

An Empirical Assessment of the Impact of E-Commerce on Value Added Tax Revenue Generation in Nigeria.

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Abstract: The study was aimed to examine the empirical relationship between Value Added Tax Revenue and e-commerce in Nigeria. Secondary source of data was utilised, quarterly time series data from 2010 to 2017 was used. Auto Regressive Distributed Lag (ARDL) Model and Vector Error Correction Model (VECM) were employed to analyse the data. From the short run empirical result, previous Value Added Tax Revenue and National Consumption have a positive relationship with the dependent variable (Value Added Tax Revenue). Similarly e-commerce and VAT exemption have a negative relationship with the dependent variable. However Cointegration Bounds Test revealed a long run relationship among the variables, and a long run model was run. The long run empirical result obtained revealed a positive relationship between consumption and the dependent variable, while e-commerce and VAT exemption have a negative relationship with the dependent variable. Error Correction Term obtained confirmed that the model can correct its previous disequilibrium at the rate of 7.6617 percent per quarter. Finally the study recommends that the Revenue Authority should devise an efficient means of taxing e-commerce transactions; doing this will not only enhance VAT revenue collection but will also ensure equity among taxpayers. The value of de minimis should be reduced if possible eliminated; elimination of de minimis may reduce direct importation of small items by consumers, thereby protecting domestic consumption base.

Keywords: E-commerce, Value Added Tax, Relative Income Hypothesis Consumption, Exemption Autoregressive Distributed Lag
JEL Classifications: C22, D11, E21, F63, H25, L81, P44

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I. INTRODUCTION

There is no doubt, e-commerce has impacted positively on the lives and welfare of people across the globe. E-commerce makes it easy for people to make purchases of essential products such as drugs, books, medical, educational and entertainment services; in fact e-commerce has increased both the consumption and investment choices. In any economic arrangement there are winners and losers, e-commerce may have a negative effect on some individuals, business, and economies particularly in Sub-Saharan countries, who import virtually everything they use and export raw materials. Expansion of e-commerce in Sub-Saharan African countries like Nigeria, without taking proper measures may increase pressure on the value of domestic currency, create unemployment, erode domestic consumption base, and may lead to a fall of revenue from Value Added Tax (VAT) and Import Duties. Jones and Basu (2002), e-commerce provides a qualitatively different challenge to tax regimes. First, it leads to the gradual elimination of intermediaries, such as wholesalers or local retailers, who in the past have been critical for identifying taxpayers, especially private consumers. Second, there will be discrepancies where foreign suppliers may be tax-exempted, whereas local suppliers would be required to charge value added tax (VAT) or sales taxes. Third, direct orders from foreign suppliers will substantially increase the number of low-value shipments of physical goods to individual customers. These low-value packages now fall under so-called de minimis relief from customs duties and taxes in many countries, the cost of collection being more than the amount of tax due. A substantial increase in these shipments as a result of e-commerce (where foreign suppliers replace domestic ones) could pose an additional challenge to tax as well as customs authorities who would need to decide whether and how to tax such goods. It is possible that e-commerce will result in an erosion of the consumption tax base. Kerimov (2005), nations have identified three main concerns facing the global business community as a result of international tax issues: the erosion of source country tax revenues, the inability to tax international financial capital, and the harmful effects of international tax competition.

According to European Court of Auditors Report (2018), e-commerce is prone to irregularities concerning VAT (Value Added Tax) and customs duties. Such irregularities directly affect the Member States'

budgets and, indirectly, the European Union's (by reducing the Member States' customs duties and VAT-based contributions). In terms of the EU as a whole, a 2016 study by a Danish consultancy firm likewise points out gaps in the system. According to the study, VAT is levied on only 35 % of postal imports, and these gaps translate directly into a loss of VAT revenue of approximately €1.05 billion. It estimates additional losses of €0.25 billion from gaps in the collection of import duties. The European Commission, meanwhile, estimates the overall VAT losses in cross-border e-commerce resulting from the exemption of low-value consignments to be as high as €5 billion per year. Similarly Agrawal and Fox (2016) said that rapid growth in online transactions and the expansion of digital products – such as video streaming, cloud-based storage, and smartphones – place new pressures on destination-based, subnational transaction taxes, like state and local retail sales and use taxes in the United States. For example, the location of both consumption and sale for digital products is difficult to define and imperfect enforcement capacity allows many remote transactions to effectively escape taxation because they are not taxed at origin or destination. New technologies and digital products challenge the design of decentralized commodity taxes in other countries as well. Canada operates a Goods and Services Tax (GST) with federal and provincial rates; Value Added Tax (VAT) rates vary within the European Union (EU); and India and Brazil levy state-level rates through their tax systems. Even highly centralized tax systems are not immune to the pressures of e-commerce.

