Tax Structure and Economic Growth in Nigeria: A Disaggregated Empirical Evidence (1986–2012)

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Abstract
This study examines the Tax Structure and Economic Growth in Nigeria: A Disaggregated Empirical Evidence using a time series data spanning from 1986 through 2012. The data for the analysis were collected from CBN statistical bulletin and federal Inland Revenue services. The Engel–Granger cointegration technique was used to ascertain the relationships between the variables in the model employed in this study. The study finds a linear relationship between economic growth and tax revenue. It suggests a "tax and growth" ranking of taxes, confirming results from earlier literature but providing a more detailed disaggregation of taxes. Petroleum Income Tax, Corporate Income Tax are found to be most beneficial to growth in Nigeria. On the contrary, Personal Income Tax as well as the custom and excise duties do not promote growth as empirically examined in this study. Revenue neutral growth-oriented tax reform therefore, is to shift part of the revenue base from Personal Income Tax as well as the Custom and Excise Duties to less distortive taxes aimed at inducing local consumption. A major contribution of the study to knowledge is that it has been able justify empirically that taxation-economic growth nexus is both per capital income and consumption induced in Nigeria. This therefore closes the knowledge gap induced by inconclusive evidence on the growth effects of taxation composition which most often has resulted in situations where empirical findings of researches done in developed economies are generalized to developing countries. It is therefore recommended that Nigeria should restructure the Personal Income Tax and the Custom and Excise Duties to induce consumption to achieve growth. Furthermore, the level of tax evasion in Petroleum Profit Tax, Corporate Income Tax and Value Added Tax which proved to be very beneficial to growth in Nigeria should be reduced through an efficient and effective tax administration.
Keywords: Tax Burden, Tax Rate, Value Added Tax, Tax Evasion, Petroleum Income Tax, National Tax Policy

Introduction

The policy of taxation in Nigeria like any other nations of the world is directed towards achieving some specific objectives which include amongst others revenue generation and upholding economic growth. Recently, the Nigerian government introduced the National Tax Policy (NTP). This is a policy geared towards shifting from direct to indirect taxation in Nigeria. The choice between direct and indirect tax has elicited serious debate in terms of economic benefits and limitations that characterized each. Thus, most studies have reached substantially different conclusions on the relative impact of direct and indirect taxes on economic growth with multiplicity of problems ranging from inconclusive findings, chaotic generalization of results and findings in developed countries to developing countries (Avi-Yonah & Margalioth, 2006; Burgess and Sten, 1993). According to Avi-Yonah & Margalioth (2006), direct taxation accounts for about two third of the total tax revenue generated in developed countries. But proponents of the conventional wisdom hypothesis are advocating for the use of indirect taxation. To them, developing countries should focus on indirect taxation (Burgess and Sten, 1993). However, the results of most studies are saddled with inconsistencies. While some researchers like Lee and Gordon (2005), Jones, Manuelle & Rossi (1993), Li & Sarte (2004), Kneller, Bleaney & Gemmell (1999), Wildmam (2001), Avi-yonah & Margolioth (2006), reported a positive relationship between indirect tax and economic growth, others in similar studies such as Emran & Stigliz (2005), Gordon & Li (2005), Baunsgaard & Keen (2005), Abizadeh (1979), Chelliah (1989) take a different position that direct taxation is the major driver of economic growth. Coming to developing economies like Nigeria, empirical studies on the subject matter are relatively few. The few were concentrated in South Africa, Turkey and Organisation for Economic Cooperation and Development (OECD) countries. A situation where results of cross country researches in developed economies are generalized to developing countries often induce knowledge gap. This study seeks to close this knowledge gap in Nigeria by empirically testing the functional relationship between taxation and economic growth using macroeconomic variables as control. The erroneous generalization and inconclusive evidence has made the issue of growth effect of different types of taxation especially at a country (Nigeria) level open for further research. This in fact informed the basis of this research.

Considering the gargantuan tax proceed from all sectors in the Nigeria economy, most especially the oil sector as well as its ever increasing nature which many believe has not yielded desirable impact on the lives and living standard of an average Nigerians, it therefore becomes justifiable to empirically investigate the exact

impact of the nation's tax system on its rate of growth. However, this study would provide an econometric assessment of the performance of the Nigerian corporate tax system on the Nigeria growth and development. Consequently, the study will contribute to existing literature on the subject matter by investigating empirically the role which taxation has on the growth and development of the Nigerian economy. The study will also serve as a vital instrument for subsequent researchers on the subject matter. The findings would be of important to academia, researchers and policy makers at the national level as they design policies aimed at enhancing economic growth through a better optimal tax policy. It is expected that the recommendations based on the findings will be useful for further academic works in the area of the impact of tax on economic growth. Laconically, the main prominence of this study is that it provides policy recommendations to policy-makers on ways to improve operations and activities of the nation's fiscal policy especially in the area of corporate taxation – economic growth nexus.

It is in view of the foregoing that this research work attempts to provide answers to the following questions: is there a significant positive relationship between Petroleum Profit Tax and economic growth in Nigeria?; is there a significant positive relationship between Company Income Tax and economic growth in Nigeria?; is there a significant positive relationship between Value Added Tax and economic growth in Nigeria?; is there a significant positive relationship between Personal Income Tax and economic growth in Nigeria?; is there a significant positive relationship between Custom and Excise Duties and economic growth in Nigeria?

