Comparative Analysis on Effect of Tax Revenue on Economic Growth of Developing Countries

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ABSTRACT: *The study examines effect of tax on economic growth of developing countries categorized into three regions namely; Africa, Asia and South America for the period 1990 to 2019 with specific objective to determine effect of tax revenue on gross domestic product of the regions collectively and provided comparative analysis of the three regions. Ex post facto research design was used and data were extracted from the World Bank and Organization of Economic Community and Development (2020) while the variables were analyzed using panel regression analytical technique. The study established clear evidence that each of the regions and collective tax revenue have positive significant effect on their gross domestic product. It further found that the positive effect of tax revenue on gross domestic product of the Asian region is more significant than the African and South American countries while that of the African countries is more than that of the South American countries sampled. The study therefore concludes that tax revenue has significant effect on economic growth of developing countries and recommends that governments of developing countries should intensify efforts to sustain their gross domestic product by reinvigorating their tax system, fiscal institutional structures, and framework to generate more tax revenue and invest in critical infrastructure; ensure more efficient means of tax collection so as to reduce the cost of collection and enhance the total revenue from taxes and seek for international collaboration on taxes to enhance growth.*

KEY WORDS: tax revenue, economic growth, developing countries, Africa, Asia, South America.

INTRODUCTION

Governments around the world have responsibility of ensuring a better standard of living for their citizens by raising revenue to provide socio – economic welfare and a strong economy amongst others (Tapang, Onodi & Jones, 2018; Onokoya & Afintinm, 2016; Ihendinihu, Jones & Ibanichuka, 2014). One of the ways by which governments including developed and

developing countries raise revenue is through the imposition of taxes on businesses and individuals.

Countries have differing tax policies, reforms, legislations, strategies, philosophies and structures designed to achieve different outcomes such as capital formation, attracting foreign investors and to shape their economy. Developing and developed countries endeavor to attract inflows of capital by reducing taxes on investments and other creative fiscal strategies such as investment tax credits, tax holidays, special zones, investment tax allowances, accelerated depreciation, targeted reduction of tax rates, targeted tax exemptions, exemptions or deferrals of customs taxes on imports, and tax incentives on financing (Liuz, 1997; Hung & Phyllis, 2000; Aradhna, 2006; Fuest, Peichi & Seisech, 2013; Zolt, 2015; Stieglitz, 2016; Mathias & Silke, 2017; Nnuobia & Fabian, 2018). . Some of the reforms made by developing countries are generally targeted by establishing a tax environment that encourages savings, investment and entrepreneurship that would grow the economy.

Studies have observed that tax constitutes about 54% of the annual budget of OECD countries, while in most developing countries tax hardly contributes 30% of annual revenue (Mascagni, Moore & MaCleskey 2014). Tanzi and Zee (2001) posit that low income on workers, large informal economic structure, lack of dependable statistics, difficulty in creating robust tax administration amongst others are the reasons inhibiting developing countries in their effort to institute an efficient tax system.

Nzotta (2007) noted that developed countries has a high proportion of their gross domestic product from tax revenue when compared to developing countries while Linnea (2017) posits that developing countries' tax revenue to GDP is estimated to be between 5% to 22% when that of developed countries is between 28% to 48%.Moore (2013) declared that the developed countries tax agencies find it easier to tap into revenue sources with a minimum cost of collection as against the developing countries which have high cost of collection and difficulty in assessment. Besely and Persson (2019) states that high cost of tax collection and difficulties in accessing revenue will affect the economic growth indicators of nations.

Empirically, several authors have studied relationship between tax and economic growth in developing countries with varying results but made no regional comparisons. Amongst others are; Abdisa (2018) and Dasalgn (2014) focused on Ethiopia; African countries (Ahmed & Musah, 2018); Southern African Development Community (Ade, Rossonw &Gwatidzo, 2018); West African countries (Oboh, Chinonyelum &Edeme, 2018); India (Ghuge &Katdare, 2016); Latin America region (Martorano, 2016); Nigeria (Ojong, Anthony & Arikpo, 2016; Onakoya & Zfinitinnni, 2016; Jones and Ekwueme, 2016 and Fatoki, 2014).

