ALTERNATIVE SPECIFICATION AND ESTIMATION OF TAX REVENUE-GROSS DOMESTIC PRODUCT RELATIONSHIP

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ABSTRACT

In fiscal economics, tax has been recognized as veritable instrument in generating revenue and stabilizing growth. However, to determine if a country has made efforts at increasing tax revenue over a period, tax performance in the dynamic sense which measures the sensitivity and response of the tax revenue in relation to GDP is imperative. Motivated by this, we adopted the buoyancy approach to examine Tax revenue-GDP relationship using Nigeria data. This is to ascertain if the government is keeping track on tax revenue mobilization as GDP is on a continuous increase. Besides, the estimation of tax buoyancy for Nigeria is very useful in understanding the overall tax revenue performance in the economy. The finding indicates that although the rate of growth in GDP has been fairly high, Tax-GDP ratio has not grown rapidly over the past years.

Contribution/ Originality: This study contributes in the existing literature by using the Bayesian approach to analyze the relationship between tax revenue and gross domestic product.

1. INTRODUCTION

One sure way of generating domestic revenue is an economy is taxation. However, it has been observed that over the years attention has been focused on oil revenue. Although, various efforts aimed at improving non-oil revenue have been implemented paying attention on the role of taxation as an instrument of economic growth. In an attempt to improve tax revenue various taxes and tax reforms have been put in place. One of the main aims is to accelerate domestic revenue mobilization to meet expenditure demands. As such major reforms involving granting autonomy to revenue agencies, the introduction of the value added tax (VAT) and the establishment of the revenue agencies, harmonization of customs and excise duties and stamp duties. The contribution of tax revenue to a nation's total revenue has been widely recognized as a useful indicator of development of a nation. As per certain estimates, a minimum of 18 percent of its value may be required in most emerging economies. However, the ratio is much lower than in developed countries, of which 70 percent of national income is subject to tax revenue as compared to about 10 percent for developing countries. Interrelationships between tax revenue and economic

growth are not conspicuous because linkages between them appear to be rather circular in nature. Taxable capacity depends upon the level of development; economic growth is indicated by an increase in real per capita income or national income and that increased development expenditure enhances growth in GDP (Skinner, 1989). In fiscal economics, tax has been recognized as veritable instrument in generating revenue and stabilizing growth. To evaluate if a country has made efforts at increasing tax revenue over a period, a tax performance in the dynamic sense which measures the sensitivity and response of the tax revenue with respect to GDP is required. As observed by Chelliah (1981) the four main approaches to assess tax performance are ability to give up approach, efficient resource use approach, ability to collect approach and comparison with average performance. However, a commonly adopted approach is regressing tax with output ratio on a set of variables including the major determinants of output that serves as proxies for tax handles. The predicted tax ratio therefore gives the ratio that the country would have if it had made the average tax effort. Thus, it becomes a measure of the taxable capacity of the country while the regression coefficients act as the average effective rates on the base. However, to determine if a country has made efforts at increasing tax revenue over a period, tax performance in the dynamic sense which measures the sensitivity and response of the tax revenue in relation to GDP is imperative. Although a number of studies such as Osoro (1993; 1995); Kusi (1998); and Ariyo (1997); have examined the relationship between tax revenue and GDP, they focused on income tax elasticity using the double log form equation and the proportional adjustment methods without necessarily considering the contribution of tax revenue to GDP growth. This study therefore adopted the buoyancy approach as an alternative specification and estimation of tax revenue-GDP relationship. This is apt as it will help ascertain if the government is keeping track on tax revenue mobilization with GDP growth. Beside, such an approach is very useful in understanding the overall tax revenue performance in the economy.

1.1. Review of Previous Studies

It has been asserted by Teera (2002) that estimation of the income tax elasticity is useful in determining the extent to which tax system is responsive to changes in the tax composition and its value in GDP. When the elasticity of major revenue sources remains relatively insignificant either due to low base or evasion or avoidance, the government is expected to raise additional revenue through discretionary measures. When this happens, the growth of tax revenue comes through high buoyancy rather than through elasticity. It should be noted however that the coefficient of elasticity depends on the level of tax base to changes in income. This makes it possible to break up the value of elasticity into two components: the response of the tax base to a change in income and the response of the tax yield to a change in the tax base of individual taxes through decomposition of elasticity (Musgrave, 1969). The growth of the base depends on the way the structure of the economy changes with economic growth. The tax-to-base elasticity depends on the tax rate; if the rate structure is progressive or if there is an improvement in tax administration, then the tax-to-base elasticity will be raised by preventing evasion.