2.0   Review of Literature
2.1   Conceptual Issues
Tax Structure in Nigeria

The Nigerian Tax System has undergone significant changes in recent times. However, the tax system is basically structured in such a way as to contribute to economic growth through income generation. On the basis of incidence, taxes can be structured into direct and indirect. There are different components of direct taxation. These include the personal income tax (PIT), petroleum profit tax (PPT), companies' income tax (CIT), educational tax (ET). The PIT is currently regulated under the Personal Income Tax Act of 2004. The PPT is regulated by the Petroleum Profit Tax Act (PPTA) of 1990. PPT is charged on the profit of a petroleum company in the upstream sector of the industry. Companies in Nigeria are taxed under the Companies Income Tax Act introduced in 1961 with modifications in 2007. The administration of the CIT is vested on the Federal Inland Revenue Services. Education tax in Nigeria is under the regulation of the Education Tax Act No. 7 that was promulgated in 1993. The tax is payable by all companies at the rate of 2 percent of the assessable profit defined in the Company Income Tax Act. Therefore, assessment of education tax and companies' income tax are done concurrently. The different prominent components of indirect taxation in Nigeria include, Value Added Tax (VAT) and Custom and Excise Duty (CED). VAT is regulated by the Value Added Tax Act (VATA) of 2007. The Nigerian VAT system is destination based, which means the tax is levied on goods and services consumed within the tax jurisdiction. The implication of this is that VAT imposition is designed to stimulate export growth (Desai & Hines, 2002). In Nigeria, the tax rate chargeable is 5 percent on goods and services purchased but the tax payer can claim credit for input tax when such goods are sold. The CED is regulated by the Custom and Excise Management Act of 1990. The duty is chargeable on all goods and services imported into Nigeria. The tax is administered by the Nigeria Custom Services and is also referred to as import duties. Currently, the duties ranged between 2.5 percent to 100 percent depending on the product.

2.2   Empirical Studies

A number of studies have tried to identify a link between the overall level of taxes and growth performance both from developed and developing economies. Among the first empirical work to include fiscal variable into growth regressions were two studies by Barro (1989, 1991). He analysed (among other variables) the ratio of real government consumption expenditure to real GDP as a regressor, and found a significantly negative correlation with growth. Koester and Kormendi (1989) used measures of the average and the marginal tax rate (obtained from a regression of total tax revenues on GDP), but do not distinguish between different tax instruments. In contrast to Barro, they discovered only limited evidence of a relationship between tax rates and growth.

King & Rebelo (1990) used a number of different measures of marginal tax rates to explain growth. Except for one measure, they find no significant correlation between tax rates and growth, and conclude that the link is fragile. Levine and Renelt (1992) also fail to find a robust cross-country relationship between a diverse collection of fiscal policy indicators (though not including variables about the tax structure) and growth. Similarly unstable evidence about this relationship is presented by Solow (1996), who finds changing signs depending on the specifications of parameters and countries considered. For OECD countries alone, he does not find an obvious relationship of either sign between tax rates and GDP per capita. Mendoza, Milesi-Ferretti & Asea (1997) find that their tax variables become insignificant once they control for the initial level of GDP. More recently, Folster and Henrekson (2001) looked at the relationship between growth and the size of

government and find a negative relationship between total public expenditure as a share of GDP and growth. Agell et al. (2006) dispute the methodology behind these findings, and find only an unstable and insignificant relationship between the expenditure ratio and growth.

The findings of the few studies that analysed the link between growth and tax structures rather than tax levels provide somewhat more conclusive answers than the studies that have focused on the level of taxation. Kneller et al. (1999) make a distinction between distortionary taxes on one hand, which they define as taxes on income and property, and so-called non-distortionary taxes on the other hand, which include consumption taxes. Their conclusion is that while the former reduce growth, the latter do not. Similarly, they find that productive government expenditure is beneficial for growth while non-productive public expenditure is not. In a related study, Gemell et al. (2006) use annual data and account for short-run dynamics in a similar way as done in this paper, and confirm the findings of Kneller et al. (1999). Widmalm (2001) examines economic growth between 1965 and 1990 in a cross-section of 23 OECD countries, and finds that the proportion of tax revenues raised from taxing personal incomes is negatively correlated with growth. She also documents a tendency for consumption taxes to be growth-enhancing. Using disaggregate data, Schwellnus and Arnold (2008) and Vartia (2008) document a negative effect of corporate taxes on the productivity of firms and industries, based on a large data sets of firms and industries across OECD countries. Similarly, Lee and Gordon (2005) find a significant negative correlation between statutory corporate tax rates and growth for 70 countries during 1970-1997.

Arnold (2008), Johansson et al (2008) and Arnold et al (2011) have investigated the effect of the tax structure on long-run GDP, using a panel error correction model for 21 OECD countries over the years 1971-2004. Based on the results of these estimations the authors suggest a growth- friendliness ranking for tax instruments, which is lead by property taxes, in particular by recurrent taxes on immovable property, followed by consumption taxes (and other property taxes). The authors classify personal income taxes as inferior to these two tax instruments, and corporate income taxes as having the most negative effects on GDP per capita.

