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Fiscal Policy and Economic Growth in Nigeria: Testing the Prediction of the Endogenous Growth Model

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Abstract: The objectives of this study were to examine the neutral effect of both non-productive government expenditure financed by non-distortionary taxation, positive and negative effect of productive government expenditure and distortionary taxation, respectively on economic growth in Nigeria using annual data from 1970-2005. The error correction mechanism technique was employed to analyze the data. The findings were consistent with previous empirical findings in other countries; an increase non-productive government expenditure financed by non-distortional taxes have had neutral effect on economic growth as predicted by economic theory. The productive government expenditure had positive effect on economic growth but contrary to expectation there was no evidence of distortionary effects on economic growth of distortionary taxation. Implication of this for the policy maker is that the composition of government expenditure and tax revenue is crucial in determining economic growth in Nigeria.

Key words: Fiscal policy, productive, non-productive, government expenditure, distortionary taxation, non-distortionary taxation, Nigeria

INTRODUCTION

Endogenous growth model such as Barro (1990) predicts that an increase in productive government spending financed by non-distortionary taxation will increase growth while the effect is ambiguous if distortionary taxation is used. Also, an increase in non-productive government expenditure financed by non-distortional taxes will have neutral effect on growth but if distortional taxes are used, the impact on growth will be negative. However, the problem with most of the existing studies is that they do not formally incorporate the government budget constraints into testing procedures (Ram, 1986; Easterly and Rebelo, 1993; Barro and Sala-I-Martin, 1995; Nancy and Rebelo, 1995; Engen and Skinner, 1996). Indeed, not many studies based on cointegration technique have been reported on the test of prediction of this endogenous growth model in Sub-Saharan Africa.

Specifically in Nigeria, no known study to the knowledge has done a comprehensive testing of the relevance of this prediction. It is this gap that this study attempts to fill. Specifically, the study attempts to estimate a simple model of endogenous growth by Barro (1990) and Barro and Sala-I-Martin (1992, 1995) by decomposing government expenditure into productive and non-productive and tax revenue into distortionary and non-distortionary. In this study therefore, attempt is made to test the prediction of endogenous growth model with respect to the impact of the structure of the fiscal policy on growth. More importantly, the study attempts to test the theoretical theoretical hypothesis that non-productive expenditure and non-distortionary taxes have zero effects on economic growth and that no useful information is lost if they are removed from the growth model.

Undoubtedly, findings from this study will shed light on the Nigerian macroeconomic dynamics especially on public-private partnership and provide useful inputs for macroeconomic policy formulation in developing countries like Nigeria.

Theoretical framework: In the standard neoclassical growth model, government policy can determine the level of output but is unable to have a substantial effect on the growth rate (Judd, 1985). However, endogenous model transforms the temporary growth effects of fiscal policy implied by the neoclassical model into permanent growth effect and hence growth rate (Barro and Sala-I-Martin, 1992). There are n producers, producing output (y) according to the production function:

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$$y = Ak^{1-\alpha}g^{\alpha} \quad (1)$$

Where:

A = A positive constant
k = Represents private capital
g = A publicly provided input
α = A parameter between 0 and 1

The government balances its budget in each period by raising a proportional tax on output at rate τ and lump-sum taxes of L. The government budget constraint is therefore:

$$ng + C = L + \tau ny \quad (2)$$

Where C represents government-provided consumption (non-productive) goods. The lump-sum (non-distortionary) taxes do not affect the private sector's incentive to invest in the input good whereas the taxes on output do. With an isoelastic utility function, Barro and Sala-I-Martin (1992) show that the long-run growth rate in this model (γ) can be expressed as:

$$\gamma = \lambda (1-\tau)(1-\alpha) A^{1/1-\alpha} (g/y)^{\alpha/1-\alpha} - \mu \quad (3)$$

Where λ and μ are constants that reflect parameters in the utility function, Eq. 3 shows that the growth rate is decreasing in the rate of distortionary taxes (τ) increasing in productive government expenditure (g) but unaffected by non-distortionary taxes (L) and non-productive consumption expenditure (C). The sole objective of this study is to test Eq. 3. The above specification assumed that government balances its budget each period, an assumption that is unlikely to hold in reality especially in the developing country like Nigeria. Therefore, the constraint becomes:

$$ng + C + b = L + \tau ny \quad (4)$$

Where:

b = The budget deficit/surplus in a given period
g = Productive, its predicted sign is positive
τ = Negative as it distorts incentives of private agents
C and L = Hypothesized to have zero effects on growth