Bilquees (2004) studied the elasticity and buoyancy of the tax system in Pakistan using the Divisia Index method over the 1974/75 to 2003/04 period. The results showed a total tax buoyancy and elasticity after the reform as 0.92 and 0.88 respectively and concluded that overall the adoption of discretionary tax measures has been significant mean of generating substantial revenue in Pakistan. This outcome further motivated Twerefou et al. (2012) and they aptly demonstrated that for the Ghanaian economy, the overall tax and the individual tax categories are not buoyant in the short run except personal income tax. In the long run, the overall tax and individual tax categories were buoyant except company income and excise tax. The results of the estimation of the base-to-income elasticity models further indicated that all the individual tax categories are not base-to-income elastic in the long run except import duty while all the tax categories were base-to-income inelastic in the short run. The long run-base to income elasticity suggest that Ghana's tax base is not wide enough to capture many tax payers due mainly to the large informal economy which is not virtually taxed. A decomposition of buoyancies over the pre-reform and post-reform periods also indicate that all the tax categories were base-to-income inelastic prior

to the reform period but were base-to-income elastic after the reform except corporate tax. This means that the tax reforms have impacted positively on the tax system. Also decomposition of the buoyancy coefficients into tax-to-base and base-to-income elasticities show that the former was greater than the later by their indices hence the gap between them depicts potential revenue in the economy which is untaxed. Overall tax elasticity was estimated to be about 1.03, an indication that the tax system resulted in a more than one percent change in the GDP.

Osoro (1993) examined the revenue productivity implications of tax reforms in a developing economy. Tax buoyancy was estimated using double log form equation and tax revenue elasticity using the proportional adjustment method. The result gave an overall elasticity of 0.76 and a buoyancy of 1.06. The study affirms that tax reforms had failed to raise tax revenue which was attributed to series of tax exemptions granted by the government and poor tax administration. This outcome was further collaborated by Osoro (1995) when he established that the elasticity of the overall tax system in Tanzania declined from 0.85 in 1970 to 0.78 in 1980. Meanwhile, income tax and sales tax which were elastic in the 1970s became inelastic in the 1980s. Also, import duty, which was inelastic in the 1970s, became elastic in 1980s. These changes were attributed to reduction in import duty rates and a rise in imports, rapid changes in the tax base arising from steep exchange rate depreciation. This finding is similar to Chipeta (1998) for Malawi where the effects of tax reforms on tax yields for the period 1970-1994 depicted buoyancy of 0.95 and an elasticity of 0.6. However, tax bases grew less rapidly than GDP.

The evaluation of the productivity of the Nigerian tax system from 1970-1990 by Ariyo (1997) using the double log form equation and the proportional adjustment methods revealed an overall satisfactory tax productivity level but wide variations in the level of tax revenue by various tax sources. This outcome was attributable to the laxity in administration of non-oil tax sources during the oil boom periods. This suggests that with more revenue from the oil taxes, less attention is paid to the non-oil tax sources.

On the basis of the above findings, series of reform were introduced by many countries so as to make tax more responsive in terms of revenue generation and series of studies have been conducted in this regard, For instance, Ayoki et al. (2005) found that reforms in Malawi has positively impacted on direct taxes as evidenced in the tax-to-income elasticity index which grew from 0.71 to 1.08 while indirect taxes rose from 1.04 to 1.31. Although the growth in the tax revenue was marginal, the implication of the findings is that tax reform is necessary to in generating more revenue in domestic economy. A study by Mtatifikolo and Moyi (2003) on Kenya also showed that tax reforms had a positive impact on the overall tax revenue except VAT which failed to respond to changes in income. Similarly, Kusi (1998) used the Proportional Adjustment method and established a pre-reform buoyancy of 0.72 and elasticity of 0.71 for the period 1970-1982 while the period after reform (1983-1993) showed increased buoyancy of 1.29 and elasticity of 1.22. The low buoyancy during the pre-reform period was attributed to smuggling, unrecorded trade, tax evasion and laxity in tax collection. A major conclusion of this study is that reforms had contributed significantly to tax revenue productivity from 1983 to 1993. Brafu-Insaidoo and Obeng (2008) examined the effect of import liberalization on tariff revenue in Ghana for the period 1966-2003. The result indicated overall buoyancy of 0.56 and elasticity of 0.28. Specifically, the period before import liberalization gave buoyancy of 0.33 and elasticity of 0.81 while the period after the import liberalization buoyancy was 0.31 and an elasticity of 0.05. With the dummy variable method (DVM), Kabbashi (2005) examined the impact of trade liberalization on revenue mobilization and stability in Sudan and found that the overall elasticity was inelastic with an index of 0.82. Although the elasticities of the individual taxes were divergent, trade liberalization led to the generation of more revenue from tax which assisted immensely in stabilizing the domestic economy

