



Journal of Accounting and Taxation

Volume 9 Number 2 February 2017

ISSN 2141-6664



*Academic
Journals*

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The Journal of Accounting and Taxation (JAT) is published monthly (one volume per year) by Academic Journals.

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Full Length Research Paper

Taxation revenue and economic growth in Africa

Onakoya Adegbemi Babatunde^{1*}, Afintinni Oluwatobi Ibukun¹ and Ogundajo Grace Oyeyemi²

¹Department of Economics, Babcock University, Ilishan - Remo, Nigeria.

²Department of Accounting, Babcock University, Ilishan - Remo, Nigeria.

Received 4 September, 2016; Accepted 27 October, 2016

As most developing countries strive to achieve economic growth and development through taxation, they face numerous economic challenges. The debate on the effectiveness of taxes as a tool for promoting growth and development remains inconclusive, as several studies have indicated mixed impacts of tax on economic growth. Against this background, the study investigated the impact of taxation on economic growth in Africa from 2004 to 2013. The study carried out various preliminary tests including descriptive statistics, and stationary tests using Augmented Dickey Fuller (ADF) test, Levin et al. test, Im, Pesaran and Shin W-stat tests. The appropriate fixed and random effect test was employed to determine the fitness of the model using the Hausman test. The study conducted the Hausman-Test to determine the appropriate estimator between Fixed and Random Effect. To confirm the robustness and validity of regression model, some post estimation tests are conducted which were omitted Variable Test, and Heteroscedasticity test. Findings indicated that tax revenue is positively related to GDP and promotes Economic Growth in Africa. It was significant at 5% level. The study concluded that tax revenue has a significant positive relationship with Gross Domestic Product. Therefore, high and weak levels of taxation are favorable to economic growth as upheld by the economic effect of Ibn Khaldun's theory on taxation, which approves the positive impact that lower tax rate have on work, output and economic performance. However, in the midst of harsh economic conditions such as crashing oil prices, rising exchange rates, drop in Naira value, the governments should be ready to develop a comprehensive tax structure or model that will grow, nurture and sustain its tax economic base so as to drive economic performance.

Key words: Taxation revenue, economic growth, Johansen cointegration test, fixed and random effect, panel data.

INTRODUCTION

The extent to which tax revenue stimulates economic performance in an economy especially in developing nations has continued to attract empirical debate. In 2014, eight African countries - Cameroon, Côte d'Ivoire, Mauritius, Morocco, Rwanda, Senegal, South Africa and

Tunisia reported tax revenues as a percentage of gross domestic product (GDP) ranging from 16.1 to 31.3% (Revenue Statistics in Africa, 2016). Indeed, all of these countries presented rise in their taxation-to-GDP ratios ranging from 0.9% points in Mauritius to 6.7% points in

*Corresponding author. E-mail: adegbemionakoya@yahoo.com.

Tunisia.

When compared to the average of organisation for economic co-operation and development (OECD) countries, the increase of 34.4% was only 0.2 percentage points higher in 2014 than in 2000. The revenue data for these eight African countries accounted for almost a quarter of Africa's total GDP (Revenue Statistics in Africa, 2016).

Some African countries are significantly dependent on non-tax revenues, and more specifically on grants such as foreign aid (Kenya) and resource rents from oil (Nigeria and Angola) and Bauxite (Zambia); these countries' economies tend to be highly volatile that their finances could not be stabilized and predictive through tax revenue. The nagging question is whether the revenues from taxation in African countries are growing as a proportion of national incomes. This becomes critical in view of the falling prices of oil and other commodities

The empirical literatures depict different and disaggregated findings. Ugwunta and Ugwuanyi (2015) and Dasalegn (2014), indicated positive relationship between taxation and economic growth. On the other hand, a negative nexus was reported in the works of Keho (2013), Juniours and Tafirenyika (2010), Delessa and Daba (2014), Saima et al. (2014). McBride (2012) opined that progressive taxation dampens investment, risk taking, and entrepreneurial activity due to the fact that a disproportionately large share of these activities is done by high income earners; contrary to this, some studies still find no significant relationship between the variables (N'Yilimon, 2014).

Hungerford (2012) has found support for the position that taxes have no impact on economic growth when the USA experience from the end of World War II in 1945 to 2011 was examined. The examination of 18 OECD countries by Mendoza et al. (1997) and Osundina and Olanrewaju (2013) also report that the effect of taxation on national growth was insignificant. Although effective consumption taxes increase investment, the overall tax burdens have no effect on investment or growth of the economy.

