Econometric models of tax reforms

Экономико-математические модели налоговых реформ

Tax Revenue Impact on Economic Growth in Nigeria: ARDL Bounds Test and Cointegration Approach

O.B. Emudainohwo 🅓 ✉, **O.M. Ndu** 🅓

Delta State University, Abraka, Nigeria

✉ *ochuko.bemudainohwo@gmail.com*

ABSTRACT

The paper aims to explore how the introduction of an electronic tax system impacts on economic growth in Nigeria. The neoclassical growth theory and Technology Acceptance Model (TAM) was used in the study. Based on diagnostic tests, Autoregressive Distributed Lag bounds test regression model was adequately created. The quarterly secondary data of Central Bank of Nigeria and tax statistics data were divided into two periods for analysis: from $2011q_1$ to $2015q_3$ pre-electronic tax period (pre-e-tax) and from $2015q_4$ to $2020q_4$ post-electronic tax period (post-e-tax). In pre-e-tax in the long-run, education trust fund revenue strongly enhances economic growth, company income tax and stamp duty are moderate revenue earners for economic growth, while petroleum profit tax revenue have moderate negative impact on economic growth. Value added tax and capital gain tax revenues insignificantly decreases in economic growth in the same period. In post-e-tax in the long run, value added tax, petroleum profit tax, and capital gin tax insignificantly decreases economic growth, while company income tax, education trust fund, and stamp duty insignificantly enhance it. For pre-e-tax revenue in the short-run, education trust fund strongly decreases economic growth, value added tax and petroleum profit tax had insignificant positive influence, while company income tax, capital gain tax, and stamp duty had no impact. For post-e-tax revenue in the short-run company income tax had no influence, value added tax had moderate negative impact, petroleum profit tax had a strong positive impact, education trust fund, capital gain tax, and stamp duty had strong negative impact on economic growth. To optimize the relationship between tax structure and economic growth, tax evasion, corruption, and tax avoidance should be checked.

KEYWORDS

economic growth, economic development, Nigeria, pre-e-tax tax revenue, post-e-tax tax revenue, autoregressive distributed lag bounds test regression model

JEL H25

Влияние налоговых поступлений на экономический рост в Нигерии: тест ARDL и коинтеграционный подход

О.Б. Эмудайнохво 🅓 ✉, **О.М. Нду** 🅓

Государственный университет Дельта, г. Абрака, Нигерия

✉ *ochuko.bemudainohwo@gmail.com*

АННОТАЦИЯ

В статье исследуется влияние внедрения электронного налогообложения на экономический рост в Нигерии. Используется неоклассическая теория роста и модель принятия технологий. На основе диагностических тестов построена адекватная регрессионная модель с авторегрессионным распределенным лагом. Квартальные данные Центрального банка Нигерии и данные налоговой

статистики разделены для анализа на два периода: до внедрения электронного налогообложения (с 1-го квартала 2011 г. по 3-й квартал 2015 г.) и после внедрения электронного налогообложения (с 4-го квартала 2015 г. по 4-й квартал 2020 г.). В долгосрочном периоде, до внедрения электронного налогообложения доходы от целевого фонда образования значительно повышали экономический рост, налог на прибыль компаний и гербовый сбор являлись умеренными источниками экономического роста, в то время как налог на нефтяную прибыль оказывал умеренное негативное влияние на экономический рост. Доходы от налога на добавленную стоимость и налога на прирост капитала незначительно снижали экономический рост в тот же период. В долгосрочном периоде, после внедрения электронного налогообложения налог на добавленную стоимость, налог на нефтяную прибыль и налог на прирост капитала незначительно снижали экономический рост, в то время как налог на прибыль компаний, целевой фонд образования и гербовый сбор незначительно повышали его. В краткосрочном периоде до внедрения электронного налогообложения целевой фонд образования существенно снижал экономический рост, налог на добавленную стоимость и налог на нефтяную прибыль оказывали незначительное положительное влияние на экономический рост, в то время как налог на прибыль, налог на прирост капитала и гербовый сбор не оказывали никакого влияния на экономический рост. В краткосрочном периоде, после внедрения электронного налогообложения направления влияния на экономический рост следующие: налог на прибыль не оказывает влияния; налог на добавленную стоимость оказывает умеренное негативное влияние; налог на прибыль от продажи нефти оказывает значительное положительное влияние, а целевой фонд образования, налог на прирост капитала и гербовый сбор оказывают значительное негативное влияние. Для оптимизации взаимосвязи между налоговой структурой и экономическим ростом предложено контролировать уклонение от уплаты налогов, коррупцию и обход налогов.

КЛЮЧЕВЫЕ СЛОВА
экономический рост, экономическое развитие, Нигерия, налоговые поступления до электронного налогообложения, налоговые поступления после электронного налогообложения, регрессионная модель авторегрессионного теста с распределенным запаздыванием

1. Introduction

The machinery and procedures for implementing a good tax system in Nigeria is undergoing reformation. The policy makers are grappling with the quests for effective tax administration for collecting adequate tax revenue and particularly, curbing large scale corrupt practices prevalence in tax administrative system, avoidance and evading tax payment, non-compliance with relevant tax laws, and so forth (see Angahar & Alfred [1], Chiamaka et al. [2]).

On another hand, tax experts and administrators are advocating for technology driven taxing system to minimize the menaces associated with tax challenges in Nigeria. Some reforms have been taken so far such as taxpayers' identification number introduced in February 2008; automated tax system made to facilitate tracking of tax positions; e-payment sys-tem in 2015 meant to enhance smooth payment procedures and reduce the incidences of tax touts among others. It is believed that technology adoption will advance tax administration because, technology has influenced lives in many ways, and it continue to change the way of doing things (see Chiamaka et al [2]).

A country tax system is a major determinant of other macroeconomic indexes, particularly, the level of economic growth (EcG) and economic development (EcD). While some earlier studies found strong positive association between taxation and EcG (see for example, Keho [3], Jalata [4], Okoli, Njoku & Kaka [5], Ugwunta & Ugwanyi [6], Ugochukwu & Azuibike [7], Ali et al. [8], Egbunike et al. [9]). Other previous studies shows that tax has significant negative influence on EcG from Edame & Okoi [10], Delessa [11].

Jens et al. [12] studied 21 OECD countries data between 1971–2004 and found that corporate taxes has been harmful to the economy. Hungerford [13] found that tax has no impact on economic growth when the USA experienced from the end of WWII in 1945 to 2011 was examined.

Electronic tax system is the integration of information technology into tax administration for enforcement of core tax processes such as electronic registration, filing of tax returns and payment, as well as education and information to taxpayers and general maintenance of database (from Wasao [14], Chiamaka et al. [2]). It provides adequate tax records for easy communication of information and efficiently minimize cost of administration due to submission of tax returns on a paperless environment (see Oseni [15] Chiamaka et al. [2]). Embracing e-tax payment system is assumed to fetch increased tax revenue and in turn increase EcG. It is also expected to facilitate voluntary compliance (Oseni [15]), and its convenience can serve as key driver for e-filing adoption.

Literature relating e-tax system to economic growth are seemingly scanty. Most study is about the relationship between economic growth and taxation but not on e-tax and economic growth. For this reason, the researcher infers on the implication of how compliances to e-tax will contribute to revenue generation and consequently on economic growth.

Scholars' views are that economies where tax revenues significantly form major part of their revenue, they have long deployed electronic tax system in far back years (see Ofurun et al. [16]). Thus, the purpose of e-taxation in current time is to improve revenue collection and consequently economic growth. Modern tax administrators' main objectives are to facilitate voluntary compliance by taxpayers, providing adequate tax records for ease of communication of information, and efficiently minimizing cost of tax revenue collection (Oketa et al. [17]).

