Disaggregated Real Sector Growth and Tax Revenue in Nigeria

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Abstract: The recent dwindling price of crude oil has led to a significant decline in government revenue in Nigeria. Therefore, government is exploring alternative measures to grow revenue. This study examined effect of disaggregated real sector growth, proxy by GDP, on tax revenue in Nigeria. It employed ex-post facto research design using macro data for the period 1981-2017. Descriptive and Inferential statistics were adopted to determine the relationships between the variables. The study found that GDP of the individual sectors had mixed effect on tax revenue: GDP of agriculture and trade sectors individually had significant effects on tax revenue, while individual GDP of other sectors (manufacturing, crude petroleum, solid minerals, construction and service) had insignificant impact on tax revenue. In addition, the joint effect of GDP of the disaggregated sectors had significant positive influence on tax revenue. The study concluded that disaggregated real rector growth has significant effect on tax revenue in Nigeria. It is recommended that Nigerian government should implement relevant policies to drive growth in real sector in order to create the platform for sustainable increase in tax revenue. It also recommended that such measures should take into cognisance the peculiarities of each sector on revenue generation in Nigeria.

Keywords: Disaggregated real sector GDP, Government policy, Government Revenue, Gross domestic product (GDP), Real Sector, Real Sector GDP, Tax revenue.

1. Introduction

Government and general public have continued to deliberate on how to respond to the unrelenting dwindling price of oil price and its impact on government revenue in Nigeria due to the fact that all the three tiers of government in Nigeria (i.e. federal, state and local) are finding it extremely difficult to meet their statutory responsibilities. These responsibilities include provision of public goods, maintenance of law and order, defense against external aggression, regulation of trade and business (Abiola & Asiweh, 2012 and Edame & Okoi, 2014).

Taxation is one of the oldest means of financing government activities (Bird & Casanegra de Jantscher, 1992; Gupta, 2007). Suberu, Ajala, Akande and Olure-Bank (2015) posited that revenue generation is one of the most critical responsibility of government. According to Nwaeze and Nwaeze (2014), tax revenue is the only reliable and controllable source of government revenue globally.

Musgrave & Musgrave (2004) discovered that tax has micro-economic effects (distribution of income and efficient use of resources) as well as macroeconomic impact (on the level of economic capacity-GDP, employment, prices and growth). Aji (1997) defined taxation as compulsory contribution levied on property, income, commodity and transactions primarily with the aim of raising revenue and directing the factors of production towards government objectives. Taxation has come into existence "from time immemorial" without a specific mention of when exactly it evolved. However, the origin of tax and levies can be traced to the ancient cities of Greek and Rome in modern literature; but from the Bible account, it has been as old as the world. In these so called cities of Greek and Rome, taxes were levied on consumption, saving, investment and properties.

The determinants of tax revenue can be broadly classified into tax collection effort and tax buoyancy (Samir-ul-Hassan, Biswambhara, Mishra, Srinivasa & Suresh, 2017; Entela and Liambi, 2014). Tax collection effort measures the effectiveness of the tax system (tax administration, tax policy and tax laws) while tax buoyancy measures response of tax revenue to changes in GDP. Adam (1776) in his book on Wealth of Nation stated that economic growth depends on the amount of factors of production viz; land, labour and capital. He stated that economic growth depends on the the aggregate of wealth of the nation which remains the platform for economic activities.

Economic growth refers to increase in the value of goods and services produced in an economy over a particular period. According to Abata (2014), economic growth refers to the increase, over time, of a country's economic capacity to produce goods and services needed to improve the well-being of the citizens. Economic growth is viewed differently by different scholars. Salami, Apelogun, Omidiya and Ojoye (2015) describe economic growth as the sustained increase in per capital national output or net national product over a long

period of time. According to them, economic growth occurs when a nation's production possibility frontier shifts outward. Economic history provides us with ample evidence that agricultural revolution is a fundamental pre-condition for economic growth, especially in developing countries (Adong, Muhumuza, & Mbowa, 2014). Bategeka, Kiiza and Kasirye (2013) submit that in the 1960s, agriculture contributed up to 64% of the total GDP in Nigeria but gradually declined in the 1970's to 48% and it continues in 1980 to 20% and 19% in 1985, which was as a result of oil glut of the 1980s.

Nigerian economic can be broadly classified into four interrelated sectors, which are operating to ensure that resources are best utilised in the production of goods and services to maximise economic growth as stated in the 2013 annual report of Central Bank of Nigeria (Oduyemi, 2013). These sectors are the financial, fiscal or government, external and real sector. While all the four sectors have important roles, the role of the real sector is particularly significant and strategic. In view of this, the real sector is the pillar upon which the government's objective on economic growth is achieved Anyanwu, Offor, Adesope and Ibekwe (2010).

