

Review Article

Analysis of the Causal Relationship between Electronic Tax System, Tax Revenue and Economic Growth in Nigeria

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Abstract: The current research documents the link between economic growth, electronic tax system and the trend of revenue components from education tax and value added tax. Based on the *ex-post facto* design, secondary data were therefore gathered and analysed given the study's specified hypotheses and models. Statistical tools adopted include the descriptive statistics, co-integration test and the least square regression. Empirical evidence from our results indicates that the introduction and adoption of electronic system in the collection and payment of value added and tertiary education tax jointly impacts significantly on Nigeria's GDP. Additionally, a long-run causal relationship was found to have existed between GDP, value added tax and tertiary education tax. With the result of the normalized co-integrating coefficient, our argument is that a 1% change in revenue generated from VAT will possibly trigger GDP upward by about 0.56%. Based on the above outcomes, we recommend amongst others that the decision of Nigeria's regulatory agencies and relevant tax authorities on the deployment of the e-tax system should be sustained.

Keywords: Value Added Tax, Taxation, Nigeria, Finance Act 2019, Government Revenue, Gross Domestic Product

INTRODUCTION

Taxation has remained one, among other revenue sources for governments across the globe. Specifically, tax is an authoritative and mandatory financial levy on taxpayers (Lin & Jia, 2019; Jeroh, 2019), employed by governments to stimulate and foster economic, social, infrastructural and other developmental strides (Feger & Asafu-Adjaye, 2014; Fricke & Süßmuth, 2014; Olurankinse, & Oladeji, 2018; Olayungbo & Olayemi, 2018; Theobald, 2018; Lin & Jia, 2019; Ebiaghan, Jeroh & Ideh, 2021). According to the FMoF (2012), taxation refers to financial charges by governments on the income, or revenue from sales and/or gains on disposal of persons, entities, chargeable assets, transactions or properties. Available means of collecting various forms of taxes could either be direct or indirect (Shaari, Ali & Ismail, 2015). Direct taxes according to Aguolu (2004) are levied by governments through appropriate authorities on the income of individuals, businesses/firms and are required by law, to be directly borne by such person(s)/firm(s) on whom they have been compulsorily and legally levied. This is not the case for indirect taxes whose burden is borne by the final consumers of products/services rather than the tax payers (Omesì & Nzor, 2015). This paper however focused on one direct tax (education tax) and one indirect tax (valued added tax); and the study's primary goal is to empirically assess the presumed causal relationship subsisting between and among the revenue component from education tax and Valued Added Tax (VAT) and their linkage with the level of economic growth in Nigeria especially before and after the era of electronic tax system.

Noteworthy, this study is empirical in nature and adopts relevant quantitative tools like the descriptive statistics, unit root tests (ADF and Phillips-Perron tests), co-integration test and Least Square Regression (LSR) technique. Insights from the findings that emanated from the study's analytical procedure are relevant to tax practitioners, regulatory personnel and tax consultants, policy makers and management personnel in the budget offices at the federal and state levels, researchers in the area of accounting, economics and related disciplines within and outside Nigeria.

In addition to the introduction and the concluding section of this paper, this research report consists majorly of four (4) other sections – the problem statement, the literature review and theoretical underpinnings, methodology and results/findings.

Problem Statement

In Nigeria, value added tax and education tax were introduced by the federal government in 1993; but due to some delays in implementation, the enforcement of education tax commenced around 1995.

Notwithstanding, prior studies (Ismail, Rihan & Nsouli, 2014; Ogidiaka & Igwe, 2016) have pointed that prospective value added tax (VAT) payers includes suppliers, manufacturers/producers, importers, and wholesalers of taxable goods and/or services who by the decree No 102 of 1993 were required to register expressly with the Federal Inland Revenue Services (FIRS).

Worth mentioning, countries within Africa and beyond have introduced VAT, education tax and other forms of tax as revenue sources for their respective governments (Pavliková, Bánociová, & Jakubíková, 2014; Yang, 2016; Zou, Shen & Gong, 2019). It is believed that economic growth amongst countries have direct and/or indirect link with the amount of revenue generated from VAT, education tax and other forms of tax (Keen & Mintz, 2004; Feger & Asafu-Adjaye, 2014; Fricke & Stüssmuth, 2014; Hajdúchová, Sedláčiková & Viszlai, 2015; Alizadeh & Motallabi, 2016; Hoseini & Briand, 2020). In this light, Jalata (2014) reported that Ethiopia introduced VAT in 2003 with a principal rate of 15% and has attracted growth of over 66.27%. In the Nigerian context, VAT was initially charged at a rate of 5%. However, by the year 2010, the federal government attempted increasing VAT to 10%; an action that was perceived by taxpayers as horror-struck. Again, apart from some exempted items, the Finance Act of 2019 signed into law in 2020 recently pegged the VAT rate for all consumables in Nigeria at 7.5% (Jeroh, 2019). The remittances according to the new Act (Finance Act) are made on cash basis instead of accrual basis; and further provides for stiffer punishments for tax crimes and offenders.

According to Usman and Adegbite (2015), efforts by governments to increase VAT rate in any country often stirs public attention since despite a presumably increase in government revenue strings, any rise in the rate of VAT or other forms of taxes may possibly have a bad effect on aggregate consumption and by extension, a seemingly decline in economic growth. This possibly may have accounted for why experts (Iheduru & Ajaero, 2018) had argued that revenues obtained through taxation over the years may not have made momentous contributions to the total overhaul of Nigeria's economy. With the recent perk in VAT rate from 5% to 7.5%, the expectation in line with the arguments of Usman and Adegbite (2015) and Jeroh (2019) is that Nigeria's economy would experience meaningful growth.