Xing (2012) challenged these results. The author argued that the used Pooled Mean Group (PMG) estimator's assumptions might not be valid for the investigated dataset. The PMG estimation method assumes that the long-run relationships between variables are homogenous across countries and only allows for heterogeneous short-run dynamics. Challenging the validity of the homogeneity assumption, Xing (2012) first replicates the estimations by Johansson et al (2008) using slightly different specifications and performing robustness tests. Based on a differently specified PMG estimates, the author concludes that income taxes and consumption taxes are worse than property taxes. However, Xing (2012) does not find strong evidence for any further ranking between consumption taxes, personal and corporate income taxes. Relaxing the homogeneity assumption and using pooled OLS and the two-way Fixed Effects estimations the author can only confirm the results from the PMG estimations for certain groups of countries.

Coming to developing countries, Hossain (1995) investigates the income distributional implications of different value-added tax (VAT) schemes in Bangladesh. The results indicate that a revenue-neutral uniform VAT is regressive (relative to the pre-reform situation) in its impact on the income of different households. This paper explores the income distributional impact of an alternative policy package, consisting of a basic rate of VAT with exemptions and excise taxes for certain commodity groups, chosen on the basis of their distributional characteristics. The welfare consequences of the alternative package are found to be superior to those of the uniform VAT.

Corlett and Hague (1953) suggest an interesting case in which a reduction in the income tax rate is compensated by a small ad valorem non-uniform indirect tax in a two goods economy. This combination makes sure the same tax revenue is raised from the consumer. Their central conclusion is that in general, the consumer will work harder when the higher rate of tax is levied on the good which is more complementary with leisure, and vice versa. Therefore, a shift from taxes on income to taxes on consumption, raising the same revenue from an individual, can either increase or reduce the supply of effort and real income.

On the other hand, proponents of consumption taxes often argue that income taxes distort investment. For example, the neoclassical investment theory pioneered by Jorgenson (1963) and Hall & Jorgenson (1967) suggests that a corporate income tax system which implies higher cost of capital would lower investment, resulting in a lower capital-labour ratio in the long run. On the contrary, lowering the tax-adjusted user cost of capital, perhaps by providing more generous investment tax credits, allowing for faster depreciation of assets, or simply reducing the statutory corporate income tax rate, can induce additional investment.

Another argument against an income tax is that it may reduce the return to saving, which is thought to be inefficient because it changes the relative prices of current and future consumption, and unfair because it discriminates between individuals with different preferences for saving. Nevertheless, the effects of income taxes on saving behaviour remains an ongoing debate and no conclusion has been reached yet.

Although the link between tax structure and long-run growth is not the focus of the current study, it is worth mentioning the related literature. One source of technical progress that leads to long-run growth in the neoclassical growth models is new ideas generated by entrepreneurial activities, as emphasised in Schumpeter

(1942). Cullen and Gordon (2002) show that there are several possible routes through which taxes can affect the amount of entrepreneurial risk-taking. On the other hand, in the framework of endogenous growth models, any tax policy that distorts the incentives for factor accumulation can have a permanent impact on the growth rate. Barro and Sala-I-Martin (1992) provide a comprehensive survey on the role of fiscal policy in endogenous growth models. Regarding the long-run growth effects of tax structure, King & Rebelo (1990) introduced a endogenous growth model which addresses the relative distortiveness of different taxes, whose conclusions lend some support to the premise that taxes on income are more distortionary than taxes on consumption.

Both Kneller, Bleaney and Gemmell (1999) and Widmalm (2001) use five-year averages of the data to remove the effects of business cycles. Kneller, Bleaney and Gemmell (1999) argue that this allows them to separate the effects of policy variables on the transition from those on the steady state. Nevertheless, in their following study (Bleaney et al., 2001), they find that this period averaging does not appear to isolate long-run effects fully. Besides, it is generally found that the initial level of income per capita is negatively related to the current growth rate. Widmalm (2001) points out that this is an empirical regularity reflecting conditional convergence, which is consistent with both the neoclassical growth model and certain types of endogenous growth models (for example, Rebelo, 1991). Therefore, the estimated coefficients on other explanatory variables in these studies should not be interpreted as indicating long-run growth effects.

Kneller, Bleaney and Gemmell (1999) emphasize that the estimated effects of different types of taxes may be biased if other elements in the budget, such as expenditures, are omitted. As suggested by Arnold et al. (2011), one possible solution is to focus on the growth effects of revenue neutral changes in tax structure, which avoids the complication that changes in total tax revenue are reacted in changes in public spending.

Widmalm (2001) analyses the growth effects of revenue-neutral changes in tax structure based on data provided by the OECD Tax Revenue Statistics, which covers 23 OECD countries over the period 1965-1990. In Widmalm (2001), Y is the five-year average annual growth rate of real per capita GDP. I includes the initial level of per capita income, the investment-to-GDP ratio, and the population growth rate. Z includes variables such as the export-to-GDP ratio, the level and the variability of the inflation rate. M contains total tax revenue as a share of GDP, the share of a particular tax in total tax revenue, and a measure of progressivity. Unlike Kneller, Bleaney and Gemmell (1999), different taxes are no longer grouped a priori into "distortionary" or "non-distortionary" taxes. Instead, taxes are grouped into five categories, namely, taxes on corporate income, taxes on labour and capital income for individuals, taxes on property, taxes on goods and services, and taxes on payrolls and social security contributions.