Similarly, the effect of b is expected to be zero provided Ricardian equivalence holds and that the composition of expenditure and taxation remains unchanged. Suppose that growth of output at time τ i.e., Y_t is a function of conditioning (non-fiscal) variables, E_{it} and fiscal variables, F_{jt} from Eq 4:

$$Y_t = \alpha + \sum_{i=1}^{k} \beta iEit + \sum_{j=1}^{m} \delta_j Fjt + \varepsilon t \quad (5)$$

Where εt white noise error terms. In theory, if the budget constraint is fully specified $\Sigma^m j = 1$ Fjt 0 because expenditure must balance revenues. To avoid perfect collinearity in the estimation, one element of F must be omitted. The omitted variable must be that which theory suggests has neutral effect on growth, for to select any other would introduce substantial bias in parameter estimate. Equation 5 can be simplified thus;

$$Y_t = \alpha + \Sigma_{i=1}^{k} \beta iEit + \delta 1F_{1t} + \delta_2 F_{2t} + \delta_3 F_{3t} + \ldots + \delta_m F_{mt} + \varepsilon_t \quad (6)$$

$$Y_t = \alpha + \sum_{i=1}^{k} \beta iEit + \sum_{j=1}^{m-1} \delta_j Fjt + \delta_m F_{mt} + \varepsilon_{it} \quad (7)$$

We can then omit F_{mt} from Eq. 7 to obtain fiscal growth equation as shown:

$$Y_t = \alpha + \sum_{i=1}^{k} \beta iEit + \sum_{j=1}^{m-1} (\delta j - \delta m) Fjt + \varepsilon_{it} \quad (8)$$

From Eq. 8, the hypothesis test of zero coefficients for Fjt usually conducted in empirical studies, tests the null hypothesis that δ_j-δ_m= 0 and not δ_j = 0 as implicitly assumed. We actually estimate the impact of a change in one fiscal variable when there is an offsetting change in the omitted mth fiscal variable which implicitly finances the variation in the variable of interest. If the omitted category is modified, the coefficient of Fjt will be different. The implication of this is that fiscal instrument with legible effect on growth has to be omitted i.e., one for which δ_m = 0 or to omit two fiscal variables for which the hypothesis that $\delta_j = \delta_m$ cannot be rejected.

The interpretation of the coefficient of fiscal variables (δ_j - δ_m) is the effect of a unit change in the relevant variable offset by a unit change in the element omitted from the regression (Kneller *et al*., 1999). If the null hypothesis, Ho: (δ_j - δ_m) is rejected, more precise parameter estimates can be obtained if the neutral elements are eliminated from the model (i.e., $\delta_m = 0 \rightarrow (\delta_j - \delta_m) = \delta_j$ we test this).

MATERIALS AND METHODS

Model building: The specified model for estimation is equivalent of Eq. 8 using annual data 1970-2005. There is no generally agreed growth model to guide on what factors to include in a growth equation. However, those variables included in the estimated equation are dictated by the objectives of the study and more importantly, availability of data. Specifically, we shall test the prediction of endogenous growth model by adopting four variants of the growth Eq. 8 by dropping those variables which theory has found to have a zero effect on growth. In view of the discussion above, the growth models specified for estimation (including error term) are as follow:

$$Y_t = a_0 + Y_{t-1} + ENROL_t + PRINV_t + GINV_t + Dt_t + NDT_t + PGE_t + NGE_t + e_t \quad (9)$$

$$Y_t = a_0 + Y_{t-1} + ENROL_t + PRINV_t + GINV_t + Dt_t + NDT_t + PGE_t + BD_t + e_t \quad (10)$$

$$Y_t = a_0 + Y_{t-1} + ENROL_t + PRINV_t + GINV_t + Dt_t + BD_t + PGE_t + NGE_t + e_t \quad (11)$$

$$Y_t = a_0 + Y_{t-1} + ENROL_t + PRINV_t + GINV_t + Dt_t + PGE_t + BD_t + e_t \quad (12)$$