Undoubtedly, tax rates vary across countries and have either experienced increase or decrease over time. While studies have suggested that tax cut or reduction in tax rates has the capability of stimulating growth through expanded tax base leading to an increase in tax revenue (Lin & Jia, 2019), a body of knowledge also pointed that an increase in VAT and education tax unaccompanied by additional reforms on social/safety

plans would culminate into welfare loss (Ghiaie, Auclair & Ntsama, 2019). Despite this viewpoint on the idea of increasing VAT and education tax, some experts within Nigeria have cautiously advocated for and supported the increase in the rate of VAT since it may improve the economy, possibly because the budget of the Nigerian government has widened over time. Additionally, calls have been made for the need to migrate from the manual system of tax collection to an ICT driven tax collection system.

Noteworthy, Nor, Mohd, and Zariati (2010) discredited the manual system of tax filing because it is not only complex and monotonous, but paper-intensive and time-consuming both for the taxpayers and the relevant tax authorities. Arguing from the point of the Nigeria tax reforms, Oriakhi, and Ahuru (2014) opine that restructuring the FIRS was partly to make the task of tax collection in Nigeria to be ICT driven. This restructuring became eminent given the understanding that the existing manual structure was ineffective, chaotic and spurred high-powered indiscipline leading to fraud and huge lose in government tax revenue. Thus by 2015, the electronic tax system was introduced in Nigeria with the hope of improving tax collection and eliminating leakages and unethical tax-related practices in the country (Okunowo, 2015; Olaoye & Atilola, 2018). Since the concern of prior studies have not bothered on ascertaining the link between the adoption of the electronic tax system, revenue generation of government through tax and economic growth, this study therefore sets to fill the existing knowledge gap by empirically assessing the causal relationship between tax revenue from VAT and education tax, electronic system and economic growth in Nigeria. We therefore hypothesize as follows:

- ❖ H_{01} : there is no long run causal relationship between value added tax, tertiary education tax and economic growth in Nigeria
- ❖ H_{02} : the adoption of electronic tax system has no significant impact on economic growth

Literature Review and Conceptual Clarifications Electronic Taxation

Electronic taxation (hereinafter, e-tax) is a means of filing and paying tax(es) through technological means. E-tax system therefore refers to the practice of submitting tax documents to revenue service/authorities electronically, often without the need to acknowledge any form of paper documentation (Asaolu, Ayoola & Akinkoye, 2011; Wambesyo, 2017). According to Cobham (2010) e-tax started in the United States of America (USA) in 1986 as a little computer test program in which only five (5) tax-payers from Cincinnati, Raleigh Durham, and Phoenix agreed to participate. Since then, e-tax system has become a widespread channel for over 33 years, serving various tax payers across the globe with early adoption in countries like Australia - 1987, Canada - 1993, Taiwan - 1998, Slovenia - 2003, Japan - 2004, while Malaysia,

Netherlands, and Uganda, joined the system in 2005 (Umenweke & Ifediora, 2016). With the attendant positive attributes of the system, countries like Ireland followed suit in 2009, while Ethiopia and Egypt launched the e-tax system in 2012 and 2013 respectively (Umenweke & Ifediora, 2016).

Notably, technological improvement in the system of managing and generating revenue for governments has witnessed rapid transformation across the globe. Alade (2018) observed that the e-tax and e-filing system has many advantages over the manual filing system. Accordingly, the paperless or e-tax system presents a faster approach to taxation with lower associated costs and increased level of efficiency. PricewaterhouseCoopers (2010) suggests that with the reduction of human interaction (between tax payers and the relevant tax authorities), e-filing and its payment systems practically reduces problems associated with tax compliance and related costs.

In Nigeria, the desire to strengthen the society through an increased revenue base brought about the launching of the e-tax system in 2015 by the FIRS in conjunction with Nigeria inter-bank settlement System (NIBSS) (Okunowo, 2015; Ofurum, Amaefule, Okonya & Amaefule, 2018; Olaoye & Atilola, 2018). The e-tax system in Nigeria encompasses the deployment of several proven technological channels like e-registration, e-stamp duty, e-tax payment, e-receipt, e-filing and, electronic tax clearance certificates amongst others. Nchuchuwe and Ojo (2017) maintained that Nigeria's adoption of e-tax system was primarily motivated by its ability to significantly improve the procedures for tax collection in the country, while simultaneously minimizing and/or eradicating leakages in the revenue collection process through the reduction of other unethical practices.

Given the acclaimed advantages of the e-tax system and its deployment in Nigeria, and with the belief that government policies are geared towards producing a better society and improving the lives of the citizenry and the growth potentials of the entire economy, this study sets out to examine whether a significant statistical link exist between the deployment of e-tax system, the revenue generated from VAT and economic growth of the country.

Tax Revenue

Since this study focused specifically on value added tax (indirect tax) and education tax (direct tax); the conceptual overview under this section is narrowed down to discussions on both forms of tax and how they are used by government as a source of revenue generation.

