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ANALYZING THE EFFECTIVENESS OF REVENUE AND EXPENDITURE ON PRICES AND GROSS DOMESTIC PRODUCT IN NIGERIA: A VAR METHOD

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ABSTRACT

As the global economy meltdown continuous, there is the need for thorough investigation into Nigerian economy. This study investigates and measures the relative impact of revenue and expenditure on prices and output growth in Nigeria using annual data from 1970 to 2010. A Vector Autoregression (VAR) method was used. Through impulse response and variance decomposition the dynamic interrelationship among the variables has been captured. The response function shows that both the real GDP and the Prices responded positively to the shocks to revenues more specifically in the long term but with low magnitude at the short term, while shocks to government expenditure will lead to the declined in real GDP growth in short term and with no explanation in the long term but prices responded positively. Although real GDP and prices accounted most for its contemporary variance from its own innovations but there is little variation caused by revenues in later periods of real GDP. An increase in revenues rather than government expenditure in the economy are the most influential instrument for fiscal policy in Nigeria. The implication of this for the policy maker is that there should be more emphasis and reliance on revenues (or tax) for the purpose of economic growth in Nigeria, though; government expenditure can contribute to the economy at long run.

Keywords: VAR, Impulse response and Variance decomposition

INTRODUCTION

The term fiscal policy has conventionally been associated with the use of revenue/taxation and public expenditure to influence the level of economic activities. The implementation of fiscal policy is essentially routed through government's budget. The budget is, therefore, more than a plan for administering the government sector. It (budget) both reflects and shapes a country's economic life. In fact, the most important aspect of a public budget is its use as a tool in the management of a nation's economy **(**Omitogun and Ayinla, 2007**).**

A sound fiscal policy is important to promote price stability and sustain growth in output and employment. Fiscal policy is regarded as an instrument that can be used to lessen short-run fluctuations in output and employment in many debates of macroeconomic policy (Mehrara, Pahlavani, and Elyasi, 2011). It can also be used to bring the economy to its potential level. If policymakers understand the relationship between government expenditure and government revenue, without a pause government deficits can be prevented. Hence the relationship between government expenditure and government revenue has attracted significant interest in an economic activities. This is due to the fact that the relationship between government revenue and expenditure has an impact on the budget deficit.

The past two decades have witnessed a considerable increase in government indebtedness in Nigeria. Beyond the issue of poor quality of public expenditure, the ability to save windfalls from excess crude oil proceeds by the government remains critical in ensuring that government expenditure is maintained at a sustainable level and consistent with the absorptive capacity of the economy. There is a substantial increase in government spending, primary deficit and debt in Nigeria between 1980 and 2005. The oil windfall between 1990 and 1992 was followed by rapid growth in government spending with an average of about 21 percent of GDP during that period. However, as the oil market weakened in the subsequent years, oil receipts were not adequate to meet increasing levels of demands, and expenditures being reinforced by political pressures, were not rationalised. Government resorted to borrowing mainly from the central bank to finance the huge deficits.

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In designing and implementing fiscal policy, government plans for budget deficit, budget surplus or balanced budget. Budget deficit is a type of budget plan in which government expenditure outweighs its revenue while budget surplus is a budget plan where government revenue is proposed to be greater than government expenditure. Balanced budget, however, arises when government expenditure equals government revenue.

The purpose of this paper is to empirically investigate and measure the impact of government revenue and expenditure as fiscal policy variables on inflation and economic growth in case of Nigerian economy, using Unrestricted VAR approach similar to that of Md. Habibur (2005) for Bangles dash.

LITERATURE REVIEW

This section of the study seeks to review relevant empirical studies that have examined the impacts of fiscal policy in the actualization of sustainable growth and development. Differing opinions have indeed continued to emerge on how fiscal policy can affect economic activities. The genesis of these controversies has been traced to the theoretical exposition of the different schools of thought namely: the Classical; the Keynesian; and the Neoclassical schools of thought.

In addition to the controversies among the different schools of thought on the possible linkage between fiscal policy and economic growth, efforts have also been made by researchers to authenticate or refute the arguments of these prominent schools of thought.

Ndung'u (1995) attempts to establish whether there is a link between budget deficit, the rate of inflation and money supply growth, on the one hand, and money printing and the rate of inflation on the other. Using multivariate Granger Non-Causality tests, it was found that, at least in the case of the Kenyan economy, budget deficits affect monetary base growth. It was also found that there are both direct and indirect links between money printing and the rate of inflation. It was, therefore, concluded in this paper that budget deficits affect growth in the monetary base, money printing affects the rate of interest and hence the rate of inflation and in addition, excess money printing affects the rate of inflation.

Aregbeyen (2007), Ekpo (1994), Devarajan et al. (1996), and Kneller et al. (1999), established positive relationship between fiscal policy (public spending) and economic growth. Bose et al. (2003) in Aregbeyen (2007) found that the share of government capital expenditures in the gross domestic product is positively and significantly correlated with economic growth, while the growth effect of current expenditure is insignificant. Aregbeyen (2007) believed that although government expenditures were necessary for economic growth, yet the impact of such expenditures on the economy is of primary importance. He concluded that the key to rapid economic growth constituted capital and public investment expenditure and that increased government budget deficits do not automatically guarantee rapid economic growth.