Jones and Basu (2002), tax administrations throughout the world face the formidable task of protecting their revenue base without hindering either the development of new technologies or the involvement of the business community in the evolving and growing e-market place. Concerns of governments centre on the impact of e-commerce on the state and local revenue. Whereas states can impose a tax on residents' purchases from out-of-state vendors, they cannot impose an obligation on those vendors to collect the tax unless the vendor has a substantial presence, or nexus, in the state. These problems will be greater for developing countries. The shrinking of the tax base will have a disproportionate effect and further jeopardize the already fragile economy of the developing world. E-commerce and globalization challenge traditional tax regimes. Historically goods were physical, the production, distribution and consumption of these goods was easily traceable and therefore easily taxable. Physical goods were produced at a manufacturing plant, shipped off to wholesalers and boxed on to retailers—the final consumer walking away with a paid for (and taxed) product. Tax collection was in the hands of the retailers who would charge the consumer VAT or sales tax and then remit this to the taxing authorities. However, global e-commerce makes the cross-border movements of goods, capital and labour less transparent allowing companies and individuals to exploit tax differences between countries, or even to evade taxation at all.

Yapar, Bayrakdar, and Yapar (2015), the effects of globalization and rapid developments are experienced in knowledge and technology raises level of e-commerce. E-commerce provides businesses to sell their goods and services with a different method around the world and admits to consumers to access goods and services easily. Taxation of e-commerce is an important issue for countries, businesses and consumers who want to be a party of e-commerce. The issues such as tax loss and tax evasion are crucial in terms of countries. Difficulties like uncertainty and double taxation make parties of e-commerce reluctant and affect development of e-commerce negatively. According to Rosenberg (2008), e-commerce brings with it a paperless environment, hence, many traders may not be issuing paper invoices and transactions may not be easily traceable. No audit trail is left, and compliance checking and monitoring of transactions are made too complex for a tax authority to handle.

World Custom Organisation (2015), low-value consignments for which no duties and taxes are collected under the de minimis value rule – no Customs declaration is required, and immediate release may be granted on the basis of a consolidated declaration that can be a manifest, waybill, cargo declaration or an inventory of the items, or following the presentation of a simplified goods declaration; the increase in imports of low-value consignments below the de minimis level can have an adverse impact on revenue collection. Some Customs administrations are witnessing the growing misuse of the de minimis facility, by way of vendors splitting and/or under-valuing consignments for tax avoidance purposes, to keep the value of an individual shipment below the specified threshold. Some tax authorities are already considering the option of reducing or eliminating de minimis for VAT/GST. Australia recently decided that with effect from 1 July 2017, the existing threshold for GST liability on cross-border imports of goods – currently 1000 Australian dollars – will be reduced to zero, in line with GST collections for other products and services. Non-residents (overseas vendors) will need to charge, collect, and remit the GST for digital and physical products, as broadly described under the 'vendor collection model.

Ecommerce Forum Africa (EFA) (2015), Taxation should seek to be neutral and equitable between forms of electronic commerce and between conventional and electronic forms of commerce. Business decisions should be motivated by economic rather than tax considerations. Taxpayers in similar situations carrying out similar transactions should be subject to similar levels of taxation. The OECD countries at Ottawa meeting managed to set out principles to be applied among member countries in relation to issues such as domicile for

personal and corporate taxation, electronic tax records and filing and e-commerce. Such principles which include neutrality; efficiency; certainty & simplicity, effective & fairness; as well as flexibility should not be differently applied under e-commerce circumstance as they operate under conventional commerce.