Using the Extreme Bounds Analysis of Leamer (1983), Widmalm (2001) finds that there is a robust negative correlation between the share of personal income taxes and the growth rate of GDP per capita. As the investment-to-GDP ratio is included in the estimation, this result suggests that tax structure may affect growth through channels other than physical capital accumulation (for example, human capital accumulation or the supply of effort). Widmalm (2001) finds that taxes on corporate income as a share of total tax revenue have a positive but fragile correlation with income growth. The evidence is also fragile in relation to taxes on payrolls and social security contributions, taxes on property, and taxes on goods and services.

Karingi, Kaimenyi and Ndung'u (2001) carried out an assessment on beer taxation in Kenya. They find that there is need for the government to review taxes on beer as low taxes may create incentives to produce more. This would then lead to higher levels of income through revenue from the increased taxation. On the other hand, looking at the tobacco industry, Lanaspa, Pueyo & Sanz (2008)

find that the price elasticity of demand for tobacco is low. Therefore an increase in price from increases in taxes on tobacco products is unlikely to reduce demand by so much, while instead increasing government revenue. Of interest from the research by Karingi et al (2001) and Lanaspa, Pueyo & Sanz (2008) is that the price elasticity of demand for the two commodities matter. Where price elasticity is low, then an increase in tax does not affect the demand for these commodities by very much. In this case, a net overall effect of the tax would be positive, since it is assumed that the taxes are used for government expenditure on productive projects thus contributing to economic growth. Romer (1986), looking at the agricultural sector, finds that agriculture tends to be taxed implicitly. Where inputs to agriculture include commodities that are traded in the foreign sector and thus other taxes such as excise duty apply. Implicit taxes therefore means that the cost of production to farmers increases and raising these taxes would have adverse effects on agriculture.

Among the very few studies on the nexus between taxation and economic growth in Nigeria is the work of Anyanwu (1997). He investigated the effects of taxes on Nigeria's GDP/Economic Growth (1981-1996) and findings revealed that companies' income tax positively and significantly affects GDP just as do customs and excise duties. However, petroleum profit tax is positively and insignificantly affects Nigeria's GDP. The same is true of other direct taxes (capital gains and stamp duties). However, all direct taxes positively and significantly affect Nigeria's GDP.

Ajakaiye (2009) examined the macroeconomic effects of Value Added Tax (VAT) in Nigeria under a Computable General Equilibrium analysis. Impacts of VAT on the macro variables were analyzed under two

scenarios, namely, the current Nigerian situation whereby VAT is imposed on all goods except export; and the alternative situation where imported intermediate inputs are also zero-rated. The simulation results showed that the prevailing situation where intermediate inputs are not zero-rated tend to induce increases in prices of locally produced goods and services beyond 5%. This implies that the imposition of VAT on imported intermediate inputs will tend to have a cascading effect on prices of locally produced goods. Correspondingly, the fall in gross output and value added and private consumption expenditure will be greater under a situation where imported inputs are subject to VAT compared to a situation where they are not. However, the improvements in government fiscal posture and balance of trade will be greater when VAT is imposed on imported intermediate inputs compared to a situation where they are not.

Folawewo and Udeaja (2009) investigated the impact of tax incentive measures on sectoral output and value added performance in Nigeria within a static CGE framework. The efficacies of various reductions in export, import, sales, and income taxes at boosting output and value added in the four identified economic sectors were analysed. The results of the simulation exercises performed suggested that the impact of alternative tax incentives could vary from one sector to the other. Based on their findings, they recommend that tax policies should be designed sectorally. In other words, tax incentives to one sector might not be appropriate to another sector.

Anichebe in 2013 studied of the impact of tax on economic growth in Nigeria between 1986 to 2011. His study finds out a significant relationship between tax composition and economic growth. Decomposing the impact into direct and indirect tax and total tax revenue component, finds a significant positive relationship between direct, indirect tax and economic growth and a negative relationship between total tax revenue and economic growth.

So, on the aggregate, findings from literature have led to inconclusive results. As an additional complication, even when robust correlation could be established in the data analyses, in most cases, it is far from clear what the direction of causality would be between these two sets of variables.

3.0   Methodology
3.1   Model Specification
Following the work of Ogbonna et al (2011), the model for this research work is thus specified below:

$$GRGDP = f(TR) \qquad \text{-----------------------} \qquad (1)$$

where: TR = Tax Revenue; $\Rightarrow$ Petroleum Profit Tax, Companies Income Tax, Value Added Tax, Personal Income Tax, Custom and Excise Duties

therefore, the specification shall be;

$$GRGDP = f(PPT, CIT, VAT, PIT, CED) \qquad \text{-----------------------} \qquad (2)$$

Equation *(2)* is explicitly stated below as an econometric model in a natural log form;

$$\ln GRGDP = \beta_0 + \beta_1 \ln PPT + \beta_2 \ln CIT + \beta_3 \ln VAT + \beta_4 \ln PIT + \beta_5 \ln CED + \mu \qquad \text{------} \quad (3)$$

Note: It is expected that increased tax revenue will consequently lead to an increase in Growth Rate of Gross Domestic Product, the economic a – priori expectation is hence; $\beta_1, -\beta_5 > 0$

Where:

GRGDP =		Growth Rate of Real Gross Domestic Product
PPT	=	Petroleum Profit Tax
CIT	=	Companies Income Tax
VAT	=	Value Added Tax
PIT	=	Personal Income Tax
CED	=	Custom and Excise Duties
Ln	=	Natural logarithm
$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 =$		parameters estimate in the model
μ	=	Stochastic error term

3.2   Estimation Technique
This study employed quantitative tools of data analysis and interpretations were based on standard econometrics principles. First, a unit root test was conducted to determine the time series properties of data collected. This is with a view to establish whether there is the presence of unit root in the series because when time series data is characterized by a unit root or in other words is non-stationary, regression analysis conducted in a conventional way, yield spurious regression results. This according to Granger and Newbold (1974) is indicated by high value of R^2 with a low value of Durbin Watson statistic.