Concept of Value Added Tax (VAT)

Nigeria's effort to increase the tax net with minimum resistance and also to reduce tax evasion so

that most of the tax income would get to the Nigerian government was paramount among the reasons for the introduction of VAT in 1993. VAT was practically launched to replace the defunct Sales Tax whose structure was perceived as being too narrow in terms of its coverage regarding taxable goods. By the launching of the new tax system (VAT), it was believed that Nigeria may possibly remain independent of any external force by averting all forms of borrowing from international bodies.

Olusegun (2018) adduced that VAT being a consumption tax, applies to the market value added to products/goods and materials at every production stage down to their respective distribution to the final consumers. Notwithstanding the above definition, under the Nigerian system of taxation, specific goods/items of transactions are identified as VAT exempt (Owolabi & Okwu, 2011; Jeroh, 2019). Such exempted items include exported goods, equity shares, medical products, basic food items, pharmaceutical products, veterinary medicines, children's (kiddies) products, books, other educational materials other than books, commercial vehicles and their respective spare parts, fertilizers and agricultural products, equipments for farming and transportation, newspapers, magazines amongst others.

VAT which is regarded as an indirect tax in Nigeria is collected and remitted to the Federal Government and the proceeds are usually distributed among the three (3) tiers of government, with the Federal Government receiving fifteen percent (15%) while the state and local governments receiving fifty percent (50%) and thirty-five percent (35%) respectively (Sani, 2011; Izedonmi & Okunbor, 2014; Omesì & Nzor, 2015).

As reported by Guage (2018), Nigeria has so far recorded drastic growth in VAT since 2015 because it has collected ₦767billion in 2015 and in 2016 it generated the sum of ₦828billion while in 2017, a total sum of about ₦972billion was realized; thus representing growth of approximately 25%.

Notwithstanding the growth in revenue generated through the imposition of VAT in Nigeria, empirical evidence suggests that the revenues generated from VAT are not enough to meet the expenditure limit of the Nigerian government; a situation that has led experts to advocate the need for an increase in VAT rate as compared to other countries whose rates range from 12.5% in Asia, to 13% in Oceania, 20% in Europe and 27% in Hungary (Okoli & Afolayan, 2015; Omesì & Nzor, 2015). Contrary to arguments for an increase in VAT rate, some stakeholders have expressed concerns on the need for government, through her regulatory authorities to bring into being, the required machinery that will facilitate the institution of modernized approaches to VAT collection while reducing loopholes and corrupt practices (Okonkwo & Afolayan, 2019)

since tax systems are originally not designed to serve individuals' personal interests, but to cure the ills of society as a whole (Abomaye-Nimenibo, Michael & Friday, 2018).

Concept of Education Tax (EDUTAX)

Education has widely been accepted as one major instrument that is germane to the promotion of socio-economic, political and cultural development of countries, Nigeria inclusive. On this note, prior literature has evinced that access to good and quality education remains crucial for every country (Etale, & Bariweni, 2019). This is premised on the fact that education has been described as the key to national development and the foundation that addresses critical issues like reduction of unemployment and the plummeting of poverty levels. Given the above, the federal government of Nigeria introduced education tax sometime in 1993; but was enforced in 1995 due to some delays.

Nonetheless, it is observed that although the Finance Act of 2019 appeared to be silent on matters concerning education tax (EDUTAX) in Nigeria, several amendments to EDUTAX over the years have not changed its rate of 2% chargeable on companies' assessable profit and treated as allowable expense (Sanni, 2019). In Nigeria, Education tax has no specific filing requirements. However, the tax is self-assessed and companies are mandated to obtain and fill the "Form 4D-EDT" which usually accompanies the filing of company income tax. EDUTAX is partly regulated by section 1(2) of the Tertiary Education Trust Fund (TETFUND) Act of 2011 which expressly states that companies engaged in any form of commercial activity, including real estate or real property transactions from which they make profit, are liable to pay two per cent (2%) of such profit as education tax to the designated Trust Fund (presently, TETFUND). Notably, non-resident firms and all unincorporated entities are exempted from this category of tax.

As expected, companies must pay the tax to the FIRS within 60 days upon the receipt of the notice of assessment; but where a company has an adjusted loss in a particular year, such company or group will not be liable to education tax in that year (Kwaji & Ishaya 2017). Where a company fails to make good, the payment of EDUTAX two months after the notice of assessment was served and received, such a company will be liable to a fine of 5% of the total tax due plus the total principal tax.

EDUTAX is collected on behalf of the TETFUND by the FIRS and is assessed by over 300 public tertiary institutions in the country and the pooled fund is respectively distributed in the ratio 2:1:1 between Universities, Colleges of Education and Polytechnics (Sanni, 2019). Through the establishment of TETFUND, the government has visibly intervened in

the prevailing chronic and abysmal state of funding through several construction projects in tertiary institutions across the country over time (Ekundayo & Ajayi, 2009; Anyaduba, Eragbhe & Modugu, 2012; Ugwuanyi, 2014). It is however believed that the transition to electronic methods of tax collection may possibly enhance the system of education tax administration in Nigeria, thereby increasing the revenue base of the country through EDUTAX.

Economic Growth Conceptualized

Economic growth describes a measure of aggregate economic advancement at a national level. It can be measured on the basis of a country's Gross Domestic Product (GDP) and other development indices. Edewusi, and Ajayi, (2019) maintained that governments across the globe must strive to continually increase the well-being of its people via the establishment of necessary economic plans and activities and in fulfilling these great objectives such as education, good road, sanitation, security, health-care and electricity facilities. Karimi, Kimani, and Kinyua (2017), argued that the deliberate improvements in the revenue collection and revenue base among countries is key to meeting the ever increasing financial obligation plaguing developing economies.