Phillips (1997) critically analyses the Nigerian fiscal policy between 1960 and 1997 with a view to suggesting workable ways for the effective implementation of Vision 2010. He observes that budget deficits have been an abiding feature in Nigeria for decades. He notes that expect for the period 1971 to 1974, and 1979, there has been an overall deficit in the federal Government budgets each year since 1960 to date. The chronic budget deficits and their financing largely by borrowing, he asserts, have resulted in excessive money supply, worsened inflationary pressures, and complicated macroeconomic instability, resulting in negative impact on external balance, investment, employment and growth. He, however, contends that fiscal policy will be an effective tool for moving Nigeria towards the desired state in 2010 only if it is substantially cured of the chronic budget deficit syndrome it has suffered for decades.

Egwaikhide (1998) appraises the implication of Nigeria budget deficit profile for inflation and the current account balance. Evidence indicates that fiscal indiscipline in terms of lack of control over expenditure is the major determinant of budget deficit in Nigeria, while its mode of financing has aggravated inflation in the country. Most importantly, it is revealed that budget deficit correlates highly with current account deficit, implying that external disequilibrium is partly attributable to endogenous factors.

Folorunsho and Abiola (2000) examine the long –run determinants of inflation in Nigeria between 1970 and 1998, using the econometric methods of cointegration and error correction mechanism. They find that inflation in Nigeria could be caused by the level of income, money supply, and public sector balance. The results also indicate that in the long –run, exchange rate, money supply, income and fiscal balance determine the inflation spiral in Nigeria.

The study, therefore, concludes that a reduction in fiscal deficits, an increase in domestic production and a stable exchange rate should be pursued as means of controlling inflation in Nigeria. Bogunjoko (2004) examines the growth performance in Nigeria. He adopted a linear equation of the production function as suggested by Ram (1989) and adopted by Aigbokhan (1996). In order to complement the single equation model and account for the interdependency of expenditure and growth in Nigeria, a vector autoregressive model of three variables namely real output, federal government expenditure and state government expenditure was employed. Based on the Ram – type production function, the empirical results show that while the externality of the alternative expenditure (i.e. federal and state) is positive, the overall impact of the expenditure is growth retarding. This finding complements the argument that federal and state expenditures are made without due reference to the absorptive capacity of the economy. His VAR model shows that, inter – temporally, the response of real output to state and federal expenditures is weak in the short run. Aigbokhan (1996) opined that federal government spending if employed efficiently could boost private investment and promote economic growth. Ekpo (1994) contended that the role of the public sector should be limited to the continuous creation of an enabling environment to allow and enhance private sector – induced development. Ogiogio (1996), however, notes that the economy does not have the productive capacity to support growth in the absence of new (government) investment. In particular, it was agreed that government expenditure was necessary for the maintenance of existing infrastructure and the implementation of policies / projects in the economic and social sectors of the economy.

Ajayi (1974) and Aigbokhan (1985) employed original version of the St. Louis equation were the first among the earliest studies to extend the debate to less developed countries with particular reference to Nigeria. Ajayi (1974) maintained that much reliance have been placed on the use of fiscal policy rather than monetary policy. He then set out to investigate the usual hypothesis for the period 1960-1970 in Nigeria. In his study, he estimated the variables of fiscal and monetary policies using Ordinary Least Square technique. His result was line with that of Anderson and Jordan (1968) revealed that monetary actions are much larger and more predictable than fiscal action while empirical result of Aigbokhan (1985) favoured fiscal policy. Aigbokhan (1985) employed the elasticity version of the St. Louis equation and found that monetary policy exacts greater impact on economic growth in Nigeria.

METHODOLOGY

Description and Source of Data

The data sets used for this analysis is the annual series of the selected relevant macroeconomic variables from 1970 to 2010. The Data for total government revenues (REV) both oil and non-oil revenues, total government expenditure (capital & recurrent expenditure) , real gross domestic product (both Agriculture and industrial), and Inflation rate (as consumer price index) will be used in this analysis. The data were obtained from Central Bank of Nigeria Statistical Bulletin 2009 and 2010.

Model Specification

Sims's (1980) seminal work introduces unrestricted vector autoregressions (VARs) that allows feedback and dynamic interrelationship across all the variables in the system and appears to be highly competitive with the large-scale macro-econometric models in forecasting and policy analysis.

To provide an empirical insight into the impact of government revenue and expenditure on inflation and economic growth in Nigeria, we begin first by formulating four-variable VAR model includes: total Government revenues (REV) and total Expenditure (EXPT)), inflation variable proxy by consumer price index (CPI) and growth variable (GDP).