The impact of taxation is also not homogenous; the investigation on taxation impact on economy by Jens et al. (2011) using 21 OECD countries between 1971 and 2004 finds that corporate taxes has been most harmful to the economy, likewise taxes on personal income, consumption, and property. Indeed, progressivity of personal income taxation is deleterious to economic growth. When the top marginal rate on personal income increased, productivity and growth are adversely affected.

The conflicting findings on the relationship between taxation and economy growth necessitate this study which seeks to further investigate both the short run dynamism and the long run relationship of these variables in Africa. The study covers twenty years between 1994 and 2013. The study period spans

economic cycles of 16 African countries and provides an opportunity for a comprehensive assessment of the effect of taxation revenue on selected African economies.

LITERATURE REVIEW

This section is in two parts: the theoretical underpinning the study and the review of relevant prior works.

Underpinning theories

The quest for the optimum taxation rate where tax revenues are maximised for social welfare and economic growth has been the essence of the various theories. Adam Smith regarded taxation as a means of sustaining the government. Ricardo provided justification for capital tax which as part of factors of production (labour and capital) is required (in part) to fund government activities. In its regulatory function, taxation provides a mechanism to redistribute national income. In its catalytic role, taxation is applied to increase the value of effective demand, stimulate investment and engender economic development. There are quite a number of theories underlining the concept of taxation including the decentralization theorem which deals with the division of public sector functions and finances among different tiers of government (Ozo-Eson, 2005).

The Benefit theory of taxation by Cooper (1994) suggests that the taxes are to be imposed on individuals according to the benefit conferred on them. In effect, the more benefits a person derives from the activities of the State, the more he should pay to the government, thus a "quid pro quo" is expected to subsist. However, it is impossible to implement precisely due to the difficulty of determining the amount of government benefits, including diffuse benefits such as military protection received by each resident and non-resident tax payer.

The contra theory to the benefit theory is the 'Cost of service' theory of taxation which provides that the government should tax the citizens according to the cost of service rendered by it. The tax, an individual should bear, must be equal to the cost of benefit receives that is, cost-benefit postulation. Yet a complimentary theory, 'Ability to pay' theory by Pigou (1920) suggests that every citizen should pay taxes according to his ability to pay, to meet the cost of Government expenditure. The Ability to pay theory of taxation is synonymous with the principle of equity or justice in taxation. People with higher incomes should pay more taxes than people with lower incomes, thus 'no quid pro quo' subsist. It appears more reasonable and just that taxes should be levied on the basis of the taxable capacity of an individual. The major drawback inherent in this theory is the definition of one's ability to pay.

The sacrifice theory by Makinya (2000) attempts to

determine the burden that rests upon an individual in virtue of his payment of taxes and how much of his or her income remains for purpose of his own subsistence. According to this theory payment of tax is a sacrifice that an individual makes towards the support of the government.

The Ibn Khaldun's (1332 to 1406) theory on taxation as espoused by Islahi (2006) identifies two different effects: the arithmetic and the economic effect which the tax rates have on revenues. The two effects have opposite results on revenue in case the rates are increased or decreased. According to the arithmetic effect, if tax rates are lowered, tax revenues will be lowered by the amount of the decrease in the rate and vice versa. The economic effect however proposed that lower tax rate positively impact on work, output and employment. The Ibn Khaldun's proposition is validated by the optimum tax theory propounded by Mirrlees (1971). This theory seeks to stipulate a given rate of the tax at which a given amount of government revenue can be raised, with minimum distortion in an economy. This is important in order to achieve social efficiency through a desired adequate income distribution or an improvement of welfare. These theories incorporate the various subsisting interconnection between taxation and economic growth, and development.

Review of relevant prior works

On the empirical ground, diverse empirical studies have investigated the effects of taxes on economic growth. Results are far from being conclusive, varying across countries, methodologies, and fiscal variables involved. This study examines previous empirical works from African countries.