Prior works have consistently looked into the effect of tax revenue on economic growth but limited attention has been focused on the influence of economic growth on tax revenue. The concern of this study is to examine the influence of disaggregated real sector GDP (agriculture, manufacturing crude petroleum, solid minerals, construction, trade and non-financial service) on tax revenue in order to address the issue of low tax revenue in Nigeria. In addition, insignificant number of studies have been conducted in the Nigerian context on the influence of growth in each of the various categories of the real sectors of the economy (agriculture, manufacturing, crude petroleum, solid minerals, construction, trade and non –financial service sector) on tax revenue.

2 Review of Literature

2.1 Conceptual Review

2.1.1 Tax Revenue (TR)
The term 'tax' has been defined as a compulsory transfer or payment of money from the private individuals, institutions or groups to raise revenue to finance government expenditures. It may be levied upon wealth or income, or the form of surcharge price (Anyanwu, 1997). The concept of tax in Nigeria is clarified by the provision of section 69 of the Federal Inland Revenue Service (Establishment) Act, 2007, which defines tax to include any duties, levies or other revenue accruable to the government in full or in part under this Act, the laws listed in the first schedule to this Act or any other enactment or law (Somorin, 2012). However taxes may be imposed on individuals, entities, assets and or transactions. Therefore, tax is usually a monetary charge on a person's or entity's income, property or transaction. The Nigeria's revised 2017 National Tax Policy defines tax as any compulsory payment to government imposed by law without direct benefit or return of value or a service whether it is called a tax or not.

2.1.2 Real Sector Growth
The real sector in Nigeria comprise of agricultural, manufacturing, crude petroleum, solid minerals, construction, trade and non-financial service sectors (Oduyemi, 2013). The real sector Investors seeks financial support from the financial sector to boost production and increase yields. The real sector is where goods and services are produced through the combined utilization of raw materials and other production factors such as labour, land and capital. It therefore forms the main driving force of Nigerian economy, and the engine of economic growth and development. It is the part of the economy that is concerned with production of goods and services as opposed to the part of the economy that is concerned with buying and selling on the financial markets. The aggregate real sector GDP is the GDP of agricultural sector, manufacturing sector, crude petroleum sector, solid minerals sector, construction sector, trade sector and non-financial services sectors in a particular year.

2.1.2.1 Agricultural Sector GDP
Prior to the discovery of oil in Nigeria, agricultural sector was the mainstay of Nigeria economy, contributing about 95% to her foreign exchange earnings, generating over 60% of her employment capacity and approximately 56% to gross domestic earnings (World Bank, 2013). The major exportable crops were cocoa, palm products, cotton, ground nut, timber and rubber, with these products contributing most of Nigeria's export, Agriculture was the leading growth sector of the Nigerian economy while oil export was very poor. In fact, available literature on the Nigerian economy has it that Nigeria was primarily an agrarian economy, whose revenue generation was based on agriculture. Records from the National Bureau of Statistics indicates that between 1958 and 1969, the contribution of petroleum (GDP) at was just 0.007 percent while agriculture formed the mainstay of the country's economy accounting for higher percentage of Gross Domestic.

Meanwhile, with the discovery of oil, oil has remained a major source of energy and income in Nigeria since 1970. Agriculture is also the largest economic activity in the rural area where almost 50% of the population lives. Given the enormous resource endowment both in human capital and natural resources, the performance of the economy has been far below expectation (Aluko, 2004; Otaha, 2012). Agricultural sector GDP represents total value of goods and services from crop production, livestock, forestry and fishing in Nigeria (National Bureau of Statistics, 2017).

2.1.2.2 Manufacturing Sector GDP
Manufacturing industry sector utilize technology, equipment and machineries for the production of goods and services, alleviating human suffering and to ensure continuous improvement in their welfare. Modern manufacturing processes are characterized by high technological innovations, the development of managerial and entrepreneurial talents and improvement in technical skills which normally promote productivity and better living conditions. In recognition of this, successive governments in Nigeria have continued to articulate policy measures and programme to achieve industrial growth and development.

Manufacturing has generally been described and accepted as an engine of growth and development of any country. In modern economies, industrialization under industrial sector is widely conceived as a critical tool for accelerating economic growth and development. It serves as a channel for the production of goods and services, creation of massive employment opportunities and income generation.

Manufacturing sector GDP is the total value of goods and services from Oil Refining; Cement; Food, Beverages and Tobacco; Textile, Apparel, and Footwear; Wood and Wood products; Pulp Paper and Paper products; Chemical and Pharmaceutical products; Non-metallic Products, Plastic and Rubber products; Electrical and Electronic, Basic Metal and Iron and Steel; Motor Vehicles and Assembly; and other Manufacturing activities (National Bureau of Statistics, 2017).