E-commerce has been consolidating its ground in Nigeria as the number of internet users keep increasing every day, Executive Vice Chairman Nigerian Communications Commission, Danbatta (2018), described the growth of internet in Nigeria as enormous with the number of users reaching 103 Million as at May, 2018, it was an impressive growth from 28 million internet users recorded in 2012. Abbakin (2019), currently, the E-commerce market in Nigeria is worth around \$13 billion; according to a report by London based Economist Intelligence Unit (EIU). Abbakin further said that, experts in the Nigerian financial sector have also estimated that Nigeria's e-commerce market could rise to \$50 Billion over the next ten years. Based on record of the Nigerian Bureau of Statistics (2019), e-commerce sector contributed about ten percent, of the nation's Gross Domestic Product in 2018.

World Custom Organisation (2016), The local e-commerce operators that do business within Nigeria, such as JUMIA and KONGA, function well and collaborate internally with Government Agencies but the e-commerce Operators that do business across borders such as Mall Boxes Ltd, owners of Mall for Africa platform, do not collaborate with Government Agencies in the area of data sharing, risk and security, and do not clear their cargo as e-commerce cargo but as General Cargo. It is assumed that there is a potential loss of revenue as data on low-value shipments is not properly captured. The manual process of handling such items necessitates the need for improvement. Secondly, revenue is lost from returned goods resulting from delay in clearance, where the goods are time bound, and the importer may decide that they do not need the goods anymore, hence, do not make duty payments. The third issue is in the area of wrong classification of e-commerce goods where agents classify such goods as personal effects for evading duty payment. There is no Official de minimis threshold in Nigeria. The de minimis threshold is currently based on internal instruction from the Customs Area Command. The internal threshold is based on compliance level assessment on Express and Postal Services which makes the de minimis threshold non-uniform. For instance, DHL Nigeria is allocated a threshold of 250USD, while others are allocated 100USD.

Nigerian VAT revenue challenged the ability of the Financial Authority to meet the West African Sub region average, as the Nigerian Minister of Finance Ahmed, (2019) said that Our VAT revenue to GDP ratio stands at less than 1% (0.8%), which compares unfavorably to the ECOWAS average of 3.4%; so is our excise revenue. Considering the volume and value of e-commerce transactions in Nigeria, its predicted potentiality and high growth rate; its importance to some sector of the economy cannot be questioned; and yet the challenges it imposed on the Revenue Authorities cannot be ignored. It is the aim of this paper to empirically assess the impact of e-commerce on Value Added Tax revenue generation in Nigeria.

II. LITERATURE REVIEW

2.1 Conceptual Literature Review

2.1.1 Concept of E-commerce

El Gawady (2005), e-commerce is usually associated with buying and selling over the Internet, or conducting any transaction involving the transfer of ownership or rights to use goods or services through a computer-mediated network. E-commerce as it is commonly known is the use of technology to conduct financial transactions online. E-commerce can occur within and between three basic participant groups: business, government, and individuals. To Suntoro and Tjen (2017), e-commerce is the selling or purchasing activities held over the Internet by particular methods with the intention of receiving and delivering orders. Furthermore, it enables goods or services to be ordered and delivered by conventional channels (indirect or offline e-commerce) or through entirely electronic delivery systems (direct or on-line e-commerce). E-commerce makes transactions between one place and another possibly done without having physical interactions. OECD (2000), an electronic transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organizations, conducted over computer mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted on or off-line.

Nanehkaran (2013), there are many various classification of electronic commerce and many different methods to characterize these clusters. Academics determined a number of frameworks for classifying electronic commerce. The main different classification of electronic commerce are Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Consumer (C2C), Consumer to-business (C2B) and Mobile Commerce (M-Commerce).

This study views e-commerce as advertisement, buying and selling of goods and services through electronics medium, it further possesses the ability of making payment, contractual agreement, educational and medical consultation through electronic medium.

B2B

Business-to-Business is a type of e-commerce transaction that exists between businesses or a transaction that occurs between a company and other company to transfer of services and products. A possible explanation for this might be that Business-to-Business includes online wholesaling in which businesses sell materials, products and services to other businesses on the websites.

B2C

Business-to-Consumer refers to transactions between a business and its end consumer and so it create electronic storefronts that offer information, goods, and services between business and consumers in a retailing transaction or it is an Internet and electronic commerce model that indicates a financial transaction or online sale between a business and consumer.

C2B

Consumer-to-Business is the transfer of services, goods or information from persons to business or it is a business model where end users create products and services that are used by business and institutions.

