PRODUCTIVITY OF THE NIGERIAN TAX SYSTEM: 1980-2010

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This research paper examines the productivity of the Nigerian tax system for the period 1980-2010. The Ordinary Least Squares (OLS) regression analysis was utilized to evaluate the productivity of the tax system over the stated period. The study reveals that most of the major tax sources recorded low elasticity estimates, which implies that they failed to fully exploit the nation's taxable capacity potential. The paper thus reports an overall unsatisfactory level of productivity of the tax system over the stated period. It advocates for a significant restructuring of the tax system to enhance its efficiency and productivity.

Key words: Productivity, Tax System, GDP

INTRODUCTION

Nigeria's tax system has over the years had to grapple with enormous challenges ranging from an unreliable taxpayer data base and general tax payer apathy to conflicting tax laws and an ill-equipped and inefficient tax administrative bureaucratic set-up (Anyaduba, 2006). To attain optimum tax performance and harness fully. the nation's tax revenue potential, the myriad of problems confronting the tax system need to be addressed. The level of the productivity of the tax system serves as a litmus test of progress made in this direction, as it is a reflection of the taxable capacity efforts of the system. Thus, the need for an examination of the productivity of the tax system, which enables us to ascertain its taxable capacity and obtain a reasonably accurate estimation of the nation's tax revenue profile cannot be overemphasized, moreso when the nation has had to contend with a fiscal deficit crises that has lingered on for over three decades. Nigeria has recorded huge unsustainable fiscal deficits over the last thirty years, most of which have exceeded the benchmark set by the World Bank/IMF of 3 per cent of GDP (see Table I). In order to exploit the full potential of the tax-based revenue, the tax system ought to be highly efficient and effective, thereby enhancing its productivity and ensuring the attainment of optimum tax performance.

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In this paper, we shall attempt to provide answers to the following questions:

(i) How responsive was the tax system to the discretionary and non-discretionary tax measures undertaken over the stated period?

(ii) What was the relative contribution of each tax source to the aggregate tax yield over the stated period?

On the basis of the foregoing issues, the main objective of the paper is to examine the productivity of the Nigerian tax system for the period 1980-2010.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Tax Productivity Measures

The productivity of a tax system is a reflection of its level of performance, in relation to its taxable capacity and is usually evaluated by elasticity and buoyancy measurement parameters. Various writers have over the years come up with different methods and approaches for deriving the productivity of taxes and tax systems. Notable amongst them are Sahota 1961; Prest 1962; Singer 1968; Mansfield 1972; Khan 1973; Wilford and Wilford 1978; Ehdale 1990; Osoro 1993; Ariyo 1997; Kusi 1998 and Karras and Furceri 2009.

The tax productivity model utilized for the study was in the mould of Prest (1962) as modified by Osoro (1993). It was considered appropriate due to its ability to identify the relative contribution of each tax source to revenue growth, and also its ability to differentiate the discretionary from the non-discretionary tax measures. The model decomposed the income elasticity of each category of tax into two elements namely, tax-to-base and base-to-income, implying that the elasticity of each tax was the product of its elasticity in relation to its base, and invariably the elasticity of the base to income. The tax sources that brought about rapid revenue growth as well as those responsible for sluggish revenue growth were identified. The growth components that were amenable to direct government influence were also identified. Thus, while the tax-to-base was under the direct control of the relevant authorities, the base-to-income was beyond their direct sphere of influence.

According to Mansfield (1972), the tax revenue-to-income elasticity of a system of n taxes is the weighted sum of the individual tax elasticities and is expressed as follows:

Elasticity of total tax revenue to income

$$ET_t^Y = (\Delta T_t / \Delta Y)(Y / T)$$

Elasticity of kth individual tax to income

$$ET_t^Y = (\Delta T_k / \Delta Y)(Y / T_k)$$

Elasticity of kth individual tax to base

$$ET_k B_k = (\Delta T_k / \Delta B_k)(Y / T_k)$$

Elasticity of kth individual base to income

$$ET_k Y = (\Delta B_k / \Delta Y_k)(Y / B_k)$$

Where:

T_t	=	total tax revenue
T_k	=	tax revenue from kth tax
Y	=	income measured by GDP
B_k	=	base of the kth tax
Δ	=	discrete change in the variable associated with it

A system of **n** taxes would thus be expressed as follows:

$$ET_t^Y = \frac{T_1}{T_t}\left[\frac{\Delta T1}{\Delta Y} \times \frac{Y}{T_t}\right] + \ldots + \frac{T_k}{T_t}\left[\frac{\Delta T_k}{\Delta Y} \times \frac{Y}{T_k}\right] + \ldots + \frac{T_n}{T_t}\left[\frac{\Delta T_n}{\Delta Y} \times \frac{Y}{T_n}\right] \ldots\ldots\ldots(1)$$

From equation (1), the elasticity of total tax revenue to income is equal to the weighted sum of the individual tax elasticities, where the weights are the fractional distribution to total tax by each individual tax.

