Innovations

Value added tax and economic development in selected sub-Saharan Africa countries

Akakabota, Edward Eta, Ph.D[1], Ugherughe, Joseph Ediri, Ph.D[2*] and Oghoghomeh, Tennyson, Ph.D[1]

[1]Department of Accounting, Faculty of Management Sciences, Delta State University, Abraka, Delta State, Nigeria
[2]Department of Banking and Finance, Faculty of Management and Social Sciences, Dennis Osadebay University, Asaba, Delta State, Nigeria

Corresponding Author And Email: Ugherughe, Joseph Ediri
ugherughejosephediri@yahoo.com
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Abstract

The study examined the effect of value-added tax productivity on the economic development of three Sub-Saharan Africa (SSA) countries: Nigeria, South Africa, and Kenya. The study adopted an ex post facto research design. Data was collected from the World Bank Database and the Organization for Economic Co-operation and Development (OECD) for the period of 1995-2018. The study analysed the data using an adopted regression analysis. A stationary test of the data was used for the Augmented Dickey–Fuller unit root test. A Johansen Co-integration test was used to test the long-run relationship between the variables. The Ordinary Least Square (OLS) was used to test the hypothesis at the 5% level of significance. The findings revealed that value-added tax was found to have significant influence in Nigeria and Kenya but had an insignificant effect in South Africa. Based on the findings, the study recommended that Nigeria and Kenya should grow their economies by increasing VAT with caution so as not to abuse the human development index, while South Africa should ignore the use of a VAT strategy to grow their economy.

Keywords:1. *Economic Development 2.Taxation 3.Tax Productivity 4. Value Added Tax.*

Introduction

The Institute of Chartered Accountants of Nigeria (2006) and the Chartered Institute of Taxation (2002) defines tax as a charge or levy by the government on a product, income, or activity. If the charge is levied directly on personal or corporate income, it is classified as a direct tax. If it is levied on the price of a good or service, it is called an indirect tax.

Tax revenue is money obtained from the tax structure. For example, the tax revenue accruing to Nigeria includes petroleum profit tax and direct and indirect taxes received from other sectors (Ola, 2001). Sanni (2007) stressed that the use of tax in obtaining revenue has both a negative and positive effect on the individual and the government.

Tax is a compulsory contribution made by the people of a country to the government, and this contribution is met for the general use of the people. Nzotta (2007) classified four main areas that must be made clear to enable taxation to play its functions in society. As stated by Appah (2010), tax is not charged by the government because it has provided certain services to the individual or his family. As a result, Nigeria and other countries cannot be considered an exception, as Appah (2010) claims.Secondly, tax is a charge that is mandatory for the taxpayer.

Nigeria and some other Sub-Saharan African countries have heavily obtained foreign capital, such as loans, as a means of achieving economic development. The resultant effect of this is the accumulation of huge external debts with the attendant problems arising from foreign exchange flow. Taxation in developing countries is very important because it enables the government to finance basic public utilities such as infrastructure, education, and health.

In Sub-Saharan Africa, taxation is regarded as a brake on development. Tax rules and laws are not specifically focused on taxpayers' peculiarities. The region has embarked on a series of reforms that are focused on eliminating the burden of a tax structure that hinders economic growth and development.

Some European countries (Canada, the United States, the United Kingdom, and the Netherlands) have derived significant revenue from value-added tax, the proceeds of which have been used to advance their citizens' welfare and progress.The study intends to examine the effect of tax productivity on the economic development of Nigeria, South Africa, and Kenya.

The main objectives of the study are to ascertain the effect of Value Added Tax productivity on economic development in the Sub-Saharan African countries of Nigeria, Kenya, and

South Africa. Section two is concerned with literature review, section three covers research methodology, and sections four and five are concerned with data presentation and conclusion.

Review of related literature

This section is concerned with the review of the literature and is organised under the following subheadings: Theoretical Framework and Empirical Review.