Accordingly, Abata (2014) explained that economic growth is visible in the general efforts of governments tailored at improving the economic welfare, infrastructures, and value of life of her citizenry through the creation of job opportunities, fostering of increased income generation and increase in the country's tax base. On the issue of increasing the revenue of countries through tax, Babatunde, Ibukun and Oyeyemi (2017) observed that the nagging question is whether the revenues from taxation within most African countries are actually growing in proportion of growth in their respective national incomes since the dispute on the effectiveness of taxes as a tool for promoting growth and development remains inconclusive.

Oyebisi, Oyedele, Oyeyemi, Ayodotun, and Adebola, (2017) posited that from 1994 to 2013, the trend of real GDP of Nigeria recorded a steady increase from ₦345.2billion to ₦950billion, and this is indicative of the fact that Nigeria's economy may possibly be experiencing steady growth during that period. After a careful analysis of the growth trend in the country, given the trend of tax revenue over time, Okonkwo and Afolayan (2019) reveals that the VAT revenue collections from 2010, 2011, 2012, 2013, 2014, 2015, to 2016 were ₦564.890 million, ₦659.160 million, ₦802.700million, ₦802.700, ₦803.000million, ₦767.300, and ₦828.200 million respectively. Despite the perceived growth in amounts, variations in the respective yearly sums generated through VAT are definitely not in tandem with the economic reality of the country when purchasing power is put into consideration. It is therefore necessary for studies to

unearth the nature and pattern of possible link between revenue from VAT and economic growth. This partly justifies the current study.

Theoretical Background

This study is hinged on the theory of the technological acceptance model since it addresses the way people react to the adoption and/or acceptance of a technological innovation and forms a fulcrum for the assessment of tax-payers' perception and attitudes towards online tax filing which has been identified as one of the major drivers of the acceptance of an innovation in the area of adopting technology in tax administration.

Technology Acceptance Model (TAM)

Davis (1989) developed the Technology Acceptance Model popularly known as TAM. Adding to the reasons why technology should be embraced, Kamarulzaman, and Che-Azmi (2010) advocated for a framework that incorporates the significant effect of performance risk, which assumes a significant perceived risk facet. Unlike the view of Karimi, *et al.*, (2017) new technologies such as personal computers are multifaceted and constitute themselves as elements of vagueness in the minds of decision makers with respect to their successful adoption and people form attitudes and intentions towards their acceptance. TAM has two theoretical postulations which are the fundamental determinant of a technology system use and predicts attitudes towards the use of such system.

The postulations of TAM are perceived usefulness (PU) and perceived ease of use (PEOU). As documented in the works of Avci-Yucel, and Gulbahar (2013), PEOU and PU are the predictors of the extent of acceptance of information technology. They offer deeper insights and clarifications on stakeholders' reaction towards the adoption and usage of identified technologies. Olusola and Abiola (2017) avers that TAM provides a succinct basis for understanding the impact which external variables may have on the internal beliefs, or attitudes/intentions of individuals.

In this study however, we agreed that taxation in developing economies just as it were in the developed countries is masked with new challenges and new possibilities owing to technological adjustments. Based on this assertion, our theoretical anchorage is based on the TAM since the perception and attitude towards online tax filing has been identified as one of the major drivers of the acceptance of an innovation in the area of adopting technology in tax administration (Mandola, 2013). This is in line with the arguments of Odusola (2006) who earlier called for the re-assessment of the tax system of the country with the hope of providing a better atmosphere for technological advancement and improvement in tax administration in the industry and country as a whole.

Further Empirical Review

Alake and Olatunji (2012) conducted an empirical investigation to ascertain the likely impact which e-tax may have on the duo of tax avoidance and evasion in the Nigerian context. The study relied on primary data and responses were obtained from the targeted respondents and same were analysed accordingly and the study's hypothesis was thereafter tested. The outcome of the study led to the rejection of the formulated null hypothesis. Consequently, the alternate hypothesis was accepted, thus implying that e-tax significantly impacts on both tax evasion and tax avoidance practices in the country. In line with the findings and decision, it was however recommended that e-tax should be embraced in the process of tax administration in Nigeria.

In the Ugandan context, Wambesyo (2017) evaluated the efficacy of electronic tax (e-tax) system on tax administration. Primary data were therefore garnered through a structured Likert-scale questionnaire that was designed and administered to the study's sample that was purposively selected for the purpose of eliciting responses on the link between e-tax and tax administration in Uganda. Analysis was done using relevant statistical/inferential techniques and findings reveals that challenges facing the full deployment of E-Tax system in Uganda include poor record keeping by Ugandan firms, high cost of compliance and poor internet/connectivity speed of internet. Additionally, it was observed that while the e-tax system has not been fully implemented across the entire country, members of the public (tax payers) have not been properly educated on general tax matters like exemptions, and the processes of tax administration, or how assessment is done by officials of the Uganda Revenue Authority (URA). It was thus recommended that the tax authority (URA) should roll out measures that will facilitate the nationwide implementation of the e-tax system in the country, while conscious efforts should be directed at educating the general masses/tax payers on matters relating to tax and tax procedures.