2. METHODOLOGY

Technically, tax buoyancy is defined as the responsiveness of tax revenue to the changes in gross income. Such can be estimated between two points of time or over a period of time. If between two points of time, tax buoyancy $[\varepsilon_{Tri,gdpi}]$ can be estimated as:

$$Tr = f$$

$(gdp)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ 1

where Tr = tax revenue and gdp = national income (gross domestic income)

The rate of change in tax revenue per a unit change in national income can be estimated as follows:

$\Delta Tr/\Delta gdp = Tr_t - Tr_{t-1}/gdp_t - gdp_{t=1}$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$

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This is also known as marginal propensity to tax revenue or marginal effect. For the estimation of tax buoyancy over a period of time, the OLS method can be employed both from the linear and log-linear regression models.

Linearly, the tax-revenue model can be specified as:

$Tr_t = \beta_o + \beta_1 gdp_1 + U_1$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ 3

where β_o = estimated coefficient of tax revenue, β_1 = rate of change in tax revenue per a unit change in income. The derivatives of Tr_t with respect to gdp_t is the rate of change in tax revenue per a unit change in income which is constant, U_1 = the random variable with the usual properties. From the above, tax buoyancy can be estimated linearly as:

$\varepsilon_{Tr_t,gdp_t} = \partial Tr_t / \partial gdp_t . gdp_t/Tr_t = \beta_1. gdp_t/Tr_t$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ 4

where β_1 is a component of tax buoyancy.

Empirically, the numerical value of tax buoyancy is evaluated at the mean values of tax revenue and national income as:

$E_{Tr_t,gdp_t} = \partial Tr_t / \partial gdp_t.$ mean of gdp_t / mean of Tr_t - β_1 mean of gdp_t / mean of Tr_t

It should be noted further that in linear regression model, the probable value of the tax buoyancy can be ascertained based on the sign of the intercept, β_o as:

$Tr_t = \beta_o + \beta_1 gdp_1$

$\varepsilon_{yt,xt} = \beta_1 gdp_1 / Tr_t$

$= \beta_1 gdp_1 / \beta_o + \beta_1 gdp_1$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$

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If β_o is positive then the average tax buoyancy is < 1; if β_o is negative then the average tax buoyancy will be > 1; if β_o = zero, then the average tax buoyancy > 1. It is on this basis that the size of the tax buoyancy will be ascertained.

However, if time series is used for analysis, tax buoyancy is estimated by taking the ratio of the growth rate of tax revenue to the growth rate of national income. This can be conducted as:

LGR = Marginal tax revenue function / Total tax revenue function * 100. This can be stated as:

$= dTr_t / dt / Tr. [dTr / dt. 1 / Tr] *100$

$= \beta_1 / Tr *100$

$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$ 6

Similarly, the linear growth rate $(LGRx)$ of national income is estimated as:

$gdp_t = \beta_o + \beta_1 t$

The estimate of tax buoyancy is the ratio of the linear growth rate of tax revenue to the linear growth rate of income given as:

$LGR_y / LGR_x = dTr_t / d_t . 1 / Tr_t / dgdp_t / d_t . 1 / gdp_t$

$= dTr_t / d_t Tr_t / dgdp_t / d_t gdp_t = dTr_t / dgdp_t . gdp_t / Tr_t$ $\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots$