Theoretical framework

The theoretical exposition in this study revolves around the endogenous growth model's proposition that government spending and tax policies can have a long-term effect on growth. The endogenous theory recommends the activation of the level and growth rate of capital output through the implementation of economic policies such as tax policies. Economic growth is usually determined by a combination of three factors of production, namely: labour, capital, and technological progress, which are related to each other through production function. Taxes can alter the economic decisions relating to these factors, and they affect economic growth as expressed by Zipbel and Heinrichs (2012).

The earliest attempts made to endogenize the link between growth and fiscal policies were by Barro (1996). He distinguished four types of public finance: productive vs. nonproductive expenditure and distortionary vs. non-distortionary taxation.Taxation is distortionary and, as such, affects economic growth. Subsequently, the expansion of economic growth leads to economic development.

The endogenous theory states that taxation can have a positive effect on the growth rate. The positive effect arises as the government embarks on public expenditure. For example, government expenditure on public goods such as: generating positive externalities; infrastructure, education, and public health (Eugene & Skinner, 1996). Relating to the endogenous growth model’s effect of taxes on economic activities, governments in Sub-Saharan countries stand to derive enormous tax productivity.

Empirical review

There are studies which indicate that value-added tax has a significant effect on the economic development of SSA countries, while on the other hand, there are studies which hold a contrary view. is of the opinion that the introduction of VAT will lead to an increase in the generation of revenue and make more resources available to various governments in SSA countries to augment the financing of government expenditures.

Oladipupo and Ibadin (2015) researched the impact of indirect taxes on the economic growth of Nigeria and made use of secondary data covering a period of thirty-four years from 1981 to 2014. The error correction model was used to ascertain the impact of VAT, PPT, CED, and RGDP. The results showed that VAT and PPT had a significant relationship with RGDP. It was also discovered that CED had a strong impact on RGDP.

Owolabi and Okwu (2011) considered the following factors in their study on the contribution of VAT to the development of the Lagos State economy: infrastructure development, environmental management, education sector development, agricultural sector development, youth and social development, health sector development, and transportation sector developments.The results showed that VAT revenue contributed significantly to the development of the respective sectors.

Adereti, Sanni, and Adesina (2011) examined a study titled "Value Added Tax and Economic Growth in Nigeria." They obtained time series data spanning from 1994 to 2008, which was analysed using simple regression. The analysis results showed that VAT accounted for more than 95% of the significant variables in GDP in Nigeria.

Babatunde, Ibukun, and Oyeyemi (2017) undertook a study to determine the relationship between taxation and economic growth in Africa and obtained data covering the period 2004 to 2013, which was subjected to multiple regression analysis. However, the results of the analysis showed that the relationship between tax revenue from all tax components and GDP is positively significant and enhances economic growth in Africa.

Ifurueze and Odesa (2014) carried out a study on the productivity of the Nigerian tax system for the period covering 1993–2012. The study adopted the tax elasticity and buoyancy method. The research methodology used in the study was regression analysis. The findings revealed that there was a positive relationship between tax base and tax revenue, and they also discovered that VAT was the most buoyant of all the various sources of tax components.

A study was carried out by Salti & Chahaan (2010) in Lebanon on the effect of increasing the rate of VAT by targeting poverty and inequality. The study focused on the consumer theory, and it was found to have a negative effect on poverty. Similarly, Saceed, Ahmad, and Zama (2012) x-strayed the impact of the value added tax in the SAARC region. They made use of secondary data covering a period of 1995 to 2012 on several macroeconomic factors, and it was discovered that most of the countries which implemented the VAT obtained favourable tax revenue to enhance their GDP. Denis (2012) carried out a study on the link

between Value Added Tax and Gross Domestic Product in Nigeria, and the results revealed that VAT does not contribute meaningfully to GDP.