These essentially allow us to determine the all-else-equal impacts of each policy variable, the estimate of these different variable VAR will enables more direct comparisons between the policies to inflation and economic growth. Following Md Habibur (2005) for Bangladesh, we formulate the model:

$$LGDP_t = a_0 + a_1 LCPI_t + a_2 LREV_t + a_3 LEXPT_t + u_t \quad (1)$$

Where LGDP is the natural log of real Gross domestic product, LCPI is the natural log of consumer price index, LREV is the natural log of total Government revenues, LEXPT is the natural log of total Government expenditure, u_t is unobservable error term, a_0 is constant and a_1, a_2, a_3 are coefficient to be estimated.

The variables GDP, CPI, REV and EXPT are incorporated into the model in their natural logs. This is to enable us index all the variables and to aid interpretation of results.

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Lutkpohl and Kratzig (2004), reveal that constructing a model for the logs is likely to be advantageous because the changes in the log series display a more stable variance than the changes in the original series.
The General basic model of VAR (*p*) has the following form

$$y_t = \mu + \psi D_t + A_1 y_{t-1} + ... + A_p y_{t-p} + u_t \qquad (2)$$

where y_t is the set of *K* time series variables $y_t = (y_{1t},..., y_{Kt})'$, A_i's are ($K \times K$) coefficient matrices, μ is vector of deterministic terms , D_t is a vector of nonstochastic variables such as economic intervention and seasonal dummies and $u_t = (u_{1t},..., u_{Kt})'$ is an unobservable error term. Although the model (2) is general enough to accommodate variables with stochastic trends, it is not the most suitable type of model if interest centers on the cointegration relations. The VECM form

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + ... + \Gamma_{p-1} \Delta y_{t-p+1} + \mu + \psi D_t + u_t \qquad (3)$$

$$\Pi = \sum_{i=1}^{p} A_i - I \qquad \text{and} \qquad \Gamma_i = -(A_{i+1} + ... + A_p)$$

In the VECM model, attention focuses on the ($n\times$ *r)* matrix of cointegrating vectors β, which quantify the "long-run" relationships between variables in the system, and the ($n\times$ *r*) matrix of error-correction adjustment coefficients α, which load deviations from the equilibrium (*i.e.* Πy_{t-1}) to Δy_t for correction. The Γ_i coefficients in (3) estimate the short-run effects of shocks on Δy_t ,and therefore allow the short-run and long-run responses to differ.
The term Πy_{t-1} is the only one that includes I(1) variables. Hence, Πy_{t-1} must also be I(0). Thus, it contains the cointegrating relations. The Γ_{jS} ($j = 1, \ldots, p-1$) are often referred to as the short-run or short-term parameters, and Πy_{t-1} is sometimes called the long-run or long-term part.

Unit Root Test
Since we are using times series data sets for the analysis, it is important that we first test the data sets for stationarity properties. Hence, to examine the stationarity properties of the data sets, we use a variety of units root tests. The motivation behind the assortment of tests is to obtain reliable and consistent results.
First, the Augmented Dickey Fuller (ADF) tests and Phillips-Perron (PP) tests are used to check whether each data series is integrated and has a unit root. This study employs the Phillips and Perron (1988) test, since the possibility of the presence of structural breaks makes the ADF test unreliable for testing stationarity. The presence of a structural break will tend to bias the ADF test towards non-rejection of the null hypothesis of a unit root.
The test specification for Augmented Dickey-Fuller (ADF) Test and Phillips-Perron(PP) test using (4) is given by

$$H_0 : \Pi = 0 \quad \text{and} \quad H_a : \Pi < 0$$

The ADF test-statistic and the ADF normalized bias statistic are

$$ADF_t = \frac{\hat{\Pi}}{SE(\hat{\Pi})} \quad and \quad ADF_n = \frac{T(\hat{\Pi})}{1 - \sum_{j=1}^{p-1} \Gamma_j}$$

The null hypothesis of non-stationary is rejected if the value of t-statistic is less than the critical value. Thus, in addition to the traditional tests of Dickey-Fuller and Phillips-Perron, we also employ the Kwiatkowski, Phillips, Schmidt and Shin"s (KPSS) test designed to overcome the problems of low power and size distortions inherent in the traditional tests (Madalla and Kim, 1998)

VAR Cointegration Test
Secondly, the results of the integration tests are then pursued by Co-integration tests. The existence of long-run equilibrium (stationary) relationships among economic variables is referred to in the literature as cointegration.

The Johansen procedure will be employed to examine the question of cointegration and provide not only an estimation methodology but also explicit procedures for testing for the number of cointegrating vectors as well as for restrictions suggested by economic theory in a multivariate setting. Engel and Granger (1987) pointed out that a linear combination of two or more non-stationary variables may be stationary. If such a stationary combination exists, then the non-stationary time series are said to be co-integrated. The VAR based co-integration test using the methodology developed in Johansen (1991, 1995). Johansen's methodology takes its starting point in the vector auto regression (VAR) of order p given by equation (3). This VAR can be rewritten as equation (4):
where

$$\Pi = -(I_n - A_1 - ... - A_p) \text{ and } \Gamma_i = -(A_{i+1} + ... + A_p)$$

If the coefficient matrix Π has reduced rank *r<n, then there exist nxr matrices* α *and* β *each* with rank *r such that* $\Pi = \alpha\beta'$ *and* $\beta' y_t$ *is stationary.* Where *r* is the number of cointegrating relationships, the elements of α are known as the adjustment parameters in the vector error correction model and each column of β is a cointegrating vector.

