretionary fiscal rule, particularly of government consumption items, leads to higher volatility of both output and inflation. However, when strict fiscal rules are introduced, discretionary policy becomes output stabilizing rather than destabilizing. This result can be more easily achieved by rules on balanced budgets, rather than on expenditures, revenue or debt. Menkulasi(2016) examined fiscal rule as a recipe for growth in developing countries during the period 1985 to end of March, 2012. The dataset counts a total of 81 developing and developed and covers four different types of rules: revenue, debt, expenditure and budget balanced countries rules. The panel data approaches were used. The GMM and dynamic fixed effect estimates suggest that the impact of national fiscal rules on growth is positive, but they are inconclusive when it comes to statistical significance. Moreover, when national fiscal rules are present with formal enforcement procedures or any mechanism outside the government that monitor the compliance of rules, the differential effect of fiscal rule with enforcement has a negative effect on growth, decreasing the magnitude of the total positive effect of fiscal rule with enforcement.

Aaskoven and Wiese (2018) examined how fiscal rule matter for government debt reduction using data for 20 OECD countries from 1967 to 2013. The variables used are debt, GDP, and the primary balance. The findings reveal that fiscal rules have larger effect on sustained debt reduction when they are embedded in a stricter national institutional framework. Ono (2019) investigated fiscal rule in a monetary economy implications for growth and welfare. The paper considers two fiscal rules, a debt rule that controls the debt-to-gross domestic product (GDP) ratio, and an expenditure rule that controls the expenditure-to-GDP ratio, in a monetary growth model with financial intermediation. The paper conclude that tightening of fiscal rules promote economic growth and thus, benefit future generations. In particular, the effects of a decreased debt-to-GDP ratio depend on its initial ratio; a high (low) ratio country has no incentive to reduce the ratio further from the viewpoint of the current generations' welfare.

Onofrei *et al* (2020) examined the implication of fiscal principles and rules on promoting sustainable public finances in the EU countries, from 2000 to 2014, using the panel data approach. The variables used are average public debt- GDP, fiscal gap, government debt to GDP forecasts, interest rates, budget deficit, balance budget rules, rule of law and political stability. The empirical findings indicate that fiscal authorities do not act to the existing stock of public debt and highlights a negative response of budget balances to the stock of outstanding debt. Fiscal position improves when the index of fiscal

responsibility is involved and countries become more sustainable when they are related to the entire level of fiscal governance, with respect to legal framework, institutional and administrative capacity, but at the debt ratio threshold of over 90%, the effect of the overall fiscal rule comes out as less relevant for the improvement of the primary balance.

Majority of the reviewed empirical evidence is focused in developed countries with few studies in developing countries, particularly Africa. Moreover, panel data analyses were mostly used in the previous studies. One or two studies examined the growth effect of fiscal rule on economic growth in the whole of the studies reviewed. This implies that fiscal rule and economic growth has not been examined well. Therefore, this paper extended the frontier of knowledge in fiscal rule literature, by investigating the effect of fiscal rule on economic growth in Nigeria, a sub-Saharan African country using the dynamic SVAR approach.

Model Specification, Methodology and Data

3.1 Model Specification Different estimation techniques are often adopted in the testing of relationship hypotheses depending on the size of the model, data availability and recursive nature of the variables. Following the framework of Barro(1996), the growth equation is specified as follows:

$$InRGDP = K_o + K_1 In\ OILP + K_2 In\ TOE + K_3 In\ FISCB + K_4 InToD + K_5 InINF + K_6 InMS_2 + K_7 InEXCH + K8InEXR + K_{9D+\mu}t \quad (3.1)$$

Where RGDP represents real economic growth or output, the dependent variable, OILP represent crude oil price, a control variable, TOE, represents total government expenditure, an explanatory variable, FISCB represents fiscal balance, an explanatory variable, TOD represents total government debt, INF represents inflation rate, MS/GDP, represents the broad money supply, EXCH represents the exchange rate vis-à-vis, the Naira exchange rate with the dollars, the major trading currency, EXR represents the external reserve, and D represents the dummy variable. The expected theoretical relationships are as follows:.