Materials and methods

The methodology here refers to the sequence of methods or procedures employed in carrying out research work of this nature for the optimal link to be achieved. These are research design, methods and sources of data collection, methods of data analysis, and model specification.

Research design

The study adopted the ex post facto research design because the researcher intended to determine the cause and effect relationship between the dependent and the independent variable using the data that already existed and the researcher made no attempt to change its nature and values.

Sources of data

The study used time series data, which is predominantly secondary and extracted from secondary sources. The data for our variables came from the Federal Bureau of Statistics, Central Bank Metadata, and the Federal Inland Revenue Service in Nigeria, and the Kenya Revenue Authority, KRS, and the Organization for Economic Co-operation and Development (OECD Statistics) in Kenya.The data from South Africa relied on the South African Revenue Service (SARS). The data source covered twenty-four years between 1995 and 2018. The study relied on data from such official sources for accuracy and standardization.

Methods of data analysis

The study adopted a multiple regression analysis to analyse the data. A augmented Dickey-fuller unit root test was used for a stationarity test of the data. A Johansen Co-integration test was also used to test the long-run relationship between the variables.

Model specification

Based on the above, Ojong, Ogar and Arikpo (2016) econometric equation: GDP = a_0 + a_1 PPT + a_2 CIT + a_3 NOR + e_t (where: GDP = Gross Domestic Product, PPT = Petroleum Profit Tax, CIT = Company Income Tax, NOR = Non Oil Revenue, e_t = Stochastic error) was adopted to capture the impact of value added tax productivity on the economic

development of selected Sub-Saharan African countries with the removal of GDP, PPT, CIT, and NOR and the introduction of HDI, a proxy for economic development, as the dependent variable and Value Added Tax (VAT), an indicator of tax productivity, as the independent variable to arrive at the following model:

HDI = ƒ (VAT)……Model 1

The linear expression is specified as follows:

$HDI = \beta_0 + \beta_1 VAT + \mu$……Equation 1

The presumptive prior signs are

$\beta_1 \geq 0$

Where:

HDI = Human Development Index

VAT = Value Added Tax.

μ = stochastic value

Analysis of data

A diagnostic test to check for stationarity of our variable using a unit root test

An augmented Dickey-Fuller (ADF) test was employed to test the stationarity of the variables under study. The ADF tests were on the level series, first difference, and second difference series. The decision rule is to reject stationarity if ADF statistics are less than the values of critical values at 1%, 5%, and 10%; otherwise, accept stationarity when ADF statistics are greater than the critical values of 1%, 5%, and 10% in absolute terms. The result of the ADF is presented below in Table 1.

Table 1: Unit root test of the data collected from Nigeria economy

Variables	T-Statistic Value	Critical Value	Order of Integration	Sig. Level
LHDI	-3.718	-3.000	I(2)	5%
VAT	-4.536	-3.750	I(1)	1%

Source: Researcher's computation (2019)

Note that the decision rule is to reject stationarity if ADF statistics are less than the critical values at 1%, 5%, and 10% values, and accept stationarity when ADF statistics are greater. The table above reveals that Value Added Tax (VAT) and human development index variable (HDI) assume stationarity at first and second differences, respectively.

Use co-integration analysis to check for a long-run relationship between our independent variables and our dependent variable.

Hence, the unit root test in the above shows that all the variables assume stationarity at different integration orders. Hence, we moved further to check for the existence of a long-run relationship between our variables using the co-integration test. The essence is to establish whether the variables have a long-run relationship among them or assume equilibrium among them. For this purpose, we used the Johansen co-integration method, and the trace maximum eigenvalue co-integration ranks are presented in table 2.