E-tax system provide more than these main objectives. The upshot of it is that e-tax system should generate more revenue over manual tax system that is cumbersome. The system increases transparency, limit the opportunity for corruption since it limits direct contact between taxpayer and tax administrators, is less costly, takes lesser time to comply with and easier for firms and individuals to file returns and pay their taxes (for example see Ofurun et al. [16], Oketa et al [17]).

Furthermore, particularly in economies where tax corrupt practices are enormous, such as tax avoidance, tax evasion, non-compliance with relevant tax laws, poor record keeping, and collusion with tax administrators, which are setbacks and challenges to tax revenue generation are likely to reduce and effectively, better-off tax revenues see Oketa et al. [17], Angahar & Alfred [1]. The conveniences associated with e-tax is a driver of its acceptance and consequently expected increase in tax revenues.

Therefore, tax effectiveness as a tool for promoting EcG remain inconclusive, as several studies show mixed impact of taxes on EcG. Furthermore, extant studies have not compared manual-tax system to e-tax system in Nigeria but the study by Olaoye & Atilola [18] that examined e-tax payment effect on revenue generation, and they found insignificant positive differences between pre- and post-VAT revenue in Nigeria. Given the case that studies have shown that countries such as Brazil and Mexico that have pursued tax digitalization have increased their tax revenue, there is need to transform the tax administration system and framework through digitalization and automation. Particularly that digitalization of tax collection and its administration is important to ensure greater transparency of the tax system and widening of the tax base.

The main objective of this research is to evaluate the pre- and post-e-tax revenue relationship with EcG in Nigeria. The results from this study are expected to be useful as a recommendation for government fiscal policies formulation. The remaining section of this study is structure as follows: theoretical framework, empirical review, methodology and hypotheses, results presentation, discussion, and recommendation.

Hypotheses: (1) the researcher expects taxes to contribute to economic growth and (2) that pre- and post-e-tax revenues have significant impact on economic growth.

2. Theoretical framework

Various framework has been used to investigate the relationship existing between taxation and EcG. The neoclassical growth theory and technology acceptance model (TAM) is used in this study.

Harrod [19] and Domar [20] were first to alleged that long-term growth is exogenously determined by saving rate. This theory was extended by Solow [21] and Swan [22] when technical variable was introduced and which is distinct from both labour and capital, and which varies with time as driver of growth. The neoclassical growth theory states that economic growth is a function of three factors: labour, capital and idea, and technology. The theory supposed that the differences in the pace of technological changes between countries are said to explain much of the variation in growth rate that we see. If so, we expect positive changes in use of technology to collect taxes to better off revenue collection which should culminate into EcG. Thus, neoclassical growth theory can be employed to explain pre- and post-e-tax period impact on EcG.

Davis & Davis [23] propounded the TAM. Davis & Davis [23] developed and validated new scales for perceived usefulness and perceived ease of use of new technology. Perceived usefulness and perceived was hypothesized to be a fundamental driver of users' acceptance of new technology. The study found that perceived ease of use may be a causal antecedent to a parallel, direct determinant of system usage. In the context of this study, if TAM relate the acceptance of e-tax and voluntary payment by taxpayer, which is one of the expected advantages of e-tax, then we expect e-tax-revenue and subsequently EcG to increase. Thus, TAM is useful as a framework to study pre- and post-e-tax revenue impact on EcG.

3. Empirical review

Nguyen et al. [24] examined the effects of individual, corporate and consumption taxes in the UK between 1973–2009. The study concluded that cuts to income taxes had significant positive effects on real GDP.

Similarly, Cloyne et al. [25], Ljungqvist et al. [26], and Mertens & Olea [27] concluded that reduction in tax rate increases real GDP and of course, better EcG. Increase in VAT on the other hand, have significant negative influence on EcG based on data from 51 countries over the period 1970-2014 used to examined VAT effect on EcG from Gunter et al. [28].

Awa [29] researched tax revenue relevance as a driver of EcG in emerging market economy using data extracted from Central Bank of Nigeria (CBN) over the period 2008-2018. The result is that PPT and CIT has significant positive association with EcG in Nigeria while VAT has inverse influence on EcG in Nigeria.

Denis [30] showed that VAT is not effective as a revenue earner in an examination of VAT impact on GDP in Nigeria.

However, Unegbu & Iretin [31], Izedonmi & Okunbor [32], Nasiru et al. [33], Asaolu et al. [34], and Bingilar & Preye [35] found that VAT has significant positive influence on EcG in Nigeria.

Omesi & Akpeekon [36] examined effect of CGT on EcD in Nigeria from 2011–2016 using secondary data extracted from CBN and FIRS. The study shows that CGT has significant positive impact on EcD in Nigeria. However, Kumai [44] examined CGT effects on total tax revenue and EcG in Nigeria for the period 2005–2018. The study shows that CGT has insignificant positive influence on total tax revenue/EcG in Nigeria.

In a study that examined the bearing between ETF and development of tertiary institution in Nigeria from 2009–2017, it was shown that ETF depicted significant positive relationship with staff training. This implies a positive relationship with EcG Nagbi & Micah [37].

Similarly, Ordu & Nkwoji [38] found that education tax revenue has a significant positive association with EcG in

an examination of education tax revenue impact on EcD in Nigeria over the period 2006–2017.

Furthermore, Inyiama & Nwankwo [39] examined CIT and tertiary education tax on Nigeria GDP. The study shows that CIT and ETF significantly and positively affects Nigeria GDP.

Onwuka & Orji [40] studied SD revenue effect on EcG in Nigeria. The study employed OLS on time series data collected from CBN, FIRS and National Bureau of Statistics (NBS). It was found that SD revenue has significant positive impact on EcG in Nigeria.

Ideh [41] examined tax revenue influence on EcD in Nigeria and found that PPT has insignificant negative association with EcD.

However, Asaolu et al. [34] shows that PPT has significant positive association with EcG in Nigeria. Asaolu et al. [34] examined the association between tax revenue and EcG in Nigeria. The study shows that CIT has inverse relationship with EcG.

On the contrary, Osho et al. [42] found that CIT has strong positive effect on GDP in Nigeria in an examination of CIT impact on GDP in Nigeria.

Chigbu & Njoku [43] analyses the association between tax and the Nigerian economy proxy with GDP. The study shows that CIT, PIT, PPT, and VAT has weak positive impact on EcG, individually.

Chiamaka et al. [2] examined electronic tax system impact on internally generated revenue in Nigeria. Electronic tax registration, electronic filing of tax revenue, an electronic payment of tax was used as proxy for electronic tax system. It was based on quantitative cross-sectional survey data from 94 valid responses. It shows that electronic tax payment does not significantly impact on internally generated revenue.

Olaoye & Atilola [18] studied e-tax payment effect on revenue generation in Nigeria. The study reported insignificant positive difference between pre and post VAT revenue with t-statistics and p-value of 0.520 and 0.012, respectively.

4. Methodology

This study used quarterly secondary data of CBN Statistical Bulletin (real GDP) and FIRS tax statistics/report for the period $2011q_1$ to $2020q_4$ (quarterly actual collection from FIRS Planning, Research, and Statistics Department for VAT, CIT, PPT, ETF, CGT, and SD). Personal income tax is collected by States in Nigeria. Gathering and collating the actual quarterly figure was challenging for this study. Hence it was not included in the study's analysis. The data was divided into two period for analysis: from $2011q_1$ to $2015q_3$ pre-electronic tax period (pre-e-tax) and from $2015q_4$ to $2020q_4$ post-electronic tax period (post-e-tax), which correspond with when electronic tax system was introduced in Nigeria.