This study extends existing studies by making comparative analysis of the effect of tax on economic growth of three regions namely; – Africa, Asia/Oceania, and Latin/Caribbean as identified by United Nations Department of Economic and Social Affairs (2016) and therefore hypothesized that the effect of tax on economic growth of developing countries is not significant. The study would be beneficial to different group of bodies including the academia, potential foreign investors, economic analysts, policy makers and tax agencies.

REVIEW OF RELATED LITERATURE

Conceptual Review

Objectives of Taxation

The objectives of taxation amongst others include to promote fiscal responsibility and accountability (Gbato, 2017), facilitate economic growth and development (Gobetti & Orair, 2016), provide the government with stable resources for the provision of public goods and services (Arachi, Bucci & Casarico, 2015), address inequalities in income distribution (Causa & Hermansen, 2017), provide economic stabilization (Gomez, Martorano & Moran, 2016), pursue fairness and equity (Christian, 2014).

Economic growth

Economic growth can be defined as a positive change in the level of goods and services produced by a country over a certain period. (Organization for Economic Co-operation and Development, 2017). Nmesirioye, Jones and Onuche (2009) explain that economic growth is the rise in the estimated value of goods and services produced in a nation in a particular year. Therefore, it can be asserted that growth comes from within a country's economic activities and eternal (Bogdonov 2010). Economic growth relates to a persistent increase in per capita national output over a long period (Forbin, 2011).

The determinants of economic growth inter alia include; the quality and quantity of available human resources (Ogbodo & Ggbunike, 2016); the efficient utilization or exploitation of natural resources in given conditions such as the skills and abilities of human resources, technology and the availability of funds (Adebawo, 2015); capital formation (Oyinlola &Adeyemi, 2014); technological development (Okpala & Chidi, 2010); social and political factors (Okereke & Kurotamunobaraami, 2016).

Theoretical Review

The study is hinged on the tax structure theory developed by Hinrichi (1996) and it is cardinal to the assessment of the growth and performance of the various strands of taxation in virtually all economies of the world. In most parts of Africa, the bulk of income tax revenue comes from large business firms and government employees. The extension of the tax to small traders, artisans, or professional persons meets with serious administrative difficulties as there is no way of ascertaining income where no proper books are kept, and no regular accounts are prepared or audited (Kaldor, 1970).

The theory of tax structure development as advanced by Hinrichs (1966); Thorn (1967); Braun (1975); Webber and Wildavsky (1986) posits that at the early stages of economic development, the basic features of taxation are the narrowness of personal income tax base, the operation of the poll tax, the scarcity of train tax administrators.

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Empirical Review

Several empirical studies have been undertaken to establish the relationship between tax and growth in developed and developing countries but few are considered here.

Ade, Rossouw and Gwatidzo (2018) examined the determinants of tax revenue performance in the Southern African Development Community (SADC) by utilizing secondary panel data from 1990 to 2010. The investigation adopted two estimation techniques – least squares dummy variables fixed effects and the feasible generalized least square on one hand and the extreme-bound analysis technique in delineating the various causal relationships. The results suggest that increased FDI inflows into the SADC will culminate in an expanded tax base and increase tax revenue. It further buttressed the need to maintain the current tax rates in the sub-region to maximize the tax revenue for the sub-region.

Oboh, Chinonyelum, and Edeme (2018) investigated the nexus between tax revenue and economic growth in five selected West African countries for the period 2000 to 2015. The applicable data – direct and indirect tax revenue and GDP, were analyzed through the use of regression estimates to reveal a statistically significant positive relationship between tax revenue and economic growth in the Sub-region.

Kalas, Mirovic, and Milenkovic (2018) analyzed the effect of taxes on GDP growth in Serbian and Croatian, Panel regression analysis approach was used for the analysis. The result shows that CIT and social security tax have a positive and significant effect on GDP growth.