Table 2: Johansen co-integration result of our variables gathered form Nigeria

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.960887	194.2167	95.75366	0.0000	77.79121	40.07757	0.0000
At most 1 *	0.893945	116.4255	69.81889	0.0000	53.85112	33.87687	0.0001
At most 2 *	0.704397	62.57436	47.85613	0.0012	29.24975	27.58434	0.0303
At most 3 *	0.616399	33.32462	29.79707	0.0188	22.99563	21.13162	0.0270
At most 4	0.335435	10.32899	15.49471	0.2563	9.806938	14.26460	0.2249
At most 5	0.021517	0.522048	3.841466	0.4700	0.522048	3.841466	0.4700
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level Max-eigenvalue test indicates 4 cointegrating eqn(s) at the 0.05 level *denotes rejection of the hypothesis at the 0.05 **MacKinnon-Haug-Michelis (1999) p-values							

Source: Researcher's computation (2019), using Eview9.0. Software

Table 2 shows that trace statistics and maximum eigenvalue have at most three (3) co-integration equations each. This shows that a long-run relationship exists between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious regression results. Hence, the implication of this result shows a long-run relationship exists between our dependent and explanatory variables used in the model.

Using data from Nigeria, a hypothesis was tested.

$HDI_t = \beta_0 + \beta_1 VAT_t$ ……Equation (2)

Decision rule:

If the P-value is greater than the 5% level of significance, accept H0; otherwise, reject H0.

Testing of hypothesis formulated for Nigeria's economy using Nigeria data

In order to examine the impact of the independent variable (VAT) on the dependent variable (HDI), the study used panel data and multiple regression analysis. This is due to the fact that the data is a time series (1995–2018) data and the result of our analysis is presented in table 3.

Table 3: HDI panel regression result for Nigeria data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.095817	0.056741	-1.688664	0.1151
VAT	-0.657377	0.373930	-1.758021	0.1022
R-squared	0.907445	Mean dependent var		0.006818
Adjusted R-squared	0.836249	S.D. dependent var		0.349943
S.E. of regression	0.141609	Akaike info criterion		-0.767934
Sum squared resid	0.260690	Schwarz criterion		-0.227993
Log likelihood	20.21521	Hannan-Quinn criter.		-0.624687
F-statistic	12.74568	Durbin-Watson stat		1.556114
Prob. (F-statistic)	0.000036			

Source: Researchers summary (2019) from E-view 9.0 statistical result.

Table 3 above presents the panel regression result obtained in investigating the impact of VAT on economic development in Nigeria. The dependent variable is economic development, measured as the human development index (HDI), and the independent variable is VAT. From the table, the coefficients of determination (R-Squared) and adjusted R-Squared are found to be 0.907445 and 0.836249, respectively. This implies that the explanatory power of the variable is high. The explanatory variable used for this study explains about 91% of the systematic variations in economic development, a proxy for which is the human development index (HDI) of our study. The F-test is applied to check the overall significance of the model. It shows the goodness of fit of the specified model in a study. The F-statistics value stood at 12.74568 and the P-value stood at 0.00. This shows that our model is generally significant, well specified, and significant at the 1% level. The Durbin Watson (DW) statistics, which we obtained from our regression result, is 1.556114, which is approximately 2, which agrees with the Durbin Watson rule of thumb. showing that our data is free from autocorrelation problems and, as such, fit for the regression result to be interpreted and the result relied on. The Akika Info Criterion and Schwarz Criterion, which are-0.767944 and -0.227993 respectively, further strengthen the fitness of our regression result for reliability as they confirm the goodness of fit of the model specified.

Based on the negative value of t-statistics of 1.758021 and a p-value of 0.10, VAT in the short run was found to have a negative influence on the human development index, and this influence is not statistically significant at the 5% level since the p-value is 0.10. This result suggests that we should therefore accept our null hypothesis (HO2), which states that value-added tax (VAT) has no significant effect on economic development in Nigeria, and reject the alternative hypothesis. This result is an indication that, in both the long and short run, VAT does not significantly influence HDI. This implies that a 1% increase in VAT revenue collected by the government during the year under study cannot lead to about a 0.567% decrease in the human development index (HDI) in Nigeria in the short run and about a 66% increase in the human development index in the long run.