Nchuchuwe and Ojo (2017) examined how the Lagos state government in Nigeria deployed new Information Technology (IT) devices to create revenue by effectively blocking revenue leakages. By relying on the survey method, self-structured questionnaire was specifically designed and distributed to the study's participants in a bid to eliciting primary data for the study. The study employed the descriptive statistics to analyse responses from the respondents, while the study's hypothesis was tested with the help of Chi-Square statistical tool. Findings indicate that despite the gigantic investments by the state government on IT tools in the area of tax administration, little progress was recorded. The study attributed the lacuna to infrastructural gap, power failure, digital divide, low ICT literacy level, attendant theft, intentional destruction of ICT equipment, poor enlightenment

amongst others. The study thus concluded that in spite of the desperate need to implement e-taxation in Lagos State, it has not significantly enhanced the expected level of revenue generation. There was therefore the need for the State Government to partner with relevant software developers and facilitate the ease of tax payments through the proper deployment of ICT tools.

Supporting the idea that tax system differs across countries and depends largely on several factors, Stoilova (2017) examined the link between the structure of tax systems and economic growth by analyzing empirical evidence from 28 member states of the European Union. Specifically, economic data were obtained from a cross section of country level data between 1996–2013. Descriptive analysis was conducted to understand the perceived cross-country differences in tax structure and the trend of tax burden. Additionally, inferential statistical tools were deployed to analyse the pooled panel data in a bid to ascertain the impact which tax structure may possibly have on economic growth across the 28-member states. From the results obtained, the study concludes that some variants of consumption taxes, property and income (personal income) taxes were found to be more significant in engineering economic growth among the sampled states.

In a study by Olusegun (2018), the implication which revenue generated through VAT may have on Nigeria's economy was consciously examined. A trend analysis was however conducted along with the bivariate correlation of data on VAT revenue against the country's GDP data for relevant years. Results indicate that though government revenue from VAT was found to be highly and positively correlated with GDP, the same was not the case with revenue from VAT against Total Federally Collected (TFC) revenue. This could perhaps be due to the minuteness of revenue from VAT relative to TFC. It was also observed that greater amount of revenue would have been generated through VAT, but bedeviled by laxity in tax administration, corruption on the part of tax officers and taxpayers. Based on the study's outcome, recommendation was that Government should strive harder in overhauling the VAT law, retraining of tax officers, re-evaluation of the database of tax agents and the reactivation of tax enforcement mechanism.

Sun, Zhan and Du (2020), examined whether VAT incentives for new energy companies have the capacity of increasing overall firm profitability levels. Financial data were therefore obtained from listed companies in China from 2004 – 2012. The *DID* approach was adopted in the process of data analysis since the entire sample period was categorized into two periods – period before and after the granting of VAT incentives. Analysis was done on 1317 observations drawn from four (4) categories of enterprises in China. Several relevant analysis/tests that were conducted include the

descriptive analysis, *PSM-DID* robustness test, Placebo tests, fixed effect amongst others. Findings show that the policy on tax incentives is constrained by time lag. Also, the dynamic effect which the policy had varies considerably over time and across the categories of the sampled companies.

METHODS

Since ex-post facto research determines the cause-effect relationship among variables, it was considered appropriate and was adopted in the course of this study. Thus, secondary data were collated from relevant sources like Federal Inland Revenue Service (FIRS), Central Bank of Nigeria Statistical bulletin, National Bureau of Statistics, and Quarterly Economic Reports. Aside the data on GDP, efforts were made to collate aggregate data on Value added tax (VAT) and Education Tax (EDUTAX) throughout the study period and broken down into Pre and Post electronic tax era. The pre e-tax period spanned from the second quarter of 2011 to the third quarter of 2015 (2011Q2-2015Q3) while the post e-tax period spanned from the fourth quarter of 2015 to the first quarter of 2020 (2015Q4-2020Q1). In total, the study covered approximately nine (9) years. The choice of using 2015Q4 as our base year for post e-tax era was because; e-tax was an initiative of Babatunde Fowler the erstwhile chairman of FIRS in Nigeria who was appointed August 2015 and commenced the implementation of e-tax during the fourth quarter of 2015. Economic growth serves as the independent variable and GDP was adopted as its proxy.

Specifically, the model is adapted from the research of Ogidiaka and Igwe (2016) as;

$$FGR = \beta_0 + \beta_1 VAT + \beta_2 CIT + \varepsilon \quad (1)$$

Modified to suit our study as thus;

$$RGDP = \beta_0 + \beta_1 VAT + \beta_2 EDUTAX + \varepsilon \quad (2)$$

RESULTS AND DISCUSSION

Table 1 reports the descriptive statistics of all variables across the observations used in the study. Impliedly, Table 1 reports the results of the summary statistics for the full sample (2011Q2-2020Q1), across the periods; pre Tax periods (2011Q2-2015Q3) and post tax periods (2015Q4-2020Q1). Results from Panel A and B in table 1 indicate that the mean value added tax for the entire period is 5.381 percent (=N=224.939 billion). Before the emergence of electronic VAT, the mean value for the period was 5.182 percent (=N=182.394 billion) and during the emergence of electronic VAT, the mean recorded for the period was 5.582 percent (=N=268.356 billion). This trend shows that more VAT was recorded and collected with the introduction of electronic technology in the collection and computation of VAT. This result is similar to the empirical study of Dang (2013) and Wambesyo (2017). The trend in EDUTAX is similar to that of VAT.