Logging both sides of the Eq. 9-12 and then obtaining their first order differentiation, each equation yields growth rates as follow:

$$y_t = a_0 + y_{t-1} + enrol_t + prinv_t + ginv_t + dt_t + ndt_t + pge_t + nge_t + e_t \quad (13)$$

$$y_t = a_0 + y_{t-1} + enrol_t + prinv_t + ginv_t + dt_t + ndt_t + pge_t + bd_t + e_t \quad (14)$$

$$y_t = a_0 + y_{t-1} + enrol_t + prinv_t + ginv_t + dt_t + bd_t + pge_t + nge_t + e_t \quad (15)$$

$$y_t = a_0 + y_{t-1} + enrol_t + prinv_t + ginv_t + dt_t + pge_t + bd_t + e_t \quad (16)$$

Endogenous models classify generally the fiscal policy instruments into:

- Distortionary taxation which weakens the incentive to invest in physical/human capital, hence reducing growth
- Non-distortionary taxation which does not affect the above incentives, therefore growth due to the nature of the utility function assumed for the private agent
- Productive expenditures that influence the marginal product of private capital henceforth boost growth
- Non-productive expenditures that do not affect the private marginal product at capital, consequently growth

In the study of Barro (1990), he defines productive expenditure as that which enter into the production function of the private agent and non-productive expenditure as that which enters into private agent's utility function. It is not theoretically clear which items of public expenditure fall under the Barro categories and as a consequence, some subjectivity cannot be entirely ruled out. The researchers therefore, aggregate the various types of expenditures and tax revenues in the functional classification of IMF and OECD but with the exception of expenditure on agriculture which is being considered productive in the context of Nigerian economy.

y_t is gross domestic product growth rate which proxied output growth rate, enrol is the enrolment growth rate proxied human capital development growth rate, prinv and ginv stand for private investment growth rate and government investment growth rate. dt and ndt represent growth rate distortionary taxation and non-distortionary taxation proxied company income tax and custom and excise duty growth rate, respectively.

pge stands for productive government expenditure growth rate which is the component of expenditure on education, health, transport and communication and agriculture while nge represents non-productive government expenditure growth rate, which is equally the component of expenditure on general public service or administration and internal security.

Equation 13 is the general fiscal growth equation. Budget deficit only is dropped from the equation purposely to avoid estimating an identity and it is assumed to have negative effect in the short run but likely to have neutral effect on growth if Richardian equivalence holds. In the Eq. 14, non-productive government consumption expenditure is excluded while retaining all the other expenditure and revenue items and then testing for zero coefficient of the non-distortionary tax revenue (neutral element).

While in the Eq. 15, non-distortionary tax revenue is removed and all other fiscal variables including non-productive government expenditure and non-fiscal variables were retained and test for the zero coefficient of the non-productive consumption expenditure (neutral element). We now dropped both neutral elements of fiscal policy in the Eq. 16 while retaining other variables and theoretically, the omitted variables should be insignificant in the model. This is like imposing common zero restriction on coefficients of both elements and the expectation, based on the theory is that both should have zero effect on long run growth. If null hypothesis is not rejected then Eq. 16 should yield more precise parameter estimates with lower standard errors of the remaining fiscal variables.

Since, data employed are time series, we therefore used an Ordinary Least Square (OLS) method of estimation. In other to avoid spurious result, we first test for the order of integration of the individual series by conducting Unit root test for stationarity. According to Engle and Granger (1987), a non-stationary series is said to be integrated of order d if it can be made stationary by differencing it d times; expressed as $X_t \sim I$ (d). After confirming firstly that the series are generated by first order autoregressive process i.e., AR(1) of the form:

$$y_t = y_{t-1} + \varepsilon_t \quad (17)$$

Because of the possible autocorrelation, the above equation is extended to allow for AR (n) process yielding Augmented Dickey Fuller (ADF) test of the term:

$$\Delta y_t = \beta y_{t-1} + \sum_{i-1}^{n} \beta i \Delta y_{t-i} + \varepsilon_t \quad (18)$$

Where:

y_t = A particular variable
β = Parameter
e_t = Error terms assumed to be white noise i.e., $\varepsilon_t \sim$ IID $(0, \sigma^2)$

Philip-perron-z test will be employed along with ADF test as Pesaran and Pesaran (1997) argued that the ADF unit root testing procedure is not very powerful in finite samples hence, the Philips-Perron (PP) (Philips and Perron, 1988) unit root test is used as one alternative.If the variables of concern are all stationary at level, we then run an OLS regression of the variables on levels and test for cointegration by testing that the residual is I(0). The superior test for cointegration when there are many variables like this study is Johansen test.

The existence of cointegration allows for analysis of the short run dynamic model that identifies adjustment to the long run equilibrium relationship through the error correction model representation.