Additionally, Engle-Granger (1987) state that when variables were found to be I(1), stationarity of residual (obtained from a static regression) implies cointegration. Meaning that a long run equilibrium condition exist between the dependant and independent variables. The residual series is included in the regression as an error correcting mechanism. Long run regression results are obtained by traditional ordinary least square (OLS) technique.

3.3   The Engle–Granger Cointegration Test

The most well known test, suggested by Engle and Granger (1987) (sometimes known as the EG test) is to run a static regression (after first having verified that y_t and x_t both are I(1))

$$y_t = \theta' x_t + e_t$$

----------------------- (4)

Equation (4) above represents a static regression model where x_t is one - or higher-dimensional. The asymptotic distribution of θ is not standard, but the test suggested by Engle and Granger was to estimate $\hat{\theta}$ by OLS and the test for unit roots in

$$\hat{e}_t = y_t - \hat{\theta} x_t$$

----------------------- (5)

However, to test for cointegration between two or more non-stationary time series, it simply requires running an OLS regression, saving the residuals and then running the ADF test on the residual to determine if it is stationary. The time series are said to be cointegrated if the residual is itself stationary.

3.4   Augmented Dickey Fuller (ADF) Test of Unit Root

This is the first step in co-integration analysis and it is the standard approach to investigate the stationarity of a time series. This test is relevant because statistical test of the parameter resulting from spurious regression, sequel to regression of a non-stationary series, or another non-stationary series may be biased and inconsistent (Yoo et al, 1987). A test of stationarity (or non-stationarity) that has become widely popular over the past several years is the unit root test (Gujarati, 2004). The empirical test of co-integration is usually a unit root test in which the order of integration of each series employed is determined. The determination of the order of integration of each series is necessary for co-integration and indeed for Error Correction Model (ECM), simply because each series involved in the estimation of a model must be integrated of the same order (Folorunsho, 2000).

3.5   Error Correction Mechanism (ECM)

The Engle – Granger representation theorem proves that, if a co-integrating relationship exists among a set of I(1) series, then a dynamic error-correction (EC) representation of the data also exists. The methodology used to find this representation follows the "general-to-specific" paradigm (Hendry, 1987). Initially, first difference of each variable in the model for this study, a constant term, and one-lagged EC term (EC_{t-1}) generated from the static regression procedure were used. Then the dimensions of the parameter space were reduced to a final parsimonious specification by sequentially imposing statistically insignificant restrictions or eliminating insignificant coefficients.

3.6   Evaluation Technique

The evaluation consists of deciding whether the estimates of the parameters are theoretically meaningful and statistically significant. For this purpose, various criteria are employed which includes; the economic a-priori criteria, the statistical criteria (coefficient of multiple determination (R^2), test of overall significance $(F\text{-test})$ and the econometric criteria (Breusch – Godfrey test of serial correlation).

4.0   Results and Discussions
4.1   ADF unit root test of stationarity

Testing for the existence of unit roots is of major interest in the study of time series models and co-integration. The presence of a unit root implies that the time series under investigation is non-stationary; while the absence of unit root shows that the stochastic process is stationary (Iyoha and Ekanem, 2002). The time series properties of each variable are ascertained using the Augmented Dickey-Fuller (ADF) tests. Moreover, for the purpose of the econometric approach employed in this study, the variables are said to be integrated of order I(1)). Furthermore, trend status of each of the variables was determined using a line graph.

4.2   Unit Root Models

The Unit Root models are presented below;

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \sum_{\tau=1}^{m} \alpha_i \Delta Y_{t-1} + \varepsilon_t$$

(with intercept)

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{\tau=1}^{m} \alpha_i \Delta Y_{t-1} + \varepsilon_t$$

(with trend and intercept)

Table 4.1: ADF unit root test results at level

Variables	ADF test statistics	Critical Value	Order of integration	Remarks
lnGRGDP	-1.597483	-3.595026	I(0)	Not Stationary
lnPPT	-4.291525	-3.690814	I(0)	Not Stationary
lnCIT	-1.658220	-3.595026	I(0)	Not Stationary
lnVAT	-1.177947	-3.144920	I(0)	Not Stationary
lnPIT	-3.053379	-3.595026	I(0)	Not Stationary
lnCED	-2.292073	-3.595026	I(0)	Not Stationary

Source: **Author's Computation**

Table 4.2:   ADF unit root test results at first difference

Variables	ADF test statistics	Critical Value	Order of integration	Remarks
lnGRGDP	-4.451367	-3.603202	I(1)*	Stationary
lnPPT	-6.021113	-3.603202	I(1)*	Stationary
lnCIT	-5.742728	-3.603202	I(1)*	Stationary
lnVAT	-4.596384	-2.986225	I(1)*	Stationary
lnPIT	-5.100551	-3.612199	I(1)*	Stationary
lnCED	-5.476715	-3.603202	I(1)*	Stationary

Source: **Author's Computation**

Note: * - Significant at 5 percent

The above tables (i.e., Table 4.1 and 4.2) show the time series performance of the variables using the ADF Unit Root Test Statistics. However, from Table 4.1, it is revealed all the variables in the model are not stationarity at 5% levels of significance, hence; the null hypothesis of unit root is accepted for the variables at this level. However, for the variables to be associated to one another statistically in the long-run, they must be of the same order of integration I(1)), this is shown in the first difference unit root test table of Table 4.2 where all the variables are stationary and are integrated of the order I(1). At this level, all the variables became stationary at 5% level of significance. At this level, the null hypothesis of unit root is rejected for all the variables in the models. The next step to take is to conduct a cointegration test on the residual to investigate whether or not the presence of cointegration or long-run relationship.