To determine the number of co-integration vectors, Johansen (1988) and Johansen and Juselius (1990) suggested two statistic tests, the first one is the trace test (λ trace). It tests the null hypothesis that the number of distinct cointegrating vector is less than or equal to n against a general unrestricted alternatives n = r. the test calculated as follows:

$$\lambda_{trace}(r) = -T\sum_{r+1}^{n} \ln(1 - \hat{\lambda}_i) \quad (5)$$

Where T is the number of usable observations, and the $\hat{\lambda}_i$ are the estimated eigenvalue from the matrix. The Second statistical test is the maximum eigenvalue test (λ max) that is calculated according to the following formula

$$\lambda_{\max}(r, r+1) = -T\ln(1 - \hat{\lambda}_{r+1}) \quad (6)$$

The test concerns a test of the null hypothesis that there is r of co-integrating vectors against the alternative that r + 1 co-integrating vector.

RESULTS AND DISCUSSIONS

Unit Root Tests

Before using the data in the estimation of VAR, we need to know time series properties of all the variables. Accordingly, a series of unit root test, such as Augmented Dickey-Fuller (ADF, 1981), Phillips-Perron (PP, 1988), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS, 1992) test are used to determine the order of integration for each series. The ADF unit root tests used Akaike information criterion for lag order selection, PP unit root tests and KPSS tests lag length are decided based on Akaike's information criterion and AR spectral – GLS detrended spectra.

The results of the unit root tests are reported in Table 1. Note that the ADF and PP tests are based on the null of unit –root while KPSS test assumes the null of stationarity. Using The ADF tests and PP tests, all other variables possess unit roots at their levels since each reported t-statistics is not smaller than their respective critical values. The KPSS tests in the other hand also reject the null hypothesis of stationarity for all the variables at their levels, which is in line with the estimated results from ADF and PP tests. In general, the results of these tests shown in Table1 are consistent with the presence of a unit root in each of the variables, investigated.

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Table 1: ADF, PP & KPSS Test Using Simulated Critical values

Variables	constant			Constant & trend		
	ADF t-statistic	PP t. statistic	KPSS t. statistic	ADF t-statistic	PP t. statistic	KPSS t. statistic
LGDP	-2.4854	-3.5159	1.2162	-2.3271	-1.8836	0.29354
LCPI	-0.82440	-0.45534	1.4512	-1.5709	-1.6742	0.15303
LREV	-0.73161	-1.0587	1.4432	-2.0029	-2.3502	0.14210
LEXPT	-0.79676	-0.68676	1.4471	-1.9211	-2.1814	0.11590
	Simulated critical values (5%) ADF= -2.9582 PP = -2.9607 KPSS = 0.43882				Simulated critical values (5%) ADF= -3.4873 PP = -3.4523 KPSS = 0.14165	

NOTES:
*Critical value = 95% simulated critical value using 41 obs. and 1000 replications.
*The critical values are computed by stochastic simulations.
* software: MicroFit 5.0

Estimating VAR in Levels

An important issue that arises when it comes to the specification of the VAR system is whether to use the variables in levels or in the differenced form. This issue stems from the fact that most economic variables are, in practice, non-stationary, which sheds some doubts on the estimated parameters using the standard OLS procedure. The choice between the level variables and differenced variables, however, is not a clear cut case. In principle, this choice depends on the cointegration analysis of the system.

However, Enders (1995) argued that while the above mentioned worries are valid in the case of estimating a single structural equation, one should not to worry about the non-stationarity implications when performing the VAR analysis and, therefore, the VAR system could be estimated using the variables in levels. Quoting several empirical studies, Enders (1995) argued that the VAR analysis is mainly used to evaluate the interrelationship between the variables included in the system, which means that one should not to worry about individual parameter estimates. Also, Sims (1988), Sims, Stock, and Watson (1990), Leeper, Sims, and Zha (1996), and Bernanke and Mihov (1997) argues against differencing even when the variables are I(1) , and that differencing throws away valuable information and the standard asymptotic tests are still valid even if the VAR is estimated in levels.

The VAR analysis of the impact government revenue and expenditure on inflation and economic growth in Nigeria will be performed using the level variables.

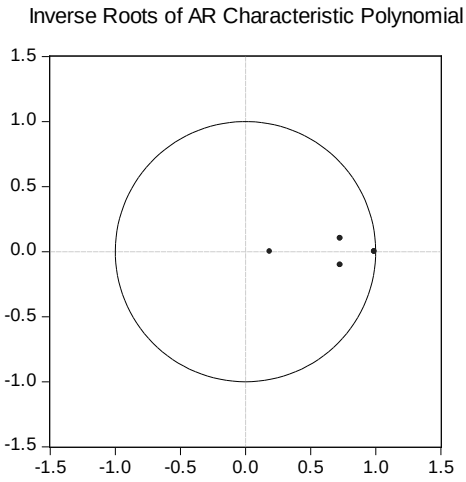
Optimal Lag Length in the VAR

A major requirement in conducting Johansen (1992, 1995) co integration tests and estimation of a VAR system, either in its unrestricted or restricted Vector Error Correction (VEC) forms, is the choice of an optimal lag length. Lag length selection is important for VAR specification because choosing too few lags result in mis-specification and choosing too many lags result in unnecessary loss of degrees of freedom. To avoid this, lag lengths are selected using statistical tests, which include the modified Likelihood Ratio (LR) test, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Criterion (SC) and Hannan-Quinn information criterion (HQ). These tests, instead of relying on any dynamic theory, use actual data to determine lag length.