The elasticity of an individual tax could thus be decomposed into the product of the elasticity of the tax-to-base and the elasticity of the base-to-income as follows:

$$ET_k^Y = \left[\frac{\Delta T_k}{\Delta B_k} \times \frac{B_k}{T_k}\right]\left[\frac{\Delta B_k}{\Delta Y} \times \frac{Y}{B_k}\right] \ldots\ldots\ldots(2)$$

The combination of equations (1) and (2) would yield equation (3) below:

$$ET_k^Y = \frac{T_1}{T_t}\left[\left(\frac{\Delta T_1}{\Delta B_1} \times \frac{B_1}{T_1}\right)\left(\frac{\Delta B_1}{\Delta Y} \times \frac{Y}{B_1}\right)\right] + \ldots + \frac{T_k}{T_t}\left[\left(\frac{\Delta T_k}{\Delta B_k} \times \frac{B_k}{T_k}\right)\left(\frac{\Delta B_k}{\Delta Y} \times \frac{Y}{B_k}\right)\right] + \ldots + \frac{T_n}{T_1}$$

$$\left[\left(\frac{\Delta T_n}{\Delta B_n} \times \frac{B_n}{T_n}\right)\left(\frac{\Delta B_n}{\Delta Y} \times \frac{Y}{B_n}\right)\right] \ldots\ldots\ldots(3)$$

This is thus the elasticity of total revenue to income in a system of **n** taxes where the elasticity is dependent on the product of the elasticity of the tax-to-base and the elasticity of the base-to-income for each separate tax, weighted by the importance of each tax to the total tax system. Mansfield thus concluded that equation 3 can permit the identification of the sources of revenue growth and the identification of that part of the revenue growth which is directly controlled by policy makers. Generally, the elasticity concept assumes that a high value elasticity estimate (i.e. greater than 1) is a reflection of a high contribution to revenue growth, while a low value elasticity estimate (i.e. less than 1) implies a low contribution to revenue growth.

Our adopted model for the elasticity estimation is thus presented as follows:

$T_k = a_k Y^{-k}_{er}$

Where:

T_k	=	tax revenue
a_k	=	intercept concept
Y	=	real GDP
K	=	estimate of elasticity for kth tax
e_r	=	error term

It is converted to log-linear form as follows:

$\text{Log TR} = a_0 + K_1 \log Y + er$

Where:

TR	=	tax revenue
a_0	=	intercept concept
Y	=	real GDP
K_1	=	estimate of elasticity for kth tax
er	=	error term

- The elasticity of a tax refers to the degree of its responsiveness to automatic non-discretionary (in-built) measures taken by the authorities, which may increase its yield.
- The buoyancy of a tax refers to the degree of its responsiveness to discretionary measures taken by the authorities which may increase its yield.

Changes in tax yield are usually reflected in the growth of the tax base or coverage which is proxied by GDP changes.

METHODOLOGY

A research design was developed to quantitatively determine the elasticity and buoyancy of the major tax sources as well as the relative contribution of each tax source to the aggregate tax yield between 1980-2010. The data used was essentially secondary data obtained from various sources such as the Nigeria Bureau of Statistics (NBS), the Federal Inland Revenue Service (FIRS) and the Central Bank of Nigeria (CBN).

Model Specification

We utilized a productivity model proposed by Prest (1962) and adopted by Osoro (1993). Following difficulties encountered in trying to isolate the effects of the discretionary tax measures from the effects of the non-discretionary tax measures, we adopted an aggregative elasticity approach, whereby an aggregate elasticity and buoyancy effect was obtained in the decomposition process of tax-to-base and base-to-income (GDP). In the decomposition of the aggregate measurement parameter into tax-to-base and base-to-income (GDP), we introduced proxy bases for the respective tax sources. We also disaggregated the Non-Oil Gross Domestic Product (NGDP), from the total GDP in order to capture the dominant position of crude oil revenue, and also so as not to distort any developments in the non-oil sector.

Under the model, changes in the aggregate yield of the major tax sources TR (which proxied for tax performance) is stated as a function of the discretionary and non-discretionary tax measures undertaken as reflected in the GDP.

The model is explicitly specified as follows:

$$TR = aY^{-b}_{er} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

TR	=	tax revenue
Y	=	real GDP
a	=	intercept concept
b	=	estimate of elasticity for the bth tax
er	=	error term

The model is presented in log-linear form as follows:

$$LogTR = a_0 + b_1 LogY + er \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

The functional form of the elasticity of the tax revenue to income (GDP) in respect of the tax sources and their bases is thus presented as follows:

(i)	LogTR	=	$a_0+b_1 logGDP+er$	.....(3)
(ii)	LogNOR	=	$a_0+b_1 logNGDP+er$	
(iii)	LogCED	=	$a_0+b_1 logGDP+er$	
(iv)	LogCED	=	$a_0+b_1 logIMEXM+er$	
(v)	LogPPT	=	$a_0+b_1 logGDP+er$	
(vi)	LogPPT	=	$a_0+b_1 logTOS+er$	
(vii)	LogCIT	=	$a_0+b_1 logGDP+er$	
(viii)	LogCIT	=	$a_0+b_1 logCP+er$	
(ix)	LogVAT	=	$a_0+b_1 logGDP+er$	
(x)	LogVAT	=	$a_0+b_1 logTCX+er$	

Where:

TR	=	Tax Revenue
NOR	=	Non-Oil Revenue
CED	=	Customs and Excise Duties
PPT	=	Petroleum Profits Tax
CIT	=	Companies Income Tax
VAT	=	Value Added Tax
IMEXM	=	Imports, Exports and Manufactures
TOS	=	Total Oil Sales
CP	=	Corporate Profits
TCX	=	Total Consumption Expenditure
GDP	=	Gross Domestic Product
NGDP	=	Non-Oil Gross Domestic Product
a_0	=	intercept concept
b_1	=	coefficient of tax elasticity
er	=	error term

Lagged Value

A one-year time lag of the explanatory variables was added to the equations to highlight the economic implications of the administrative lags usually experienced between the date of the announcement of the budget and its actual implementation.