2.1.2.3 Crude Petroleum Sector GDP
Following the discovery of crude oil in Nigeria late 1950s, there was an unprecedented rise in oil revenue in 1970's due to a global boom in the demand for oil. Oil income is generated from export and domestic sales of petroleum derivatives. Nigeria's economic development somewhat is driven chiefly by the rents from petroleum industry. Nigeria is a resource rich nation, both in natural and human terms. Nigeria is one of the few developing countries that have benefited immensely from the petroleum industry in terms of increasing the revenue available to government. For example, the petroleum sector contribution to GDP in 1970, 1980, 1990, and 2000 were 7.1%, 22.0%, 12.8%, and 47.5% respectively (CBN 2010). GDP from crude oil represents the quantity of crude petroleum produced (barrels) and Natural gas in million cubic feet (mcf) multiplied by the average price in domestic currency (equivalent of the price during the account period) according to National Bureau of Statistics (2017).

2.1.2.4 Solid Minerals Sector GDP
Solid minerals are important to the economic and social development of many countries. Minerals can either be extracted from the surface of the earth or from deep in the earth. The process of extracting minerals from open mines is termed as quarrying while the process of extracting minerals from shaft mines is termed as mining. For example, in case of limestone and marble stones quarrying processes take place, whereas mining is done in case of iron, coal, gold etc. Solid minerals sector GDP is the GDP of coal mining, metal ores, quarrying and other mining activities (NBS, 2017).

2.1.2. 5 Construction Sector GDP
The construction sector provides the necessary infrastructure for many productive activities and contributes to the creation of jobs and income in the state. Its across-the-board interactions with other sectors of the economy make it a key industry for fostering economic development. GDP from construction sector is the value of completed work including blocks, metals/iron bars, sand, stone, wood, gravel, other construction inputs, and cost of fuel used by generator, water bills and expenses on internet services/telephone/postage bills during the construction period (National Bureau of Statistics, 2017).

2.1.2.6 Trade Sector GDP
Like other developing countries, the Nigerian economy considers trade as a principal engine for growth. This is based on the implicit belief that trade creates jobs, expands markets, facilitates competition; disseminates knowledge and raises income both to the individuals and to the government (Briggs, 2007). These overwhelming benefits from trade, has been a principal factor on which the Nigerian government had engaged

in trade over the past decades. At independence, the Nigerian economy engaged in international trade due to the agrarian nature of the economy while the exportation of agricultural products was the main source of foreign exchange to the government. The discovery of crude oil however brought a significant shift in the economy from an export oriented one to an import dependent one, with importation of virtually all forms of commodity (including agricultural and final product). GDP from trade sector is equal to the trade margin, i.e. the difference between the revenue of goods sold and the value of the goods purchased for resale. Intermediate Consumption: Goods and services needed to run the trading establishment, such as packaging materials, electricity, office supplies, and rentals, (National Bureau of Statistics, 2017).

2.1.2.7 Gross Domestic Product from Service Sector
GDP from service sector is the aggregate value of services from Transport (road, rail, water and air); Information and Communication; Utilities; Accommodation and Food Services; Finance & Insurance; Real Estate; Professional, Scientific & Technical Services; Administrative and Support Services Business Services; Public Administration; Public Administration; Education; Human Health & Social Services; Human Health & Social Services; Arts, Entertainment & Recreation; and Other Services excluding financial services (Banking, insurance and other financial services) according to CBN (2013).

2.2   Theoretical Framework
This study is anchored on Keynesian theory which was developed in 1936. The theory suggests that economic growth is related to monetary savings and that surplus savings must be subtracted with the help of taxation. One of the main assumptions in Keynes's theory is that large amounts of savings hinder economic growth as they represent a passive form of income and are not invested in production; as a result the author suggested that surplus savings must be subtracted with the help of taxation. While the Neo-Classical theory of taxation suggest that taxes must be as small as possible and corporations should be granted significant tax exemptions, the Keynesian theory argued that high level progressive taxation is necessary and that low tax rates lead to reduced state revenues and as a result contributes to economic instability. This implies that growth in economy should translate to increase in tax revenue. Keynesian theory attempt to explain establish that economic growth promotes long run growth in tax revenue. Hence, this theory serves as the bedrock of this study.

.2.3   Empirical Review
On the empirical ground, diverse empirical studies have, investigated the effects of real sector growth on tax revenue. Results are far from being conclusive, varying across countries, methodologies, and fiscal variables involved. This section examines empirical works from prior studies.

Joseph and Ezra (2016) examined the responsiveness of tax revenue to sectoral GDP growth and how public expenditure can be better prioritized to stimulate tax revenue performance. By employing Auto Regressive Distributed Lag (ARDL) methods, their work demonstrated some mismatches in the sectoral contributions to GDP and overall tax revenue collections. The GDP on agricultural sector exhibited negative effect on tax revenues in the long run whereas GDP on industrial sector exhibited a positive long run relationship with tax-GDP growth. The GDP on service sector does not seem to influence tax revenue. Further, the results have also demonstrated the large negative effects of GDP in the informal sector on tax revenue performance. Another work of Neway, Kenenisa and Woldemicael (2018) revealed that annual rate of GDP from Agriculture sector was found to have significant and negative effect on tax revenue in Ethiopia. In contrast, GDP from industry sector was significant and positive effect on tax revenue in Ethiopia.