The applied panel data estimation under the fixed-effect assumptions deployed by Ugwunta and Ugwuanyi (2015) reported a positive but insignificant relationship between non-distortionary taxes and economic growth of sub-Saharan countries. Similar result was obtained by N'Yilimon (2014) using unit root test on panel data. It suggests the absence of a non-linear relationship between taxation and economic growth of West African Economic Monetary Union (WAEMU) countries. Anne (2014), in her own study adopted Ordinary Least Squares, Unit Root tests, Johanssen Cointegration Test, Vector Error Correction Model (VECM), and finds a negative but insignificant effect of income taxes on the Kenyan economy

Wisdom (2014) applied the Co-integration and Granger Causality tests, and finds that tax revenue exerted a positive and statistically significant impact on economic growth of Ghana both in the long-run and short-run. Dasalegn (2014) discovers that VAT revenue plays an energetic positive role for the national development of Ethiopia. Sekou (2015) in his study utilised ordinary least squares method, and reports positive and significant positive correlation between the collection of taxes and

growth in Mali. Chigbu et al. (2011), Ogbona, and Appah (2012) and Confidence and Ebipanipre (2014) had a corroborative result, as they adopted descriptive statistics and econometric models such as White test, Ramsey RESET test, Breusch Godfrey test, Jacque Berra test, Augmented Dickey Fuller test, Johansen test, Granger Causality test and Ordinary Least Squares (OLS) technique. Results show that tax reform is positively and significantly related to economic growth in Nigeria. It is not farfetched that taxation has a positive role, and is an engine to the economic growth of Nigeria. Similar finding which indicate that low income tax rates boosted the economic growth was reported by Bonu and Pedro (2009) who utilized descriptive technique in Botswana.

In contrast to the aforementioned findings, Keho (2010) who adopted the Scully and quadratic regression models concludes that higher taxes are strongly correlated with reduced economic growth in Cote d'Ivoire. Similar negative relationship between tax burden and rate of economic growth in Nigeria and South Africa was reported by Saibu (2015). Another study by Yaya (2013) adopted the Branson and Lovell (2001) linear programming based methodology which is the Data Envelopment Analysis (DEA) for New Zealand, the findings indicate that higher taxes are associated with reduced economic growth.

A research on the effect of tax incentives on economic growth in Kenya conducted by Hilda (2014) utilised descriptive analysis, correlation analysis and regression analysis and reports similar inverse relationship between the variables. Also, the study by Lawrence (2015) on the effect of value added tax on economic growth in Kenya and Edame and Okoi (2014) research using auxiliary approach and Ordinary Least Squares estimating technique, found significant and negative relationship between Value Added tax and economic growth.

The rationale for this study is further accentuated by the disparity in the findings. The methodology is discussed in the next section.

METHODOLOGY

This section deals with the method employed to obtain relevant information on implication of taxation, foreign direct investment and inflation rate on economic growth of selected African countries.

Data source and descriptions

Secondary data for a period of ten years covering 2004 to 2013 for 16 selected African countries were obtained from the World Development Indicators, the World Bank. The tax revenue was utilized in the absence of data composite tax types from these selected countries for the entire period.

Model specification

This research model was underpinned by the Ibn Khaldun's theory of taxation and its modern equivalent – "the Laffer curve theory of taxation" which seeks to achieve the optimal tax rate. The research adapts the 2015 empirical model of Ugwunta and Ugwuanyi (2015).

The inclusion of inflation in the model is informed by the advice of Taylor (1994) that in order to increase growth, cost-oriented anti-inflation programs have to be accompanied by increased transfers from abroad. Recursive relationship exists between economic growth and tax revenue accruable to the government. The relevance of foreign direct investment in the model is informed by the two-gap model of Chenery and Strout (1966) which showed that developing countries are constrained with low level domestic savings and foreign exchange earnings. The postulation is that, in concert with other variables, foreign direct investment provides an optimal avenue to break the poverty circle, solve the two gaps simultaneously and increase economic growth. The functional relationship is expressed as:

$$GDP = f(TAXR, FDI, INF) \quad (1)$$

Where: *GDP* is the Gross Domestic Product; *TAXR* is the Tax Revenue, *FDI* is the foreign direct investment; *INF* is the inflation rate. Specifically, to achieve the objective of this study and based on the property of the linearity of variables, the functional relationship is modeled in a linear equation to yield Equation 2:

$$GDP_{it} = a_0 + TAXR \sum_{t=1}^p a_{it} + FDI \sum_{t=1}^p a_{it} + INF \sum_{t=1}^p a_{it} + U_{it} \quad (2)$$