It follows that cointegration is a necessary condition for error correction model to hold (Engle and Granger, 1991). Hylleberg and Mizon (1989) have given a detailed analysis of cointegration and error correction mechanism. Also, Philips and Loretan (1991) have considered a variety of ways of representing cointegrated systems with particular emphasis on error correction model representation. Indeed, such models incorporate both the economic theory relating to the long run relationship between variables and short run disequilibrium behaviour. The next step is the adoption of the short run model with an error correction mechanism. Adopting the Engle and Granger representation, we employ an error correction dynamic specification of the form:

$$\Delta y_t = \alpha_0 \Delta Z_t + \alpha_2 (Y - Z)_{t-1} + e_t \quad (19)$$

For real Y_t where Z is the vector of variables that cointegrate with each growth equation. Alternatively, Eq. 19 can be written as:

$$\Delta Y_t = \alpha_o L\ \Delta Z_t + \alpha_2 ECM_{t-1} + e_t \quad (20)$$

Where, L is lag operator and ECM is the time series of residuals from the cointegrating vector. Equation 20 incorporates a corrective mechanism by which previous disequilibria in the relationship between the level of growth rate of output and the level of one or more of one or more of its determinants are permitted to affect the current change in growth.

In this way, an allowance is made for any short run divergence in output growth rate from the long run target holding.

Equation 20 can then be reduced to a parsimonious equation through the elimination of insignificant terms and the imposition of constraints that hold a reasonable approximation (Adams, 1992; Buoghton, 1991). The result of re-parameterization of this equation is then used in further analysis.

Models estimation

Unit root tests: Taking into consideration the steps suggested in the previous study, we start by testing for the order of integration of the variables which appear in the models. In other to characterize the time series property of the variables of the interest, both Augmented Dickey Fuller (ADF) and Phillip-perron-z tests were employed. All variables are regarded as non-stationary at their levels since each reported absolute t-value is not >5% critical values of both ADF and PP test which are 2.94 and 3.64, respectively with a sample size of 36. The null hypothesis of non-stationary is not rejected for all the series investigated in level. Summarily, the results of these tests are shown in Table 1, these suggest that there is the presence of a unit root in each of the variable investigated.

Table 1: Unit root tests for the variables

Variables	ADF	PP	ADF	PP	Remark
GGDP	-0.968	-1.174	-2.806	-5.344	I (1)
GENROL	-1.327	-1.673	-3.093	-3.234	I (1)
GPINV	-0.912	-1.232	-4.365	-7.126	I (1)
GGINV	-0.627	-0.484	-3.929	-5.930	I (1)
GPGE	-1.191	-1.264	-4.285	-5.273	I (1)
GUGE	0.659	1.077	-4.227	-6.493	I (1)
GDT	0.158	-0.109	-3.815	-6.671	I (1)
GNDT	0.473	0.388	-4.420	-6.601	I (1)
FDCT	-1.676	-2.798	-6.234	-9.967	I (1)

Table 2: Johansen cointegration test

Eigenvalue	Likelihood ratio	5% critical value	1% critical value	Hypothesized No. of CE(s)
0.929648	236.2722	156.00	168.36	None**
0.760939	148.6823	124.24	133.57	At most 1**
0.612187	101.4581	94.15	103.18	At most 2*
0.537125	70.19942	68.52	76.07	At most 3*
0.424724	44.77960	47.21	54.46	At most 4
0.369885	26.53371	29.68	35.65	At most 5
0.187405	11.29256	15.41	20.04	At most 6
0.126001	4.444317	3.76	6.65	At most 7*

GGDP GENROL GGINV GPRINV GDT GNDT GPGE GUGE Lags interval: 1-1

Tests of cointegration: The result of the unit root test shows that all the variables are random walk processes. It does not however, imply that in the long run the variables could express long run convergence i.e., long run equilibrium. Because of the problems of choosing the right lag length and the assumption of cointegrating vector captured by the cointegrating regression (i.e., stationary residual) assumed in Engle and Granger 2-step procedure, this study therefore employed Johansen cointegration test which is a superior test that lies on asymptotic property (like this study) and therefore, sensitive to error in small sample.

It is also robust to many departures from normality as it gives room for the normalization with respect to any variable in the mode that automatically becomes a dependent variable.

It also allows cointegration test to be carried out when the variables are of different orders of integration and gives room for the application of Error Correction Mechanism (ECM).