Table 2: VAR lag order selection criteria (Fiscal policy variables)
Maximum Lag used 4

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-126.6435	NA	0.013710	7.061813	7.235966	7.123210
1	20.73917	254.9322*	1.14e-05*	-0.039955*	0.830811*	0.267031*
2	30.41044	14.63761	1.65e-05	0.302138	1.869518	0.854713
3	37.84871	9.649647	2.86e-05	0.764934	3.028927	1.563098
4	49.39116	12.47832	4.33e-05	1.005883	3.966489	2.049635

* indicates lag order selected by the criterion



One-lag
Figure 1: Root of characteristic polynomial

In Table 2, all the different criteria employed suggest the use of one lag for the VAR specification, the inverse roots of the AR characteristic polynomial (Figure 1) are within the unit circle, so VAR with one lag satisfies the stability condition, and can be use for further analysis.

Cointegration Test

Cointegration was an essential test in this study since all the variables were found to be non-stationary. If the variables were cointegrated, a cointegrated VAR approach will be used; otherwise, a level VAR approach will be used for non-stationary variables. The results of the cointegration tests are reported in Table 3.

Table 3: Johensen cointegration test (Linear deterministic trend)
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.342941	36.93754	47.85613	0.3505
At most 1	0.255261	20.55827	29.79707	0.3858
At most 2	0.177556	9.064118	15.49471	0.3595
At most 3	0.036265	1.440612	3.841466	0.2300

Trace test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.342941	16.37928	27.58434	0.6334
At most 1	0.255261	11.49415	21.13162	0.5980
At most 2	0.177556	7.623506	14.26460	0.4183
At most 3	0.036265	1.440612	3.841466	0.2300

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Both Trace test and Maximum Eigenvalue test found no cointegrating relationships between the output growth (LGDP), price(LCPI), revenues and expenditure in Nigeria, this results is similar to that obtained by Md. Habibur (2005) , which found no cointegration between output growth and fiscal policy in Bangladesh. The results suggest that the null hypothesis of no cointegration between LGDP, LCPI, LREV and LEXPT cannot be rejected at the 5% level. Given the strong evidence that the series are nonstationary and do not cointegrate, this study shows that the relationship between the economic growth and Fiscal policies are unstable in Nigeria.

VAR (1) Estimation

Tables 4 estimate a VAR in levels using one lag of each variable and having a constant. The Table shows the regression results of this model. The model explains changes in output growth and prices reasonably well with an adjusted R-squared of 95 and 99 per cent respectively.

Table 4: Vector Autoregression Estimates
Standard errors in ( ) & t-statistics in [ ]

	LGDP	LCPI
LGDP(-1)	0.864119	0.053399
	(0.06875)	(0.03158)
	[12.5692]	[1.69116]
LCPI(-1)	-0.171765	0.904125
	(0.15867)	(0.07287)
	[-1.08255]	[12.4067]
LREV(-1)	0.093358	-0.034920
	(0.18022)	(0.08277)
	[0.51803]	[-0.42189]
LEXPT(-1)	0.098428	0.097844
	(0.23603)	(0.10841)
	[0.41701]	[0.90258]
C	-0.086380	-0.953837
	(1.45395)	(0.66778)
	[-0.05941]	[-1.42837]
R-squared	0.953937	0.996481
Adj. R-squared	0.948673	0.996079

The coefficient of LGDP lagged one period are statistical significant at 5% level of significant, while those of LCPI, LREV and LEXPT are not statistical significant at 5% level of significant in the LGDP equation. While in the LCPI equation estimate the coefficient of Consumer price index(LCPI) lagged one period are statistical significant at 5% level of significant, In Nigeria, the highest predictive information about output growth (LDGP) and prices change comes from the LGDP and prices themselves.

VAR Residual Test

After estimation has been carried out, and certain results have been obtained, we implement a series of tests for the purpose of figuring out how adequate our model is. If the model passes all these tests, we conclude that its results may be trusted, further report and discuss can then be perform from innovation accounting. The residual tests are: Lagrange-multiplier (LM) test for Autocorrelations, Residual ARCH-LM TEST and Multivariate ARCH-LM test.

Table 5: VAR Residual Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag order h

Lags	LM-Stat	Prob
1	14.41226	0.5680
2	8.787984	0.9219
3	12.15709	0.7331
4	7.310620	0.9668
5	14.01243	0.5978

Probs from chi-square with 16 df.