4.3   Engle – Granger co-integration test

It has been shown from the unit root test above that most of the time series are non-stationary series that only become stationary after differencing. Confirmation of the presence of non-stationary series suggests bogus relationship in the short-run because of the stochastic possessed by these non-stationary series. However, they cannot generate an equilibrium relationship in the short-run; they can only do so in the long-run if they co-integrate.

Therefore, Engle – Granger Co-integration test is carried out to test for the presence of co-integrating equation of the multivariate series in the long-run. In the Engle – Granger Co-integration test, residuals obtained from static regression of the estimated model is tested and the result is reported on Table 4.3 by employing Engel-Granger (1987) two-step method to check for any cointegration relationship between the dependent and independent variables by choosing 10% Engle–Granger critical value.

Table 4.3:   Engel–Granger Cointegration Test Result

Variables	ADF test statistics	Critical Value			Order of integration	Remarks
		1%	5%	10%		
ECT	-4.124488	-2.656915	-1.954414	-1.609329	I(0)*[(**)(***)]	Stationary

Source: **Author's Computation**

Note[: *(**)(***)] - significance at 1%(5%)(10%) level

4.4   Co-integration Hypothesis

H_0:   There is no co-integration

H_1:   There is co-integration

The Engel-Granger (1987) two-step methodology provides that if residuals are stationary and integrated of order zero, that is, I(0) then the variables that generated the residuals are said to be cointegrated. Thus, it is evident from Table 4.3 that the residual of the model employed in this study is stationary at level; as a result, we conclude that there exist stable long run equilibrium relationships among variables in the model.

However, the OLS result that generated the residuals tested above are said to be long-run equilibrium/cointegration equations. The models are thus presented below to explore the long-run specific effect of the independent variables on the dependent variable in the model.

4.5 Analysis of Long–Run Cointegration Model

$$\ln GRGDP = 2.550174 + 0.067261*\ln PPT + 0.096713*\ln CIT + 0.150268*\ln VAT - 0.074461*\ln PIT - 0.066741*\ln CED$$

S.E.   (0.148639) (0.015739)   (0.026088)   (0.005308)   (0.019456)   (0.031627)

$R^2 = 0.985222$, D.W. = 1.622676, F-Statistic = 280.0139, Prob(F-Statistic) = 0.000000

The model above represents the estimated long-run model employed in this study to ascertain the effect of taxation on economic growth in Nigeria.

A look at the estimated equation however shows that, at zero levels of the explanatory variables, the value of the Growth Rate of Gross Domestic Product (*GRGDP*) will increase by the value of the intercept (2.550174). Moreover, specifically looking at the effects of the explanatory variables on the dependent variable, it is evident that, PPT, CIT and VAT variables in the model depicts positive long-run equilibrium relationship with the dependent variable as shown in the model which is in concurrence with the economic a-priori expectation. Consequently, PIT and CED variables depict negative relationship with the dependent variable in the long-run; this is however not in agreement with the economic a-priori expectation of positive relationship.

The estimated long-run model revealed a positive relationship between Petroleum Profit Tax *(PPT)* and the Growth Rate of Gross Domestic Product - *GRGDP*. This result conforms to the economic a priori expectation of positive relationship. However, the result can be attributed to the gargantuan proceeds realized from the oil sector which serve as the bedrock of revenue by accounting for over 60% of the nation's income. However, a unit change in the petroleum profit tax variable will bring about an increase of 6.72% in the Growth Rate of Gross Domestic Product of Nigeria in the long run.

Consequently, the estimated long-run model depicts a positive relationship between Company Income Tax (CIT) and the Growth Rate of Gross Domestic Product (GRGDP) in the long-run. This result can be ascribed to the judicious usage of the proceeds that accrues to the Nigeria government, in form of tax from the myriads of companies in the economy. These however connotes the feedback effect of the payment been made by these corporations in form of tax by government discharging its responsibilities of the provision of government responsibilities. However, as shown in the long-run model, one percent change in the Company Income Tax (CIT) variable will further increase the nation's GDP Growth Rate by 9.67% in the long-run.

In the same vein, the estimated long-run equation reveals that, Value Added Tax (VAT) portrays a positive relationship with the explained variable in the long-run. This result leads credence to the aforementioned relationship between company income tax and the economy's GDP growth rate as well as conforms to the economic a – priori expectation of positive relationship. Hence, one percent change in the Value Added Tax (VAT) will further increase the Nigeria's GDP Growth Rate by about 15.03% in the long-run.