Table 1: Summary of Descriptive Statistics

	<i>All sample periods</i>			<i>Pre e-Tax period (2011Q2-2015Q3)</i>			<i>e-Tax period (2015Q4-2020Q1)</i>		
Panel A: With Log									
	<i>VAT</i>	<i>EDUTAX</i>	<i>GDP</i>	<i>VAT</i>	<i>EDUTAX</i>	<i>GDP</i>	<i>VAT</i>	<i>EDUTAX</i>	<i>GDP</i>
<i>Mean</i>	5.381	3.626	16.637	5.182	3.497	16.582	5.582	3.829	16.682
<i>Maximum</i>	5.786	5.885	16.879	5.406	5.512	16.735	5.838	5.885	16.879
<i>Minimum</i>	4.174	1.976	16.437	4.174	1.976	16.437	5.287	1.978	16.451
<i>Std. Dev.</i>	0.285	1.034	0.101	0.253	0.944	0.085	0.145	1.064	0.100
<i>Jarque-Bera</i>	79.418	1.087	0.309	136.070	0.758	0.561	0.470	0.551	0.057
<i>Prob.</i>	0.000	0.580	2.738	0.000	0.684	0.755	0.790	0.759	0.971
Panel B: Without Log									
	<i>VAT</i>	<i>EDUTAX</i>	<i>GDP</i>	<i>VAT</i>	<i>EDUTAX</i>	<i>GDP</i>	<i>VAT</i>	<i>EDUTAX</i>	<i>GDP</i>
<i>Mean</i>	224.939	64.248	16890333	182.394	49.466	15966469	268.356	80.563	17674680
<i>Maximum</i>	325.914	359.735	21405824	222.802	172.868	18533752	343.345	359.735	21405824
<i>Minimum</i>	64.992	7.214	13757732	64.992	7.214	13757732	197.776	7.229	13951968
<i>Std. Dev.</i>	54.972	77.512	1725528	32.230	46.245	1378023	39.416	97.745	1766322
<i>Jarque-Bera</i>	0.246	74.352	1.235	61.292	6.454	0.682	0.221	14.253	0.098
<i>Prob.</i>	0.884	0.000	0.539	0.000	0.039	0.710	0.895	0.000	0.952

VAT = Value Added Tax, EDUTAX = Tertiary Education Tax, GDP=Gross Domestic Product, Std. Dev. = Standard Deviation, Prob. = Probability

In addition, for the entire sample, tertiary education tax amounted to 3.626 percent (=N=64.248 billion). Prior to the introduction of technology, tertiary education tax amounted to =N49.466 billion (3.497 percent). Subsequently, with the introduction of electronic collection of tertiary education tax, it amounted to =N=80.563 billion (3.839 percent). This implies that the introduction of electronic collection and computation generated higher tertiary education tax. This result is similar to empirical findings of earlier research works (Etales & Bariweni 2019; Leary & Roberts, 2005). With the latest rebasing of GDP in 2014, higher value was recorded as against the previous

values prior to 2014. Mean value of GDP recorded was =N= 17,674,680 trillion after the rebased period as against =N= 15,966,469 trillion prior to the rebased period. The implication of this result is that the introduction of electronic collection and computation into the tax system increased revenue from these sources to the entire non-oil revenue component. Furthermore, figure 1 show that the mean levels of value added tax increased significantly from what was obtained during the pre e-tax period as compared to the figures obtained during the e-tax period; a situation that is different for education tax.

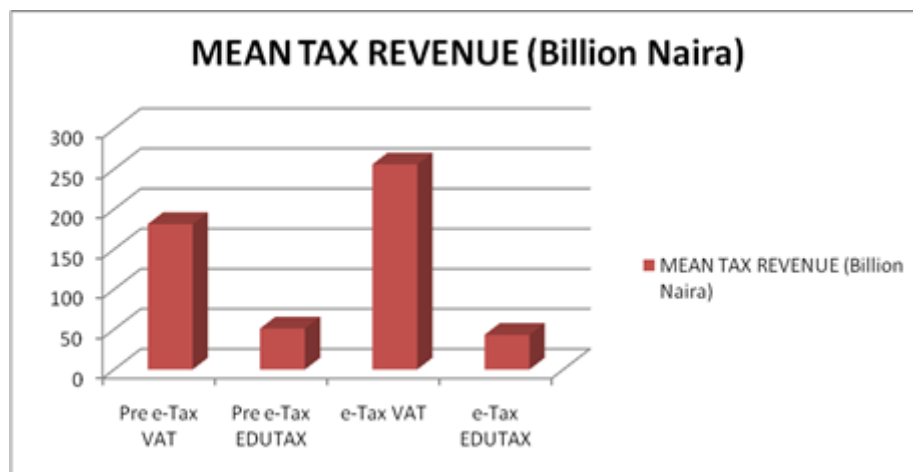


Figure 1: Graph of the Average (Mean) Tax Revenue for VAT and EDUTAX during the Period before and after the Implementation of E-Tax in Nigeria.

Unit Root Tests

The Time plots of almost all the series show a strong upward trend movement. In addition, we can notice some fluctuations in some of the series more specifically VAT, EDUTAX and GDP. These plots show some unknown outliers at time points; thereby

requiring the performance of weathered formal tests to confirm these inherent properties. Accordingly, a series of unit root test, such as ADF (Dickey and Fuller, 1981) and Phillips-Perron (Phillips & Perron, 1988) are used to determine the order of integration for each series.