Where: U_{it} is the error term which denotes other variables that are not specified in the model; i represent the number of countries and t is the number of years. The parameter estimates $a_i > 0$. The panel data estimation (also known as the longitudinal or cross-sectional time-series data) technique was conducted under the random effect assumption to factor in the possibility of either an autoregressive model with a fixed effect or a random walk with drift. The error term was decomposed as $U_{it} = H_{it} + \varepsilon_{it}$. Where ε_{it} is the standard disturbance term, which varies across years and countries, while H_{it} is a set of group specific effects, which refer to each country in the model. Equation (2) is therefore re-written as follows:

$$GDP_{it} = a_0 + a_1 TAXR_{it} + a_2 FDI_{it} + a_3 INF_{it} + H_{it} + \varepsilon_{it} \quad (3)$$

Model estimation procedure

The study employs three-phase procedural steps: pre-estimation, estimation and post estimation. Pre-estimation tests; the first step in the pre-estimation phase is the use of descriptive statistics in order to understand the nature of the data. It also helps to know if the data are normally distributed through their averages and *Jarque-Bera* values (Gujarati, 2010).

The second step in this phase is the correlation matrix and variance inflation factor tests to check for the existence or otherwise of auto correlation among the explanatory variables. The third step is to determine the stationarity of the series and also to predict the existence of long-run relationship between the dependent variable and the explanatory variables, the study carried out panel unit root tests and panel co-integration tests using Levin et al. t, Breitung t-stat, Im, Pesaran and Shin W-stat (2003), ADF-Fisher Chi-square and PP-Fisher Chi-square test; and Kao (Engle- Granger Based) test. Prior to the panel co-integration test, the optimal lag length was ascertained using Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC) in order to confirm if lagging of the series is necessary and the required optimal lag for most appropriate results. Lastly, Ramsey RESET test will be carried out to detect the possible omission of any significant variable which could affect or impair the dependent variable (*GDP*) of the model.

In the estimation phase, based on the stationarity of the series, OLS technique is employed. The Hausman test is further applied to determine the appropriate estimator between fixed and random effect. In the event that the result does not meet the asymptotic assumptions of the Hausman test, the Ordinary Least Squares method would not be an appropriate estimator for the model. The Generalized Least Squares (GLS) will have to be deployed.

In order to confirm the robustness and validity of regression model result, some necessary post estimation tests will be conducted in the third phase. The tests to be conducted are Heteroscedasticity, cross sectional dependence and serial correlation using modified wald test, Pesaran CD test and Wooldridge tests respectively. These tests are to determine whether the residuals of the model are constant over the time frame; if there are issues of dependence across the residuals of the model and possible multi-collinearity problem among the model residuals.

The estimations are carried out with the aid of E-views version 8.0 and StatalC 11 software. Having described the estimation procedure, the next section discusses the results and discussion of the findings

RESULTS

Preliminary analysis

The preliminary characteristics of the data and summary of the statistics of the variables, the result of the correlation matrix and Variance Inflation Factor (VIF) showing the level of association among the explanatory variables are presented in Tables 1 to 3. The characteristics of the data and the summary of the descriptive statistics of the variables are presented in Table 1.

There is evidence of significant variation in the trends of the variable over the period of consideration. This shows the large difference between the minimum and maximum values of the series, with the exceptions of Foreign Direct Investment. With the statistical distribution of series in view, the results show that the series are all positively skewed.

The *GDP*, *TAXR*, *FDI*, and *INF* are leptokurtic in nature, since their values for kurtosis 8.02, 9.71, 7.83, and 8.40 respectively, are greater than 3. This indicates a flatter than normal distribution. The Jarque-Berra statistics is a goodness of fit of where sample data have skewness and kurtosis matching a normal distribution. It is a test of normality that combines skewness and kurtosis. The P-value of the Jarque-Bera test reveals that all series are not normally distributed which is expected in a panel data with subsisting heterogeneous features in the different countries. There is the need for further pre-estimation testing to determine possible intra-variable associations. This is discussed in the next section.

Series correlation test

To determine if the series are uncorrelated, both correlation matrix test and variance inflation factor tests were conducted, the results are presented in Tables 2

Table 1. Descriptive statistics.