The study's data, a time series data is characterized by irregular fluctuations, seasonality and increasing or decreasing trend, and as such, they may be stationary or non-stationary. Thus, their mean, variance and covariance may change, or it may not change with a specified time respectively. Thus, Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) unit root tests was employed to test the data unit root status. A known weakness of ADF and PP unit root tests is potential structural breaks challenges in the series. Unit root test will fail to reject the unit root hypothesis if the series has a structural break. On this basis, the Clemente and Montane Reyes methods was used for testing the existence or not of structural breaks. Should there be a structural break, the data will be differenced to make changes so that a stationary data is obtained before any analysis. The null hypothesis that the series has a unit root with structural break(s) was tested against the alternative that there are stationary with break(s).

The study's model was created using value of quarterly GDP as a proxy for dependent variable (EcG), while VAT, CIT, PPT, ETF, CGT, and SD are independent variables. Structural break(s) introduces uncertainty as to the true order of integration of the variables. Thus, the study will include an interactive dummy variable (DV) compiled as the product of dummy variable (pre-structural break = 0,

while post-structural break = 1) and GDP (proxy for EcG) if there is a structural break in GDP. The variables are presented in Table 1.

Where there is structural break, the Autoregressive Distributed Lag (ARDL) bounds test model is preferred for the study's analysis. ARDL bounds test yields valid results regardless of whether the underlying variables are l(0) or l(1), or a combination of both. F-statistics and Wald tests was used to examine the null hypothesis of no cointegration among the variables in the ARDL bounds test. The estimated F-statistics value is compared with the two sets of upper- and lower-bounds critical values. The null hypothesis of no cointegration is rejected if the F-statistics value is higher than the upper- and lower-bound critical values. The conclusion is indecisive if it lies between the two critical values. On the other hand, if the F-statistics value is lower than the critical values, the null hypothesis of no cointegration is accepted.

The study's model is specified as follow:

$$EcG_t = \alpha_0 + \alpha_1 VAT_t + \alpha_2 CIT_t +$$
$$+ \alpha_3 PPT_t + \alpha_4 ETF_t + \alpha_5 CGT_t +$$
$$+ \alpha_6 SD_t + \alpha_7 DV_t + \varepsilon_t,$$

where *EcG*, *VAT*, *CIT*, *PPT*, *ETF*, *CGT*, *SD*, and *DV* are defined in Table 1; α_0 = constant term; α_1 to α_7 = independent variables coefficients; ε = model error term, and *t* = quarterly time.

However, interactive dummy variable term ($\alpha_1 DV_t$) will be excluded from the model in the absence of a structural break.

The study will examine the variables statistical distribution, correlation, lag selection, unit root, and some assumptions of classical normal regression to ensure goodness of fit of the model. The diagnostic checks include heteroskedasticity test, serial correlation tests, normality test, and cumulative sum of recursive residuals of square (CUSUMSQ). If the estimated coefficients are unstable though, cointegration is present, the obtained regression results will be unreliable. Thus, CUSUMSQ was employed to examine the residuals of the estimated error correction models to test for parameter constancy.

5. Results presentation

5.1. Clemente and Montane Reyes structural break test

Clemente and Montane Reyes structural break test confirmed the presence of structural break in $2013q_3$ (pre-e-tax) and 2018q1 (post-e-tax), respectively (Figure 1). Thus, effect of structural break was incorporated in the series by interacting it with GDP the proxy for EcG (see Table 1).

5.2. Paired sample t-test (differences in millions of Naira)

Table 2 present the paired sampled *t*-statistic on the subtraction order of pre-e-tax from post-e-tax. Based on the subtraction other, the EcG mean value of post-e-tax is higher than that of the pre-e-tax by 1,736,150. The t-statistics and p-value is 4.1646 and 0.0002, respectively. It implies a significant positive difference between post- and pre-e-tax EcG, connoting that post-e-tax has a strong positive effect on EcG in the examined period.

Table 1

Variables, Measurement and Sources

Variables	Symbols	Measurement	Source
Economic growth	*EcG*	Log of quarterly GDP	CBN Statistical Bulletin
Value added tax	*VAT*	Actual quarterly VAT	FIRS
Company income tax	*CIT*	Actual quarterly CIT	FIRS
Petroleum profit tax	*PPT*	Actual quarterly PPT	FIRS
Education tax fund	*ETF*	Actual quarterly ETF	FIRS
Capital gain tax	*CGT*	Actual quarterly CGT	FIRS
Stamp duty	*SD*	Actual quarterly SD	FIRS
Interactive dummy variable	*DV*	Structural break dummy*Quarterly GDP	Compiled by researcher

Source: Compiled by researcher 2022

Table 2 also revealed that post-e-tax VAT, CIT, CGT, and SD mean revenue are higher than those of pre-e-tax by 89.490, 72.993, 2.950, and 6.114, respectively. Their respective t-statistics and p-values are 5.7257 and 0.0000, 1.9742 and 0.0561, 0.8051 and 0.4288, and 1.793 and 0.0881.

The result infers that there is a significant positive difference between post and pre-e-tax, for VAT at 1% level, for CIT at 10% level and for SD at 10% level, respectively, and insignificant positive difference between post and pre-e-tax for CGT revenue. On the other hand, mean revenue of post-e-tax PPT and ETF are less than those of pre-e-tax by 222.766 and 0.182, respectively. It suggests that while post-e-tax has significant negative effect on PPT revenue (–4.3121, 0.0001), post-e-tax has an insignificant negative influence on ETF revenue (–0.0121, 0.9904).
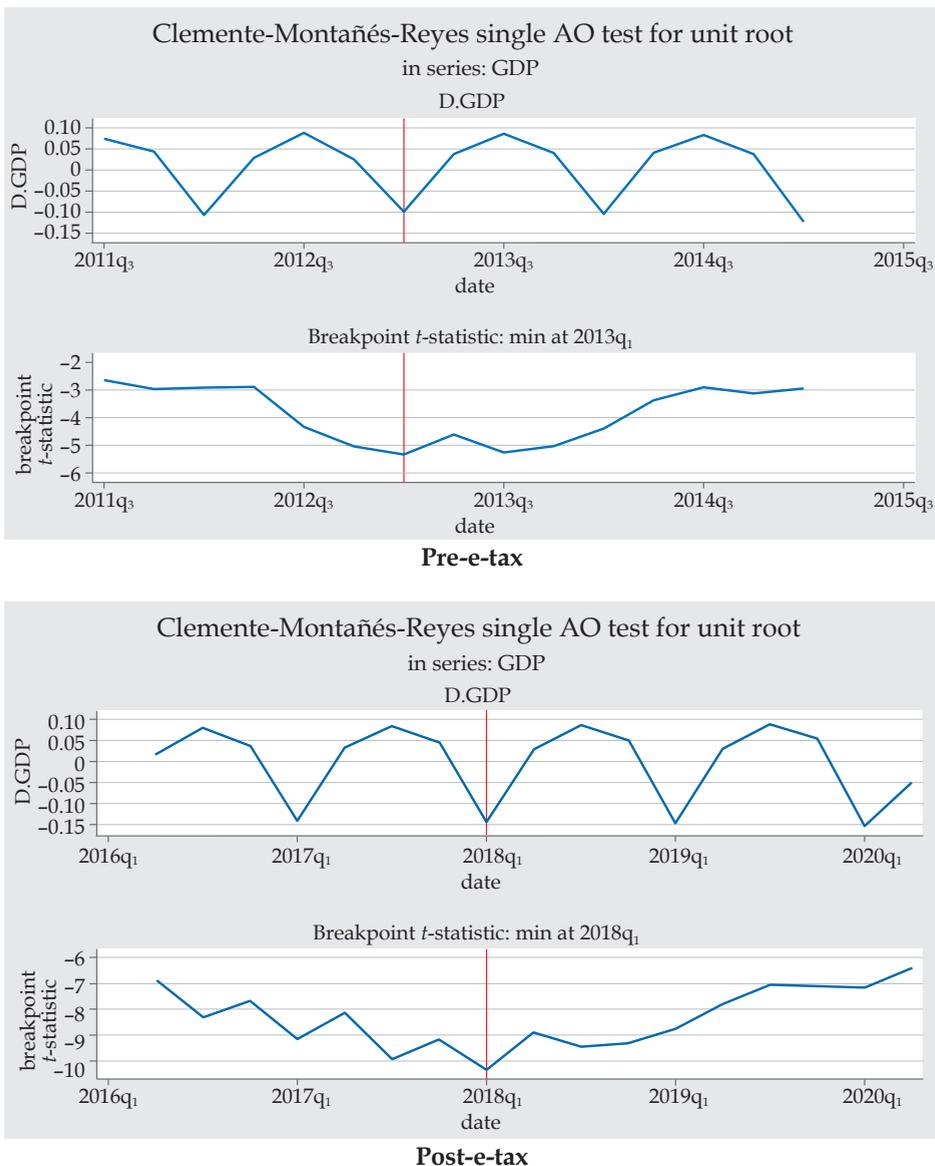

Pre-e-tax

Post-e-tax

Figure 1. **Clemente-Montañés-Reyes Unit Root Test with Single Structural Breaks**

Source: Researcher using data from FIRS (see Table 1)

5.3. Correlation matrix

Correlation matrix is presented in Table 3.