Martorano (2016) investigated taxation and inequality in developing countries, with a focus on the Latin American region. Data from 1990 to 2010 were extracted from the income distribution in Latin America Dataset and the Socio-Economic Database for Latin America and the Caribbean. The study adopted the use of the regression model developed by Cornia, et al. (2011) to show that the present level of inequality in the 18 investigated countries is strongly correlated with its past level. It was thus concluded that the recent changes in tax composition by Latin American countries contributed to influencing income distribution over the period under investigation.

Arachi *et. al.* (2015) studied relationship between growth and tax structure using implicit tax rates and tax ratios as indicators. The study used a sample of 15 OECD countries from 1965 to 2011 and analyzes with the ordinary least square method. They found that the link between tax structure and long-term per capita GDP is not robust.

Saidu (2015) examines the optimal tax rate and economic growth: Evidence from Nigeria and South Africa using the Balance budget assumption method develop by Scully (2003). It was discovered that there is a great difference between the two economics in terms of the effect of tax on their economic growth.

Mehrara, Masoumib, and Barkhi (2014) look at effect of fiscal policy on economic growth and inflation in developing countries. The PVAR approach was adopted to determine the effect on

macro variables. The result shows that economic growth will increase through government expenditure in the short term but in the long run, is the reverse. Taxes in the short run slightly promote economic growth and have no effect in the long run. In the case of inflation, taxes reduce inflation in the short run and increase in the latter period.

Hakim, Karia and Bujang (2014) examine impact of indirect taxes, especially VAT, on economic growth in developing and developed countries using the Arellano-Bond GMM estimator. They find that indirect taxes are negatively correlated with economic growth in developing countries, and significantly and positively correlated with economic growth in developed countries. They conclude that the implementation of the current flat rate VAT is less effective in raising higher revenues and stimulating growth in developing countries.

Dackehag and Harrison (2012) analyzed how to tax income impact GDP growth by using panel data of 25 OECD countries and was analyzed by panel regression method of analysis with a focus on CIT and Personal Income Tax. The finding shows that both taxes hurt GDP growth, but the correlation between CIT and GDP growth was positive.

METHODOLOGY

Research Design
The ex post facto design was adopted in this study, as it suits the historical and econometric nature of data and analysis (Cresswell, 2003).

Population of the Study
The United Nation Department of Economics and Social Affairs ascertained the number of developing countries to be one hundred and eight (108) (UNDESA, 2016). It was from these countries that the sampled were selected based on availability of data.

Sampling Technique and Size
In this study we used non probability method of purposive sampling because of the nature of data. The study investigated 33 of those developing countries from three (3) regions representing about 28% of the population which were selected based on relevant available data. We extracted data of 16 countries from the Africa region, 9 countries from Asian region and 8 countries from Latin America/Caribbean region. The countries selected from African region are Cote D`voire, Egypt, Madagascar, Mauritius, Nigeria, Tunisia, Uganda, South Africa, Congo Democratic Republic, Burkina Faso, Ghana, Congo, Niger, Senegal, Togo, and Rwanda.

Those from the Asian region are United Arab Emirate, Indonesia, Malaysia, Philippines, Thailand, Fiji, Vanuatu, Singapore and Oman while from the Latin American/Caribbean region we extracted data from Argentina, Bahamas, Brazil, Barbados, Chile Columbia, Jamaica and Mexico. The variables were extracted from the records of World Bank and Organization of Economic Community and Development (2020). The values are stated in United States of

America Dollars (USD) and were accordingly used for effective comparison. The variables were logged due to the different magnitude of the values extracted.

Balsley and Clover (1985) opined that the minimum sample size from a population should not be less than 10%.

3.4. Method of Data Analysis
The analytical tool employed in the study is the Panel regression model using the Fixed and Random Effect and the Hausman Test. These computations where done with E-view 9 software.