Statistics	Gross domestic product (GDP)	Tax revenue	Foreign direct investment	Inflation rate
Mean	63.30	6.47	1.13E+09	8.69
Median	18.44	2.69	4.21E+08	6.91
Maximum	514.96	55.81	9.89E+09	44.39
Minimum	0.47	0.02	-7.12E+09	-1.41
Std. Dev.	104.85	9.96	2.29E+09	7.73
Skewness	2.37	2.59	1.19	1.99
Kurtosis	8.02	9.71	7.83	8.40
Jarque-Bera	317.65	479.56	193.14	300.43
Probability	0.00	0.00	0.00	0.00
Sum	10,128.30	1,034.791	1.80E+11	1,389.92
Sum Sq.Dev.	174,8223.	15,775.95	8.35E+20	9,504.130
Observations	160	160	160	160

Source: Author's computation using E-views 8.0 (2016).

and 3 respectively. As shown from the correlation matrix, the correlation coefficients among independent tax revenue, foreign direct investment and inflation rates are less than the threshold of 0.8. This means that the explanatory variables are uncorrelated (Gujarati, 2010). In Table 3 the result of the Variance Inflation Factor (VIF) test result shows a mean (VIF) of 1.17 is less than the threshold of 3. The implication of this as advised by Gujarati (2010) confirms that the explanatory variables are uncorrelated. The study also tested for the possibility of having omitted variables which may have influenced the dependent variable (GDP) apart of the stated explanatory variables (tax revenue, foreign direct investment and inflation rate). The result, using Ramsey RESET test is shown in Table 4. The implication of the P-value of 0.00 (0%) is that there are some important independent variables apart from tax revenue, foreign direct investment and inflation rate that can impact the GDP. The F value however attests to the appropriateness of the model in spite of the existence of omitted variables within the scope of the study. The next step is to conduct the test for stationarity of the variables.

Stationarity test results

The results of the panel unit root test summary comprising of Levin et al. t^* , Im, Pesaran and Shin W-stat, ADF-Fisher Chi-square and PP-Fisher Chi-square are presented in Table 5. The result in Table 2 shows that all the variables were stationary at first difference since their respective probability values were less than the 5% significance level. In order to determine the possibility of long run relationship among the series, the Panel co-integration test is conducted. The Pedroni (Engle-Granger Based) co-integration test was conducted. This is deployed in the next section after determining the optimal lag length.

Estimation results

Optimal lag length selection

The implication of the lag length selected explains the effect of the outcome of previous year on the current year. The selection of an optimal lag length was very essential before carrying out a Panel co-integration test, the result of which is presented in Table 5. The result in Table 5 portrays different lag length criterion (LR, FPE, AIC, SC and HQ). The Schwarz information criteria depicting lag order length of 2 for the model is selected. After establishing the lag order length, the Co-integration, and long-run equation results was estimated and explained in the next section.

Panel cointegration test result

The Pedroni (Engle-Granger Based) co-integration method was conducted. The result is depicted in Table 6 and 7. In Table 6 and 7, four different statistical results are reported. These are the panel v-statistic, rho-statistics (both at panel and as group), PP-statistic (both at panel and as group), ADF-statistic (both at panel and as group). Out of the four the results of Engle-Granger test, only the rho-statistic is insignificant while the remaining three are significant. The conclusion to be drawn is that, tax revenue, FDI and inflation rate are related with GDP in the long run.

Regression results

The main estimation tests conducted were the OLS, fixed effect regression and random effect GLS. The comparative results are shown in Tables 8 and 9. The

Table 2. Result of the correlation matrix test.

Variable	TAXR	FDI	INF
TAXR	1.00	-	-
FDI	0.38	1.00	-
INF	-0.05	-0.01	1.00

Source: Author's computation, StatalC 11, (2016).

Table 3. Result of the variance inflation factor test.

Variable	VIF	1/VIF
TAXR	1.17	0.86
FDI	1.17	0.86
INF	1.00	0.99
Mean VIF	1.11	

Source: Author's computation, stataC 11, (2016).

Table 4. Ramsey RESET test result.

F(3.153)	Prob
17.46	0.00

Source: Authors' computation using StatalC 11, (2016).

results of the OLS estimation reveals that tax revenue and foreign direct investment have significant and positive influence on the GDP. Inflation rate however is both insignificant and negative in influencing GDP. The combined overall explanatory power of TAXR, FDI and INF on GDP is 76%; this implies that the 76% changes in the GDP are caused by the combined influence of the explanatory variables. The result of the fixed effect as presented in Table 9 reveals that all the explanatory variables (of TAXR, FDI and INF) exert positive effect on GDP. Only TAXR is however significant. The combined explanatory power of TAXR, FDI and INF on the GDP is 66%. This implies that the 66% of the changes in the GDP is caused by these variables.