In table 5, testing for serial correlation, high p-values (Prob>chi2) indicate that we can accept the null at conventional significance levels (α=5%, 1%). Rough inference is that autocorrelation is not present at all the lag order. This is indicative of efficient estimates of coefficients (minimum variance property hold) and cannot distort hypothesis testing procedure through wider confidence intervals.

Table 6: Residual ARCH-LM test

Variable	**Test stat**	**p-Value(Chi^2)**	**F stat**	**p-Value(F)**
LGDP	21.0224	0.0501	7.0300	0.0003
LCPI	13.5972	0.3272	2.2028	0.0754
LREV	11.0053	0.5285	1.5110	0.2226
LEXPT	11.0409	0.5254	1.5191	0.2198

Table 7: Multivariate ARCH-LM test

VARCHLM test statistic	**227.7317**
p-value(chi^2):	0.0869
degrees of freedom	200.0000

We can observe that in Table 6 and Table 7 all variables passed the ARCH-LM test and multivariate ARCH-LM test except that of real GDP in the individual equations.

Table 8: Roots of Characteristic Polynomial

Root	Modulus
0.988541	0.988541
0.726487 - 0.102327i	0.733658
0.726487 + 0.102327i	0.733658
0.186493	0.186493

No root lies outside the unit circle.
VAR satisfies the stability condition.

Table 8 lists all the eigenvalues of the companion matrix, which meet the mathematical stability condition as all of them are obviously less than one in absolute value.

Impulse Response Functions

The impulse response analysis provides a practical vision to interpret the behavior of a time series in response to the various shocks in the system. Since all the variables are endogenous in the VAR, any shock in one equations innovation is transmitted to the rest of the system. The impulse response analysis therefore provides an opportunity to investigate the response of one variable to an impulse in another variable in a system that involves a set of other variables as well.

Figure 2 represent the dynamic responses of LGDP and LCPI to one standard deviation impulse of LREV and LEXPT. The response forecast period is ten years to enable us capture both the long term and short term responses.

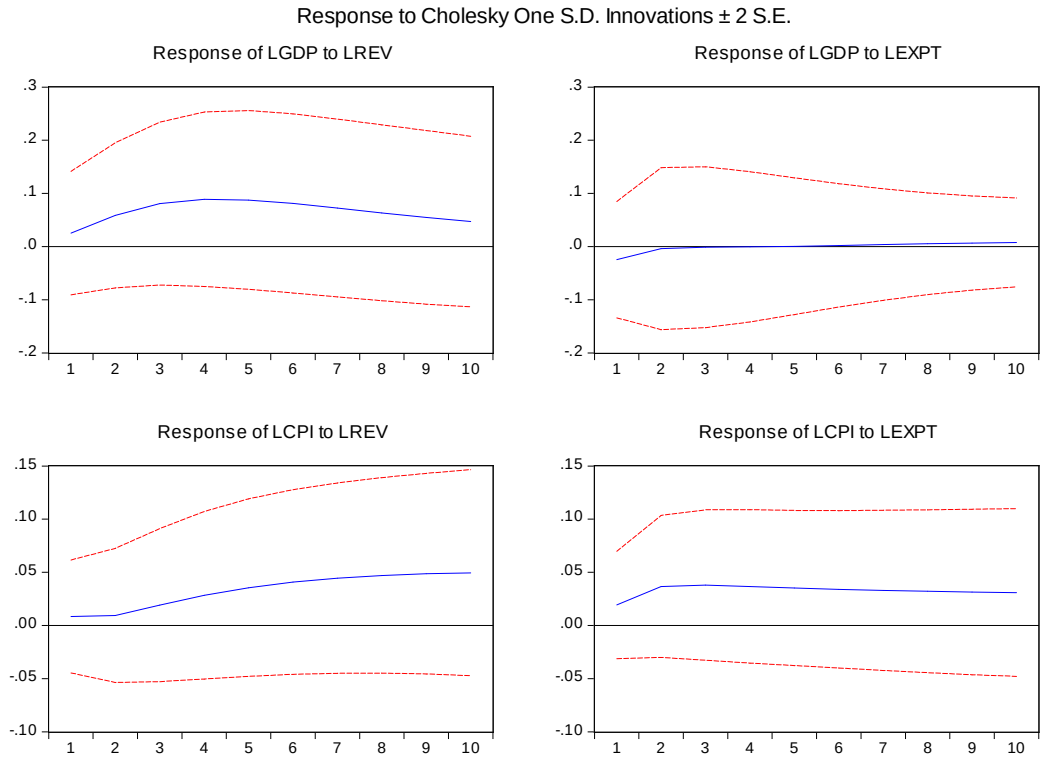

Figure 2: impulse response of output growth and inflation to Fiscal policy shocks

The response function shows that shocks to government revenue will lead to an increase in GDP growth and prices especially in the first two to three years; this means that any positive shocks on the Nigerian revenue prices and output growth will response positively. But shocks to government expenditure will lead to the declined in GDP growth while inflation rate recorded high volatility. Over the long period, shocks to revenue will lead to continues upward trend response of GDP and Prices while shocks to expenditure at long run, GDP will have no effect r but prices due with steady positive response.