The resulting equation following the introduction of the lagged values is stated as follows:

$$LogTR_t = a_0 + b_1 logGDP_t + b_2 logGDP_t + er \quad .....(4)$$

Impact of SAP

To ascertain the impact of the Structural Adjustment Programme (SAP) on the tax yield, we adopted the Dummy Variable Technique (DVT) proposed by Singer (1968), whereby a dummy variable D_i was introduced for each year that an exogenous tax policy change occurred as follows:

$$LogTR_t = a_0 + b_1 logGDP_t + b_2 logGDP_{t-1} + \Sigma_i D_i + er \quad \ldots\ldots\ldots\ldots\ldots (5)$$

Where:

$D_i(i=0,1)$ takes a value of 1(one) for each year that there was an exogenous change in tax policy and 0(zero), where there was no such change.

Thus, the resulting equation following the introduction of the dummy variable is stated as follows:

$$LogTR_t = a_0 b_1 + logGDP_t + b_2 logGDP_{t-1} + b_3 D_1 + er \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Second Dummy

Another dummy variable D_2 was also introduced to enable us derive the slope of the dummy function. The value of the second dummy variable D_2 in respect of each of the basic equations is stated as follows:

(i) $D_2 = D_1 \times GDP$
(ii) $D_2 = D_1 \times NGDP$
(iii) $D_2 = D_1 \times GDP$
(iv) $D_2 = D_1 \times IMEXM$
(v) $D_2 = D_1 \times GDP$
(vi) $D_2 = D_1 \times TOS$
(vii) $D_2 = D_1 \times GDP$
(viii) $D_2 = D_1 \times CP$
(ix) $D_2 = D_1 \times GDP$
(x) $D_2 = D_1 \times TCX$

The basic equations with their lagged values and dummy variables are thus finally presented as follows:

(i) $LogTR_t = a_0 + b_1 logGDP_t + b_2 logGDP_{t-1} + b_3 D_1 + b_4 D_2 + er \ldots\ldots (7)$
(ii) $LogNOR_t = a_0 + b_1 logNGDP_t + b_2 logNGDP_{t-1} + b_3 D_1 + b_4 D_2 + er$
(iii) $LogCED_t = a_0 + b_1 logGDP_t + b_2 logGDP_{t-1} + b_3 D_1 + b_4 D_2 + er$

(iv) $LogCED_t = a_0 + b_1 logIMEXM_t + b_2 logIMEXM_{t-1} + b_3D_1 + b_4D_2$

(v) $LogPPT_t = a_0 + b_1 logGDP_t + b_2 logGDP_{t-1} + b_3D_1 + b_4D_2 + er$

(vi) $LogPPT_t = a_0 + b_1 logTOS_t + b_2 logTOS_{t-1} + b_3D_1 + b_4D_2 + er$

(vii) $LogCIT_t = a_0 + b_1 logGDP_t + b_2 logGDP_{t-1} + b_3D_1 + b_4D_2 + er$

(viii) $LogCIT_t = a_0 + b_1 logCP_t + b_2 logCP_{t-1} + b_3D_1 + b_4D_2 + er$

(ix) $LogVAT_t = a_0 + b_1 logGDP_t + b_2 logGDP_{t-1} + b_3D_1 + b_4D_2 + er$

(x) $LogVAT_t = a_0 + b_1 logTCX_t + b_2 logTCX_{t-1} + b_3D_1 + b_4D_2 + er$

PRESENTATION AND ANALYSIS OF RESULTS

The data schedule for the study spanning 30 years (1980-2010) is presented in Appendix I. With the aid of an econometric software known as Microfit 4.1, data spanning 30 years (i.e. 1980-2010) was estimated and the following results were obtained.

Table 4.1 Aggregate Tax Elasticity Results (1980-2010)