$K_1, K_2, K_3, K_6, K_7, K_8 > 0$; $K_4, K_5 < 0$

Aside traditional proxies of real gross domestic product (RGDP) as a scale variable for real output as a dependent variable (Olarinde & Omojolabi, 2014), the remaining explanatory are measured as follows. The choice of the oil price as a control variable is underscored by the fact that the Nigerian fiscal rule was adopted and anchored on the oil price. Fiscal balance, measured as the difference between expenditure and revenue in percentage of GDP. Fiscal balance is expected to impact positively on output.Total debt, measured as the sum of external debt and internal debt as a percentage of GDP. Total debt is assumed to impact negatively on GDP. Inflation rate measured by the average consumer price index (CPI). This is a monetary fiscal. We assumed inflation to impact positively here to output following the implementation of the fiscal although inflation could influence RGDP negatively. Broad money supply, measured as the ratio of broad money supply to GDP is a monetary variable that shows the deepening/ degree of financial liberalizations of the monetary sector. It impacts positively on output. Both exchange rate and external reserve are external sector variables. Exchange rate measures the ratio of the domestic currency to the major trading currency (US Dollar). Existing theoretical literature has provided a

justification for a link between international reserve and fiscal policy. Again, there is also an indirect channel through which foreign reserves and fiscal policy can be related. A large stock of international reserves may improve a borrowing country's credibility and put the country in a better position to conduct countercyclical fiscal policy (Hausman *et al.*, 1996; Nnaji *et al.*, 2011). The Dummy Variable is used to capture the period of fiscal policy rule in Nigeria. The dummy variables are '0' for the period 1970-2003 and 1 for the period (2004-date) - fiscal rule period, following the annual budgetary framework of the Nigerian economy.

The inclusion of the monetary variables-inflation rate, broad money supply, exchange rate and external reserves are justified on the grounds that fiscal policy complimenting monetary policy is used in different combinations to direct a country's goal (*Agu et al.*, 2014). Similarly, studies have shown that both monetary and fiscal policies are counter-(pro-) cyclical when credibility is high (low) as in the case of Latin America and the Caribbean's. Therefore, the variables of the model are justified.

Methodology To investigate the response of fiscal policy rule variables to innovations in economic growth, a structural vector autoregressive model (SVAR) is adopted. The SVAR model provides a multivariate framework where changes in a particular variable (economic growth) are related to changes in its own lag and to changes in other variables and the lags of those variables of MTEF /fiscal policy rule. The SVAR is known to produce a better empirical fit than other forms of vector autoregressive models. More importantly, it provides a theoretical basis for analyzing the net effect of unexpected changes in one variable on other variables in the system. Essentially, the SVAR attempts to identify the variance decompositions and impulse response functions by imposing a priori restrictions on the covariance matrix of the structural errors and the contemporaneous and/or long run impulse responses themselves (Dada, 2011). Transmission of fiscal policy rate stocks to economic growth can be captured with a SVAR model of order K, thus:

$$Y = \alpha_o + \sum_{i=1}^{K} A_t Y_{t-1} + \mu_t \quad (3.2)$$

Where: $Y_t = (Y_{1t}, Y_{2t}, \dots Y_{nt})$ is an n x 1 vector of the endogenous variables in the model. Y_{t-1} is the corresponding lag term for order 1. A_i is an n x n matrix of auto regressive coefficients vector Y_{t-1} for 1 = 1, 2 … k. $\alpha_o = (\alpha_1, \alpha_2 \dots \alpha_n)$ is the intercept vector of the VAR model. $\mu_t = (\mu_{1t}, \mu_{2t}, \mu_{nt})^1$ is the n x 1 vector of while noise processes. K is the number of lagged terms. The literature suggests that the reduced form VAR model is lacking on explaining the contemporaneous coefficient matrix. As such, C_o is introduced into VAR model to form a SVAR of the order:

$$C_o T_t = \alpha_o + \sum_{i=1}^{K} C_i Y_{i-1} + \varepsilon \quad (3.3)$$

Where: C_o is a 6 x 6 non-identity matrix. Hence, the reduced from VAR in lag operator can be written as: $A(L)\ Y_t = \mu_t$ (3.4)

And, the structural VAR model in its lag form thus become: CA (L) Y_t = C ψ_t = ε_t (3.5)