C2C

Consumer-to-Consumer is an electronic Internet facilitated medium, which involves transactions among users and it is a business model which two consumers deal business with each other directly.

M-Commerce

The term of Mobile Commerce was invented in 1997 to aim “the buying and selling of products, information and services” via wireless handheld devices such as cellular phones, laptops and personal digital assistants. These wireless devices interact with computer networks that have the ability to conduct online merchandise purchases. Mobile commerce allows user access to Internet and shopping in it without needing to find a place to plug in. Mobile Commerce transactions continue to improve and the phrase includes the purchase and sale of a wide range of products and services, online banking, bill payment, information delivery and so on.

2.1.2 Concept of Online and Offline Transactions

Elisha (2013) Online-business, sometimes referred to as direct electronic commerce, has an important feature that the Internet is used to fulfill the contractual obligation, for instance to deliver ordered software, music or videos. The Internet provides the infrastructure for fulfilling the contract and not just concludes it. The contractual obligation is delivered electronically. Not all services or goods can be delivered electronically. However, there are already several applications in place on the Internet. For instance downloading of e-books, magazines, newspapers, music, standard-software, individualized software and using online information services.

Elisha (2013), offline business transactions, also known as indirect electronic commerce, the Internet is only used to conclude the contract. The marketing, advertising and certain information is provided through the Internet. However, the delivery of the goods is not done through the Internet; it is done offline by using traditional ways such as the post or other delivery services or other forms of transportation. The crucial criterion for offline business is that the Internet is used as a communication tool.

2.1.3 Concept of De Minimis

The International Chamber of Commerce (ICC) Customs Guideline #11 defines de-minimis as “a valuation ceiling for goods, including documents and trade samples, below which no duty or tax is charged and clearance procedures, including data requirements, are minimal (UNECE, 2012)”. The Revised Kyoto Convention (RKC), by the World Customs Organization (WCO), calls for Customs administrations to set de-minimis thresholds below which duties and taxes are waived. Shipments falling into this category enjoy expedited release with minimum documentary requirements. The World Trade Organisation(WTO) Bali agreement of 2013 supports the future development of trade facilitation, including setting relevant de-minimis levels across the globe.

Collection of VAT and import duties generates additional cost, not only for Customs and tax authorities, but also for the logistics operators, importers and consumers. Furthermore, it causes time delays with quantifiable value. Hence, the application of de-minimis levels is likely to reduce the cost for all parties involved, while improving the fast flow of goods.WCO News (2015), the rationale behind the de minimis regime is that revenue collection on low-value shipments should be commensurate with their processing costs. Packages declared to be of a value exceeding the de minimis threshold for payment of duties and/or taxes are withheld from delivery until the duties and taxes payable have been charged and collected.

2.1.4 Concept of Value Added Tax (VAT)

Kagan (2019), VAT is a consumption tax placed on product whenever value is added at each stage of the supply chain, from production to the point of sale. The amount of VAT that the user pays is on the cost of the product, less any of the costs of material used in the product that have already been taxed.

Black (2003), defined VAT as an indirect tax levied on the goods and services as a percentage of their value added. The customer pays VAT on purchases in addition to normal price; the seller then pays the government VAT collected on the sales less the VAT they have paid on purchased inputs.

The VAT is chargeable on the nominal value of the value added, in real sense, the value of the product may be less than its original cost due to inflation, but still VAT is chargeable.

According to the provisions of section 4 of the Nigerian VAT law, the tax is charge at 5 and 0 percent of taxable supply. However there are some certain goods, services, and transactions that were exempted from the tax, as provided under the provisions of section 3 and first schedule of the VAT act.

2.1.5 VAT Exemptions

According to European Commission Taxation and Custom Union (2016), a supply of goods and services is an exempt supply if no VAT is applied to it, whether at final stage of sale to the consumer or at some intermediate business to business stage. The goods and service exempt mostly are certain activities that are for public interest. Some exempt transactions are called “zero rated” transactions as the result there is no residual VAT in the final price.

Some goods and services were exempted due to the general perception of VAT as a regressive tax, because it is proportional to consumption and poor household spends more of their income than rich ones. Therefore VAT exemptions for education, health and basic foods are to minimise the impact of the inequality.