Conversely, from the long-run equation presented above with substituted coefficients, it is evident that there exists a negative long-run relationship between Personal Income Tax (PIT), Custom and Excise Duty (CED), and the Growth Rate of Gross Domestic Product (GRGDP). This result however does not conform to the economic a priori expectation of positive relationship. However, justifying the negative coefficient of the Personal Income Tax (PIT) variable, the result can be attributed to the heavy tax weight on tax payers (Nigerian workers) without any significant "life made easy" amenities provided therein in return. The purchasing power of a hand been taxed heavily without any significant feedback for the tax payers which will definitely not add value to the nation's output, even if it did, these may not be significant. Another revealing implication is that the direction of the effect of PIT is towards consumption inducing output.

On the other hand, the Custom and Excise Duty (CED) variable which is the income accrued to the economy from inflow and outflow of goods in the country is one of the prominent earning bases for the Nigeria economy. However, the negative coefficient suggests that the series corrupt attitude of the authorities in charge of the Nigeria borders are counterproductive. These attitudes includes the seizing of customers good and valuable which would have serve as a contribution to the nation's national productivity; hence, the tax that should accrue to the economy from the business holder in this sense has been jettisoned as a result of the illicit activities across the Nigeria borders. Again, the negative influence of CED on GDP growth rate suggests that payment of heavy duties at Nigerian boarders raises prices of goods and services which further inhibits consumption induced growth. Therefore, one percent change in the Personal Income Tax (PIT) and Custom and Excise Duty (CED) variables will respectively bring about reduction in the nation's GDP Growth Rate by 7.44% and 6.67% in the long-run.

The R^2 is the coefficient of multiple determination which measures the proportion of variation in the dependent variable (GRGDP) that is explained by the independent variables within the regression model. The value of R^2 – value of 0.985222 shows that 98.52% of the total variation in Growth Rate of Gross Domestic Product (GRGDP) is explained by the regression model, which uses the Petroleum Profit Tax (PPT), Company Income Tax (CIT), Value Added Tax (VAT), Personal Income Tax (PIT) and Custom and Excise Duties (CED) as explanatory variables. The test of significance done by F – test method shows that the F – calculated is 280.0139 and it is also at both 1% and 5% level given the statistical significance of the probability value of 0.0000. Therefore, we reject all the null hypotheses (H_0) and accept the alternatives (H_1) and conclude that each of the explanatory variables in the model has significant impact on the dependent variable – Growth Rate of Nigeria Gross Domestic Product (GRGDP).

4.6 Dynamic Error Correction Model (ECM)
Having identified the co-integrating vector using the Engel – Granger Cointegration Test, we proceed to investigate the dynamics of the model. The Error Correction Mechanism (ECM) intends to validate the presence of long-run relationship and incorporate the short-run dynamics into the long-run equilibrium relationship.

Table 4.4:   ECM Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000299	0.007291	0.041020	0.9677
D(PPT,2)	-0.016658	0.011731	-1.420016	0.1727
D(CIT,2)	0.068475	0.036531	1.874428	0.0172
D(VAT,2)	-0.004340	0.003435	-1.263773	0.2224
D(PIT,2)	0.005279	0.010280	0.513519	0.6138
D(CED,2)	-0.015980	0.024935	-0.640848	0.5297
ECM(-1)	-0.770578	0.235487	-3.272274	0.0042
R-squared	0.539698	F-statistic		3.517453
Adjusted R-squared	0.386263	Prob(F-statistic)		0.017593
Durbin-Watson stat	2.398796			

Source: Author's Computation

The above error correction model represents the short-run dynamic relationship between the variables in the model; hence, all coefficients therein are short-run relationship coefficients.

The ecm model result above shows that there exists a negative and statistically insignificant relationship between the petroleum profit tax, value added tax and custom and excise duties and the rate of growth of the economy's productivity – GDP. On the contrary, company income tax and personal income tax posses the economically expected a – priori positive relationship with the rate of growth of the economy's national productivity.

Specifically, the negative effect posses by the petroleum profit tax variable on the nation's GDP growth rate is however not expected as it does not conform to the expected economic a – priori positive relationship. Moreover, this negative relationship also negates the positive long-run effect of the petroleum profit tax variable on the country's GDP growth rate. However, the statistical insignificance of this short-run negative relationship implies that, the negative coefficient possessed by this variable is not likely going to have significant odious effect on the economy; this is further justified in the long-run positive effect of the same variable on the economy's growth rate. Hence, one percent change in the petroleum profit tax variable will bring about an insignificant reduction in the economy's GDP growth rate by about 1.65% in the short-run.

Consequently, the value added tax as well as the custom and excise duties depicts negative and statistically insignificant relationship with the dependent variable – GDP Growth Rate in the short-run. This result is exactly in concurrence to the negative long-run relationship possessed by these variables on the dependent variable. This implies that, the contribution of the nation's value added tax as well as the custom and excise duties is nothing to write home about. However, one percent change in the value added tax and the custom and excise duties variable will bring about a reduction in the nation's GDP growth rate by 0.43% and 1.59% respectively in the short-run.

Conversely, the ecm result shows that, company income tax and personal income tax portray positive relationship with the rate of growth of the economy's productivity – GDP. These results conforms to the economic a – priori expected positive relationship. The result also leads credence to the positive long-run relationship earlier discussed in the preceding section of this study. This implies that, the significant effect of the company income tax as well as the personal income tax on the nation's growth rate is enormous and cannot be overemphasized. Specifically, one percent change in the company income tax and well as the personal income tax will further increase the nation's GDP growth rate by about 6.85% and 0.53% in the short-run respectively.