Equation	Constant	Elasticity coefficient	Elasticity coefficient lagged values	F-statistic	R^2	DW	SER
(i)LNTR	-2.464	0.742	0.340	364.93	0.969	1.913	0.381
	(-4.503)	(4.018)	(1.844)				
(ii)LNNOR	-1.738	0.546	0.494	129.06	0.964	1.954	0.391
	(-2.897)	(4.551)	(4.134)				
(iii)LNCED (source)	-2.695	0.516	0.417	294.30	0.984	2.010	0.236
	(-7.355)	(5.065)	(4.147)				
(iv)LNCED (base)	-1.154	0.513	0.337	181.45	0.974	2.172	0.299
	(-1.992)	(8.631)	(5.677)				
(v)LNPPT (source)	-3.329	0.594	0.463	91.53	0.951	2.049	0.486
	(-1.422)	(3.504)	(2.790)				
(vi)LNPPT (base)	-0.162	0.736	0.166	145.53	0.968	2.078	0.389
	(-0.092)	(5.720)	(1.327)				
(vii)LNCIT (source)	-5.119	0.580	0.476	466.10	0.990	1.847	0.214
	(-7.703)	(9.072)	(7.582)				
(viii)LNCIT (base)	-1.230	1.022	-0.020	276.90	0.999	1.997	0.028
	(-37.310)	(24.383)	(-0.470)				
(ix)LNVAT (source)	-10.680	9.207	-7.865	1.08	0.764	2.683	0.620
	(-3.263)	(2.274)	(-1.974)				
(x)LNVAT (base)	-2.168	1.156	-0.192	10.88	0.685	1.267	0.685
	(-0.770)	(1.755)	(-0.297)				

The t-statistics are in parentheses below each parameter estimate.
Source: Researcher's Computations, 2010.

Table 4.2: SAP and Tax Elasticity Results (1980-2010)

Equation	Constant	Elasticity Coefficient	Elasticity Coefficient Lagged Value	Shift (D1) Intercept	Slope (D2)	F-statistics	R^2	DW	SER
(i)LNTR	-1.097	0.723	0.231	0.157	0.000000832	68.41	0.970	2.222	0.409
	(-1.075)	(3.417)	(1.150)	(0.543)	(1.650)				
(ii)LNNOR	-2.880	0.866	0.273	0.058	-0.00000170	301.59	0.983	1.905	0.277
	(-5.444)	(7.596)	(3.069)	(0.309)	(-4.167)				
(iii)LNCED (source)	6.205	0.220	0.217	-0.636	0.000000599	145.61	0.981	1.954	0.274
	(1.913)	(2.482)	(2.481)	(-2.154)	(0.608)				
(iv)LNCED (base)	-0.957	0.501	0.307	0.380	0.000000100	116.944	0.976	2.042	0.305
	(-1.090)	(6.387)	(4.147)	(1.341)	(0.174)				
(v)LNPPT (source)	1.970	0.298	0.331	-0.262	0.00000277	60.56	0.966	2.130	0.433
	(1.002)	(1.502)	(2.005)	(-0.526)	(3.147)				
(vi)LNPPT (base)	1.359	0.804	-0.006	-0.235	0.00000253	203.59	0.986	2.071	0.271
	(1.767)	(6.439)	(-0.047)	(-0.834)	(2.495)				
(vii)LNCIT (source)	-3.061	0.444	0.431	0.096	0.00000121	426.62	0.993	2.081	0.183
	(-4.181)	(6.377)	(7.260)	(0.545)	(3.546)				
(viii)LNCIT (base)	-1.167	1.021	0.0258	0.001	0.000000812	424.00	0.999	2.3218	0.025
	(-25.333)	(34.863)	(-0.856)	(0.056)	(1.634)				
(ix)LNVAT (source)	-18.599	1.537	0.473	*_____	0.00000222	10.17	0.772	1.426	0.504
	(-2.009)	(1.959)	(1.031)	*_____	(-1.442)				
(x)LNVAT (base)	-2.246	*_____	0.997	*_____	-0.00000171	7.20	0.590	1.518	0.642
	(-0.316)	*_____	(1.709)	*_____	(-0.215)				

*Not available

Note: Dummy variable, D_1 is not applicable as VAT had not come into existence during the pre-SAP era (i.e. 1980-85)

The t-statistics are in parentheses, below each parameter estimate.

Source: Researcher's computations, 2010.

EMPIRICAL FINDINGS

Table 4.1

It is observed that the coefficient of Multiple Determination (R^2) of the total tax revenue was 0.969, implying that approximately 97 per cent of the systemic variations in the aggregate tax yield, **TR** were explained by the major tax sources. Most of the explanatory variables thus had a high explanatory power and were also statistically significant. The adjusted R-bar square ($\bar{R}^2$) also had a coefficient value of 0.966, implying that about 97 per cent of the systemic variations in the aggregate tax yield, **TR** were adequately accounted for by the model, thus leaving only 3 per cent to autonomous influences after adjusting for the degree of freedom at 5 per cent level of significance. The Standard Error of Regression (SER) value of 0.38 confirmed the reliability and

predictive power of the model. The Durbin-Watson (DW) auto-correlation test estimate of 1.91 provided reasonable proof of the absence of any auto-correlation disturbances, thus confirming that the standard errors were minimized

The Customs and Excise Duties (CED) variant had a statistically significant elasticity coefficient value of 0.516 which was under unity (i.e. less than 1), implying that it was inelastic and the tax yield sub-optimal. It did not therefore fully respond to the tax measures undertaken. The lagged value of 0.417 was also lower than the current value of 0.516, thus confirming the relative influence of the time-lag with respect to the tax yield.

The Petroleum Profits Tax (PPT) variant had a statistically significant elasticity coefficient value of 0.594 which was under unity (i.e. less than 1), implying that it was inelastic with a sub-optimal tax yield. It thus failed to respond fully to the tax measures undertaken. It had a lagged value of 0.463 which was lower than the current value of 0.594, thus confirming the relative influence of the time-lag with respect to the tax yield.