Information from South Africa

Table 4: Unit root test of the data collected from South Africa economy

Variables	T-Statistic Value	Critical Value	Order of Integration	Sig. Level
LHDI	-4.404	-3.000	I(2)	5%
VAT	-4.193	-3.000	I(1)	5%

Source: Researcher's computation (2019)

Note that the decision rule is to reject stationarity if ADF statistics are less than the critical values at 1%, 5%, or 10% values, and accept stationary when ADF statistics are greater. The table above reveals that Value Added Tax (VAT) assumes stationarity at the first difference, and human development index variable (LHDI) assumes stationarity at the second difference.

Use co-integration analysis to check for a long-run relationship between our independent variables and our dependent variable.

As a result, we went on to use the co-integration test to see if there was a long-run relationship between our variables.The essence is to establish whether the variable has a long-run relationship or is in equilibrium. For this purpose, we used the Johansen co-integration method and the trace and maximum eigenvalue co-integration ranks as presented in table 5.

Table 5: Johansen co-integration result of our variables gathered from South Africa

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.977741	212.0865	95.75366	0.0000	91.32064	40.07757	0.0000
At most 1 *	0.895051	120.7658	69.81889	0.0000	54.10274	33.87687	0.0001

At most 2 *	0.756537	66.66310	47.85613	0.0004	33.90698	27.58434	0.0067
At most 3 *	0.540350	32.75612	29.79707	0.0222	18.65497	21.13162	0.1073
At most 4	0.426631	14.10115	15.49471	0.0802	13.34940	14.26460	0.0694
At most 5	0.030837	0.751749	3.841466	0.3859	0.751749	3.841466	0.3859
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level *denotes rejection of the hypothesis at the 0.05 **MacKinnon-Haug-Michelis (1999) p-values							

Source: Researcher's computation (2019), using Eview9.0. Software

Table 5 shows that trace statistics and maximum eigenvalue have at most three (3) and two (2) co-integration equations, respectively. This shows that a long-run relationship exists between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious regression results. Hence, the implication of this result shows a long-run relationship exists between our dependent and the explanatory used in the model.

Table 6: HDI panel regression result for South Africa data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000576	0.002785	-0.206997	0.8388
VAT	0.005296	0.027818	0.190399	0.8575
R-squared	0.744751	Mean dependent var		0.002360
Adjusted R-squared	0.608618	S.D. dependent var.		0.009593
S.E. of regression	0.006001	Akaike info criterion		-7.113712
Sum squared resid	0.000540	Schwarz criterion		-6.671941
Log likelihood	94.36454	Hannan-Quinn criter.		-6.996510
F-statistic	5.470770	Durbin-Watson stat		2.257946
Prob. (F-statistic)	0.002352			

Source: Researchers summary (2019) from E-view 9.0 statistical result.

Test of hypotheses formulated using South African data

$HDI_t = \beta_0 + \beta_1 VAT$ ……Equation (3)

Testing of hypotheses formulated for the South African economy using South African data.

To examine the impact relationships between the dependent variable HDI and the independent variables (VAT) and to also test the formulated hypotheses given, the study

used panel data and multiple regression analysis owing to the fact that the data is a time series (1995–2018) data and the result of our analysis is presented in table 6.

Table 6 above presents the panel regression parsimonious result obtained in investigating the effect of Value Added Tax on the productivity of economic development in South Africa. The dependent variable is economic development, measured as the human development index (HDI), and the independent variables (VAT). From the table, the coefficient of determination (R-Squared) and the adjusted R-Squared are found to be 0.744751. This implies that the explanatory powers of the variables are high. That the explanatory variables used in this study explain approximately 74% of the systematic variations in economic development, which serves as a proxy for the human development index (HDI) in South Africa.