In addition, the estimate of the error correction variable [ECM(-1)], the adjustment parameter is theoretically consistent and statistically significant at 5% level given the probability value which is less than 0.05 and also correctly signed. This shows a very fast and robust speed of adjustment in the model. It indicates that about 77.06% of the shocks eroded in very subsequent year have been effectively corrected. Furthermore, the coefficient of multiple determination (R^2) of 53.97% is quite high, this exhibits a high predictive power of the variations in the dependent variable as it is been explained by the independent variables. However, the F-statistic, which tests for overall significance of the regressors, shows that the variables in the model are jointly significant statistically at 99% confidence level.

4.7 Breusch – Godfrey test of serial autocorrelation

In terms of the econometrics test, the Breusch – Godfrey Serial Correlation LM test was employed in this study to check for the presence or otherwise of first order serial autocorrelation in the model using 2 period lag of the Observed R-squared at 5% level of significance.

Autocorrelation Hypothesis

H_0: Residuals are not serially correlated/There is absence of serial correlation
H_1: Residuals are serially correlated/There is presence of serial correlation

Table 4.5: Breusch-Godfrey Serial Correlation LM Test Result

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.703565	Probability	0.520118
Obs*R-squared	3.244997	Probability	0.197405

Source: Author's Computation

A look at the probability value of the Observed R-Squared in the serial correlation test presented above in Table 4.5, it is evident that the value is 19.74% which is greater than 5%, hence, we accept the null hypothesis (H_0) and reject the alternative hypothesis (H_1), we therefore conclude that there is absence of first order serial autocorrelation in the model or the residuals are not serially correlated.

5.0 Conclusion

As tax policies pursue many policy objectives, the topic quality of taxation covers many dimensions, economic growth being one of them. Given that economic growth is usually considered as a precondition for the general improvement of living conditions, the focus of the discussion on quality of taxation in this research study was on tax effects on economic growth measured using the growth rate of Gross Domestic Product on long-term and sustainable growth.

Economic theory links taxation to growth through its influence on the decisions of economic agents. Taxation – at least theoretically – changes economic decisions and can thereby affect economic growth. Considering a simple production function it is obvious that taxation can affect GDP and economic growth through its impact on i) physical capital ii) human capital and iii) through its effect on the total factor productivity. The theoretical effects of taxation on economic behaviour have been reviewed for the tax categories labour, consumption, capital and environment in this study.

The provided theoretical arguments have been put into perspective with empirical research on the growth friendliness of tax categories. Certain findings indicate that corporate and personal income taxes are the most detrimental to growth, while consumption, environment and property taxes are least harmful. In particular, the reviewed simulation results indicate that smart consolidation of budgets – i.e. increasing the right taxes such as consumption taxes – might actually increase long term GDP, provided that the increased room for fiscal policy is used to cut labour taxation later on. The findings of this study indicate that corporate and personal that income taxes and Custom and Excise Duties are harmful to economic growth of Nigeria as outlined in the long-run cointegration result of this study. Worthy of mention is the revelation that the direction of the effect of PIT in Nigeria is towards consumption inducing Growth. Again, the negative influence of CED on GDP growth rate suggests that payment of heavy duties at Nigerian boarders raises prices of goods and services which further inhibits consumption induced growth. On the other hand, Petroleum Profit Tax, Corporate Income Tax and Value Added Tax have proved to enormous beneficial effect on the nation's growth both in the long-run as well as in the short-run as analysed in this study.

The conclusions of the empirical evidence based on the findings of this research work are quite diverse and revealing. Although there are some disagreements, the picture that emerges is that the effect of taxation, if there is any at all, is relatively minor. However, the estimates are dogged by rightful defining the appropriate measure of the tax rate and the choice of appropriate regressors.

Given these findings, what principles should guide the design of taxes? The empirical evidence can be interpreted as supporting the argument that the level of PIT and CED should be downwardly reviewed in order to

allow for meaningful growth. Nigeria as the most populous African nation with a population of about two hundred million, economic growth seems to be partially consumption induced. Appealing to the logic of the Ramsey rule, this would suggest that the design of optimal taxes should trade off inelasticity in demand against the effect on the growth rate (aiming to distort choice as little as possible whilst helping growth). Effectively, taxation would be predominant on commodities that were inelastic in demand. However, this effort can be thwarted somewhat if there were initial inefficiencies and corruption in the economy. Laconically, this study results to concluding that the taxation has veritably impact on economic growth in Nigeria.

6.0   Recommendations

Based on the empirical findings of this study, the following recommendations were provided to improve the taxation structure in Nigeria:

i.   The government in Nigeria should restructure the Personal Income Tax and the Custom and Excise Duties to induce consumption to achieve growth in perfect agreement with the modified Ramsey rule.

ii. Effort to achieve growth through taxation can be thwarted somewhat if there are inefficiencies and corruption in the economy. Therefore, corruption in the management of tax revenue should be minimized to achieve the goals of a good tax system.

iii. Petroleum Profit Tax, Corporate Income Tax and Value Added Tax have proved to be very beneficial to growth in Nigeria. Therefore, the level of tax evasion of these taxes in Nigeria should be reduced through an efficient and effective tax administration.

iv. There should be accountability and transparency from government officials on the management of revenue derived from taxation so that the morale of tax payers can be enhanced in being able to benefit from the payment of taxes.

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