Model Specification
The researchers modified the work of Saidu (2015), Arachi et.al (2015), Oboh, et.al. (2018) , Kalas *et.al* (2018) and Ade *et.al*, (2018) and used Panel data regression techniques to analyze the data since the data consist of time series data and cross sectional data. Consequently, the researchers developed panel data regression model as follows:

$$GDP \quad = \quad f(TAX)$$

The model above is deterministic; we therefore translated it into an econometric model thus:

$$GDP\ t = \beta_o + \beta_1 TAX_{it} + e_{it}$$

The variables are hetroscedasticity in nature and as such the value vary significantly from one another. For the purpose of analysis, the model was logged to normalize the data set.

$$log\ GDP = \beta_o + \beta_1 \log TAX_{it} + e_{it}$$

Where:

|		
GDP	=	Gross Domestic Product
β_o	=	Intercept term
β_1	=	Slop Coefficient
e	=	Error term
í	=	Cross section of country
t	=	Time

RESULTS AND DISCUSSION

The data are presented using stack cross sections graph shown on figures 1 and 2 for tax revenue and gross domestic product respectively to examine the frequency of distribution. As expected, the 33 developing countries have varying degree of data set and provided evidence that some developing countries are better than others in terms of various performance indices. Few African countries like Rwanda and Congo had low figures due to political impasse experienced in those countries.

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The graph on tax revenue as shown on figure 1 indicates a random movement which implies that tax revenue generated by the developing countries differ significantly from each other over the period with a low tax revenue from Rwanda in 1990 and high figure from Brazil in 2011.
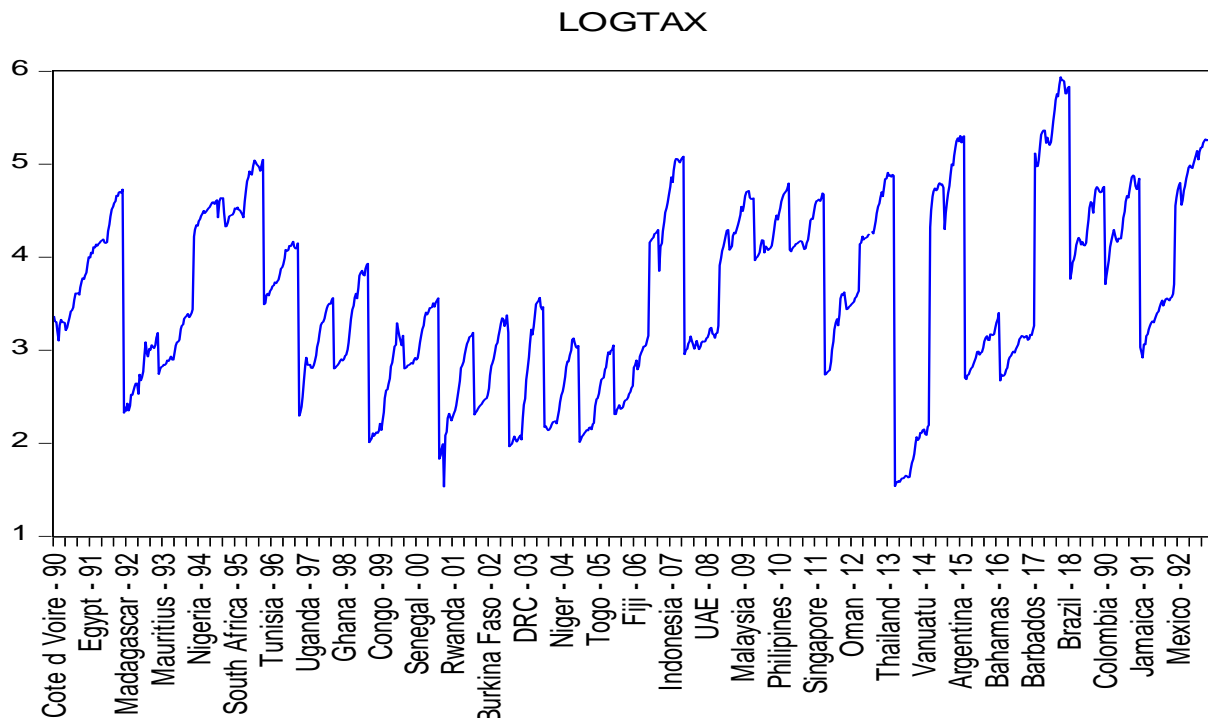
Source: Researchers computation 2023

Figure 1: Graph of data on tax revenue of 33 Developing Countries from 3 Regions showing the years with the highest tax.