The F-test is applied to check the overall significance of the model. It shows the goodness of fit of the specified model in a study. In table 8 above, the F-statistics value stood at 5.470770 and the P-value stood at 0.00. This shows that our model is generally significant, well specified, and significant at the 1% level.

Using Durbin Watson (DW) statistics, which we obtained from our regression results in table 6, it is observed that the DW statistic is 2.257946, which is approximately 2, which agrees with the Durbin Watson rule of thumb. showing that our data is free from autocorrelation problems and, as such, fit for the regression result to be interpreted and the result relied on. The Akika Info Criterion and Schwarz Criterion, which are-7.113712 and-6.671941, respectively, further strengthen the fitness of our regression result for reliability as they confirm the goodness of fit of the model specified.

VAT in the short run was based on the positive value of t-statistics of 0.190399 and p-value of 0.85, and was found to have a positive influence on the human development index. However, this influence is not statistically significant since the p-value is greater than 0.05. However, at lag one, VAT does not have a long-run relationship with HDI. This result suggests that we should therefore accept our null hypothesis two (HO2), which states that Value Added Tax (VAT) has no significant effect on economic development in South Africa, and reject the alternative hypothesis. This result is an indication that, in both the long-run and short-run, VAT does not significantly influence HDI and therefore can be ignored by management that is planning to boost their economic development through the use of a value-added tax strategy.

Analysis of Kenya data

Using the unit root test and the diagnostic test, we can see if our variables are stationary

An augmented Dickey-Fuller (ADF) test was employed to test the stationarity of the variables under study. The ADF tests were on the level series, first difference, and second difference series. The decision rule is to reject stationary if ADF statistics are less than the values of critical values at 1%, 5%, and 10%; otherwise, accept stationarity when ADF statistics are greater than the critical values of 1%, 5%, and 10% in absolute terms. The result of the ADF is presented below in Table 7.

Table 7: Unit root test of the data collected from Kenya economy

Variables	T-Statistic Value	Critical Value	Order of Integration	Sig. Level
LHDI	-4.198	-3.000	I(2)	5%
VAT	-4.424	-3.000	I(2)	5%

Source: Researcher's computation (2019)

Note that the decision rule is to reject stationarity if ADF statistics are less than the critical values at 1%, 5%, or 10% values, and accept stationarity when ADF statistics are greater. The table above reveals that all the variables (human development index (HDI) and VAT) assume stationarity at second difference in Kenya.

Use co-integration analysis to check for a long-run relationship between our independent variables and our dependent variable

The unit root test in 7 above shows that all the variables are assumed to be stationary at the same integration order. Hence, we moved further to check for the existence of a long-run relationship between our variables using the co-integration test. The essence is to establish whether the variables have a long-run relationship among them or assume equilibrium among them. For this purpose, we used the Johansen co-integration method. The trace and maximum Eigen value co-integration rank are presented in table 8.

Table 8: Johansen system co-integration result of the variables gathered from Kenya

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.958731	158.7063	95.75366	0.0000	76.50357	40.07757	0.0000
At most 1 *	0.769383	82.20272	69.81889	0.0037	35.20794	33.87687	0.0345
At most 2	0.533167	46.99478	47.85613	0.0601	18.28282	27.58434	0.4717

At most 3	0.469831	28.71195	29.79707	0.0663	15.22943	21.13162	0.2731
At most 4	0.418156	13.48253	15.49471	0.0983	12.99725	14.26460	0.0785
At most 5	0.020017	0.485276	3.841466	0.4860	0.485276	3.841466	0.4860
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level *denotes rejection of the hypothesis at the 0.05 **MacKinnon-Haug-Michelis (1999) p-values							

Source: Researcher's computation (2019), using Eview9.0. Software

Table 8 shows that trace statistics and maximum eigenvalue have at most two (2) co-integration equations each. This shows that a long-run relationship exists between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious regression results. Hence, the implication of this result shows a long-run relationship exists between our dependent and the explanatory variables used in the model.