In pre-e-tax, the correlation between EcG and the independent variables are positive except that between PPT (–0.658*), and CGT (–0.121) which are negatively correlated to EcG. VAT (0.695*), CIT (0.512*), PPT (–0.658*), ETF (0.468*), SD (0.586*), and DV (0.885*) are correlated with EcG at 5% significance level while CGT (–0.121) is insignificantly correlated to EcG. The correlations are moderate with VAT, CIT, PPT, ETF and SD, strong with DV but weak with CGT.

Among the independent variables, we have strong correlation between VAT and DV (0.764*), and PPT and DV (–0.833*), moderate correlations between VAT and CIT (0.386), VAT and PPT (-0.653), VAT and SD (0.453), CIT and PPT (–0.377), CIT and ETF (0.402), CIT and CGT (0.416), CIT and DV (0.506*), and SD and DV (0.484*). The other correlations are weak.

In post-e-tax, EcG has positive correlation with all independent variables. The correlation is moderate with CIT (0.307), and DV (0.532*) but weak with VAT (0.270), PPT (0.169), ETF (0.271), CGT (0.168), and SD (0.234). Among the independent variables, the correlation between VAT and SD (0.933*), VAT and DV (0.804*), and SD and DV (0.766*) are strong. In both pre- and post-e-tax, the strong correlation is likely to create multicollinearity challenges. However, ARDL Bounds test regression will automatically stop the executed regression command should there be a multicollinearity challenge.

Table 2

Paired Sampled t-Test

Variables		Paired Differences (Millions of Naira)		*t*	Welch's df	Sig. value
		Mean	Std Dev.			
Pair1	Post-e-tax EcG – pre-e-tax EcG	1736150	416882.2	4.1646	38.2624	0.0002
Pair2	Post-e-tax VAT – pre-e-tax VAT	89.490	15.630	5.7257	23.2923	0.0000
Pair3	Post-e-tax CIT – pre-e-tax CIT	72.993	36.973	1.9742	35.6864	0.0561
Pair4	Post-e-tax PPT – pre-e-tax PPT	–222.766	51.661	–4.3121	36.4901	0.0001
Pair5	Post-e-tax ETF – pre-e-tax ETF	–0.182	15.052	–0.0121	39.6738	0.9904
Pair6	Post-e-tax CGT – pre-e-tax CGT	2.950	3.664	0.8051	23.5382	0.4288
Pair7	Post-e-tax SD – pre-e-tax SD	6.114	3.410	1.7930	20.0666	0.0881
Pair8	Post-e-tax DV – pre-e-tax DV	1.74e+07	270188.400	62.5338	20.0000	0.0000

Source: compiled by researcher, 2022

Table 3

Spearman's correlation

Variables	Pre-e-tax								Post-e-tax							
	EcG	VAT	CIT	PPT	ETF	CGT	SD	DU	EcG	VAT	CIT	PPT	ETF	CGT	SD	DU
EcG	1.000								1.000							
VAT	0.695*	1.000							0.270	1.000						
CIT	0.512*	0.386	1.000						0.307	0.397	1.000					
PPT	–0.658*	–0.653*	–0.377	1.000					0.169	0.442*	0.413	1.000				
ETF	0.468*	0.165	0.402	0.009	1.000				0.271	–0.008	0.570*	0.227	1.000			
CGT	–0.121	–0.247	0.416	–0.068	–0.025	1.000			0.168	–0.064	0.457*	0.078	0.310	1.000		
SD	0.586*	0.453	0.161	–0.297	0.232	–0.161	1.000		0.234	0.933*	0.283	0.507*	0.013	–0.191	1.000	
DV	0.885*	0.764*	0.506*	–0.833*	0.202	–0.058	0.484*	1.000	0.532*	0.804*	0.500*	0.478*	0.118	0.094	0.766*	1.000

Source: compiled by researcher

* = correlated at 5% significant level

5.4. Diagnostic tests/checks

Lag selection. Table 4 presents the lag selection for unit root tests that included DV in the model. It shows the AIC, HQIC, and SBIC selection-order criteria results. Lags 3 and lags 4 was selected (the least value of AIC, HQIC, and SBIC with p-value < 0.05) for pre- and post-e-tax unit root test for the variables, respectively.

Unit root. ADF and PP unit root tests result is presented in Table 5. They shows the variables has combined stationarity at l(0) and l(1) in both pre- and post-e-tax, and at 5% critical value (–3.600) which suggests that ARDL bounds test model could be used for the study's analysis. Note that in all cases of stationarity,

MacKinnon approximate p-value for $Z(t)$ were < 0.05.

ARDL Bounds Test Cointegration. Pesaran/Shin/Smith [45] ARDL bounds test for cointegration was used to test for levels relationship base on the SBIC criteria (table 6). In the models with DV, F-statistics is 13.66 and 25.7 for pre- and post-e-tax, respectively. In the model without DV, F-statistics is 14.21 and 20.74 for pre- and post-e-tax, respectively. The F-statistics value are greater than the lower and upper critical value at 1 % in all four models. Therefore, there is cointegration among the variables in the long run for all models. And thus, ARDL Bounds test model was employed for the study's analysis.

Table 4

Selection-order criteria

Lag	LL	LR	Df	P	FPE	AIC	HQIC	SBIC
Pre-e-tax (Sample: 2012q$_1$–2015q$_3$; No of obs. = 15)								
0	–393.167				2.3e+13	53.489	53.4849	53.8666
1	.	.	64	.	–4.9e-20*	.	.	.
2	3286.68	.	64	.	.	–422.223	–422.284	–416.559
3	3504.06	634.77*	64	0.000	.	–464.541*	–464.602*	–458.877*
Post-e-tax (Sample: 2015q$_4$–2020q$_4$; No of obs. = 17)								
0	–514.14				6.6e+16	61.4283	61.4673	61.8204
1	-274.468	479.34	64	0.000	1.8e+08*	40.7609	41.1117	44.2898
2	3454.18	7457.3	64	0.000	.	–390.374	–389.711	–383.708
3	3876.89	845.42	64	0.000	.	–440.105	–439.442	–433.439
4	4018.33	282.88*	64	0.000	.	–456.745*	–456.082*	–450.079*