Following the specification of the SVAR, certain restrictions are imposed on the model as follows: i) Fiscal policy rule shocks is exogenous at the contemporaneous period,(proxy variables are: total government expenditure, fiscal balance, and total debt), ii) Real GDP is completely endogenous in the system. Therefore, it is determined by the fiscal policy rule variables and itself, iii) Inflation is assumed to be determined by the fiscal policy rule variables and shocks to it. This implies that a change in other variables can affect inflation rate in subsequent periods, iv) Broad money supply is partly endogenous. The assumption is premised on the fact that broad money supply is affected contemporaneously by inflate rate, oil price shock, fiscal policy rule variables and itself, but not by real GDP, v) Exchange rate is partly endogenous. This is based on the assumption that exchange rate is affected by oil price shock, inflation rate, external reserve and itself, but not by real GDP, vi) External reserve is also partly endogenous. It is affected by total government expenditure, and total balance, inflation rate, exchange rate and itself, but not affected by real GDP, vii) Government expenditure is assumed to be determined by oil price and shocks to it, viii) Total debt is assumed to be determined by oil price, total government expenditure and the shock of itself.

Once the SVAR has been estimated, the relative importance of a variable in generating variations in its own value and in the value of other variables can be assessed (using forecast error variance decomposition (VDC). The VDC assesses the relative importance of fiscal policy rules in the volatility of other variables in the system. The dynamic response of long term economic growth to innovations in a particular variable can also be traced out using the simulated responses of the estimated VAR system (IRF). Thus, the IRF enables the determination of the dynamic effects of fiscal policy rule shocks on the long-term economic growth. In the SVAR model, the vector of variables, according to the Cholesky ordering, consists of oil price (OIIP), total government expenditure (TOE), fiscal balance (FISCB), total debt (TOD), inflation (INF), broad money supply (M_2/GDP), exchange rate (EXCHR) and external reserve (EXR):

Y_t =[OILP, TOE, FISEB, TOD, INFR, M_2/GDP, EXCHR, EXR] (3.6)

The innovations of current and past one-step ahead forecast errors are orthogonalised using Cholesky decomposition so that the resulting covariance matrix is diagonal. This assumes that the first variable in a pre-specified ordering has an immediate impact on all variables in the system, excluding the first and so on. In fact, pre-specified ordering of variables is important and can change the dynamics of a VAR system. In line with the ordering, the oil price changes are ranked as a largely exogenous variable, especially for the Nigerian economy. No doubt, Nigeria is one of the major supplier of crude oil to the international market, its however, production and export quota are predetermined by the OPEC criteria, and production activities and challenges down home. Moreover, demand for crude oil is largely determined by global economic growth and energy intensity within the industrialized countries. Therefore, oil price is exogenous to the Nigerian economy. It is expected that significant shocks in oil markets affect contemporaneously the other key variables of the SVAR model. Government expenditure is the second variable.

Government expenditures can be defined concisely as recurrent and capital expenditure. Recurrent expenditures include expenditures include expenditures on government employees, subsidies and contractors fees among others, while capital expenditure adds to the investment/infrastructure compositions of the domestic economy.

Long-term economic growth is also affected instantly by the level of government demand. The positive development in oil prices results to increase in revenue and government expenditure. The increase in inflation results in real effective exchange rate appreciation. The real effective exchange rate measures the relative prices of non-tradable goods to tradable goods and is a measure of the competitiveness of the Nigerian economy. If domestic prices increase, while prices remain unchanged, this would increase the relative prices of non-tradable leading to a fall in the competiveness of an economy.

Data Sources The paper utilized annual data series from 1970 to 2020. Data were sourced from five sources. The Central Bank of Nigeria Statistical Bulletin (CBN), National Bureau of Statistics (NBS), World Bank Development Indicator, 2020(WDI, 2020), and African Development Bank Database (AfDB, 2020). The IMF International Financial Statistics (IFS) was also used. The real exchange rate and external reserves were sourced from IMF IFS; the real exchange rate was generated using both Nigeria and USA's data. The crude oil price and the real GDP were sourced from the World Bank and the Central Bank of Nigeria Statistical Bulletin. Fiscal balance, total debts were sourced from the Central Bank of Nigeria Statistical Bulletin and the National Bureau of Statistics.

Results and Discussion

5.1 ***Unit Root Results*** The result presentation started with the descriptive/summary statistics, and the correlation matrix. The aim is to show the data movement and the distribution statistically. The estimates are robust but not presented in the paper. This was followed by the time series property examination. Zhe (2007) observed that for proper estimation of economic models based on time series, the condition for stationary unit root must be satisfied. Therefore, in order to avoid spurious regression, this paper carried out the unit root test of on all the variables using two unit root tests namely: Augmented Dickey Fuller (ADP) and the Phillips and Peron (PP) (1988) tests to ascertain the time series properties at levels and differences. The results show that the variables in their levels are non-stationary. Since the variables in the SVAR model follow an I(1) process, the next is to examine the long run relationship (co integration) exists among the variables.To achieve the co integration test purpose, the Johansen maximum-likelihood approach is utilized. Following, Harris (1995), the issue of interest and trend were included in the model.