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From the above, it can be inferred that the degree of tax buoyancy can be deduced by considering the growth rates of tax revenue and gross domestic product. If the estimate of tax buoyancy is greater than 1, then the growth rate of tax revenue will be relatively higher than the growth rate of income. If it is however less than 1, then the growth rate of tax revenue will be relatively smaller than the growth rate of income and if the estimated value is 1,

then the growth rate of tax revenue and income is equal. The application of the log linear form of regression equation is being widely used to estimate the degree of tax buoyancy of the premise that the regression coefficient of income gives directly the size of tax buoyancy. The relationship between tax revenue and national income can take the following form

$$Tr = \beta_0 gdp_t^{\beta_1}$$

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For the purpose of estimation by OLS method, the above equation is usually transformed into a log linear model to become

$$log\ Tr = log\ \beta_0 + \beta_1\ log\ gdp$$

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The derivative of $d\ log\ Y\ /\ d\ log\ X$ is

$$= dTr/\ Tr\ /\ dgdp\ /\ Tr - dTr\ /\ Tr.\ gdp\ /\ dgdp$$

$$= dTr\ /dgdp.\ gdp\ /\ Tr = \beta_1$$

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In the above equation, the tax buoyancy (β_1) can also be estimated by taking the ratio of the instantaneous growth rate of tax revenue to an instantaneous growth rate of national income.

The discussion for far is centered on the short-run tax buoyancy. But most often time series are associated with long run analysis. Considering this, the Nerlovian Partial Adjustment Model (NPAM) is often adopted to examine the long run tax impact.

Given the a long run linear revenue function as $Tr_t^* = \beta_0 + \beta_1 gdp_t$ … ………………………………… ……11

where Tr_t^* = desired or optimal level of tax revenue collections. Since Tr_t^* is difficult to observe, a partial adjustment mechanism to estimate the short-run revenue function is considered and this provide the basis for estimating long run tax revenue function.

$$[Tr_t - Tr_{t-1}] = \lambda\ [Tr_t^* - Tr_{t-1}]$$ ………………………………………………………………………….

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where $Tr_t - Tr_{t-1}$ is the actual change in the collection of tax revenue; $Tr_t^* - Tr_{t-1}$ = desired change in the collection of tax revenue; λ = coefficient of partial adjustment with value $0 \leq \lambda \leq 1$. Substituting the above equation into the long run linear tax revenue function gives:

$$Tr_t - Tr_t - \lambda\ [\beta_0 + \beta_1 gdp_t - Tr_{t-1}]$$

$$Tr_t - \lambda\ [\beta_0 + \beta_1 gdp_t - Tr_{t-1}] + Tr_t$$

$$Tr_t - \lambda\beta_0 + \lambda\beta_1 gdp_t - \lambda Tr_{t-1} + Tr_t$$

$$= \lambda\beta_0 + \lambda\beta_1 gdp_t + (1 - \lambda)\ Tr_{t-1}$$

$$Y_t = \beta_0^* + \beta_1^* gdp_t + \beta_2 Tr_{t-1}$$ ……………………………………………………………………………………….. 13

where $\beta_0^* = \lambda\beta_0;\ \beta_1^* = \lambda\beta_1;\ \beta_1^* = 1 - \lambda;\ \lambda - 1 - \beta_2^*$

From the above, the short run tax buoyancy is estimated at the mean values of Tr_t and gdp_t as - β_1^* mean of gdp_t / mean of Tr_t while the long run tax buoyancy is estimated by deflating the short run tax buoyancy with λ as β_1^* mean of gdp_t / mean of Tr_t / λ. The estimation can be conducted if a linear relationship exists between tax revenue and income. On the converse however, transformation of the function will be attempted. The long run tax buoyancy is estimated by deflating the short run tax buoyancy by the coefficient of partial adjustment (λ) as follows:

$$\partial logTr_t\ /\ \partial loggdp_t/\ \lambda - \partial logTr_t\ /\ \partial loggdp_t.\ 1\ /\ \lambda = \beta_1^*\ /\ \lambda$$ …………………………………………… 14

The estimate of the long run tax buoyancy is thus calculated by partial adjustment mechanism. Since the estimates are based on time series data, the econometric problem of autocorrelation needs to be reduced by using the first difference method. From econometric perspectives, the process of differencing the variables will continue till the Durbin-Watson status becomes two. Apart from total revenue, the impact rate can also be examined on tax revenue. Sometimes to capture the impact of time on revenue, the time variable is also included in the tax revenue

function. In such cases, the functional relationship between tax revenue and national income, tax rate and time variable can be specified as:

$$Y_t = f(X_{1t}, X_{2t}, X_{3t}) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..$$

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where Y_t = *tax revenue*, X_{1t}, = *national income*, X_{2t}, = *tax rate*, X_{3t} = *time period*