Figure 2 is the data of gross domestic product of the countries. There are different levels of growth rate in these countries over the years. Brazil in 2014 recorded the highest gross domestic product while Vanuatu had the lowest in year 1990. The performance of Asian countries such as Malaysia and Singapore experienced considerable growth than others while in Africa, Nigeria and South Africa had higher GDP than other African countries. In Latin America; Brazil, Chile and Mexico had high GDP in some years than other countries in the continent.
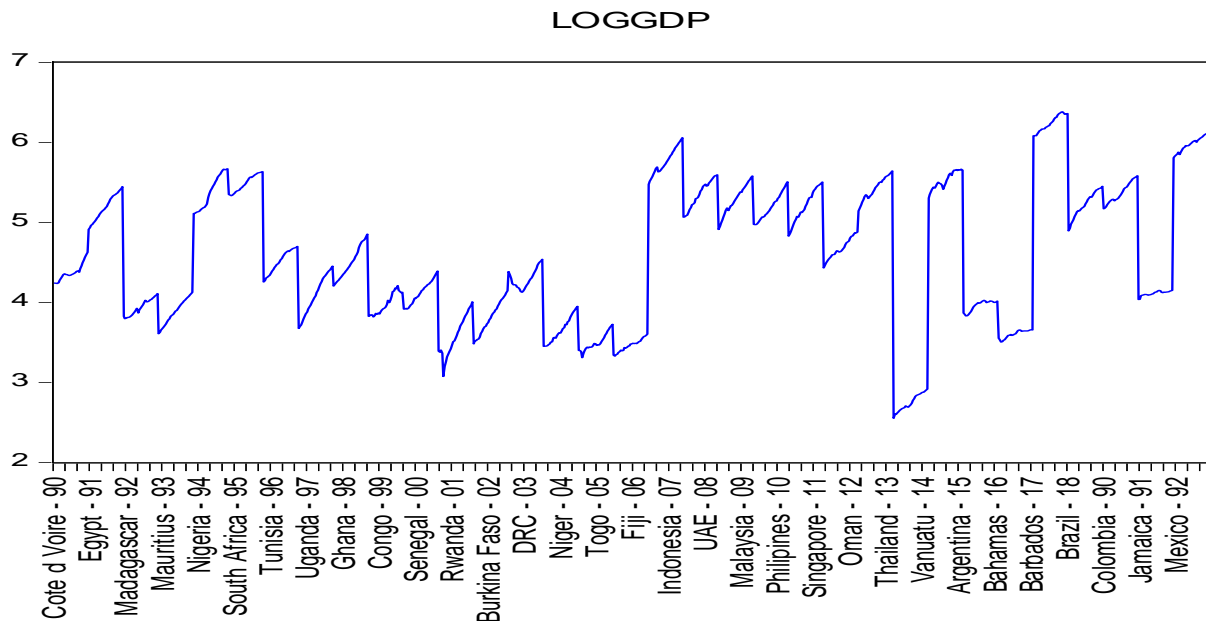
Source: Researchers computation 2023

Figure 2: Graph of Data on Gross Domestic Product of 33 Developing Countries from 3 Regions showing the years with the highest GDP.

The study adopted panel unit root test to determine stationarity of the data set. The result indicates that all the variables are stationary and integrated at level and are therefore assumed to be co-integrated. The researchers therefore employed unbalanced panel least squares regression analysis to ascertain the relationship between tax revenue and economic growth variables of the selected developing countries.

Table 1: Panel Unit Root Test

Variable	Statistic	Probability	Order of Integration
LogTAX	-2.43274	0.0062	1 (0)
LogGDP	-2.93570	0.0017	1 (0)

Source: Researchers computation, 2023.