From the result of the random effect, both tax revenue and FDI have significant positive influence on the GDP. The inflation rate has a contrary relationship with GDP. The combined overall explanatory power of the explanatory variables (R-sq = 73%) on the average, explains 73% of the changes in the GDP.

Having established the relationship between the variables using OLS linear regression technique and testing for the fixed effect and random effects, the next

step is to determine the more appropriate model estimator using Durbin-Wu-Hausman test also known as the Hausman specification test. The result of the test presented in Table 10 reveals that the model did not meet the asymptotic assumptions of the Hausman test.

Another estimation technique is therefore required which is the GLS method. The result of the Generalized Least Squares regression presented is in Table 11. The estimated model (3) is presented in equation (4) as:

$$GDP = 1.17 + 7.47 TAXR + 0.80FDI - 0.06INF \quad (4)$$

The result reveals that both the changes tax revenue and foreign direct investment have positive influence on the GDP. The tax revenue is in addition statistically significant at 5 percent level. Indeed on the average, one hundred percent increase in the revenue for taxation will lead to about seventy five percent boosts in the GDP. Similar change in the foreign direct investment on the average would result in about eighty percent increase in the GDP. The inflation rate however, negatively and significantly affects the GDP at 5 percent level. The coefficient of 0.06 means that one percentage rise in inflation would cause a reduction in GDP by 6 percent. The explanatory power of TAXR, FDI and INF combined, as reflected in the Wald test result means that they significantly and jointly influenced the GDP of the sampled countries. It is still necessary to confirm the validity and robustness of the model. To achieve this, the study conducted post estimation test such as the Breusch-Pagan/Cook-Weisberg heteroscedasticity test, Pesaran's test of cross sectional independence and Wooldridge test for autocorrelation. The results of the post estimation tests for the confirmation of the estimation results are reported in the next sub-section (Appendix).

Post estimation results

The model was tested for heteroscedasticity, cross sectional dependence and auto correlation to examine the robustness of the model. The results of the tests are presented in Table 10 and 12. The results of the heteroscedasticity cross sectional dependence and auto correlation tests as shown in Table 10 and 12 reveal that the resids of the model are not constant over time; there is no presence of cross sectional dependence but serial correlation problem exist among the resids of the model. Given these econometric errors (heteroscedasticity and serial correlation problems) in the model, the Generalized Least Squares with panel (heteroscedastic) and correlation (panel – specific) is needed.

DISCUSSION

As one of the recent studies that empirically analysed the extent which tax revenue engenders growth in Africa,

Table 5. Panel unit root test results.

Series	Levin, Lin and Chu t*		Im, Pesaran and Shin W-stat		Equation Specification	Order of integration
	t-Statistic	Prob	t-Statistic	Prob		
GDP	-10.21	0.00	-4.03	0.00	Intercept	I (1)
TAXR	-13.46	0.00	-4.82	0.00	Intercept	I (1)
FDI	-9.57	0.00	-5.46	0.00	Intercept	I (1)
INF	-11.71	0.00	-8.05	0.00	Intercept	I (1)

Series	ADF-Fisher chi-square		PP – Fisher Chi-square		Equation Specification	Order of integration
	t-Statistic	Prob	t-Statistic	Prob		
GDP	84.69	0.00	95.05	0.00	Intercept	I (1)
TAXR	87.32	0.00	87.02	0.00	Intercept	I (1)
FDI	96.51	0.00	138.77	0.00	Intercept	I (1)
INF	128.61	0.00	199.41	0.00	Intercept	I (1)

Source: Authors computation using E-Views 8.0 (2016).

Table 6. Optimal lag length selection criteria.

Lag length	LogL	LR	FPE	AIC	SC	HQ
0	-3201.61	NA	1.51e+21	57.28	57.42432	57.33777
1	-3183.28	35.02	1.28e+21	57.11	57.47	57.26
2	-3157.24	48.35*	9.42e+20*	56.81*	57.39*	57.04*

Source: Authors computation using E-views 8.0 (2016); * indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: -Hannan- Quinn information criterion.

Table 7. Result of panel (Engle-Granger Based) test on both intercept and trend.