Forecast Error Variance Decomposition

Variance decompositions are presented in Table 9, which help identify the main channels of influence for individual variables. Each table, below, reflects the contribution by other variables to the variance of each variable considered in turn. The numbers under each variable represent the percentage of variance of the variable analyzed that was attributable to the particular variable over a 10 year period.

Table 9: Variance Decomposition of Output growth and inflation

Variance Decomposition of LGDP: Period	S.E.	LGDP	LCPI	LREV	LEXPT
1	0.322853	98.80441	0.000000	0.612555	0.583032
2	0.432385	97.14719	0.334817	2.184637	0.333352
3	0.501386	94.83281	0.702483	4.216112	0.248598
4	0.547032	92.66604	0.948982	6.176019	0.208961
5	0.577238	90.90095	1.064616	7.846688	0.187744
6	0.597050	89.55229	1.088010	9.183069	0.176633
7	0.609973	88.54947	1.065819	10.21192	0.172795
8	0.618440	87.80363	1.037105	10.98412	0.175148
9	0.624097	87.23463	1.028481	11.55385	0.183041
10	0.628023	86.78006	1.054317	11.96981	0.195809
Variance Decomposition of LCPI: Period	S.E.	LGDP	LCPI	LREV	LEXPT
1	0.148282	1.491473	96.49400	0.323490	1.691042
2	0.201900	0.805924	94.59484	0.388116	4.211117
3	0.239345	1.048464	92.52144	0.915677	5.514422
4	0.269353	1.902952	90.05935	1.829126	6.208570
5	0.295210	3.054645	87.38503	2.969068	6.591261
6	0.318366	4.284100	84.71746	4.193096	6.805341
7	0.339532	5.464623	82.20672	5.403582	6.925074
8	0.359098	6.535566	79.92939	6.543641	6.991402
9	0.377310	7.476506	77.91026	7.585661	7.027576
10	0.394340	8.288748	76.14364	8.520673	7.046936
Cholesky Ordering: LREV LEXPT LGDP LCPI					

The interest here is, to examine the impact and predictive ability of REV and EXPT on GDP and CPI. Table 9 throws further light on the relationships among the Variables of study. According to Table 9, the real GDP accounted for its contemporary variance from its own innovations with about 98 per cent in the first year. There was little variation caused by revenue in later periods with about 2 to 11 per cent in the long run. CPI accounted about 96 per cent for its on variance. The expenditure variable increasingly contributed to variations of consumer price index with about 2 to 8 per cent. Government expenditure caused the most variations to inflation over the long term.

Analyzing the Effectiveness of Revenue and Expenditure on Prices and Gross Domestic Product in Nigeria: A Var Method

CONCLUSION

This study investigates and measures the relative impact of Government revenues and expenditure on prices and real GDP in Nigeria using annual data from 1970 to 2010. We used Johansen cointegration test. The result of cointegration test does not provide any evidence of long-run equilibrium relationship among the variables. Unrestricted vector autoregressions techniques were employed to analyze and draw policy inferences. Impulse response functions and Forecast error Variance decompositions were compute through 1000 Monte Carlo simulations. The response function shows that both the real GDP and the Prices responded positively to the shocks to government revenue more specifically in the long term but with low magnitude at the short term, while shocks to government expenditure will lead to the declined in real GDP growth in short term and with no explanation in the long term but prices responded positively. Although real GDP and prices accounted most for its contemporary variance from its own innovations but there is little variation caused by revenue in later periods of real GDP.

RECOMMENDATION

Although, an increase in Government revenues rather than government expenditure in the economy are the most influential instrument for fiscal policy in Nigeria as shown in this study. We recommended that the policy maker should give more emphasis and reliance on Government revenue (or tax) for the purpose of economic growth in Nigeria. The outcome indicates that revenue is an important variable for prediction of future output growth (GDP) and in the other case government revenue and expenditure for the little prices changes in long term.

REFERENCES

Aigbokhan, B. E (1996) Government Size and Economic Growth: The Nigeria Experience Beyond Adjustment: Management of the Nigeria Economy. *Annual Conference Proceedings, Nigerian Economic Society*.

Ajayi, S.I. (1974). The Demand for Money in the Nigerian Economy: Comments and Extensions. *Nigerian Journal of Economic and Social Studies,* Vol. 16(1): 165-173.

Aregbeyen, O. (2007). Public Expenditure and Economic Growth in Africa. *African Journal of Economic Policy*, 14(1): 1-25.

Anderson, L. C. and Jordan, J.L. (1968). Monetary and Fiscal Actions: A test of their relative Importance in Economic Stabilization, *Federal Reserve Bank of St. Louis Review*, Vol.80, 29-45

Ajisafe, R.A and Folorunso, B.A (2002), "Relative effectiveness of fiscal and monetary policy in macroeconomic management in Nigeria" *The African economic and business Review*, Vol. 3, N0. 1

Ansari, M.I. (1996) "Monetary vs. Fiscal Policy: Some Evidence from Vector Autoregressions for India". *Journal of Asian Economics,* 677-687.

Bernanke, Ben, and Ilian Mihov (1998), Measuring monetary policy, *The Quarterly Journal of Economics* (3) 870-902.