If non- linear relationship exist between the dependent and explanatory variables, then the model can be transformed into log linear as:

$$log\ Y = log\alpha_0 + \alpha_1 logX_1 + \alpha_2 logX_2 + \alpha_3 X_3 \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\ 16$$

Here α_1 and α_2 is constant tax buoyancy and the degree of responsiveness of tax revenue to the changes in tax rates, while the partial derivative of $logY$ with respect to X_3, α_3 $[\partial logy\ /dX_3 - \partial Y/\partial X_3\ /\ 1 - \partial Y\ .\ 1\ .\ \partial X_3]$ is the instantaneous growth rate of tax revenue. This method is applicable when there is one-way causation between the tax revenue and each of the explanatory variables. The implication of this is that the co-variance between income and random variable and co-variance between tax rate and random variable must be zero. If this condition is not satisfied, then the estimates will be biased and to reduce this biasness requires the application of either the 2- stage least square (2SLS) method. Data for Nigeria for the period, 1970-2013 were generated from Central Bank of Nigeria Statistical Bulletin.

As a pre-requisite in time series analysis, trend-stationarity was induced on each component of tax revenue (company income tax (*citx*), personal income tax (*pitx*) and value-added tax (*vatx*) and *gdp* (agriculture (*ags*), industry (*ins*) and service (*svs*). Therefore, the long-term behavioural growth paths was traced for each of the components through an identification of the function of the best-fit from amongst different forms such as Simple Linear (SLR), Log-Linear (LLR), Exponential (EXP), Exponential-Parabolic (EPB), Modified Exponential (MEX) and Nerlovian Partial Adjustment Model (NPAM). The functions were first linearized through logarithmic transformation before they were estimated using the OLS technique. Similarly, the function HYP could easily be linearized for the purpose of estimation through reciprocal transformation. Estimation of the asymptotic growth curves (LGS and NPAM) was deduced using the method of Partial Sums. Besides, tax buoyancy was worked out through two different approaches. In the first approach, the buoyancies were worked out by estimating a geometric equation of the form:

$$Txr_t = ae^{kt} gdp\beta\, e^{u_t} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\ 17$$

where: Txr_t = a given component of tax revenue. e^{kt} is included in the equation so as to filter-out the effect k of the common time variable from each of $Txrv_t$ and Y_t while β provides directly a tax buoyancy coefficient. It should be noted that the time variable was not included in the equation because its influence has already been excluded effectively through the trend-stationarity. This is because both variables would tend to change in the same direction due to the common chain-variable. Consequently, the results based on stationary time-series data are expected to be much more reliable.

3. PRESENTATION AND DISCUSSION OF RESULT

The presentations of empirical results follow different stages. The summary statistics of the variables were conducted to determine their initial behavior and the result is presented in Table 1 below.

The long-term growth pattern of tax revenue components and gross domestic product components was first analyzed and the result shows that the behavioural growth paths were, in general non-linear.

Table-1. Descriptive Statistics in Relation to growth rates of Tax Revenue, real GDP and Tax-GDP Ratio

	Average Growth Rate of Tax Revenue (in %)	Average Growth Rate of Real GDP (in %)	Average Tax-GDP Ratio (in %)
Mean	39.07	88.23	3.82
Median	47.26	73.06	8.48
Maximum	11.05	12.98	10.53
Minimum	4.76	5.20	3.50
Standard Deviation	19.118	5.292	−1.84
Skewness	5.451	29.58	5.29
Kurtosis	30.818	11.25	2.58

Source: Author's Computation

Table-2. Best-fit Growth Curves Fitted to Aggregated Tax Revenue, Gross Domestic Product and Tax-GDP Ratio

Sector	Best-fit Equation	Statistical Yardsticks			
		Phi	RMS	D-W	I
Component of txrv:					
Citx	MEX	0.9952	91.2315	1.516	1.1792
Cetx	ECB	0.9976	311.6525	1.642	1.1970
Vatx	ECB	0.9870	145.1462	1.433	1.1521
Component of gdp:					
Ags	LCB	0.9966	1.2555	0.696	1.0169
Ins	LCB	0.9992	6.1322	0.510	0.9830
Svs	LCB	0.9994	5.5297	0.569	0.9951
***trx-gdp* ratio:**					
gtrv/gdp	LCB	0.9544	1.2885	0.885	1.0010

Source: Author's Computation

With regard to the relative growth rates, most of the components of GDP (except service sector) showed inverted U-shaped pattern. However, the different components of government tax revenue portrayed different patterns of growth. Income tax revenue showed increasing pattern while excise duties and customs duties growth exhibited decreasing pattern. Applying the specification in equation (14) above, tax performance relative to GDP shows that tax performance was abysmal. A comparison of the results from the study with similar such studies conducted in other countries revealed that Nigeria tax system has performed relatively low and as such failed in mobilizing revenue to meets expenditure, and tax revenue in the country. This could be attributed to the fact that the Tax-GDP ratio started declining during liberalization period as shown in Table 2 below.