Variable	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-statistic	10.71	0.00	1.99	0.02
Panel rho-statistic	3.45	0.99	3.63	0.99
Panel PP-statistic	-10.49	0.00	-2.06	0.02
Panel ADF-statistic	-4.65	0.00	-1.18	0.12
Group rho- statistic	4.83	1.00	-	-
Group PP-statistic	-10.06	0.00	-	-
Group ADF-statistic	-3.55	0.00	-	-

Source: Authors computation using E-views 8.0(2016).

Table 8. OLS regression results.

Variable	Coeff	Std.Err	t-stat	Prob
TAXR	6.46	0.44	14.69	0.00
FDI	19.84	1.91	10.40	0.00
INF	-0.18	0.52	-0.34	0.73
Constant	0.72	6.80	0.11	0.92
Adj R-squared = 0.76				
F(3.156) = 171.57				
Prob > F = 0.000				

Source: Authors' computation using Stata IC 11 (2016).

Table 9. OLS Regression results (fixed and random effect).

Method Variables	Fixed effect				Random effect			
	Coeff	Std.Error	t-stat	Prob	Coeff	Std. Error	t-stat	Prob
TAXR	7.86	0.74	10.66	0.0	7.49	0.58	12.97	0.00
FDI	3.42	2.36	1.45	0.15	10.29	2.17	4.73	0.00
INF	0.03	0.57	0.06	0.96	-0.27	0.55	-0.48	0.63
Constant	8.34	8.16	1.02	0.31	5.61	9.61	0.58	0.56
-	R-sq overall = 0.66				R-sq overall = 0.73			
-	F(4.141) = 40.16				Wald chi2(3) = 229.96			
-	Prob > F = 0.000				Prob > F = 0.000			

Source: Authors' Computation using Stata IC 11 (2016).

Table 10. Hausman fixed and random test.

Variable	Fixed (b)	Random (B)	Difference (b-B)	Sqrt (diag(V_b-V_B)) S.E
TAXR	7.49	7.49	-2.66	-
FDI	10.29	10.29	1.78	2.98
INF	-0.27	-0.27	5.55	-
Chi2 (4) = -0.00				
Prob> chi2 = 0.0000				

Source: Authors' computation using StataIC 11 (2016).

Table 11. Generalized least squares regression result.

Variable	Coeff	Std.Error	t-stat	Prob
TAXR	0.75	0.20	37.89	0.000
FDI	0.80	0.50	1.60	0.11
INF	-0.06	0.03	-2.30	0.02
Constant	1.17	0.62	1.89	0.06
Wald chi2(3) = 1596.67				Prob > chi2 = 0.000

Source: Authors' Computation using StataIC 11 (2016).

Table 12. Results of the Wald test, Pesaran test and Wooldridge test.

Breusch-Pagan / Cook-Weisberg test	Pesaran CD test	Wooldridge test
Chi2 (1) = 146.79	Cross sectional = 1.889	F (1.15) = 8.827
Prob> chi2 = 0.000	Pr = 0.06	Prob >F = 0.01

Source: Authors' computation using StataIC 11 (2016).

study has attempted to ascertain and project the driver(s) of economic growth in Africa given Government deliberate actions through taxation. The empirical results of obtained from the Generalized Least Squares estimation indicate that tax revenue is positively and statistically related to GDP. The results of the various diagnostic tests conducted reveal a well specified model, robust enough for replication and provides suitable integrity for policy formulation on the taxation as it

impacts on the economic growth of African countries.

The results of this study corroborate the findings of Dasalegn (2014), Wisdom (2014), and Ugwuanta and Ugwuanyi (2015). The result for the tax revenue and economic growth is not surprising as these developing African countries use taxation as a key internally generated revenue tool to boost economic performance. This is made evident in some African countries that have proven that increasing revenue generated from other

sectors like agriculture, manufacturing, and commerce has boosted tax contribution to the GDP.

The result of this research is consistent with the Ibn Khaldun's theory of taxation. This theory posits a significance of a positive impact from a sustained optimum tax rate has on the general revenue generation and output of the economy or economic growth. Using selected Africa data set, the research found that tax revenue raises the growth rate. Evidence arising from this study also suggests that taxes generate revenue to government for further productive investment in the quest for economic growth. It is also in congruence with the expectancy theory of taxation that requires every tax proposal to pass the test of practicality (Bhartia, 2009).