Source: compiled by researcher, 2022

Table 5

ADF & PP unit root test

	Pre-e-tax					Post-e-tax				
	Augmented Dickey-Fuller		Phillip-Perron		Decision	Augmented Dickey-Fuller		Phillip-Perron		Decision
	l(0)	l(1)	l(0)	l(1)		l(0)	l(1)	l(0)	l(1)	
EcG	–1.027	–0.865	–6.231*	–6.675*	**l(0)**	–1.356	–2.218	–5.211*	–5.546*	**l(0)**
VAT	–1.227	–2.231	–2.595	–7.107*	**l(1)**	–1.815	–0.009	–0.907	–5.114*	**l(1)**
CIT	–1.583	–3.593	–9.680*	–12.164*	**l(0)**	–0.502	–2.092	–3.844*	–8.215*	**l(0)**
PPT	–2.029	–3.373	–2.599	–4.404*	**l(1)**	0.359	–1.715	0.099	–5.807*	**l(1)**
ETF	–0.915	–4.412*	–5.503*	–9.898*	**l(0)**	–1.723	–3.692*	–8.161*	–8.954*	**l(0)**
CGT	–1.867	–2.111	–4.771*	–9.006*	**l(0)**	–3.801*	–3.266*	–3.910*	–6.479*	**l(0)**
SD	–2.152	–1.059	–3.866*	–6.651*	**l(0)**	–3.021	–3.234	–5.031*	–16.661*	**l(0)**
DV	–1.846	–1.795	–2.024	–3.973*	**l(1)**	–1.831	–1.661	–2.014	–4.223*	**l(1)**

Source: compiled by researcher 2022

Diagnostic checks. The study's various diagnostic checks result is presented in table 7. *Durbin's alternative test for autocorrelation/serial correlation* shows that the null hypothesis of no serial correlation cannot be rejected (p-values of 0.0846 and 0.9574 for pre- and post-e-tax, respectively for models with DV and p-value of 0.6246 and 0.2667 for pre- and post-e-tax, respectively for models without DV; are > 0.05).

The *White's test for Homogeneity of variance* p-value for the 4 model test results are > 0.05. It suggests residuals are homoscedastic for all models in pre- and post-e-tax. *Jarque-Bera (JB) normality test* p-values for all models in pre- and post-e-tax period are greater than 0.05. The study fails to reject null hypothesis in all JB tests. Thus, the series are normally distributed based on JB normality test for all models in pre- and post-e-tax.

The normality of the variables was further conformed using *Skewness and Kurtosis normality test*. The tests show that the models are normally distributed: their p-value > 0.05 in pre- and post-e-tax. Thus, Skewness and Kurtosis jointly reaffirmed normality of the series by the JB normality test.

Ramsey RESET test was also carried out to ascertain if the series has omitted variables. All Ramsey RESET test *p*-values are greater than 0.05 for pre- and post-e-tax. The diagnostic test results suggest the models will be well fitted.

Testing for parameter stability. The models long-run parameter stability was tested using CUSUMSQ to ensure that the estimated coefficients are stable (Figure 2a, 2b, 2c, and 2d). CUSUMSQ null hypothesis is all coefficients are stable. The plot of the CUSUMSQ stays within the 5% critical bounds in all cases. Thus, all coefficients for with DV and without DV for pre- and post-e-tax period are stable.

Table 6

**Pesaran/Shin/Smith ARDL bounds test for cointegration:
Critical value (0.1 – 0.01), F Statistic, Case 3.**

									Decision
With DV: Pre-e-tax: F = 13.66; post-e-tax: F = 25.7									
	(1 0)	(1 1)	(1 0)	(1 1)	(1 0)	(1 1)	(1 0)	(1 1)	Decision
	L_1	L_1	L_05	L_05	L_025	L_025	L_01	L_01	There is levels relation
K_7	2.03	3.13	2.32	3.50	2.60	3.84	2.96	4.26	
without DV: pre-e-tax: F = 14.21; post-e-tax: F = 20.74									
	(1 0)	(1 1)	(1 0)	(1 1)	(1 0)	(1 1)	(1 0)	(1 1)	Decision
	L_1	L_1	L_05	L_05	L_025	L_025	L_01	L_01	There is levels relation
K_6	2.12	3.23	2.45	3.61	2.75	3.99	3.15	4.43	

Source: Researcher 2022

Table 7

Diagnostic checks

	p-values of models that included DV		p-values of models that excluded DV	
	Pre-e-tax	Post-e-tax	Pre-e-tax	Post-e-tax
Durbin's alternative test for serial correlation	0.0846	0.9574	0.6246	0.2667
White's test for heteroskedasticity	0.6081	0.3303	0.2074	0.2362
Jarque-Bera test for Ho: normality	0.8283	0.9084	0.9513	0.2161
Skewness/Kurtosis tests for normality	0.9179	0.9454	0.9702	0.0730
Ramsey RESET test for omitted variables	0.8590	0.2680	0.8867	0.2264

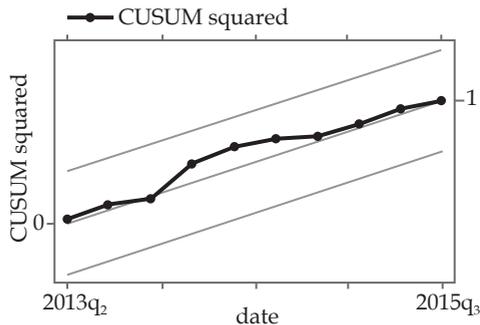*Source:* compiled by researcher 2022
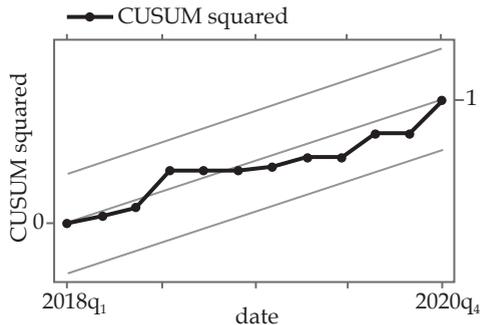
Figure 2a. **Pre-e-tax CUSUMSQ with DV**
Source: Researcher 2022
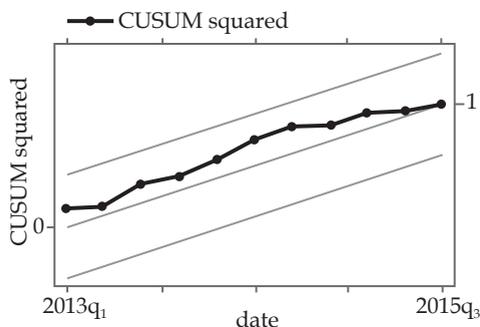

Figure 2b. **Post-e-tax CUSUMSQ with DV**
Source: Researcher 2022

Figure 2c. **Pre-e-tax CUSUMSQ**
without DV
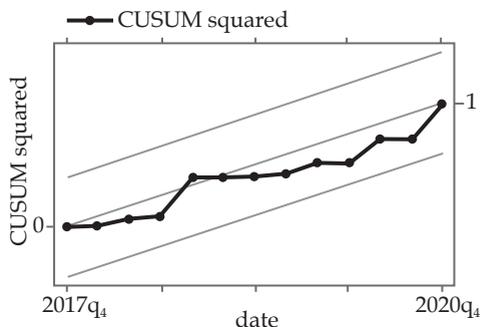*Source:* Researcher 2022

Figure 2d. **Post-e-tax CUSUMSQ**
without DV
Source: Researcher 2022

5.5 ARDL Bounds test Regression results: Pre-e-tax and post-e-tax (column A & B) compared

This study's series has structural break: in pre-e-tax $2013q_3$ and in post-e-tax $2018q_1$ (see Figure 1). It is a known fact that the conventional unit root tests can yield misleading results when the data series exhibits shocks, and with break in a series, bounds test will yield inconsistent results. This has prompted having four models: two models that introduced break (DV) in column A and B and two models without DV in column C and D (see Tables 8a & 8b). Table 8a that incorporated shock effects are adopted for the study's analysis.

The regression results for pre- and post-e-tax for with DVs are presented in Tables 8a while pre- and post-e-tax for without DV are presented in Table 8b.