Joseph and Godin and Hindriks (2015), using a database covering 203 countries with 40 tax items over the period 1980-2010, assess some of the main determinants of tax collection. They found a significant positive effect on tax revenues from economic growth, government efficiency, and trade openness, along with the size of tax rates. Karagöz, (2013) found that tax revenues in Turkey are significantly affected by GDP from industrial sector while the GDP from agriculture is found to be negatively associated with the tax revenue. He also opined that openness to GDP from foreign trade has no significant impact on tax revenue in Turkey. On the contrary, trade taxes and a higher share of agriculture in GDP decreases the amount of tax revenues.

Oyetunji (2014) on determinants of tax revenue (dependent variable) in Nigeria using the independent variables- manufacturing GDP, service sector GDP, agriculture GDP, among others. The co-integration result indicated that manufacturing GDP, service sector GDP and agriculture sector GDP turned out to be insignificant. Also, Akongwale, Ayodele and Udefina (2013) in their analysis on the role of solid minerals on economic diversification in Nigeria, employing both qualitative and quantitative (descriptive) analysis, discovered that the solid mineral sector in Nigeria has the potential to contribute immensely to tax revenue of Nigeria. Specifically, it reveals that the development of the solid mineral sector could help to combat poverty in

Nigeria via job creation; especially, given its forward linkage with other sectors of the economy. Most importantly, it could help alleviate some of the problems associated with "enclave" nature of the Nigerian economy that has for too long being vulnerable to fluctuations in global oil prices. He concluded that the realization of these potentials is the strengthening of Nigeria existing solid mineral development policy and creation of an enabling environment by the government for the private sector to take the lead in developing this sector.

Agbeyegbe, Stotesky and Woldemariam (2004) investigated the relationship between the tax revenue, trade liberalization and changes in the exchange rate using a panel data set of 22 sub-Saharan countries and found that trade liberalization, agricultural share, industrial share, government consumption, and terms of trade exert positive effect on total tax revenue whereas inflation exerts a negative effect. On the contrary, countries where agriculture has a higher share of GDP tend to have less revenue. Keen (2009) also found evidence of the negative impact of tax incentives on the agriculture sectors on tax on revenues. The fact that trade also has a positive impact on VAT revenues was also concluded by Rodrick (1998). Similar results were found for sub-Saharan Africa by Addison & Levin (2011) who posited that outside of the energy sector, Nigeria's economy is highly inefficient.

Eltony (2002) examined the determinants of tax revenue shares and constructed an index of tax effort for the sixteen Arab countries. The results suggested that agriculture sector GDP and minerals sector GDP have significant positive relationship with tax revenue. Anware (2014) study on determinants of tax revenue in case of Ethiopian Revenues and Customs Authority for the period 1990 to 2011 and identified variables that determine tax revenue to be mainly; industry, agriculture, inflation, GDP per capital income, export and import. He concluded that structural factors such as exports of goods and services (% of GDP) and import of goods and service (% of GDP) significantly affect tax revenue.

3. Methodology

This study is an empirical survey research, thus, *ex-post facto* research design was adopted. It is an *ex-post facto* research because the study used existing data without manipulating them. This decision to adopt ex-post facto research design is further supported by the availability of un-manipulated data from secondary sources in analyzing the relationship between disaggregated real sector growth and tax revenue in Nigeria. This study reveals and predicts the nature and degree of relationship between dependent and independent variables; the independent variable in this study is disaggregated real sector output, proxy by Gross Domestic Product (GDP), while the dependent variable is tax revenue. The study conducted a post-effect review of disaggregated real sector growth from all sectors (agriculture; manufacturing; crude petroleum; solid minerals; construction; trade; and non-financial service) on federal government's tax revenue, using macro data as obtained from Federal Inland Revenue Service Central Bank of Nigeria (CBN) and National Bureau of Statistic (NBS). It covered the existing gaps in the literature on real sector growth and tax revenue in Nigeria. This type of design is one that is non-experimental in which pre-existing groups are compared on some dependents variables (Lammers & Badia, 2005). *Expost facto* research design is used because it involves the use past records in order to determine the present association and to develop a predictive model of forecasting the future relationship that may exist between the variables (Akinyemi, 2016).