Table 2: Results of Unit Root Tests

<i>Augmented Dickey-Fuller Unit Root Test</i>			
<i>Variable</i>	<i>At level (prob.)</i>	<i>First difference (prob.)</i>	<i>Decision</i>
VAT	-4.950 (0.001)**	-	I(0)
EDUTAX	-5.384 (0.000)**	-	I(0)
GDP	-1.063 (0.718)	-5.205 (0.000)**	I(1)
<i>Phillip Perron Unit Root Test</i>			
VAT	-5.030 (0.001)**	-	I(0)
EDUTAX	-4.260 (0.008)**	-	I(0)
GDP	0.814 (0.883)	-5.205 (0.000)**	I(1)

VAT = Value Added Tax, EDUTAX = Tertiary Education Tax, GDP = Gross Domestic Product, Std. Dev. = Standard Deviation, Prob. = Probability; ** indicates significant at the 0.05 level, *** indicates significant at the 0.1 level

The test of stationarity as shown in Table 2 shows that the time series data for value added tax and tertiary education tax were found to be stationary at level, implying the absence of random walk. This further implies that the afore-stated variables are integrated at order zero. Conversely, time series data for GDP were found to be stationary at first difference, which implies that the GDP is integrated of order one. Similar results were revealed with the adoption of the Phillips Perron test.

Co-integration Test

The Johansen co-integration test between GDP, value added tax and tertiary education tax was conducted to establish the long run causal relationship existing between them. Result from Table 3 reveals that there exists a long run causal relationship between

GDP, value added tax and tertiary education tax, with trace and maximum-Eigen probability values less than 5% level of significance. This further implies that there exists just one co-integrating equation between the afore-stated variables.

The normalized co-integrating coefficient of (-0.569) reveals that a positive relationship exists between value added tax and gross domestic product. This implies that a 1 percent change in revenue generated from VAT will trigger GDP upward by 0.56 percent. Similarly, the normalized co-integrating coefficient of (-2.078) suggests that a positive relationship exists between tertiary education tax and GDP, implying that a 1 percent change in EDUTAX causes GDP to increase by 2.07 percent.

Table 3: Results of Co-integration Test

<i>Co-integration Results of GDP, VAT and EDUTAX</i>					
<i>Hypothesized No. of CE(s)</i>	<i>Eigen Value</i>	<i>Trace Statistics</i>	<i>0.05 Critical Value</i>	<i>Max. Eigen Statistic</i>	<i>0.05 Critical Value</i>
None	0.450	33.174**	29.797	21.571**	21.131
At most 1	0.247	11.601	15.494	10.257	14.264
At most 2	0.036	1.343	3.841	1.343	3.841
<i>Normalised Co-integrating Coefficients of GDP, VAT AND EDUTAX</i>					
<i>Series</i>	<i>GDP</i>	<i>VAT</i>	<i>EDUTAX</i>		
	1.000	-0.569 (0.458)	-2.078 (1.311)		

** indicates significant at the 0.05 level, *** indicates significant at the 0.1 level

Least Square Regression

Table 4 reports the least square regression results for the full sample. Regression results for the full sample show that coefficient of VAT (0.035) is positively related to gross domestic product (GDP), howbeit statistically insignificant. For the pre tax period, the coefficient of value added tax (0.013) is positively related to GDP, while for the post tax period, the coefficient of value added tax (0.127) also shows a positive relationship to GDP, howbeit statistically insignificant. Furthermore, results reveal that the corresponding increase in VAT during the e-tax period is economically large. These results shows that value added tax ratios are higher in the e-tax period (2015Q4-2020Q1) than during the pre e-tax period (2011Q2-2015Q3). While this evidence is similar to that of

Fosberg (2012), it is inconsistent with the results reported by Okoli and Afolayan (2015). Regression results of table 4 for tertiary education tax show that the coefficient of EDUTAX (0.038) for the full sample is positively and statistically significant to GDP. In relation to the pre-tax period, the coefficient was found to be positive and statistically significant to GDP, while during the e-tax period, EDUTAX recorded a positive but insignificant relationship with GDP. The result highlights the fact that tertiary education tax was higher during the pre e-tax period than the e-tax period. This result is in line with the findings of Sanni (2019) and Ugwuanyi, (2014). Furthermore, the coefficients of tertiary education tax are deemed to be economically small in the e-tax era.