Table 9: HDI panel regression result for Kenya data

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000503	0.002170	0.231781	0.8198
VAT	0.083052	0.037030	2.242840	0.0404
Adjusted R-squared	0.649536	S.D. dependent var		0.011957
S.E. of regression	0.007079	Akaike info criterion		-6.783419
Sum squared resid	0.000752	Schwarz criterion		-6.341649
Log likelihood	90.40103	Hannan-Quinn criter.		-6.666217
F-statistic	6.328420	Durbin-Watson stat		1.852207
Prob(F-statistic)	0.001123			

Source: Researchers summary (2019) from E-view 9.0 statistical result.

Using data from Kenya, a hypothesis was tested.

$HDI_t = \beta_0 + \beta_1 VAT_t$ ……Equation (4)

Testing of hypotheses formulated for Kenya's economy using Kenya data.

Table 9 above presents the panel regression parsimonious result obtained in investigating the effect of tax productivity on economic development in Kenya. The dependent variable is economic development, measured as the human development index (HDI), and the independent variable (VAT). From the table, the coefficients of determination (R-Squared) and adjusted R-Squared are found to be 0.771437 and 0.649536, respectively. This implies that the explanatory powers of the variables are high. That the explanatory variables used in this study explain approximately 77% of the systematic variations in economic development, which is a proxy for the human development index (HDI) in Kenya.

The F-test is applied to check the overall significance of the model. It shows the goodness of fit of the specified model in a study. In table 8 above, the F-statistics value stood at 6.328420 and the P-value stood at 0.00. This shows that our model is generally significant, well specified, and significant at the 1% level.

Using Durbin Watson (DW) statistics, which we obtained from our regression result in table 12, it is observed that the DW statistic is 1.852207, which is approximately 2, which agrees with the Durbin Watson rule of thumb. Showing that our data is free from autocorrelation problems and, as such, fit for the regression result to be interpreted and the result relied on. The Akika Info Criterion and Schwarz Criterion, which are -6.783419 and -6.341649, respectively, further strengthen the fitness of our regression result for reliability as they confirm the goodness of fit of the model specified.

Based on the positive value of t-statistics of 2.242840 and a p-value of 0.04, VAT in the short run was found to have a positive influence on the human development index, and this influence is statistically significant at the 5% level since the p-value is less than 0.10. However, VAT does not have a long-term relationship with HDI in Kenya. This result suggests that we should therefore reject our null hypothesis two (HO2), which states that value-added tax (VAT) has no significant effect on economic development in Kenya, and accept the alternative hypothesis. This result is an indication that in the short run, a 1% increase in VAT will result in about a 0.08% increase in the economic development of Kenya. Therefore, Kenya's government when considering boosting its economic development can do so through the increase of its Value Added Tax (VAT), as this has a significant influence on the economic development of the country.

Discussion of findings

Based on our findings, VAT was found to have a significant influence on our dependent variable, a proxy for HDI in Kenya, and an insignificant effect in Nigeria and South Africa. Though this effect on Kenya is positively significant, in Nigeria it is negatively insignificant and in South Africa it is positively insignificant.

Conclusion

The study examined the effect of value-added tax productivity on the economic development of three Sub-Sahara African countries: Nigeria, South Africa, and Kenya by using a dataset that covered a period of twenty-six years from 1995 to 2018. Based on our findings, the study revealed that the variable of tax productivity, or VAT, has an overall significant effect on the human development index in the SSA countries of Nigeria, South Africa, and Kenya, judging from the probability of the F-statistic.

Recommendation:

Based on our findings above, the following recommendation was made by this study as follows:

1. Kenyan government, if planning to boost her economic development through VAT productivity, is encouraged to increase VAT in both countries. However, caution should be exercised not to do so regularly as this can negatively affect the human development index if abused. However, Nigeria and South Africa should ignore the use of the VAT strategy in growing their economies as this does not have a significant effect on the human development index in these countries.

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