Model Specification

$$LTTR_t = \alpha_0 + \alpha_1 LGDPAG_t + \alpha_2 LGDPMA_t + \alpha_3 LGDPCP_t + \alpha_4 LGDPSM_t + \alpha_5 LGDPCO_t +$$
$$\alpha_6 LGDPTR_t + \alpha_7 LGDPSE_t + \mu_{1t}$$

Where: dependent variable = Log of Total Tax Revenue (LTTR) and independent variables are:

LGDPAG = Log of GDP of Agriculture Sector
LGDPMA = Log of GDP of Manufacturing Sector
LGDCP = Log of GDP of Crude Petroleum Sector
LGDPSM = Log of GDP of Solid Minerals Sector
LGDPCO = Log of GDP of Construction Sector (GDPCO)
LGDPTR = Log of GDP of Trade Sector (GDPTR)
LGDPSE = Log of GDP of Non-financial Service Sector (GDPSE)

and α_0 is the intercept; $\alpha_1 - \alpha_7$ is the coefficients of the explanatory variables; t represents the periods under study; μ_t are the error or disturbance terms that absorb the influence of itted variables in the proxies to be used. Natural logarithm of the variables were used because coefficients on the natural-log scale are directly interpretable as approximate proportional differences.

4.0 Results and Findings

The characteristics of the series in the distribution and the models were explained through the descriptive statistics; co-integration analysis to assess the influence of real sector growth proxy by GDP; ARDL bounds

test was used to determine the existence of short run and long run relationships between the dependent and independent relationships through the aid of E-view (Version 10.0), both in magnitude and relevance of the influence of explanatory variables on the dependent variables as specified in each of the model are explained in details while the interpretation was carried out on which the decision to accept or not to accept the hypothesis of the study are drawn from.

4.1   Descriptive Statistics

Table 1: Descriptive Statistics

Variables	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Jacque-Bera	Obs
LGDPAG	8.69	8.46	9.75	7.74	0.68	0.21	1.52	3.66 (0.16)	37
LGDPCO	6.7	6.52	7.89	5.82	0.63	0.61	2.17	3.33 (0.19)	37
LGDPCP	8.79	8.83	9.14	8.31	0.23	-0.36	2.18	1.85 (0.40)	37
LGDPMA	7.71	7.47	8.81	6.93	0.54	0.91	2.56	5.38 (0.07)	37
LGDPSE	9	8.77	10.14	8.21	0.68	0.48	1.75	3.81 (0.15)	37
LGDPSM	3.59	3.49	4.63	2.84	0.53	0.38	2.07	2.24 (0.33)	37
LGDPTR	8.21	7.88	9.37	7.42	0.69	0.61	1.76	4.63 (0.10)	37
LTTR	5.57	5.53	8.56	1.84	2.36	-0.22	1.59	3.36 (0.19)	37

Notes: Table 4.1 shows the mean, median, maximum, minimum, standard deviation, skewness, kurtosis and Jarque-Bera test for normality of the variables for the period 1981-2017 in Nigeria. The estimation process was facilitated using Eviews 10

Looking at the mean and the median values of all the series in the distribution, the mean and the median are averagely of the same value, as this is one of the assumptions of normal distribution, thus the series can be said to be normally distributed. Also, the results of the standard deviation which measures the dispersion of the series from the mean reveal that all the series in the distribution sparingly dispersed from the mean. This indicates the possibility of the series exhibiting traits of normal distribution. This is also confirmed from the results of the skewness, as nearly all the skewness value are within the average of the threshold (0), this is an indication that the series in the distribution are slightly skewed either positively or negatively but approximately normal in distribution. From the ρ-value of the Jacque-Bera test, a test for normality; since all the ρ-values are greater than the significant level of 5 per cent, thus the null hypothesis which states that the series are normally distributed cannot be rejected. In conclusion, the results of the standard deviation, skewness and Jacque-Bera confirmed the normality of the series in the distribution.

4.2 Result of the Stationary Test

Table 2: Result of the Unit Root Test

Variables	@ Level		@ First Difference		Remarks
	ADF test (Prob.)	Critical Value 10%	ADF test (Prob.)	Critical Value @ 10%	
LTTR	-1.50	-3.50	-6.26	-2.93	I(1)
LGDPAG	-2.10	-3.50	-5.80	-2.93	I(1)
LGDPMA	-2.27	-3.50	-5.17	-2.93	I(1)
LGDCP	-0.62	-3.50	-5.23	-2.93	I(1)
LGDPSM	-1.69	-3.50	-3.49	-2.93	I(1)
LGDPCO	-3.45	-3.50	-3.39	-2.93	I(1)
LGDPTR	-2.16	-3.50	-3.08	-2.93	I(1)
LGDPSE	-3.80	-3.50	--2.22	-2.93	I(0)

The results show that natural log of all the variables were stationary in their first differences at **10** per cent level of significance. It should be noted that because all the series were stationary at levels and this calls for the use of autoregressive distributed lag (ARDL) model introduced in Pesaran, Shin and Smith (2001).