Table 1: STATIONARY/UNIT ROOT TEST

	ADF				**PP**			
	Without Trend		**With Trend**		**Without Trend**		**With Trend**	
	Level	**First Diff**	**Level**	**First Diff**	**Level**	**First Diff**	**Level**	**First Diff**
OilP	-0.76	-4.62***	-2.00	-6.34***	0.81	-16.43***	2.01	-17.6***
TOE	-2.56*	-4.05***	-2.16	-6.13***	-2.01*	-15.45***	-2.03	-15.6***
FISCB	-121	-11.69***	-2.01	-11.6***	-1.34	-11.23***	-3.43	-11.5***
TOD	-3.06**	-6.32***	-3.01*	-8.26***	-3.30	-8.76***	-2.03	-9.12***

INF	-1.05	-18.13***	-1.32	-16.3***	-1.23*	-35.8***	-4.12*	-42.51***
M²/GDP	-0.68	-6.42***	-2.45	-7.6***	-0.76	-30.7***	-8.72**	-28.34***
EXCHR	-2.04	-14.14***	-1.65	-8.45***	-8.53***	-25.6***	-8.56***	-31.31***
EXR	-8.76***	-10.04***	-6.98**	-15.4***	-7.82***	-25.7***	-9.5**	28.65***

Source: Researcher's Computation using E-view 10.0 [Econometric view]
*Critical values are : -3.6056(1%), -2.9369(5%) and -2.6069(10%). With constant and trend, critical values are: -4. 2050(1%), -3.5266(5%)and -3.19646(10%). Note: *, **, *** represent significance at 10, 5 and 1 percent respectively.*

The number of co integrating relations from the SVAR model, on the basis of trace statistics and the maximal eigenvalue statistics using critical values from Osterwald-Lenum (1992) at 5 percent level are presented in Table 2. The procedure explored to determine the number of cointegrating vector begins with the hypothesis that there are no cointegrating vectors and with trends, H^+ A rejection of the hypothesis would lead to testing the alternative hypothesis of no cointegrating vectors, and no trend H.

Table 2: COINTEGRATING RESULTS (LONG-RUN RELATIONSHIP)

Maximal Eignevalue Statistics			**Trace Statistic**		
Rank	**H+**	**H**	**Rank**	**H+**	**H**
r = 0	118.44***	121.23***	r = 0	150.34***	128.64***
r = 1	76.32***	78.64***	r = 1	132.64***	86.24***
r = 2	63.54	48.35	r = 2	56.20	32.17
r = 3	7.44	15.28	r = 3	7.24	9.26
r = 4	0.73	3.65	r = 4	0.64	1.92

Source: Researcher's Computation using E-view 10.0
Note: *** indicates 1 percent confidence level.

Test statistics indicate that the hypothesis of no cointegration among the variables can be rejected. The results show that at least two cointegrating vector exist among the variables of interest. The optimal lag length is 4. In addition, since the variables are cointegrated the equations of the VAR also included the lagged values of the variables in levels to capture their long-run relationships.

5.2 ***Variance Decomposition*** The results are summarized in Table 3. Since the graphical movements of the impulse responses/functions support the IRF, it is not presented. The essence of the variance decomposition is that it measures the proportion of the forecast error variance in one variable explained by innovations in it and the other variables. The VAR was estimated with the sets of contemporaneous structural restrictions specified in the equations.