Generally, their adjustment coefficients are negative indicating they have long-run equilibrium relationship among the variables at 1% level of significance. It suggests that their previous errors will be speedily corrected in the current period. As noted above, the results in Table 8b are adopted for the study's analyses. In pre-e-tax, the explanatory variables explained 88.66% of variation in EcG while they explained 92.73% variation in EcG in post-e-tax. The speed of adjustment to economic shock is faster in post-e-tax (147.99%) than in pre-e-tax (61.69%).

a. Long-run. VAT has insignificant negative association with EcG in both pre- (–0.00373, 0.110) and post-e-tax (–0.00046, 0.116). In pre-e-tax, CIT have positive impact on EcG at 10% significant level (0.00044, 0.060) but insignificant positive impact in post-e-tax (0.00015, 0.252). PPT

has significant negative association with EcG in pre-e-tax (–0.00023, 0.040) at 5% level but insignificant negative impact in post-e-tax (–0.00009, 0.299). ETF has a strong direct impact on EcG in pre-e-tax (0.00284, 0.020) at 5% level but with an insignificant positive impact in post-e-tax (0.00038, 0.323). CGT has insignificant inverse relationship with EcG in both pre- (–0.00402, 0.251) and post-e-tax (–0.00009, 0.845). SD coefficient has a moderate direct bearing with EcG in pre-e-tax (0.05811, 0.061) at 10% level and a strong direct bearing with EcG in post-e-tax (0.00593, 0.045) at 5% level. Effect of moderated

dummy variable (DV) on EcG in pre-e-tax is insignificantly positive (0.00316, 0.219) while in post-e-tax, the effect of DV on EcG is strong and positive (0.00474, 0.035) at 5% level.

b. Short run. VAT first difference coefficient has an insignificant positive influence on EcG in pre-e-tax (0.00084, 0.225) but a moderately negative association with EcG in post-e-tax (–0.00226, 0.062) at 10% level. The study finds no association between first difference of CIT in pre- and post-e-tax. The coefficient of first difference of PPT in pre-e-tax is insignificantly positive (0.00012, 0.130) but significantly

Table 8a

Regression Results for with DV

D.EcG	Pre-e-tax (column A)				Post-e-tax (column B)			
	ARDL (1,1,0,1,1,0,0,0) Regression Results				ARDL (1,1,0,1,1,1,1,1) Regression Results			
	Coef.	Std. Err.	t	p	Coef.	Std. Err.	t	P
Adj								
EcG								
L1.	–0.61688	0.15888	–3.88	0.008	–1.47992	0.27032	–5.47	0.003
LR								
VAT	–0.00373	0.00199	–1.87	0.110	–0.00046	0.00024	–1.90	0.116
CIT	0.00044	0.00019	2.32	0.060	0.00015	0.00012	1.30	0.252
PPT	–0.00023	0.00009	–2.62	0.040	–0.00009	0.00008	–1.16	0.299
ETF	0.00284	0.00090	3.14	0.020	0.00038	0.00035	1.10	0.323
CGT	–0.00402	0.00317	–1.27	0.251	–0.00009	0.00044	–0.21	0.845
SD	0.05811	0.02521	2.30	0.061	0.00593	0.00223	2.65	0.045
DV	0.00434	0.00316	1.37	0.219	0.00474	0.00166	2.86	0.035
SR								
VAT								
D1.	0.00084	0.00062	1.35	0.225	–0.00226	0.00094	–2.40	0.062
CIT								
D1								
PPT								
D1	0.00012	0.00007	1.75	0.130	0.00082	0.00023	3.56	0.016
ETF								
D1.	–0.00089	0.00019	–4.79	0.003	–0.00202	0.00030	–6.70	0.001
CGT								
D1.					–0.00231	0.00063	–3.67	0.014
SD								
D1					–0.00911	0.00336	–2.71	0.042
DV								
D1					–0.00266	0.00254	–1.05	0.342
_cons	10.5156	2.58959	4.06	0.007	17.5183	4.54276	5.44	0.003
	R^2 = 0.9600; Adj.R^2 = 0.8866 Root MSE = 0.0243				R^2 = 0.9809; Adj.R^2 = 0.9273 Root MSE = 0.0258			

positive (0.00082, 0.016) at 5% level in post-e-tax. ETF first difference recorded a strong inverse association with EcG in both pre- (–0.00089, 0.003) and post-e-tax (–0.00202, 0.001) at 1% level. There are no first difference association between CGT, SD, and DV and EcG in pre-e-tax. But in post-e-tax, first difference of CGT (–0.00231, 0.014) and SD (–0.00911, 0.042) coefficient has a strong inverse relation with EcG at 5% level while DV has insignificant negative bearings with EcG (–0.00266, 0.342).

6. Discussion

The study's emphasis is to explore how pre-e-tax revenue and post-e-tax revenue influence on EcG. That is the process whereby the country's real national and per capita income increases over a long period of time. Firstly, the model

is well fitted given the diagnosis checks and post estimations sturdiness. In this study, where there is an economic shock, post-e-taxes adjust faster than in pre-e-tax.

In the long run, the association between VAT and EcG in pre- and post-e-tax did not support the study's expected significant relationship. The result support Denis [30] that reported VAT is not an effective revenue earner for boosting EcG. In the short-run, post-e-tax VAT coefficient depicts that increase in VAT will moderately decrease EcG. The negative associations suggest that an increase in VAT revenue will retard EcG in both pre- and post-e-tax in the long-run, and post-e-tax in the short-run which support the argument that VAT leads to an economy's real sector collapse as it probably causes increase in prices of vatable goods and services Awa [29].

Table 8b

Regression results for without DV

D.EcG	Pre-e-tax (column C)				Post-e-tax (column D)			
	ARDL (1,0,0,1,1,0,0) Regression Results				ARDL (1,0,1,1,1,1,0) Regression Results			
	Coef.	Std. Err.	t	p	Coef.	Std. Err.	t	P
Adj								
EcG								
L1.	–0.63991	0.15342	–4.17	0.003	–1.20505	0.26180	–4.60	0.002
LR								
VAT	–0.00190	0.00121	–1.57	0.155	0.00013	0.00018	0.75	0.473
CIT	0.00042	0.00016	2.56	0.034	0.00026	0.00016	1.74	0.121
PPT	–0.00028	0.00008	–3.48	0.008	6.35e-06	0.00007	0.09	0.929
ETF	0.00284	0.00087	3.28	0.011	0.00099	0.00053	1.85	0.102
CGT	–0.00206	0.00289	–0.71	0.497	0.00039	0.00063	0.61	0.556
SD	0.05834	0.02084	2.80	0.023	–0.00058	0.00052	–1.12	0.297
SR								
CIT								
D1.					–0.00018	0.00015	–1.20	0.263
PPT								
D1.	0.00010	0.00007	1.44	0.187	0.00021	0.00011	1.90	0.094
ETF								
D1.	–0.00090	0.00019	–4.70	0.002	–0.00111	0.00027	–4.10	0.003
CGT								
D1.					–0.00088	0.00053	–1.67	0.134
_cons	10.73142	2.50496	4.28	0.003	19.88045	4.35419	4.57	0.002
	R^2 = 0.9420; Adj.R^2 = 0.8767 Root MSE = 0.0253				R^2 = 0.9545; Adj.R^2 = 0.8919 Root MSE = 0.0315			

The result fails to support earlier studies that show VAT have weak positive impact on EcG. Chigbu & Njoku [43], strong positive impact on EcG (Unegbu & Iretin [31] Izedonmi & Okunbor [32], Nasiru et al. [33], Asaolu et al. [34], Bingilar & Preye [35]), and strong negative influence on EcG Gunter et al. [28].

The result shows that in the long r un, an increase (decrease) in CIT revenue will attract increase (decrease) in EcG. The CIT revenue positive influence on EcG is weak in pre-e-tax but insignificant in post-e-tax. However, CIT revenue has no impact on EcG in pre- and post-e-tax in the short-run.