Bogunjoko, J. O. (2004) Growth Performance in Nigeria Empirical Evidence in the 20th Century *Leading Issue in Macroeconomic Management and Developmen*t; Ibadan: Nigerian Economic Society, Daily Graphics Nigeria Limited.

Central Bank of Nigeria, Statistical Bulletin, 2009.

Central Bank of Nigeria, Statistical Bulletin, 2010.

Devarajan S, Swaroop V, Zou H, 1996. The Composition of Public Expenditure and Economic Growth. *Journal of Monetary Economics*, 37: 313-344.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica, 49*(4), 1057-1072.

Ekpo, A. (1994). Public expenditure and economic growth in Nigeria 1960 to 1992. *Final Report*. AERC, Nairobi.

Enders, W. (1995). *Applied econometric time series*: Wiley New York.

Egwaikhide, F.O. (1998): Budget Deficit and Macroeconomic Management in Nigeria. In Post – Structural Adjustment Programme. *The Nigerian Journal of Economic and Social Studies*, Vol. 38 Nos. 1, 2 and 3.

Ekpo, A. H. (1994): Public Expenditure and Economic Growth in Nigeria, 1960 – 1992. Final Report: *African Economic Research Consortium (AERC)*, Nairobi, Kenya.

Engle, R.F and C.W.F Granger (1987). Cointegration and Error Correction: Representation and Testing. *Econometrica* 55: 251-276.

Folorunso, B. A and Abiola, A. G. (2000): The Long – run Determinants of inflation in Nigeria (1970 - 1998). *The Nigerian Journal of Economic and Social Studies,* Vol 42, Vol. 1 pages 37 - 52.

Johansen, S., & Juselius, K. (1990). "Maximum Likelihood Estimation and Inference on Cointegration with Applications to the Demand for Money". *Oxford Bulletin of Economics and Statistics, 52*(2), 169-210.

Johansen, S. (1991). "Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models", *Econometrica* **59**: 1551–1581.

Johansen, S. (1992). "Determination of cointegration rank in the presence of a linear trend". *Oxford Bulletin of Economics and Statistics, 54*(3), 383-397.

Johansen, S. (1995). *Likelihood-based Inference in Cointegrated Vector Autoregressive Models*, Oxford University Press, Oxford.

Johansen, S. (1988). "Statistical analysis of cointegrating vectors." *Journal of Economic Dynamic and Control* **12**(June-Sept): 231-54.

Kwiatkowski, D., Phillips, P. C. B., Schmidt, P. & Shin, Y. (1992). "Testing the null of stationarity against the alternative of a unit root: How sure are we that the economic time series have a unit root?"*Journal of Econometrics* **54**: 159–178.

Kneller R, Bleaney M, Gemmell N, (1999). Fiscal Policy and Growth: Evidence from OECD Countries. *Journal of Public Economics*, 74: 171-190.

Leeper, Eric, Christopher Sims and Tao Zha (1996), What does monetary policy do? *Brookings Paper on Economic Activity*(92) 1-63.

Lutkephl, H. & Kratzig, M.(2004) " Applied Time series Econometrics" Cambridge University press, New York.

Maddala, G.S and Kim In-Moo (1998), Unit Roots, Cointegration and Structural Change. Cambridge University Press, Cambridge.

Md. Habibur, R. (2005) "Relative Effectiveness of Monetary and Fiscal Policies on Output Growth in Bangladesh: A VAR Approach**"** Policy Analysis Unit (PAU) Research Department, Bangladesh Bank.

Mehrara, M., Pahlavani, M., and Elyasi, Y.(2011). Government Revenue and Government Expenditure Nexus in Asian Countries: Panel Cointegration and Causality. *International Journal of Business and Social Science. Vol. 2 No. 7:199-207*

Ndung'u, Njuguna (1995). Government Budget Deficit and Inflation in Kenya. *African Journal of Economic Policy*, Vol. 2, No. 2, p 19-34.

Ogiogio, G. O (1996). Planning Horizon, Government Expenditure and Economic Growth in Nigeria. *Economic Reform and Macroeconomic Management in Nigeria*, Ariyo, (ed) Ibadan: University Press, Ibadan.

Omitogun O. and Ayinla, T. A. (2007). Fiscal policy and Nigerian economic growth. *Journal in Research and National development.* Vol. 5, N0. 2

Phillips, P. C. B., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika, 75*(2), 335-346.

Philips, A. O (1997): Nigerian Fiscal Policy, 1998 -2010. *Nigerian Institute of Social Economic Research (NISER)*, Monograph Series No. 17, Ibadan.

Ram, R. (1989). Government size and economic growth: A new framework and evidence from cross -section and time – series data. *American Economic Review 76 91:* 191 -203, March.

Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica, 48*(1), 1-48.

Sims, C. A., Stock, J. H. & Watson, M. W. (1990). "Inference in linear time series models with some unit roots", *Econometrica* 58: 113–144.

Sims, C.A. (1988). Bayesian Skepticism on unit root econometrics, *Journal of economic Dynamics and Control,* 12, 463-474.