2.2 Review of Empirical Literature

Makere (2018), conducted a research to examine the impact of e-commerce on import taxes in Kenya, using a quarterly time series data, from 2012 to 2016. The research used multiple regression model. The empirical result obtained revealed a negative relationship between e-commerce and import taxes in Kenya. The result further revealed that e-commerce have been shrinking the domestic consumption base. Similarly Biodun (2017), carried on a research to investigate the impact of e-commerce on the economic development of Togo, using time series data from 2009 to 2015. The study employed Ordinary Least Square Method and Co integration Models to achieve the stated objective. The result obtained revealed a significant negative relationship, both for short and long run between e-commerce and economic development in Togo. Cowgill and Dorobantu (2017), investigated the influence of cross-border e-commerce on international trade in European countries, using domestic trade data and cross-border data collected from Google AdWords. The study employed both econometric models and descriptive statistics. The empirical result obtained revealed that the growth of cross-border e-commerce reduced distance-related trade cost by approximately two-thirds.

Wang, Wang and Lee (2017), conducted a study to investigate the impact of cross-border e-commerce on international trade in the context of China, mainly from the perspective of transaction cost economics in conjunction with the traditional comparative advantage model by analyzing information cost, negotiation cost, transportation cost, tariffs and middlemen cost separately. The study employed Generalized Model Method, other Econometrics Models and theoretical models. The theoretical result obtained suggested that cross-border e-commerce may have a positive role in promoting international trade only when the negative impact caused by tariff cost and transportation cost is offset. While the empirical result shows that cross-border e-commerce has a positive effect on the growth of China's international trade in each year. However, the positive effect does not show incremental growth over time, possibly as a result of the weak implementation of favorable policies in trade, in addition to global trade shrinking.

Agrawal (2015) studies the effects of the Internet on tax competition and tax rates. The result shows that when consumers have the choice of buying online, buying from their home town and buying from a neighboring town, the Internet will put downward pressure on tax rates if the online transactions are tax free, and this downward pressure will be most pronounced in local jurisdictions setting high tax rates in the pre-Internet era. If, on the other hand, online firms remit taxes in all jurisdictions, an increase in Internet usage will raise tax rates because the online firm remits taxes on a destination basis reducing tax avoidance. The first of these two extreme scenarios dominates in Agrawal's empirical research, with a one standard deviation increase in Internet penetration lowering local tax rates by approximately 10 percent of the average rate. However, increased Internet usage puts upward pressure on local tax rates in places that have a high number of online firms with nexus. The positive effects in some jurisdictions provide policymakers with evidence that the Internet can facilitate tax collection, which may become more important as more online firms have physical presence. Alake and Olatunji (2015), conducted a study to investigate the impacts of electronic taxation on tax avoidance and evasion in Nigeria. The sampled for the study was taken from Ekiti State of Nigeria focusing on

some banks and the Board of internal revenue of the state. Well-structured questionnaires were administered in the target respondents and were analysed using standard deviation and hypotheses testing. The result led to the rejection of the hypotheses that electronic taxation does not have significant impact on tax avoidance and evasion in Nigeria and consequently the alternative hypothesis was accepted and the study concluded that embracing electronic taxation in tax administration in Nigeria will significantly reduce the incidences of tax evasion and avoidance in Nigeria.

Mirmiran and Shams (2014) carried on a study to determine the impact of e-commerce on some of important economic criteria including total factor productivity (TFP) of Iran as a developing country in comparison with US standard as a developed country through analyzing and calculating interrelated issues. The model is based on both econometrics and growth accounting approach to fill the gaps of previous studies. On the first step, this research fulfills the gap of economic growth by transforming the US and Iran e-commerce model to parametric model and providing statistical analysis. On the second step, the two parametric models are compared to each other. The results showed that the impact of e-commerce on Iran could be even stronger than that of US as a developed country because the scope for reducing inefficiencies and increasing productivity is much larger in Iran. The results also are showing that although during the last decade e-commerce has always been an attentive issue to Iranian governments and Iran made some policies to develop and enhance e-commerce in the country, but statistics are showing the necessity of more comprehensive and organized policies for developing and localizing e-commerce in the way of universal standards accomplishment.