The results neither support earlier reported strong positive association between CIT and EcG see Awa [29] and Osho et al. [42], nor inverse relationship between CIT and EcG Asaolu et al. [34]. Only the pre-e-tax result in the long-run supports Chigbu & Njoku [43] that found weak positive influence of CIT on EcG. The result suggests that in the long-run, CIT revenue weakly attracts EcG in pre-e-tax but trivially attracts EcG in post-e-tax.

In both pre- and post-e-tax in the long-run, an increase (decreases) in PPT revenue causes decrease (increase) in EcG. The long-run, result fails to corroborate earlier studies that reported that PPT have strong positive impact on EcG (Awa [29], Asaolu et al. [34]) nor weak positive influence of PPT on EcG Chigbu & Njoku [43]. The insignificant negative bearing between PPT revenue and EcG in post-e-tax in the long-run is supported by Ideh [41] that show similar result. In the short-run, post-e-tax PPT revenue significant positive impact on EcG supports Awa [29] and Asaolu et al [34] that recorded comparable result. The results suggests that in post-e-tax, increasing PPT may likely better EcG in the short-run but worsen it in the long-run. Furthermore, the strength of negative impact is strong in pre-e-tax but insignificant in post-e-tax.

In the long-run, an increase in ETF revenue has a strong inclination to increase EcG in pre-e-tax but will insignificantly increase EcG in post-e-tax. In the short-run, increase in ETF revenue in pre- and post-e-tax strongly cause EcG to fall. The pre-e-tax ETF revenue impact on EcG

in the long-run support earlier studies that recorded significant positive association between ETF and EcG (Nagbi & Micah [37] and Inyiama & Nwankwo [39]).

However, the strong negative association between ETF and EcG in the short run in this study did not support similar reviewed studies. The result depicts that in the long-run, ETF revenue significantly and insignificantly enhance EcG in pre- and post-e-tax, respectively. While in the short-run, ETF is not healthy to EcG in pre- and post-e-tax.

The result shows that in the long-run, increasing CGT revenue insignificantly weakens EcG in pre- and post-e-tax and did not support study's expectation of significant impacts. In the short-run, CGT revenue has no impact on EcG in pre-e-tax but an increase(decrease) in CGT revenue will significantly decrease (increase) EcG. The results fail to support Omesi & Akpeekon [36] that shows that CGT has a strong positive influence on EcG, nor Kumai [44] that shows CGT has insignificant positive association with EcG. The result suggests that in post-e-tax increasing CGT revenue insignificantly and significantly decreases EcG in the long-run and short-run, respectively.

The result of the long-run relationship shows that increase in SD revenue will moderately boost EcG in pre- and post-e-tax. In the short-run, SD revenue has no impact on EcG but shows that an increase in SD revenue will moderately cause a drop in EcG. While the long-run results contradict the notion that SD is universally recognized as one of the most inefficient and harmful taxes, and which is a barrier to economic growth see Fiona [46], the post-e-tax result in the short-run corroborated the notion. Thus, SD revenue moderately boost EcG in the long-run but retards EcG in post-e-tax in the short-run.

7. Conclusion

The researcher suggests expanding the VAT base to possibly increase VAT revenue and EcG rather than increasing VAT rate. Given the weak positive association between CIT and EcG in post-e-tax, the study recommends stimuli for attracting

unlisted firms to be listed and to discourage tax avoidance and evasion.

This study's result shows a decrease from a strong negative association in pre-e-tax to an insignificant negative impact in post-e-tax. Probably, with some efforts to minimize PPT tax avoidance and evasion, and strengthening tax administration, PPT may reverse to positively influence EcG in post-e-tax, all things being equal. Since ETF is assessed alongside with CIT and PPT, perhaps, incentives for attracting unlisted firms to be listed and discouraging tax avoidance and evasion by listed firms that pay CIT and PPT will enhance ETF revenue positively on EcG.

The study's result suggests CGT revenue does not significantly support EcG in Nigeria. Perhaps, a reduction in CGT rate will probably better EcG. In view, the result suggests that SD base and rate may be increased to support EcG. This is with caution since a high tax rate coupled with weak tax administration will lead to widespread tax evasion through under declaration and tax avoidance. To optimize the relationship between tax structure and EcG, tax evasion, corruption, and tax avoidance should be checked. On the other hand, government should be transparent on the management use of collected revenue.

References

1. Angahar P.A., Alfred S.I. Personal income tax administration in Nigeria. Challenges and prospects for increased revenue generation from self-employed persons in the society. *Global Business and Economics Research Journal*. 2012;1(1):1–11.

2. Chiamaka E.O., Obinna P.N., Friday N.E., Oraekwuotu C.N. Electronic tax system and internally generated revenue in the Nigerian emerging economy: The study of Ebonyi State Board of internal revenue. *International Journal of Academic Research in Accounting, Finance and Management Sciences*. 2021;11(2):123–149. https:// doi.org/10.6007/IJARAFMS/v11-i2/10312

3. Keho Y. The structure of taxes and economic growth in Cote d'Ivoire: An econometric investigation *Journal of Research in Economics and International Finance*. 2013;2(3):39–48.

4. Jalata D.M. Value added tax as a tool for national development in Ethiopia. *Research Journal of Finance and Accounting*. 2014;15(5):184–190.

5. Okoli M.N., Njoku C.O., Kaka G.N. Taxation and economic growth in Nigeria; A Granger causality approach. *International Journal of Research in Management, Science & Technology*. 2014;2(3):64–80.

6. Ugwunta O.D, Ugwuanyi U.B. Effect of distortionary and non-distortionary taxes on economic growth: Evidence from sub-Saharan African countries. *Journal of Accounting and Taxation*. 2015;7(6):106–112. https://doi.org/10.5897/JAT2015.0175

7. Ugochukwu M.J., Azubike J.U.B. Value added tax and economic development in Nigeria. *European Centrs for Research, Training and Development*. 2016;4(3):1–10.

8. Ali A.A., Dalmar M.S., Ali A.Y.S. The impact of tax revenue on economic growth: A time series evidence from Kenya. *Academic Research International*. 2018;9(3):163–170.

9. Egbunike F.C., Emudainohwo O.B., Gunardi A. Tax revenue and economic growth: A study of Nogeria and Ghana. *Signifikan: Jurnal Ilmu Ekonomi*. 2018;7(2):213–220. https://doi. org/10.15408/sjie.v7i2.7341

10. Edame G.E., Okoi W.W. The impact of taxation on investment and economic development in Nigeria. *Academic Journal of Interdisciplinary Studies*. 2014;3(4):209–218. https:// doi.org/10.5901/ajis.2014.v3n4p209

11. Delessa D. Tax reforms and tax revenues performance in Ethiopia. *Journal of Economics and Sustainable Development*. 2014;13(5):11–19.

12. Jens A., Brys B., Heady C., Johansson Å., Schwellnus C., Vartia L. Tax policy for economic recovery and growth. *The Economic Journal*. 2011;121(550):59–80. https://doi.org/10.1111/ j.1468-0297.2010.02415.x

13. Hungerford T.L. *Taxes and the economy: An economic analysis of the top tax rates since 1945*. December 12, 2012, pp. 1–22. Available at: https://sgp.fas.org/crs/misc/R42729.pdf

14. Wasao D. The effect of online tax system on tax compliance among small taxpayers in east of Nairobi tax district in Kenya: Unplished dissertation submitted in partial fulfillment of the requirements for the award of the degree of Master of Science (M.Sc) in finance department of university of Nairobi, Kenya; 2014.