The results of the cointegration as shown in Table 1 revealed that there was at least one cointegration relationship in each model among the various indicators of fiscal policy and growth Table 2.

Specifically, the results of the cointegration test suggested that economic growth had equilibrium condition with both fiscal and non-fiscal policy variables which kept them in proportion to each other in the long run.

This evidence of cointegration among the variables ruled out spurious correlations and implied that at least one direction of influence could be established among the variables.

The null hypothesis of no cointegration was therefore rejected as the result reveals the presence of cointegrating relationship and we thus conclude that there exist stable equilibrium relations among the variables notwithstanding that the individual variables are non-stationary. The results of the estimates of Eq. 13-16 are hereby presented.

Table 3: Effect of explanatory variables

Variables	Model 13	Model 14	Model 15	Model 16
Constant	2.94 (4.34)	2.90 (4.03)	3.18 (4.37)	3.12 (4.40)
GPGE	0.04 (0.42)	-0.03 (-0.39)	-0.05 (-0.49)	-0.07 (-0.72)
GNGE	-0.21 (-1.62)	-	-0.06 (-0.51)	-
GGINV	0.48 (2.32)	0.47 (2.08)	0.65 (2.90)	0.62 (2.91)
GNDT	0.44 (2.37)	0.27 (1.57)	-	-
GDT	0.29 (1.37)	0.28 (1.19)	0.42 (1.85)	0.40 (1.81)
GENROL	-0.31 (-1.19)	-0.05 (-0.26)	-0.18 (-0.66)	-0.11 (-0.46)
GPRINV	0.04 (1.08)	0.03 (0.82)	0.04 (0.82)	0.04 (0.80)
FDCT	-	-0.06 (-0.32)	-0.14 (-0.78)	-0.14 (-0.76)
R^2	0.991	0.990	0.990	0.990
RSS	1.732	1.889	2.036	2.056
F-STATISTIC	427.8	392.1	363.4	434.9
D.W STAT.	1.814	1.711	1.674	1.681

Table 2 shows that coefficient of determination, R^2 which account for the over all effect of explanatory variables on the dependent variable in all the models do not significantly different from one another despite the omission of non-productive government expenditure or non-distortionary or both and this is in line with the theory (Table 3).

Error correction representation: It involves moving from over-parameterization modelling to parsimonious. In general, the equation estimates an over-parameterized error correction model by setting the lag length long enough in order to ensure that the dynamics of the models have not been constrained by too short lag length but 2 years lag was considered adequate in this study. In the initial over-parameterized model, all the variables were lagged equally but these models seem difficult to interpret.

We therefore, derived parsimonious model for analysis from the over-parametised error correction model by adopting the General to Specific (GTS) methodology. This reduction is carried out by eliminating the variables with insignificant coefficients successively based on the imposition on these variables zero coefficients as they bear low t-statistics of <2.0 approach or >0.05 probability values. The resulting Schwarz Information Criterion and Standard Error were employed as a guide to parsimonious reduction. A fall in both values is indication of model parsimony.

RESULTS AND DISCUSSION

Table 3 shows static long run, the omission of non-productive government expenditure and non-distortionary taxation have no significant effect or zero effect on the magnitude and/or signs of other variables in the model. Similarly, the coefficient of determination, R^2 which account for the over all effect of explanatory variables on the dependent variable in all the models do not significantly different from one another despite the omission of non-productive government expenditure or non-distortionary or both and this is in line with the theory.

As shown in Table 3, the coefficient of determination which measures the overall proportion of changes in the dependent variable that could be explained by the independent variables are 99, 98, 98 and 98%, respectively, therefore both non-productive government expenditure and non-distortionary taxation have no over all significant effect in models and on the magnitudes and/or signs of the other variables in the model which is in line with Barro (1990) and Kneller *et al.* (1999) and Richard *et al.* (2001) who followed Helms (1985). They posit that these variables have no significant effect on the magnitudes and/or signs of the other variables in the model.

The contemporaneous as well as the lag variables presented are in their log-linear form which implies that the coefficient estimate in all the models are elasticities showing the percentage changes in the exogenous variables that condition the percentage change in the endogenous variables (economic growth) proxied by GDP. The overparameterised fiscal policy model is simplified until theory consistent and data coherent results are achieved by one by one deleting of the insignificant variables (Table 4).