The Companies Income Tax (CIT) variant had a statistically significant elasticity coefficient value of 0.580 which was under unity (i.e. less than 1), implying that it was inelastic and invariably recorded a sub-optimal performance. It therefore failed to respond fully to the tax measures undertaken. The lagged value of 0.476 was lower than the current value of 0.580, thus confirming the relative influence of the time-lag with respect to the tax yield.

The Value Added Tax (VAT) variant had a statistically significant elasticity coefficient value of 9.207, which was in excess of unity (i.e. greater than 1), implying that it impacted significantly on changes in the aggregate tax yield. It thus responded optimally to the tax measures undertaken. The lagged value of -7.865 was lower than the current value of 9.207, thus confirming the influence of the time-lag with respect to the tax yield.

Table 4.2

The derived productivity indices of the major tax sources and their bases with respect to SAP and the tax yield obtained between 1980-2010 are provided in Table 4.2. The value of the Coefficient of Multiple Determination (R^2) of the total tax revenue was 0.970, implying that approximately 98 per cent of the systemic variations in the aggregate tax yield **TR** (following the introduction of SAP) were explained by the major tax sources. The dummy function D_1, which differentiated the pre-SAP era from the SAP era revealed an insignificant shift at the intercept, following SAP of 0.157 in respect of the LNTR variable. This is an indication that SAP did not have a significant impact on changes in

the aggregate tax yield **TR**, over the stated period. The Dummy function D_2, which enabled us to obtain the slope of the D_1 Dummy variable also revealed an insignificant slope of 0.008 in respect of the LNTR variable. This provided further evidence of the low interaction effect of SAP on changes in the aggregate tax yield **TR**, over the stated period. The Dummy function D_1 also revealed an insignificant shift of 0.309 in respect of the LNNOR variable which represented the aggregate non-oil revenue sources. This is an indication that SAP had an insignificant effect on the aggregate non-oil tax yield. The Dummy function D_2 also revealed an insignificant slope of 0.0017 in respect of the LNNOR variable, which served as further evidence of the low interaction effect of SAP on the aggregate non-oil tax yield.

POLICY IMPLICATIONS OF FINDINGS

The poor performance of most of the major tax sources has far-reaching implications. Government lost substantial revenue over the stated period on account of its inability to exploit the full potential of the tax-based revenue sources, due to their inelastic nature. The implication is that unless there is a positive policy shift that would seek to make the tax sources much more buoyant and elastic, the attainment of the full complement of the tax-based revenue potential would remain elusive. Government's taxable capacity efforts proved to be largely ineffective over the stated period, as the tax sources failed to respond optimally to the tax measures. However, not withstanding the fact that government's taxable capacity efforts were frustrated principally by the inelastic nature of most of the tax sources, the tax measures could benefit from some form of restructuring to bring them more in line with the envisaged policy shift. The implication is that unless such restructuring is undertaken, the tax measures may inadvertently be out of tune with government's broad macroeconomic fiscal policy thrust, which seeks to diversify the economy and reduce its over-reliance on crude oil revenue.

SUMMARY AND CONCLUSION

In this paper, an attempt has been made to critically examine the productivity of Nigeria's tax system for the period 1980-2010. The paper began by discussing the enormous challenges facing the Nigerian tax system and the lingering fiscal deficit crises that has impacted negatively on macroeconomic growth and stability over the last three decades. It thus stressed the need for a critical examination of the productivity of the tax system to ascertain its taxable capacity and obtain a reasonably accurate estimation of the nation's tax revenue profile, which could assist in benchmarking

government's expenditure projections. The OLS regression analysis revealed that most of the major tax sources (except VAT) had low elasticity and buoyancy estimates, which implies that they did not respond optimally towards the growth of the aggregate tax yield. Nigeria thus lost substantial tax-based revenue over the stated period, which underscores the need for government to critically address the enormous challenges confronting the tax system in order to enhance its productivity and ensure full exploitation of the tax-based revenue.

REFERENCES

Anyaduba, J.O. 2006. "A Critical Appraisal of the Nigerian Tax System: 1980-2002", *Finance India*, Vol.xx, No.1. Pp.133-143.

Ariyo, A. 1997. "Productivity of the Nigerian Tax System: 1970-1990". AERC Research Paper 67, *African Economic Research Consortium*, Nairobi, Kenya.

Ehdale, J. 1990. "An Econometric Method for Estimating the Tax Elasticity and Impact on Revenue of Discretionary Tax Measures". *World Bank Working Papers,* No. 334.

Karras, A. and D. Furceri 2009. "Taxes and Growth in Europe", *South-Eastern Europe Journal of Economics*, Vol.2, pp.181-204.

Khan, A.H. 1988. "Public Spending and Deficits: Evidence from a Developing Country". *Public Finance.* Vol.3, No.3, pp.396-412.

Kusi, N.K. 1998. "Tax Reform and Revenue Productivity in Ghana", *AERC Research Paper No.74*, Nairobi, Kenya

Mansfield, C.Y. 1972. "Elasticity and Buoyancy of Tax Systems", *International Monetary Fund Staff Papers*, No.29, July. Pp425-440.