Table 3: VARIANCE DECOMPOSITION

Quarter	**RGDP**	**OilP**	**TOE**	**FISCB**	**TOD**	**INF**	**M²/GDP**	**EXHR**	**EXR**
Variance decomposition for OilP									
1	76.0	90.27	9.27	0.01	0.02	0.02	0.00	0.00	0.01

4	72.24	76.15	7.15	7.93	2.71	4.86	4.72	3.48	1.24
8	68.80	66.42	6.42	11.42	2.48	12.63	12.49	2.34	12.62
12	50.31	58.56	5.56	15.05	2.76	12.84	10.60	0.65	10.72
Variance decomposition for RGDP									
1	7.01	6.31	95.36	86.44	72.48	0.02	0.06	0.24	0.40
2	17.51	5.05	82.72	72.86	66.52	0.56	3.24	0.22	0.24
3	12.21	4.74	76.46	92.75	74.01	13.21	11.56	3.56	1.48
4	8.08	4.84	82.53	76.43	78.46	10.09	11.24	4.72	6.23`
Variance decomposition for TOE									
1	49.21	2.93	95.12	0.23	1-24	0.00	0.01	0.42	1.48
2	42.13	4.76	87.23	0.35	6.58	6.51	5.24	0.36	0.25
3	34.02	4.15	71.24	0.41	5.02	4.68	4.24	1.29	2.08
4	33.06	3.42	76.49	0.78	5.82	3.24	6.01	6.48	7.24
Variance decomposition for FISC B									
1	60.42	0.01	0.48	96.25	0.48	0.01	0.48	1.42	2.01
2	5.62	0.24	0.23	86.48	0.24	0.24	2.25	1.05	2.05
3	13.21	1.25	0.24	72.01	1.86	1.25	1.08	2.48	1.06
4	6.32	2.32	1.48	68.52	2.44	6.48	1.62	1.20	1.72
Variance decomposition for ToD									
1	96.01	2.12	0.01	0.03	86.24	0.01	0.42	1.27	1.52
2	70.01	10.23	0.22	0.02	76.32	2.23	1.11	0.48	8.03
3	80.87	12.23	0.51	0.15	59.82	4.21	2.25	3.25	5.43
4	86.21	22.01	0.58	0.08	34.07	2.10	3.26	1.20	2.89
Variance decomposition for INF									
1	0.21	2.11	3.24	4.24	1.40	56.40	1.03	2.48	1.13
2	0.56	3.24	1.48	1.28	2.41	86.28	1.09	1.49	2.46
3	0.32	1.03	1.92	2.56	3.24	74.01	2.01	3.25	1.72
4	1.40	2.06	0.43	2.48	1.79	64.23	3.03	0.84	0.86
Variance decomposition for M^2/GDP									
1	42.52	1.02	1.62	0.24	1-06	0.24	78.63	1.24	1.21
2	32.05	1.06	1.41	0.65	2.45	2.49	68.40	1.05	2.51
3	46.52	0.24	0.25	2.52	3.25	3.34	57.98	1.08	3.76
4	36.48	1.16	1.65	1.48	2.45	1.06	63.24	2.48	4.24
Variance decomposition for EXHR									
1	11.24	34.06	9./72	1.40	1.28	1.20	1.48	98.43	1.20
2	32.23	24.98	7.25	4.25	2.41	1.40	2.01	82.51	1.48
3	48.06	36.32	6.28	3.20	3.25	2.32	1.72	98.29	0.21
4	15.25	16.50	5.40	4.21	0.48	1.48	3.24	46.35	3.25
Variance decomposition for EXR									
1	0.01	11.24	10.21	1.46	1.48	10.24	1.05	0.43	76.58
2	0.24	10.25	11.46	2.35	3.25	11.07	2.48	0.24	86.01
3	1.24	9.86	23.24	9.76	4.00	10.03	3.25	0.56	76.45

4	4.28	7.24	16.01	7.21	3.24	12.48	4.86	1.24	86.24

Resource: Researchers' Computation using E-view 10.0

5.2 *Discussions and Implications for Findings*

Outputs: The variance decomposition indicates that real GDP own shock ranges from 76 percent in the first and second quarters. It started declining from the 3rd quarter down to the 4th quarter. The variables of fiscal policy rule, particularly total government expenditure had 90 percent shock on real GDP in the first quarter and declined to 59 percent in the 4th quarter. The shocks of fiscal balance, total debt, inflation, broad money supply, exchange rate and external reserve ranges from 13 percent to 0% through the time horizons. This implies that government expenditure especially on infrastructure has the effect of boosting the economy.

*Oil Price (OILP)***:** The variance decomposition suggests that its own shock (oil price shock) account for 90 percent in the 1st quarter and 58 percent in the 4th quarter. Meanwhile, shocks of real GDP to oil price ranges from 76 percent to 50 percent in the 4th quarter. This implies that there is a relationship between oil price and the Nigerian economy. This follows the reasoning that oil revenue is the major source of earning or revenue to the economy and the fact that the Nigerian economy depend over 80 percent on the oil sector. This implies that, the Nigerian economy needs to be diversified to reduce the oil price shock and vulnerabilities.