The results show that the resulting Schwartz Criterion reduced from 1.414-0.858 and from 1.287-0.605 in and similarly, from 1.171 and 1.283-0.463 and 0.786, respectively all in the parsimonious model. This is an indication that model parsimony is being achieved as the variables are being reduced. The short run dynamic specification (Table 4) explanatory variables jointly account for 52, 58, 60 and 55% in all the models.

The results also show that the coefficient of the error correction term are negatives and at the same time significant with a very low probability value of not >0.05 in all the models. The values in absolute terms are 1.23, 0.69, 0.84 and 1.04 indicating that 123, 69, 84 and 104% of the disequilibrium in the gross domestic product percapita in the previous year and are corrected in the next period (Table 4).

The F values for all the models show that Z values are significant while the standard error is low in all the model. The values of DW are approximately 2, hence there is absence of serial autocorrelation among the residual in each model.

Therefore, the models are adequate and sufficient to explain variation in the economic growth variable. As a result we strongly belief that zero effect of non-productive government expenditure and non-distortionary taxes variables hold in Nigeria.

Table 4: The overparametrised fiscal policy model

Variables	Model 13	Model 14	Model 15	Model 16
GGDP				
1	0.6201	-0.365	-	-
	(1.76)	(-1.38)	-	-
2	0.3727	-	-	.357
	(1.25)	-	-	(1.02)
GENROL				
1	-	-0.859	-	-
	-	(-1.37)	-	-
2	-0.7148	-1.124	-1.170	-1.595
	(-1.06)	(-1.76)	(-1.85)	(-2.22)
GPRINV				
1	-0.1692	-	-0.1098	-0.0794
	(-2.78)	-	(-2.12)	(-1.33)
2	-	0.0881	-	0.0498
	-	(2.13)	-	(1.09)
GGINV				
1	0.6081	-	-0.7441	-0.5139
	(-2.22)	-	(-3.28)	(-2.15)
2	-	-	-	-0.2577
	-	-	-	(-1.12)
GDT				
1	0.6948	0.5093	0.5303	0.3851
	(2.48)	(2.26)	(2.30)	(1.36)
2	-	-	-	-
	-	-	-	-
GNDT				
1	-0.3248	-	-	-
	(-1.36)	-	-	-
2	-	0.2432	-	-
	-	(1.45)	-	-
GPGE				
1	-0.2982	-	-	-
	(-2.18)	-	-	-
2	0.2478	-	0.2543	0.3529
	(1.99)	-	(2.53)	(2.65)
GUGE				
1	0.5051	-	0.4335	-
	(2.95)	-	(2.84)	-
2	-	-	-	-
	-	-	-	-
FDCT				
1	-	-	-	-
	-	-	-	-
2	-	0.4536	0.2913	0.2943
	-	(2.939)	(1.87)	(1.65)
ECM	-1.23	-1.6912	-0.8395	-1.0408
	(-2.84)	(-2.09)	(-2.77)	(-2.93)
R^2	0.5239	0.5889	0.6034	0.5568
SE	0.2541	0.2309	0.2220	0.2451
DW	1.9033	2.1462	2.1597	1.8732
F value	0.0035	0.0057	0.0017	0.0224

CONCLUSION

The econometric findings presented in this study describe that an increase in non-productive government expenditure financed by non-distortional taxes had neutral effect on economic growth proxy, the GDP in Nigeria over the period covered by the study. Also, it was found out that the findings demonstrated that the productive government expenditure had positive effect on economic growth i.e., productive government expenditure is growth-enhancing. These are consistent with the consensus or general view in the literature. However, contrary to expectation distortionary taxation is positively correlated with economic growth. This may be attributed to inefficiency in the tax system as the problem of tax evasion and avoidance are still rampant most especially in the developing countries like Nigeria. Thus, the study concluded that the components of government expenditure and tax revenue matter in determining economic growth.

APPENDIX

Data source: The study is based on annual data over 1970-2005. All data series were gathered from the statistical bulletin published by the Central Bank of Nigeria.

Definition of variables:

GGDP	:	Growth rate of Gross Domestic Product
GPGE	:	Growth rate of Productive Government Expenditure
GNGE	:	Growth rate of Non-Productive Government

Expenditure:

GDT	:	Growth rate of Distortionary Taxation
GNDT	:	Growth rate of Non-Distortionary Taxation
GENROL	:	Growth rate of Total Enrolment (pry.sch.+sec.sch.+Tertiary)
GGINV	:	Growth rate of Government Investment
GPINV	:	Growth rate of Private Investment
FDCT	:	Growth rate of Budget Deficit

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