4.3 Regression results

Table 3: Full Information on the Effects of Disaggregated Real Sector Growth on Total Tax Revenue

Panel A: Long Run Estimates

Dependent Variable: LTTR

Variable	Coefficient	S.E	t-stat	Prob
C	-23.704	9.536	-2.486	0.030
LGDPAG	7.757	2.527	3.069	0.011
LGDPMA	-0.485	0.780	-0.622	0.547
LGDPCP	0.183	1.146	0.160	0.876
LGDPSM	-0.332	0.306	-1.083	0.302
LGDPCO	1.134	0.707	1.604	0.137
LGDPTR	-3.259	0.827	-3.939	0.002
LGDPSE	-1.707	2.290	-0.745	0.472
F-statistic	214.32			
Prob(F-statistic)	0.000			

Panel B: Diagnostic Tests	Statistic	Prob.
Bound Test	3.717	0.049
Serial Correlation	1.594	0.230
Heteroscedasticity	0.816	0.652
Normality Test	0.337	0.845
Linearity Test	0.911	0.135
Adjusted R-Square	0.445	

In the Bound test, the value of F-Stat is 3.717 (p value: 0.049). This implies that the variables co-moved in the long run. Having found a long-run relationship, for the logarithm of agricultural sector GDP, manufacturing sector GDP, crude petroleum sector GDP, solid mineral sector GDP, construction sector GDP, trade sector GDP, non-financial service sector GDP and total tax revenue. The study then estimates the long-run and the short-run elasticities. The empirical results for the model, obtained through normalizing total tax revenue in the short and long run are reported in Table 3.0.

Diagnostic Test:

The Linearity Test
The linearity assumption of ARDL test was estimated using Ramsey RESET test, the ρ-value of the F-stat of 0.226 being greater than 5 per cent chosen level of significance implies that the model is correctly specified since the p-value is more than 0.05 then the null cannot be rejected which implies that there exist a linear relationship between the dependent variable and independent variable
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The Heteroskedasticity Test
Breusch-Pagan/Cook-Weisberg Test was conducted for Heteroskedasticity; that is testing for the consistency of the variations in the residuals of the model over the period "t". The result with the ρ-value of 0.202 being greater than 5 per cent chosen level of significance shows that the covariance of the error terms have a constant finite variance.

The Breusch-Godfrey Serial Correlation LM Test
The Breusch-Godfrey Serial Correlation LM Test was carried out to determine if successive error terms are correlated. The probability value of F-statistic of 0.198 is in favour of the null hypothesis which states that there is no serial correlation in the residuals up to the specified lag order at 5 percent significant level.

Normality Test
The probability value of Jarque-Bera statistic is 0.543, this suggest that the null hypothesis of normality could not be rejected; this implies that the estimated model is normally distributed.

The Long-Run Estimation

LTTR= -23.704 + 7.757LTGDAG - 0.485LGDPMA + 0.183LGDCP- 0.332LGDPSM +1.134LGDCO – 3.259LGDPTR- 1.707LGDPSE

The estimated long-run coefficients (elasticities) for the UECM model are given in the tables Panel A of Tables 4.8. Disaggregated real sector GDP had joint significant effect on total tax revenue ($Adj.\ R^2$= 0.45, $F_{(7,\ 30)}$ =214.32, $p<0.05$) while individual sector GDP had mixed effect on total tax revenue.

In the long run, there is evidence that agricultural sector GDP, crude petroleum GDP and construction sector GDP have positive relationship between total tax revenue, while manufacturing sector GDP, solid mineral GDP, trade sector GDP and service sector GDP have negative relationship with total tax revenue. This implies that increases in agricultural sector GDP, crude petroleum GDP and construction sector GDP will lead to increase in the total tax revenue, while increases in manufacturing sector GDP, solid mineral GDP, trade sector GDP and service sector GDP will lead to fall in the total tax revenue. In addition, there is evidence of a long-run significant relationship for agricultural sector GDP and trade sector GDP with the total tax revenue in Nigeria (α_1 = 7.757, t-test= 3.069, $\rho<0.05$; α_6 = -3.259, t-test= -3.939, $\rho<0.05$) respectively. This implies that agricultural sector GDP and trade sector GDP are significant factor influencing changes in total tax revenue in Nigeria.

Conversely, manufacturing sector GDP, crude petroleum sector GDP, solid minerals sector GDP, construction sector GDP and service sector GDP do not have a long-run significant relationship with total tax revenue in Nigeria (α_2 =-0.485, t-test=-0.622, $\rho>0.05$; α_3 =0.183, t-test=0.160, $\rho>0.05$; α_4 =-0.332, t-test=-1.083, $\rho>0.05$; α_5 =1.134, t-test=1.604, $\rho>0.05$; and α_7 =-1.707, t-test=-0.745, $\rho>0.05$) respectively. This implies that manufacturing sector GDP, crude petroleum sector GDP, solid minerals sector GDP, construction sector GDP and service sector GDP are not significant factors influencing changes in total tax revenue in Nigeria. Also, a 1 per cent increase in agricultural sector GDP, crude petroleum GDP and construction sector GDP will lead to 7.757, 0.183 and 1.134 per cent increase in total tax revenue respectively in Nigeria in the long run, while 1 per cent increase in manufacturing sector GDP, solid mineral GDP, tradet sector GDP and service sector GDP will lead to 0.485, 0.332, 3.259 and 1.707 decreases in total tax revenue respectively in Nigeria.