Ndekwu, E.C. 1991. "An Analytical Review of Nigeria's Tax System and Administration", paper presented at a National Workshop on Tax Structure and Administration in Nigeria, Lagos. May 15-17.

Osoro, N.E. 1993. "Tax Reforms in Tanzania: Motivations, Directions and Implications", *AERC Research Paper No.20*, Nairobi, Kenya.

Phillips, A.O. 1970. "Nigeria's Tax Effort", *British Tax Review*, Vol.180, pp.186-189.

Prest, A.R. 1962. "The Sensitivity of Yield of Personal Income Tax in the United Kingdom", *Economic Journal*, Vol.52, September, pp.576-590.

Sahota, G.S. 1961. *Indian Tax Structure and Economic Development*, Asia Publishing House, London.

Shaw, E.S. 1973. *Financial Deepening in Economic Development*. Oxford University Press, New York.

Singer, N.M. 1968. "The Use of Dummy Variables in Establishing Income Elasticity of State Income Tax Revenue", *National Tax Journal*, Vol.2, June, pp.200-204.

Wilford, D.S. and W.T. Wilford 1978. "Estimates of Revenue Elasticity and Buoyancy in Central America, 1955-74" in *Taxation and Economic Development*, Toye, J.F.J. (ed.) Frank Cass and Co. Ltd. England, po.84-89.

Table I: Federal Government Fiscal Operations, 1979-2010 (Nmillion)

Year	Federal Government Retained Revenue	Total Consumption Expenditure (TCX)	Fiscal Surplus (+)/deficit (-)	Fiscal surplus (+)/deficit (-) as a percentage of GDP
1979	8,868.4	7,406.7	+1,461.7	3.4
1980	12,138.7	14,113.9	-1,975.2	(3.9)
1981	7,511.6	11,413.7	-3,902.1	(7.7)
1982	7,490.4	12,378.5	-4,888.1	(11.8)
1983	6,272.0	12,086.1	-5,814.1	(5.9)
1984	6,938.5	17,403.7	-10,465.2	(4.2)
1985	9,640.3	14,828.8	-5,188.5	(4.2)
1986	7,969.4	16,773.7	-8,804.3	(11.3)
1987	16,129.0	22,018.7	-5,889.7	(5.4)
1988	15,588.6	27,749.5	-12,160.9	(8.4)
1989	25,893.0	41,027.0	-15,134.0	(6.7)
1990	39,033.0	61,149.0	-22,116.0	(8.5)
1991	30,829.2	66,584.4	-35,755.0	(11.0)
1992	53,264.9	92,797.4	-39,532.5	(7.2)
1993	83,493.6	191,228.9	-107,735.3	(15.5)
1994	90,622.6	160,893.2	-70,270.6	(7.7)
1995	249,768.1	248,768.1	+1,000.0	0.1
1996	369,267.0	337,217.6	+32,049.4	1.2
1997	423,215.2	428,215.2	-5,000.0	(0.2)
1998	353,724.1	487,113.4	-133,389.3	(4.9)
1999	662,585.3	947,690.0	-285,104.7	(8.9)
2000	597,282.1	701,059.4	-103,777.3	(2.1)
2001	796,976.7	1,018,025.6	-221,048.9	(4.0)
2002	716,754.2	1,018,155.8	-301,401.6	(5.1)
2003	1,023,241.2	1,225,965.9	-202.724.7	(2.8)
2004	1,253,600.0	1,426,200.0	-172,600.0	(1.5)
2005	1,660,700.0	1,822,100.1	-161,406.3	(1.1)
2006	1,836,600.0	1,938,000.0	-101,397.5	(0.6)
2007	2,333,700.0	2,450,900.0	-117,200.0	(0.1)
2008	3,193,440.0	3,240,820.0	-43,378.5	(0.20)
2009	2,242,400.2	3,452,900.8	-1,210,500.6	(3.07)
2010	2,888,778.1	4,194,217.9	-1,305,439.8	(3.80)

Source: CBN, Annual Report and Statement of Account (various issues)
CBN, Statistical Bulletin (various issues)

Table II: Structure of Federal Tax Revenue Sources, 1980-2010 (₦ Million)