Table-3. Temporal Changes in Aggregated Tax-GDP Ratio and Relative Growth Rates (%), 1970-2013

Year	Tax-GDP Ratio (%)	Relative Growth Rates (%)[*]
1970-1975	3.22	1.23
1976-1985	3.77	1.01
1986-1990	4.09	1.43
1991-1995	5.24	1.21
1996-2000	5.09	0.33
2001-2005	6.11	0.12
2006-2010	2.98	0.08
2011-2013	3.09	0.02

Source: Author's Computation

Estimation of tax buoyancies through both approaches revealed that during the entire study, there is a fairly high degree of responsiveness of tax collections to increase in income. Thus, there was an increase in tax revenue, especially from service sector. However, buoyancy coefficients turned out to be relatively low with respect to

income from social sector. Also, the direct tax buoyancy coefficients were negative which presented a rather dismal performance in revenue generated from direct taxes.

4. CONCLUSION AND POLICY RECOMMENDATION

A major finding of this study is that tax revenue is highly buoyant with respect to income. Although the rate of growth in GDP has been fairly high in the past a few years, Tax-GDP ratio has not grown rapidly. These findings call for concerted efforts by the government to adopt suitable policy measures in respect of tax design and administration, especially in the presence of dwindling oil revenue. Consequently, there is need to streamline tax administration so as to improve tax compliance and check tax evasion. Beside, rather than increasing the tax rates, government need to expand the tax base so as to capture more people under the tax net. Most importantly, there is urgent need to reform tax administration and implementation to effectively make it a viable source of revenue. Such reform should however be accompanied with expenditure reforms.

REFERENCES

Ariyo, A., 1997. Productivity of the Nigerian tax system. African Economic Research Consortium Research Paper No. 67.

Ayoki, M., M. Obwona and M. Ogwapur, 2005. Tax reform and domestic revenue mobilization in Uganda, second draft. Washington D.C: Global Development Network.

Bilquees, F., 2004. Elasticity and buoyancy of the tax system in Pakistan. Pakistan Development Review, 43(1): 73-93.

Brafu-Insaidoo, W.G. and C.K. Obeng, 2008. Effect of import liberalization on tariff revenue in Ghana. African Economic Research Consortium Research Paper No.180.

Chelliah, R.J., 1981. Provincial revenue and mechanism for fiscal adjustments in Papua New Guinea. New Delhi: National Institute for Public Finance and Policy.

Chipeta, C., 1998. The second economy and tax yields in Malawi. AERC Research Paper No. 81.

Kabbashi, M.S., 2005. The impact of trade liberalization on revenue mobilization and stability in Sudan: A Revised Report Submitted to the International Research Project, Organized by the Global Development Network.

Kusi, K.N., 1998. Tax reform and revenue productivity in Ghana. African Economic Research Consortium Research Paper No. 7.

Mtatifikolo, F.P. and F. Moyi, 2003. An economic analysis of Tanzania's tax performance experiences since the 1973 tax act. Eastern Africa Economic Review, 6(1): 34-42.

Musgrave, R.A., 1969. Fiscal systems. New Haven and London: Yale University Press.

Osoro, N.E., 1993. Revenue productivity implications of tax reform in Tanzania, Research Paper No. 20. Nairobi: AERC.

Osoro, N.E., 1995. Tax reforms in Tanzania: Motivations, directions and implications. African Economic Research Consortium Research Paper No. 38.

Skinner, 1989. Do taxes matter? A review of the effect of taxation on economic behaviour and output. Economic and Political Weekly, 7(2): 54 -61.

Teera, J.M., 2002. Tax performance: A comparative study. Working Paper 01-02, Centre for Public Economics. University of Bath.

Twerefou, D.K., A. Fumey, E.O. Assibey and E.K. Asmah, 2012. Buoyancy and elasticity of tax: Evidence from Ghana. Journal of Monetary and Economic Interpretation, 10(2): 122-131.