Considering the fact that disaggregated real sector GDP had joint significant effect on total tax revenue ($Adj.\ R^2$= 0.45, $F_{(7,\ 30)}$ =214.32, $p<0.05$) while individual sector GDPs had mixed effect on total tax revenue, this study therefore do not accept the null hypothesis which states that "Real Sector GDP (GDPRSO) has no significant effect on Total Tax revenue in Nigeria.

5. Discussion:
From this regression result, it was discovered that the joint effect of disaggregated real sector GDP has a significant positive long run relationship with tax revenue, while the disaggregated GDP from the individual sectors (agriculture, manufacturing, crude petroleum, solid minerals, construction, trade and non-financial service) have mixed effects on tax revenue in Nigeria. This observed significant positive joint effect of disaggregated real sector GDP on tax revenue is in tandem with the study of Roshaiza, Loganathan and Sisira (2011) on the effect of GDP on tax revenue in Malaysia during the period of 1970-2009, which clearly revealed significant positive relationship between real sector GDP and total government tax revenue. Also, the work of Tosun and Abizadeh (2005) on the investigation of the effect of economic growth on tax changes in OECD countries from 1980 to 1999 also supported this position.

This study found that the individual real sector GDP had mixed effect on total tax revenue: agricultural sector GDP had significant positive relationship with total tax revenue in Nigeria; trade sector GDP had significant negative effect on total tax revenue; manufacturing sector GDP, solid mineral GDP and service sector GDP had insignificant negative effect on total tax revenue; and crude petroleum sector GDP and construction sector GDP had insignificant positive effect on total tax revenue. This is supported by discovery of Joseph and Ezra (2016) that GDP from the various sectors have mixed effect on the tax revenue in Uganda. They found out that agricultural sector GDP exhibited negative effect on tax revenues in the long run whereas industrial sector

GDP exhibited a positive long run relationship with tax-GDP growth. The GDP on services sector has insignificant influence on tax revenue. Further, the results have also demonstrated the large negative effects of GDP in the informal sector on tax revenue performance. In conclusion, only agriculture sector and trade sector have significant influence on tax revenue while the remaining sectors (manufacturing, crude petroleum, solid minerals, construction and service) have insignificant effect on tax revenue.

This result of significant positive influence of agriculture sector GDP on tax revenue is supported by the study of Eltony (2002) who examined the determinants of tax revenue shares in sixteen Arab countries. The results suggest that agricultural GDP has significant positive effect on tax revenue. In contrary, Oyetunji (2014) and Tanzi (1992) posited that countries with a higher share of agriculture tend to have lower tax revenue from Agriculture. Similarly, Keen (2009) also opined that countries where agriculture has a higher share of GDP tend to have less revenues due to the negative impact of exemptions and the use of reduced rates on revenues.

In addition, the observed significant negative influence of trade sector GDP on tax revenue is in tandem Godin and Hindriks (2015), using a database covering 203 countries with 40 tax items over the period 1980-2010. Similarly, trade sector GDP has significant and negative long run relationship with total tax revenue. The authors found a positive effect on tax revenues from the influence of economic growth on trade sector.

Furthermore, the insignificant effect GDP of manufacturing sector, crude petroleum sector, construction sector, solid minerals sector and service sector is supported by the study of Raed, Iriqat, Ahmad and Anabtawi (2016). In their studies on causality relationship between sectoral GDP and tax revenues in developing countries, as a case study in Palestine, it was discovered that GDP do not granger cause tax revenue. This is also supported by Li and Murphy (2010), who found that countries with large share of mineral resources fail to give adequate attention to tax revenue mobilization. In contrary, the study of Anware (2014) on determinants of tax revenue in Ethiopian during the period 1990 to 2011 discovered that sectoral GDP significantly affect tax revenue.

6   Conclusion and Recommendation:

This study concluded that the joint effect of disaggregated real sector growth from all sectors has a significant positive long run relationship on tax revenue, while the disaggregated real sector growth from the individual sectors (agriculture, manufacturing, crude petroleum, solid minerals, construction, trade and non-financial service) have missed effects on tax revenue in Nigeria. This study has found that, within the context of taxes collectible by federal government, economic growth has statistical significant influence on tax revenue in Nigeria. This study is limited to the impact of disaggregated real sector growth on tax revenue of the federal government of Nigeria and not tax revenue of state governments and local governments in Nigeria. Thus, the observed effect of disggregated real sector growth on tax revenue might likely vary for different state governments and local governments. It recommended that government should intensify effort on stimulating growth in the real sector of the economy in order to achieve sustainable increase in tax revenue. This could be achieved by developing and implementing policies to attract local and foreign investors. In addition, government's macroeconomic should be undertaken in a way to optimize tax revenue from individual sectors of the economy (i.e. sector based tax revenue strategy).