Effect of tax revenue on gross domestic product of developing countries.
The study employed panel least squares regression analysis using fixed effect and random effect regression while the Hausman test was adopted to distinguish the preferred model between fixed and random effect. Using Hausman test, null hypothesis was rejected when the Chi square probability is less than 5% and we concluded that the fixed effect was the preferred model but when the Chi square probability is more than 5%, the random effect will be the preferred model. (Gujarati & Porter, 2009; Gujarati, 2013).

Tables 2 and 3 are the regression of fixed effect and random effect. Both the fixed and random effect regression has coefficients that are consistent but the Hausman test result on table 3 has Chi-square value of 67.76 and probability of 0.00. Since the Chi-square probability is

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significant at 5% level of significance, we reject the null hypothesis and therefore conclude that the fixed effect regression is the preferred regression to test the hypothesis.

From the fixed effect regression on table 2, the intercept term has coefficient of 3.12 which represents the average value of gross domestic products of the developing countries affected by all the variables not included in the model or it discloses the average effect of gross domestic products when tax revenue of the selected developing countries are data sets equal to zero. The t-statistic value of 103.43 has probability of 0.00% which is significant at 5% level of significance.

Table 2: Fixed Effect Regression of Gross Domestic Product and Tax: Dependent Variable LogGDP

Variable	Coefficient	Std Error	t-Statistic	Prob C
C	3.1175	0.0301	103.43	0.000
LogTAX	0.4104	0.0084	48.97	0.000
R-squared	0.9918			
Adjusted R-squared	0.9916			
F-Statistic	3401.24			
Prob (F-statistic) 0.0000				
Durbin-Watson stat	0.1004			
No of Observations	990			

Source: Researchers Computation, 2023

The adjusted R squared of 99.2% represents the total variation on gross domestic product of the selected developing countries as a result of variation in their tax revenue stated in the model. This implies that there is goodness of fit in the model. The t-statistic value of 48.97 has corresponding probability value of 0.00% which is less than 5% level of significance. This suggests that there is positive significant effect of tax revenue on gross domestic product of developing countries. The Durbin Watson is low but that does not suggest evidence of either positive or negative autocorrelation due to heteroscedastic nature of the data set.

Table 3: Random Effect Regression of Gross Domestic Product and Tax:

Dependent Variable LogGDP

Variable	Coefficient	Std Error	t-Statistic	Prob C
C	3.0824	0.0417	37.8663	0.000
LogTAX	0.4203	0.1124	74.7601	0.000
R-squared	0.7156			
Adjusted R-squared	0.7153			
F-Statistic	2400.97			
Prob (F-statistic) 0.0000				
Durbin-Watson stat	0.0936			
No of Observations	990			

Source: Researchers Computation, 2023

Table 4: Hausman Test Result of Gross Domestic Product and Tax

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	67.760479	1	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LOGTAX	0.410428	0.420353	0.000001	0.0000

Source: Researchers Computation 2023

In reliance of the Hausman test which favoured the fixed effect, the researchers conducted panel regression as shown on table 5 using the three geographical regions as dummy variables. The study therefore employed two dummy variables namely dummy two and dummy three to represent the selected developing countries using the Asian and South America/Caribbean region as dummy two and dummy three respectively. The selected countries in Africa were used as the benchmark as the two dummies were used in order to avoid the dummy variable trap while the differential coefficient was used to determine the region that had better performance in terms of the relationship amongst dependent and independent variables (Gujarati, 2013).

The differential coefficients value of 1.6267 represents the coefficient value of the African region while that of Asia and South America are 1.787 (1.6267 + 0.1603) and 1.5618 (1.6267 – 0.0649) respectively. The implication is that Asian counties have tax revenue that influenced growth of their economies than the other two regions while African countries also have better tax laws and reforms to generate higher tax revenue than the sampled South American/Caribbean countries collectively during the period review. The result provided evidence that the three regions had tax policies that affected growth of their economy. This is based on the t statistics probability values which are all significant at 5% level of significance.