Total Government Expenditure (TOE): The shock of total government expenditure on real GDP accounted for 49 and 42 percents respectively in the 1st and 2nd quarters respectively. Subsequently, the shock declined from 34 percent to 33 percent in the 3rd and 4th quarters. The shock of other variables of the SVAR model ranges from 7% to 0% in the time horizons. From the result of Table 3, the highest effect of oil price shock on government expenditure is 5 percent in the second quarter. Although minimal, it confirms the monetization of crude oil receipts. The shock of oil prices to total government expenditure will be reduced through the stabilization fund-the Sovereign Wealth Fund (SWF).

Fiscal Balance (FISCB): The variance decomposition result of fiscal balance show that its own shock accounted about 96 percent in the first quarter to 72 and 68 percents respectively in the 3rd and 4th quarters. From the result also and bearing in mind our concern on fiscal policy rule and economic growth, the shock of fiscal balance on economic growth ranges from 60% in the 1st quarter to 5 percent in the 2nd quarter. This implies that the shock of fiscal balance on real GDP may be temperate and may not last long as shown in the Table of the variance decomposition.

*Total Debt (TOD)***:** The variance decomposition estimates show that the shocks of total debt, which is a combination of domestic and foreign debt accounted about 96 percent in the first period to 86 percent in the last period. Total debt own shock ranges from 86% in the 1st period to 34 percent in the last period. The implication of this finding shows that public debt has a crow-out-effect on the economy and therefore should be minimized optimally.

Inflation (INF): A clear feature of the variance decomposition is the finding that the shock of inflation on real GDP accounted for 2% in the 1st quarter to 14% in the 4th quarter.

This finding supports the negative effect of inflation on economic growth. Looking at the relationship between inflation and oil price, the variance decomposition results show that inflation shock resulting from oil price ranges from 2 percent in the 1st quarter to 1 percent in the 3rd quarter. This finding supports the assertions of Barsky & Kilian (2004) and Rotemberg & Wakeford (2006) that oil price may cause inflationary pressures in the short-run. To insulate the economy and inflationary tendencies of oil price, there is need for increase in production of exportable goods via the instrument of diversification.

*Broad Money Supply (M^2/GDP)***:** Table 5 shows that the shock of money to real GDP accounted for 43 percent in the 1st quarter, and declined to 36 percent in the 4th quarter. Its own shock ranges from 78 percent in the 1st quarter to 57 percent in the 3rd quarter. From the VDC results, oil price shock did not contribute to the shocks in money supply in the 3rd quarter. This findings are in line with the findings of Bohi (1991) and Bernanke et al., (1997).

Exchange Rate (EXHR): The results show that exchange rate shock on itself accounted for 98 percent in the 1st quarter and 46 percent in the 4th quarter. The shock of exchange rate to real GDP accounted for 48 percent in the money supply contributed about 3% of the forecast error variance to real exchange rate in the 4th quarter. This is as inflation contributed an average of 2 percent to real exchange rate over the 3rd quarter. This finding lends supports to the findings of Amano and Van Norden (1998). From the result also, oil price shock accounted about 34 percent in the 1st quarter to 16 percent in the 4th quarter. The decline is confirmatory of the fact that high oil price may give rise to wealth effects that may eventually appreciates the exchange via de-industrialization of the tradable sector, a situation of 'Dutch-disease' in Nigeria.

External Reserve (EXR): The variance decomposition shows that the shock of external reserve on real GDP is insignificant in the 1st and 2nd quarters unlike in the 3rd and 4th quarters. Meanwhile, the shock of external reserve to itself ranges from 76 percentages in the 1st quarter to 86 percent in the 4th quarter. On the relationship between oil price and external reserve, the table shows that oil price contributed about 11 percentages in the 1st quarter to 7 percentage in the 4th quarter. Oil price has a major effect on Nigerian external reserve accumulation, since Nigeria depend mostly on oil export. The shock of exchange rate was insignificant to external reserve in the 1st and 2nd, 3rd quarters respectively. This implies that external reserve accumulation has an effect on the value or de-value of the domestic currency. The general implications of these findings are as follows:

5.3 ***Diagnostic Tests*** A battery of diagnostic tests was conducted to ascertain the statistical robustness and predictive ability of the MTEF- economic growth model. The Breusch-Godfrey Serial Correlation LM and the Breusch- Pagan –Godfrey heteroskedasticity residual tests indicated that the model was free of serial correlation and that the variance or errors were the same over the sample period. Similarly, the CUSUM of squares test (Brown, Durbin & Evans, 1975), affirm the stability and suitability of the model for forecasting. The correctness of the specification of the model was attested to by the Ramsey test carried out on the model. The normality test suggests that the compliance of the model with normality assumptions as attested to by the Jarque-Bera statistic. The CUSUM test for economic growth model, based on the cumulative sum of the recursive residuals at 5 per

cent critical lines suggests stability of the model as the test parameters of the cumulative sum lies within the area between the two critical lines (graphics not presented).

Two policy lessons are discernible: i) the variance decomposition result of fiscal balance showed that its own shock accounted about 96 percent in the first quarter to 72 and 68 percents respectively in the 3rd and 4th quarters. From the result also and bearing in mind our concern on MTEF and economic growth, the shock of fiscal balance on economic growth ranges from 60% in the 1st quarter to 5 percent in the 2nd quarter. This implies that the shock of fiscal balance on real GDP may be temperate and may not last long. Therefore, the medium term expenditure framework can be used by policy makers to promote growth. However, it must be anchored on realistic estimate/benchmarks. ii) This follows the reasoning that oil revenue is the major source of earning or revenue to the economy and the fact that the Nigerian economy depend over 80 percent on the oil sector. The major challenge of MTEF in Nigeria therefore becomes the vicarious fluctuations in the oil price. This follows the reasoning that oil revenue is the major source of earning or revenue to the economy and the fact that the Nigerian economy depend over 80 percent on the oil sector makes the economy much vulnerable to shock on oil income. This implies that, the Nigerian economy and policy makers' needs to diversify the economy to reduce the oil price shock and its vulnerability.

Conclusion and Policy Recommendations

6.1 ***Conclusion*** This paper attempted to examine the effects of MTEF on economic growth in Nigeria from the period 1970 to 2020. Specifically, it investigated how the shocks of oil price, total government expenditure, fiscal balance, total debt (fiscal rule variables), inflation dynamics, broad money supply, real exchange rate and external reserve influence economic growth (real GDP). To achieve this objective, the paper utilized the structural VAR model with restrictions and in line with the Cholesky ordering. The key findings show that the shock of total government expenditure on real GDP accounted for 49% and 42% of the shocks respectively while the explanatory variable accounted about 7% to 0% with the time horizon. Further findings reveal that total debt accounted for 96% to 86% of the shock on real GDP changing on oil price shock account for 90 to 50% negative growths. This implies that debt crowd-out-real GDP. Intuitively, for the Nigerian economy to growth significantly, the government needs to improve on growth enhancing factors, mostly expenditure on infrastructure, while reducing the accumulation of debt because of high servicing of debts. The paper is limited by the availability of data, although the Central Bank of Nigeria CBN Bulletin (CBN) and World Bank Development Indicator were used when necessary.

6.2 ***Policy Recommendations*** In line with the empirical evidence from the variance decomposition of the SVAR, the following policy options are available to policy makers in promoting economic growth in Nigeria through the fiscal balance of medium term expenditure framework. (a) Diversification is germane to the export growth of the Nigerian economy. The findings of the paper reiterate the importance of diversifying the economic base so as to reduce the shock on MTEF on economic growth in the medium to the long term. However, in promotion of diversification. (b) There must be infrastructure

provision: When infrastructure provision is improved in Nigeria through public finance expenditure channels, economic growth will be improved and diversification made easy. (c) Reduction in Total Debt: Debt per say has debilitating effects on economic growth. Those debilitating effects must be checked. Effective debt management and public debt moratorium must be enforced. The Government agency for debt management (DMO) must monitor the debt profile of the Central Government and the federating units, ministries and department so as to reduce the increasing public debt. (d) Monetary policy is an ineffective tool for reversing pure supply side shocks to prices. Consequently, supply side shocks especially those that affect food prices and exchange rate will have serious long term consequences for inflation, long after the shocks have dissipated. The paper therefore suggest for a tightening monetary policy stance via raising the Central Bank Monetary Policy Rate (MPR) from its current posture to a higher rate possible in the current to the long-term in Nigeria.

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