Year	Customs and Excise Duties	Petroleum Profits Tax	Companies Income Tax	Federal Government Independent Rev.	Value Added Tax	Education Tax	Aggregate Tax-based Revenue	GDP at Current Factor Prices	Taxes as a Percentage of GDP
1980	1,813.5	8,564.4	579.2	487.5	-	-	11,444.6	49,623.3	23.0
1981	2,325.8	6,325.8	403.0	1,997.3	-	-	11,051.9	50,456.7	22.0
1982	2,336.0	4,846.4	550.0	732.8	-	-	8,465.2	51,570.4	16.4
1983	1,984.1	3,746.9	561.5	710.1	-	-	7,002.6	56,709.7	12.3
1984	1,616.0	4,761.4	787.2	580.9	-	-	7,745.5	63,006.4	15.2
1985	2,183.5	6,711.0	1,004.3	938.9	-	-	10,837.7	71,368.1	12.9
1986	1,728.2	4,811.0	1,102.5	433.7	-	-	8,075.4	72,128.3	11.2
1987	3,540.8	12,504.0	1,235.2	407.6	-	-	17,687.6	106,833.2	16.5
1988	5,672.0	6,814.4	1,550.8	540.5	-	-	14,577.7	142,678.4	10.2
1989	5,815.5	10,598.1	1,914.3	938.0	-	-	19,265.9	222,457.7	8.7
1990	8,640.9	26,909.0	2,997.3	1,724.0	-	-	40,271.2	257,873.0	15.6
1991	11,456.9	38,615.9	3,827.9	3,040.4	-	-	56,941.1	320,247.4	17.8
1992	16,054.8	51,476.7	5,417.2	4,903.1	-	-	77,851.8	544,330.6	14.3
1993	15,486.4	59,207.6	9,554.1	5,626.5	-	-	89,874.6	691,606.8	13.0
1994	18,294.6	42,802.7	12,274.8	3,888.2	7,260.8	-	84,521.1	911,091.3	9.3
1995	37,364.0	42,857.9	21,878.3	20,436.4	20,761.0	-	143,299.6	1,960,689.1	7.3
1996	55,000.0	76,667.0	22,000.0	3,407.0	31,000.0	-	188,074.0	2,740,458.5	6.8
1997	63,000.0	68,574.1	26,000.0	8,339.9	34,000.0	-	199,914.0	2,834,998.7	7.1
1998	57,683.0	67,986.6	33,315.3	11,431.6	36,867.0	-	207,283.5	2,765,670.7	7.5
1999	87,906.9	178,649.6	46,211.2	20,076.5	47,135.8	-	379,980.0	3,225,990.0	11.8
2000	101,523.6	550,540.1	51,147.4	38,061.8	58,469.6	7,528.7	807,271.2	4,824,180.0	16.7
2001	170,557.1	669,474.3	68,660.0	44,405.2	91,757.9	16,213.6	1,061,068.1	5,487,995.0	19.3
2002	181,408.2	392,207.2	89,104.0	68,134.5	108,601.0	10,284.2	849,739.1	5,454,153.0	15.6
2003	196,468.6	683,484.9	114,771.1	54,164.4	136,411.2	n.a	1,185,300.2	7,180,140.0	16.5
2004	210,614.3	1,183,167.7	143,004.8	140,881.6	157,364.7	n.a	1,835,033.1	8,150,760.0	22.5
2005	227,448.0	1,204,900.0	178,754.8	212,100.0	178,100.0	21,800.0	2,723,102.8	9,287,021.0	29.0
2006	172,860.5	2,038,300.0	210,500.0	33,300.0	33,200.0	28,400.0	2,516,560.5	9,865,215.0	25.5
2007	763,533.0	1,132,000.0	332,400.0	381,767.0	312,600.0	59,600.0	2,981,900.0	10,623,658.8	28.1
2008	201,600.0	2,060,900.0	420,600.0	100,300.0	401,700.0	59,500.0	3,245,600.0	11,148,169.6	29.1
2009	1,358,800.0	939,400.0	600,600.0	679,400.0	481,400.0	139,500.0	4,199,100.0	11,656,334.9	36.0
2010	25,100.0	1,480,300.0	666,100.0	n.a.	562,300.0	96,200.0	2,830,000.0	12,050,500.0	23.5

Source: CBN. Annual Report and Statement of Account (various issues)

CBN, Statistical Bulletin (various issues)

Note: (i) Federal Government Independent Revenue Comprises of revenue interest payments, rent on government properties and Personal Income Tax of Members of the Armed Forces, Police, External Affairs and Federal Capital Residents

(ii) With effect from the 1998 fiscal year, taxes on petroleum products which had hitherto been inexplicably lumped together with revenue from oil exports and domestic sales, were disaggregated therefrom, and accordingly aggregated with petroleum profits tax and royalties

APPENDIX

DATA PRESENTATION (1980-2010)