Table 5: Fixed Effect with Dummies Regression of Gross Domestic Product and Tax:

Dependent Variable LogGDP

Variable	Coefficient	Std Error	t-Statistic	Prob_C
C	1.6267	0.0412	37.0263	0.000
LogTAX	0.8466	0.0118	71.3308	0.000
DUM 2	0.1603	0.0254	6.3220	0.000
DUM 3	- 0.0649	0.0281	-2.3080	0.000
R-squared	0.8638			
Adjusted R-squared	0.8633			
F-Statistic	2011.98			
Prob (F-statistic)	0.0000			
Durbin-Watson stat	0.0236			
No of Observations	990			

_____Source:
Researchers Computation, 2023

Test of Hypothesis

H_O: Tax has no significant effect on the gross domestic product of developing countries.
To test the hypothesis that:
H_0: $\beta_1 = 0$ i.e. the slope coefficients are simultaneously equal to zero.
H_I: $\beta_1 \neq 0$ i.e., the slope coefficients are not simultaneously equal to zero.

The Hausman test result confirmed the use of fixed-effect regression between tax revenue and gross domestic product. The study, therefore, adopted the F statistic probability of the fixed effect regression result to test the hypothesis.

Decision Rule: If the probability of the F-statistic result is less than 5% α level of significance, the study would reject the null hypothesis, H_0, and accept the alternative hypothesis H_1.
The F statistic with a value of 3401.24 has a probability value of 0.00% and is below the 5% level of significance. The study rejected the null hypothesis and therefore concludes that there is a significant effect of tax on the gross domestic product of developing countries.

DISCUSSION OF FINDINGS

The result between tax revenue and the gross domestic product has a positive intercept that is significant. The implication is that other variables significantly influence the economic growth of the selected 33 developing countries. The variables could be revenue from agriculture, services, oil, grants, borrowings, industrialization, tourism, and various macroeconomic policies put in place to achieve desired objectives. Also, tax revenue was found to have a direct significant effect on gross domestic product of the sampled countries

It infers that an increase in tax revenue would increase the gross domestic product of developing countries. The reasons for these direct significant relationship is consequent on the autonomy granted to tax authorities like in Nigeria, Malaysia, etc, broad tax base and such other investment-friendly tax policies embarked upon by various developing countries. This result is in agreement with that of Oboh *et.al* (2018), Kalas et.al (2018) which noted that tax revenue has positive significant effect on economic growth of developing countries.

The result further provided evidence of how countries from each of the continents had collective tax revenue that positively influenced their gross domestic product significantly. Specifically, it revealed that the Asian countries collectively have a more robust tax system and fiscal institutional framework to efficiently manage their tax revenue to enhance the growth rate of the economy than countries from Africa and South America/Caribbean. At the same time, the selected African countries collectively generated more tax that affected their gross domestic product than the Latin American countries. This means that African countries are more aggressive in tax administration and management to impact their economy. However, this result is at variance with the tax revenue percentage of gross domestic product statistic provided by OECD (2020) where the ratio of tax revenue as a percentage of GDP averaged 17.2% for 26 African countries and 22.8% for Latin American countries. This variance in the study could be as a result of the unequal number of sampled countries as 16 countries were selected in Africa while 8 are from Latin America.

CONCLUSION AND RECOMMENDATIONS

The fixed effect regression result on tax revenue and gross domestic product revealed that there exist a direct relationship between tax revenue and gross domestic product of developing countries. There was strong evidence to affirm that each of the regions has tax policies that positively affected their various gross domestic products. In terms of ranking, the Asian region's tax revenue affected their gross domestic product more than the other regions followed by the African and Latin American regions as second and third respectively. From the hypothesis tested, the study established that tax has a significant effect on the gross domestic product of developing countries.

This study has implications for policymakers, tax authorities, economic analysts, world financial institutional bodies, and researchers. Given the findings, we recommended that:

i. Governments of developing countries should intensify efforts to sustain their gross domestic product by reinvigorating their tax system, fiscal institutional structures, and framework to generate more tax revenue and invest in critical infrastructure.
ii. They should ensure more efficient means of tax collection so as to reduce the cost of collection and enhance the total revenue from taxes.
iii. There should be international collaboration between countries to enhance growth on tax revenue in developing countries.

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