The composition of the tax system is as important for economic growth as is the total taxation revenue. Countries that are able to mobilize tax revenue through wider tax structures and instruments together with more efficient administration and enforcement are better positioned to achieve faster growth rates. Indeed, the design of the tax system is likely to exert greater influence on long-term, sustainable growth rates.

One of the limitations with nearly all cross-country, panel studies is the challenge of appropriately measuring the marginal tax burden. This is due to the fact that the average tax rate is not reflective of the hypothesized marginal tax burdens required to affect economic decisions.

Conclusions

This study set out to carry out an empirical analysis on the relationship between taxation and economic growth in Africa from the periods 2004 to 2013. The pre-estimation test carried out was descriptive statistics and unit root tests, which showed that the variables GDP and tax were normal and stationary. However, having established this, the study went ahead to conduct estimation test to confirm the viability of the model. This result shows that there are omitted variables which could impair the explanatory capacity of the model. However this is not considered fatal.

This study confirms the significant positive influence of tax revenue on Gross Domestic Product. This is in congruence with the position of Ibn Khaldun's theory on taxation which postulates that lower tax rate have positive impact on output and economic performance. The selected African economies are reported to have over the years generated tax revenue internal sufficient enough to engineer economic performance. The foreign direct investments are also reported to positively influence the growth of the economy. This contrast sharply with the impact of inflation,

It is also recommended that in line with the Benefit theory of taxation by Cooper (1994) that the taxation regime should be more slanted to individuals in according

to the benefit conferred on them. In effect, the more benefits a person derives from the activities of the State, the more he should pay to the government, thus a "quid pro quo" is expected to subsist.

In view of the harsh economic conditions such as crashing oil prices, rising exchange rates, currency devaluation, the governments of these countries should deepen the development of comprehensive tax structures. These governments are also enjoined to deploy taxation policies that promote, foster and boost foreign direct and portfolio investments. They should grow, nurture and sustain their tax economic base so as to further positively drive economic performance.

More efficient taxation structure and instruments would in line with the two-gap theory of Easterly (2003) fill some of the savings and/or external finance gap in propelling the economies of Sub-Saharan Africa towards the achievement of targeted growth rates. These efforts would further increase the tax revenue accruable the governments.

Although this study using comprehensive econometric techniques, empirically explored the relationship between tax revenue and growth in selected African countries the question of the transmission mechanism by which tax policy affects economic has however not been examined. This is recommended for further studies.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Appendix

Table 1. GDP unit root at level.

Panel unit root test: Summary
 Series: GDP
 Date: 07/19/16 Time: 09:25
 Sample: 2004 2013
 Exogenous variables: Individual effects
 Automatic selection of maximum lags
 Automatic lag length selection based on SIC: 0 to 1
 Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	1.30817	0.9046	16	142
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	4.54183	1.0000	16	142
ADF - Fisher Chi-square	7.65901	1.0000	16	142
PP - Fisher Chi-square	8.12464	1.0000	16	144

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality

Table 2. GDP unit root 1st Diff.

Panel unit root test: Summary
 Series: D(GDP)
 Date: 07/19/16 Time: 09:26
 Sample: 2004 2013
 Exogenous variables: Individual effects
 Automatic selection of maximum lags
 Automatic lag length selection based on SIC: 0 to 1
 Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-10.2990	0.0000	16	120
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.05348	0.0000	16	120
ADF - Fisher Chi-square	84.9178	0.0000	16	120
PP - Fisher Chi-square	95.0945	0.0000	16	128

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality

Table 3. TAXR unit root at level.

 Panel unit root test: Summary

Series: TAXR

Date: 07/19/16 Time: 09:27

Sample: 2004 2013

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	2.58558	0.9951	16	142
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	3.51486	0.9998	16	142
ADF - Fisher Chi-square	13.8459	0.9978	16	142
PP - Fisher Chi-square	12.0499	0.9995	16	144

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality

Table 4. TAXR unit root 1st diff.

 Panel unit root test: Summary

Series: D(TAXR)

Date: 07/19/16 Time: 09:27

Sample: 2004 2013

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin and Chu t*	-13.4596	0.0000	16	123
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.81998	0.0000	16	123
ADF - Fisher Chi-square	87.3188	0.0000	16	123
PP - Fisher Chi-square	87.0243	0.0000	16	128

**Probabilities for fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality



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