Year	TR (₦-million)	NOR (₦-million)	CED (₦-million)	PPT (₦-million)	CIT (₦-million)	VAT (₦-million)	IMEXMA (₦-million)	TOS (₦-million)	Tcx (₦-million)	CP (₦-million)	GDP (₦-million)	NGDP (₦-million)	Dummy variable
1980	15,233.5	2,880.2	1,813.5	8,564.4	579.2	-	23,282.3	13,632.3	14,113.9	1,930.6	49,632.3	9,384.0	0
1981	13290.5	4,726.1	2,325.8	6,325.8	403.0	-	23,862.9	10,680.5	11,413.7	1,343.3	50,456.6	17,942.4	0
1982	11,433.7	3,618.8	2,336.0	4,846.4	550.0	-	18,976.2	8,003.2	12,378.5	1,833.3	51,570.3	16,322.2	0
1983	10,508.7	3,255.7	1,984.1	3,746.9	561.5	-	16,406.2	7,201.2	12,086.1	1,871.7	56,709.8	17,569.3	0
1984	11,253.3	2,984.1	1,616.0	4,761.4	787.2	-	16,266.3	8,840.6	17,403.7	2,624.0	63,006.2	16,707.7	0
1985	15,050.4	4,126.7	2,183.5	6,711.0	1,004.3	-	18,783.4	11,223.7	14,828.8	3,347.7	71,368.1	19,568.6	0
1986	12,595.8	4,488.5	1,728.2	4,811.0	1,102.5	-	14,904.2	8,368.5	16,773.7	3,675.0	72,128.2	25,702.8	1
1987	25,380.6	6,353.6	3,540.8	12,504.0	1,235.2	-	48,222.3	28,208.6	22,018.7	4,117.3	106,883.2	26,756.4	1
1988	27,596.7	7,765.0	5,672.0	6,814.4	1,550.8	-	52,638.5	28,435.4	27,749.5	5,169.3	142,678.3	40,146.0	1
1989	53,870.4	14,739.9	5,815.5	10,598.1	1,914.3	-	88,831.4	50,016.8	41,027.0	6,381.0	222,457.6	60,868.4	1
1990	98,102.4	26,215.3	8,640.9	26,909.0	2,997.3	-	155,604.0	106,626.5	61,149.0	9,991.0	257,873.0	68,910.0	1
1991	100,991.6	18,325.2	11,456.9	38,615.9	3,827.9	-	211,023.6	116,856.5	66,584.4	12,759.7	320,247.3	58,109.7	1
1992	190,453.2	26,375.1	16,054.8	51,476.7	5,417.2	-	348,762.9	201,383.9	92,797.4	18,057.3	544,330.7	75,382.2	1
1993	192,769.4	30,667.0	15,486.4	59,207.6	9,554.1	-	384,399.5	213,778.8	191,228.9	31,847.0	691,600.0	110,024.2	1
1994	201,910.8	41,718.4	18,294.6	42,802.7	12,274.8	7,260.8	368,848.0	200,710.2	160,893.2	40,916.0	911,070.0	188,243.4	1
1995	459,987.3	135,439.7	37,364.0	42,857.9	21,878.3	20,761.0	1,705,789.1	927,565.3	248,768.1	72,927.7	1,960,690.0	577,310.0	1
1996	523,597.0	114,814.0	55,000.0	76,667.0	22,000.0	31,000.0	1,872,170.0	1,286,215.9	337,217.6	79,333.3	2,740,460.0	600,926.2	1
1997	591,151.0	174,339.9	63,000.0	68,574.1	26,000.0	34,000.0	2,087,379.3	1,212,499.4	428,215.2	86,666.7	2,835,000.0	836,086.9	1
1998	463,608.8	139,297.6	57,683.0	67,986.6	33,315.3	36,867.0	1,589,275.4	717,786.5	487,113.4	111,051.0	2,765,670.0	830,983.3	1
1999	949,187.9	224,765.4	87,906.9	178,649.6	46,211.2	47,135.8	2,051,485.5	1,169,476.9	947,690.0	154,037.3	3,225,990.0	763,906.3	1
2000	1,906,159.7	314,483.9	101,523.6	550,540.1	51,147.4	58,469.6	2,908,687.2	1,920,900.4	701,059.4	170,491.3	4,842,186.0	798,878.3	1
2001	2,231,532.9	523,970.1	170,558.1	669,474.3	68,660.0	91,757.9	3,358,925.8	1,973,220.0	1,018,025.6	228,866.7	5,487,995.0	1,288,596.4	1
2002	1,731,837.5	500,986.3	181,408.2	392,207.2	89,104.0	108,601.0	3,463,195.4	1,787,622.1	1,018,155.8	297,013.3	5,454,153.0	1,577,778.4	1
2003	2,575,095.9	500,815.3	126,468.6	683,484.9	114,771.1	136,411.2	5,054,295.3	3,003,092.4	1,225,965.8	382,570.3	7,180,140.0	1,396,423.3	1
2004	3,886,456.1	532,121.3	210,614.3	1,183,167.7	143,004.8	157,364.7	6,258,817.5	1,506,349.9	1,426,200.0	476,682.7	8,150760.0	1,115,978.3	1
2005	5,303,791.3	541,234.9	227,448.0	1,904,900.0	178,754.8	178,100.0	8,699,052.4	6,266,096.6	1,822,100.0	595,849.3	9,287,021.0	947,710.7	1
2006	6,069,855.0	782,255.0	172,860.5	2,038,300.0	210,500.0	33,200.0	8,302,747.1	5,619,152.9	1,938,000.0	701,666.7	9,865,215.0	1,057,695.4	1
2007	5,727,500.0	1,264,600.0	763,533.0	1,132,000.0	332,400.0	312,600.0	9,020,114.6	4,100,013.1	2,450,900.0	815,670.0	10,623,658.8	1,180,784.3	1
2008	7,866,600.0	1,336,000.0	201,600.0	2,060,900.0	420,600.0	401,700.0	9,121,350.9	4,611,200.7	3,240,820.0	922,545.2	11,148,169.6	1,350,662.8	1
2009	4,844,600.0	1,652,700.0	1,358,800.0	939,400.0	600,600.0	481,400.0	7,234,015.6	2,523,101.2	3,452,900.8	1,708,120.6	11,656,334.9	1,512,782.6	1
2010	7,303,200.0	1,907,600.0	25,100.0	1,480,300.0	666,100.0	562,300.0	8,010,173.8	5,475,000.5	4,194,217.9	1,865,257.9	12,050,500.0	1,891,269.7	1

Source: *CBN, Annual Report and Statement of Account (various issues)*
CBN, Statistical Bulletin (various issues)