Table 4: Least Square Regression Results

<i>Dependent Variable: GDP</i>					
<i>Full Sample</i>		<i>Pre e-Tax period (2011Q2-2015Q3)</i>		<i>e-Tax period (2015Q4-2020Q1)</i>	
<i>Variables</i>	<i>Coefficient (Prob.)</i>	<i>Variables</i>	<i>Coefficient (Prob.)</i>	<i>Variables</i>	<i>Coefficient (Prob.)</i>
VAT	0.035 (0.800)	VAT	0.013 (0.297)	VAT	0.127 (0.464)
EDUTAX	0.038 (0.000)**	EDUTAX	0.035 (0.013)**	EDUTAX	0.025 (0.150)
C	16.320 (0.000)**	C	16.412 (0.000)**	C	15.875 (0.000)**
AR(1)	0.634 (0.000)**	AR(1)	0.663 (0.003)**	AR(1)	0.712 (0.035)**
<i>R-squared = 0.628</i>		<i>R-squared = 0.554</i>		<i>R-squared = 0.501</i>	
<i>Adj. R-squared = 0.596</i>		<i>Adj. R-squared = 0.465</i>		<i>Adj. R-squared = 0.347</i>	
<i>F-stat. (prob.) = 19.734 (0.000)**</i>		<i>F-stat. (prob.) = 6.226 (0.00)**</i>		<i>F-stat. (prob.) = 5.622 (0.00)**</i>	
<i>Akaike info criterion = -2.638</i>		<i>Akaike info criterion = -6.29</i>		<i>Akaike info criterion = -6.29</i>	
<i>Durbin-Watson stat. = 2.286</i>		<i>Durbin-Watson stat. = 2.406</i>		<i>Durbin-Watson stat. = 1.982</i>	
Diagnostic tests					
<i>Serial Corr. LM test = 2.264 (0.119)</i>		<i>Serial Corr. LM test = 1.651 (0.229)</i>		<i>Serial Corr. LM test = 1.651 (0.229)</i>	
<i>Heteroscedasticity test = 0.250 (0.780)</i>		<i>Heteroscedasticity test = 0.695 (0.513)</i>		<i>Heteroscedasticity test = 0.695 (0.513)</i>	

** indicates significant at the 0.05 level, *** indicates significant at the 0.1 level

Judging from the results of R^2 and adjusted R^2 , which measures proportions of variations in identified dependent variables attributable to predictor variables (Jeroh & Ekwueme, 2015), the obvious is that changes in the level of GDP during the entire period was accounted for by about 59.6% and/or 62.8% changes in the revenue generated through VAT and EDUTAX. For the pre e-tax period, the R^2 of 0.554 means that about 55.4% of changes in the level of GDP is traceable to changes in the amount of revenue generated from VAT between 2011Q2 – 2015Q3. Similarly, the R^2 of 0.501 implies that about 50.1% of the visible variations in the level of GDP can be traced to changes in the amount of revenue generated from VAT between 2015Q4 – 2020Q1.

Overall, the F_{stat} of 19.734 (prob.value = 0.000) implies that the introduction and adoption of electronic tax system in the collection of VAT and EDUTAX jointly have significant impact on GDP during the period (pre e-tax and e-tax period), although, the revenue generated for EDUTAX during the pre e-tax period seem to be economically larger than what was generated during the e-tax period. This goes to show that processes and policies as regards taxation in Nigeria revert back to their pre tax period levels with adjustments during those periods. Consistent with Leary and Roberts (2005), this study concludes that the system of tax administration in Nigeria contributed more and significantly to GDP during the electronic tax period than the pre e-tax period.

Conclusion and Recommendation

Globally, the systems adopted by governments to manage the entire process of revenue generation and tax collection have witnessed rapid transformation through the adoption of technologically driven devices and techniques. This accounts for why the deployment of e-tax as a system of filing and making tax payments has in recent time attracted academic debates in Nigeria and beyond. In the Nigerian context, with the introduction

of the e-tax system in 2015, stakeholders have envisaged an era of enhanced system of tax collection amidst the elimination of presumed leakages and unethical tax-related practices; with a view to witnessing improvement on the level of economic growth in the country. The motivation for this study therefore stems from the fact that the increased interest on the concept of e-tax has not birthed studies that focused on assessing the causal link between the e-tax system, trends in the revenue component from education tax and VAT and the pattern of economic growth in Nigeria. An attempt to fill this knowledge gap prompted this study that empirically assessed the causal relationship between tax revenue from VAT and education tax, electronic system and economic growth in Nigeria.

Empirical evidence from our results indicates that government revenue seem to have recorded significant increase after the introduction of the electronic system of tax collection. Additionally, from the result of the Johansen co-integration test between GDP, value added tax and tertiary education tax, we observed that a long-run causal relationship was found to have existed between GDP, value added tax and tertiary education tax, with trace and maximum-Eigen probability values of less than 5% level of significance. With the result of the normalized co-integrating coefficient, our argument is that while a 1% change in revenue generated from VAT will possibly trigger GDP upward by about 0.56%, following the positive relationship existing between tertiary education tax and GDP, a 1% change in EDUTAX will result 2.07% increase in the level of GDP.

Overall, the regression result confirms that the introduction and adoption of electronic system in the collection and payment of value added and tertiary education tax jointly impacts significantly on Nigeria's GDP.

With the above conclusion, this study recommends thus:

- ❖ The decision of Nigeria's regulatory agencies and the tax authorities on the deployment of the e-tax system should be sustained.
- ❖ Efforts should be made by the relevant tax authorities to enhance its current level of IT deployment to the process (es) of tax filing and tax payment in the country.
- ❖ Furtherance of the deployment of e-tax in Nigeria, efforts should be made to institute efficient monitoring mechanism in the country's tax system to ensure that all forms of leakages attributable to education tax remittances are eliminated.

Importantly, we note that our study is limited in its scope to only two tax components – VAT and education tax. This therefore serves as a start up point for subsequent studies that may possibly extend the scope of this current study through an examination of tax revenue from several tax components and economic growth during the e-tax era. The possible challenges associated with the e-tax system of filing and tax payment and the attendant policy implications of the e-tax system can also be examined by other researches.

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