15. Oseni M. Sustenance of tax administration by information and communication technology in Nigeria. *Archives of Business Research*. 2015;4(1):47–54. https://doi.org/10.14738/abr.41.1734

16. Ofurun C.N., Amaefule L.I., Okonya B.E., Amaefule H.C. Impact of e-taxation on Nigeria's revenue and economic growth: A pre-post analysis. *International Journal of Finance and Accounting*. 2018;7(2):19–26. https://doi.org/10.5923/j.ijfa.20180702.01

17. Oketa E.C., Nwamgbebu P.O., Nkwede E.F., Chikaodili N.O. Electronic tax system and internally generated revenue in the Nigerian emerging economy: The study of Ebonyi State Board of Internal Revenue. *International Journal of Academic Research in Accounting, Finance and Management Sciences*. 2021;11(2):123–149. https://doi.org/10.6007/IJARAFMS /v11-i2/10312

18. Olaoye C.O., Atilola O.O. Effect of e-tax payment on revenue generation in Nigeria. *A Journal of Accounting, Business and Finance Research*. 2018;4(2):56–65. https://doi.org/10.20448/2002.42.56.65

19. Harrod R.F. An essay in dynamic theory. *The Economic Journal*. 1939;49(139):14–33. https://doi.org/10.2307/2225181

20. Domar E.D. Capital expansion, rate of growth, and employment. *American Economic Review*. 1946;14(2):343–355. https://doi.org/10.2307/1905364

21. Solow R.M. A contribution to the theory of economic growth. *Quarterly Journal of Economics*. 1956;70(1):65–94. https://doi.org/10.2307/1884513

22. Swan T.W. Economic growth and capital accumulation. *Economic Record*. 1956;32(63):334–361. https://doi.org/10.1111/j.1475-4932.1956.tb00434.x

23. Davis F.D. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*. 1989;13(3):319–340. https://doi.org/10.2307/249008

24. Nguyen A.D.M., Onnis L., Rossi R The macroeconomic effects of income and consumption tax changes. *American Economic Journal: Economic Policy*. 2021;13(2):439–466. https://doi.org/10.1257/pol.20170241

25. Cloyne J., Dimsdale N., Postel-Vinay N. Taxes and growth: new narrative evidence from interwar Britain. NBER Working Papers 24659, National Bureau of Economic Research; 2018. https://doi.org/10.3386/w24659

26. Ljungqvist A., Smolyansky M. To cut or not to cut? On the impact of corporate taxes on employment and income. 2018. https://doi.org/10.2139/ssrn.2536677

27. Mertens K., Olea J.M. Marginal tax rates and income: new time series evidence. *The Quarterly Journal of Economics*. 2018;133(4):1803–1884. https://doi.org/10.1093/qje/qjy008

28. Gunter S., Riera-Cricht D., Vegh C., Vuletin G. Non-linear effects of tax changes on output: The role of the initial level of taxation. *National Bureau of Economic Research Working Paper* No. 26570. 2019. Available at: http://hdl.handle.net/10986/30990

29. Awa F.N. Relevance of tax revenue and economic growth in Nigeria (2008-2018). *European Journal of Accounting, Auditing and Finance Research*. 2020;8(4):112–120. https://doi.org/10.37745/ejaafr/vol8.no4.pp112-120.2020

30. Denis B. Investigating the relationship between VAT and GDP in Nigerian economy. *Journal of Management and Corporate Governance*. 2010;2:65–72.

31. Unegbu A.O., Iretin D. Impact of VAT on economic development of emerging nations. *Journal of Economic and International Finance*. 2011;3(8):492–503. https://doi.org/10.5897/JEIF.9000061

32. Izedonmi F.I.O., Okunbor J.A. The roles of value added tax in the economic growth of Nigeria. *British Journal of Economics, Management &Trade*. 2014;4(12):1999–2007. https://doi.org/10.9734/BJEMT/2014/11013

33. Nasiru M.G., Haruna M.A., Abdullahi M.A. Evaluating the impact of value added tax on the economic growth of Nigeria. *Journal of Accounting and Taxation*. 2016;8(16):59–65. https://doi.org/10.5897/JAT2016.0226

34. Asaolu T.O., Olabisi T.O., Akinbode S.O., Alebrosu O.N. Tax revenue and economic growth in Nigeria. *Scholedge International Journal of Management*. 2018;5(7):72–85. https://doi.org/10.19085/journal.sijmd050701

35. Bingilar P.F., Preye E.G. Impact of value added tax on economic growth in Nigeria: Evidence from 2009-2018. *Journal of Business and African Economy*. 2020;6(1):30–44.

36. Omesi I., Akpeekon B. Effect of capital gains tax on economic growth and development in Nigeria (2011-2016). *Research Journal of Finance and Accounting*. 2019;10(17):32–37. https://doi.org/10.7176/RJFA

37. Nagbi Z., Micah L. Tertiary education trust fund and development of higher institutions in Nigeria. *International Journal of Innovative Finance and Economic Research.* 2019:7(2):10–23.

38. Ordu P.A., Nkwoji N.O. Impact of education tax on economic development in Nigeria. *International Journal of Innovative Development and Policy Studies*. 2019;7(3):1–17.

39. Inyiama O.I., Nwankwo C.N. Effect of corporate and tertiary education tax on Nigeria economic growth. *Account and Management Journal*. 2016;1(7):415–425. https://doi.org/10.18535/AFMJ/V1I7.02

40. Onwuka O.O., Orji U.O. Stamp duty, revenue generation and economic growth in Nigeria. *Journal of Accounting and Financial Management*. 2021;7(3):82–97.

41. Ideh A.O. Tax revenue and economic development of the Nigerian Economy. *Nigerian Journal of Management Sciences*. 2019;7(1):222–231.

42. Osho A.E., Omotayo A.D., Ayorinde F.M. Impact of company income tax on gross domestic products in Nigeria. *Research Journal of Finance and Accounting*. 2018;9(24):105–115.

43. Chigbu E.E., Njoku C.O. Taxation and the Nigerian economy: (1994-2012). Management Studies and Economic Systems (MSES)/ 2015;2(2):111–128. https://doi.org/10.12816/0019397

44. Kumai N.S. Effects of capital gain tax on total revenue and economic growth in Nigeria. *International Journal of Advanced Academic Research*. 2020;6(4):107–121.

45. Pesaran M.H., Shin Y., Smith R.J. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*. 2001;16:289–326. https://doi.org/10.1002/jae.616

46. Fiona B. Abolishing stamp duty would grow the economy. 2015. Available at: https://www.propertycouncil.com.au/Web/Content/Media_Release/National/2015/Abolishing_stamp_duty_would_grow_the_economy.aspx

Information about the authors

Ochuko Benedict Emudainohwo – PhD (Accountancy), Senior Lecturer, Department of Accounting, Faculty of Management Sciences, Delta State University (P.M.B. 1, Abraka, Delta State, Nigeria); ORCID: https://orcid.org/0000-0002-3085-2090; e-mail: ochuko.bemudainohwo@gmail.com

Okolo Marvis Ndu – PhD (Accountancy), Lecturer II, Department of Accounting, Faculty of Management Sciences, Delta State University (P.M.B. 1, Abraka, Delta State, Nigeria); ORCID: https://orcid.org/0000-0002-4035-1070; e-mail: marvisokolo@yahoo.com

For citation

Article info

Информация об авторах

Эмудайнохво Очуко Бенедикт – PhD (бухгалтерский учет), старший преподаватель кафедры бухгалтерского учета, факультет управленческих наук, Государственный университет Дельта (P.M.B. 1, Abraka, Delta State, Nigeria); ORCID: https://orcid.org/0000-0002-3085-2090; e-mail: ochuko.bemudainohwo@gmail.com

Нду Около Марвис – PhD (бухгалтерский учет), преподаватель кафедры бухгалтерского учета, факультет управленческих наук, Государственный университет Дельта (P.M.B. 1, Abraka, Delta State, Nigeria); ORCID: https://orcid.org/0000-0002-4035-1070; e-mail: marvisokolo@yahoo.com

Для цитирования

Информация о статье