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Appendix 1: Raw Data on Tax and GDP Data for Nigeria (1981 -2017)

No	Year	TTR	GDPAG	GDPCP	GDPMA	GDPSM	GDPCO	GDPTR	GDPSE
		N'billion	N'billion	N'billion	N'billion	N'billion	N'billion	N'billion	N'billion
1	1981	9.05	2,364.37	4,977.42	1,558.70	67.14	851.56	1,770.38	3,386.27
2	1982	7.73	2,425.96	4,453.09	1,764.89	54.84	679.20	1,846.95	3,387.87
3	1983	6.29	2,409.08	4,052.98	1,167.89	44.01	598.78	1,801.78	3,438.30
4	1984	7.16	2,303.51	4,559.20	1,018.91	43.08	488.14	1,662.30	3,436.84
5	1985	9.90	2,731.06	4,918.27	1,416.79	44.54	336.27	1,727.98	3,524.01
6	1986	7.64	2,986.84	4,825.50	1,373.66	35.25	335.76	1,788.77	3,589.11
7	1987	17.15	2,891.67	4,704.42	1,398.10	32.81	367.00	1,900.94	3,640.21
8	1988	14.04	3,174.57	4,828.68	1,618.25	28.05	404.40	2,073.80	3,689.45
9	1989	18.33	3,325.95	5,407.01	1,665.09	28.66	421.21	2,156.75	3,750.35
10	1990	38.54	3,464.72	6,831.77	1,670.73	29.09	442.27	2,221.45	3,860.21
11	1991	53.90	3,590.84	6,224.45	1,829.34	40.84	459.97	2,292.54	3,944.27
12	1992	72.95	3,674.79	6,381.26	1,758.61	30.60	477.90	2,363.61	4,085.25
13	1993	84.25	3,743.67	6,394.60	1,706.70	20.78	501.80	2,434.51	4,246.35
14	1994	80.63	3,839.68	6,229.46	1,670.72	17.21	516.85	2,434.99	4,364.71
15	1995	122.86	3,977.38	6,375.97	1,592.49	17.08	530.81	2,436.69	4,480.76
16	1996	158.10	4,133.55	6,832.84	1,599.94	17.54	537.18	2,457.40	4,620.77
17	1997	190.40	4,305.68	6,933.58	1,609.83	18.50	571.56	2,494.26	4,836.57
18	1998	153.18	4,475.24	7,083.99	1,412.44	19.40	605.85	2,569.09	5,098.24
19	1999	253.01	4,703.64	6,552.69	1,459.02	20.21	628.87	2,633.32	5,345.32
20	2000	547.32	4,840.97	7,281.94	1,505.66	21.04	654.03	2,675.45	5,557.59
21	2001	738.76	5,024.54	7,662.98	1,666.49	22.39	732.51	2,742.34	6,213.47
22	2002	603.51	7,817.08	7,225.68	1,813.81	22.18	764.33	2,920.11	6,837.83
23	2003	884.67	8,364.83	8,952.62	1,918.09	23.20	831.21	3,088.31	7,134.41
24	2004	1,389.90	8,888.57	9,248.05	2,143.45	27.09	774.86	4,220.22	8,275.85

25	**2005**	1,947.90	9,516.99	9,294.05	2,350.99	29.70	868.59	4,790.51	9,132.36
26	**2006**	2,006.60	10,222.47	8,874.70	2,574.29	32.77	981.45	5,521.46	10,215.15
27	**2007**	2,018.40	10,958.47	8,471.95	2,823.53	36.87	1,109.31	6,360.81	11,501.10
28	**2008**	3,164.50	11,645.37	7,947.72	3,079.04	41.47	1,254.30	7,252.60	13,042.91
29	**2009**	2,313.50	12,330.33	7,983.63	3,323.41	46.38	1,404.50	8,085.44	14,854.44
30	**2010**	3,012.96	13,048.89	8,402.68	3,578.64	51.88	1,570.97	8,992.65	17,057.75
31	**2011**	4,822.49	13,429.38	8,598.64	4,216.19	59.42	1,817.83	9,640.90	18,353.99
32	**2012**	5,207.34	14,329.71	8,173.26	4,783.66	71.13	1,989.46	9,853.68	19,041.09
33	**2013**	4,866.10	14,750.52	7,105.28	5,826.36	82.87	2,272.38	10,507.90	20,839.77
34	**2014**	4,996.60	15,380.39	7,011.81	6,684.22	95.21	2,568.46	11,125.80	22,304.22
35	**2015**	3,872.47	15,952.22	6,629.96	6,586.62	102.54	2,680.22	11,697.59	23,250.88
36	**2016**	3,468.34	16,607.34	5,672.21	6,302.23	87.61	2,520.85	11,669.06	23,044.42
37	**2017**	4,335.89	17,179.50	5,938.05	6,288.90	87.73	2,545.99	11,546.45	22,851.37

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