Patel (2014), conducted a study to measure the effectiveness and challenges of value added tax on international e-commerce in electronic goods and services in Kenya. The study adopted a descriptive research design. The target population was 199 KRA VAT officers. The sample size was 50 officers. Primary data were used in this study. The data collection instrument used in this study was questionnaires. These questionnaires were used to collect data from the taxation authority officials dealing with VAT. The questionnaires were administered via email surveys and personal visits to respondents that is the KRA VAT officers. The research findings revealed that the major challenges against an effective VAT system for international e-commerce in electronic goods and services in Kenya included the lack of attention to e-commerce as a unique industry in the VAT Act and the lack of unique policies to regulate the sector. From questions posed to the KRA VAT officers, it emerged that there was a lack of proper and adequate resources, and their usage, within the taxation authority to monitor the industry. Liu (2013), conducted a study to examine the impact mechanism of e-commerce development to the national economic growth in China, using time series data from 1997 to 2011. The study employed multiple regression model and cointegration test to measure both the short and long run impact of e-commerce on China's economic development. The empirical result revealed that e-commerce have impacted positively on the economic growth, and the cointegration result predicted a long term positive relationship between the e-commerce and the economic growth.

III. METHODOLOGY

3.1 Theoretical Framework

The study employed Relative Income Hypothesis as its theoretical framework, the hypothesis was adopted due to its relevance to the study and the variables under consideration; the hypothesis provides a theoretical insight on why e-commerce is penetrating Nigerian economy very fast. James Duesenberry, in his seminal work, *Income, Saving and the Theory of Consumer Behavior* (1949), introduces the relative income hypothesis. Duesenberry (1949) proposes an individual consumption function that depends on the current income of the consumer and consumption and income of other people. As a result "for any given relative income distribution, the percentage of income saved by a family will tend to be a unique, invariant, and increasing function of its percentile position in the income distribution. The percentage saved will be independent of the absolute level of income. Individual's consumption is driven by the comparison of his income and the income of his reference group.

One of the artificial rules of neoclassical economics is that an individual's preferences are independent of other individuals' preferences. Duesenberry (1949), explicitly challenged the neoclassical assumption of independent consumer preferences and made use of ideas that are now common in behavioral economics: loss aversion, status quo bias, spotlight effects, herd behavior, and interdependent preferences. He also raised policy questions about the effect of redistributive taxes on national saving. Duesenberry (1949) "For any particular family the frequency of contact with superior goods will increase primarily as the consumption expenditures of others increase. When that occurs, impulses to increase expenditure will increase in frequency, and strength and resistance to them will be inadequate. The result will be an increase in expenditure at the expense of saving."

According to McCormick (2018), Duesenberry notes that many different goods can serve the same purpose. If we need to travel we can walk, take a bus, or take a taxi. If we are hungry we can eat Ramen noodles or caviar. Yet these are not equivalent; some goods are widely regarded as "better" than others. Sometimes this is based on "technical superiority". For example, a computer with word-processing software is clearly better

than a manual typewriter. But in other cases “better” is defined purely by culture, tradition and mere perception. Most Americans see no problem eating beef or pork, but in other cultures such food is taboo. On the other hand, most Americans are revolted by the thought of eating dog meat, even though it is a delicacy elsewhere.

According to the relative income hypothesis, the consumption behaviour of an economic agent, is a function of his income, then function of income and consumption behaviour of his reference group. For example if the people or consumers that the economic agent considers as his reference group have the habit of making purchases online, that habit will influence the economic agent behaviour to start patronizing online purchases. If the number of economic agents patronizing online purchases increases as it is now in Nigeria, then there will be some policy implications: Firstly the domestic economy conventional consumption base will shrink, that is base erosion of domestic consumption base. Secondly, if the domestic tax authority responsible for VAT collection failed to properly monitor and tax the domestic online transaction, then domestic VAT revenue will relatively decrease. Thirdly, if the online purchases were made on foreign goods, then this will reduce the entire domestic economy consumption base, eliminate middle men, and increase the importation of the product in smaller quantities, which are de minimis (which no duty collected on them, in Nigeria it ranges from \$100 to \$200), this will reduce the amount of VAT revenue from importation. Fourthly if both the foreign and domestic online transaction were not properly taxed, then online purchases will be cheaper than the conventional purchases, and all informed rational consumers will patronize online purchases. Therefore going by the submission of Relative Income Hypothesis, e-commerce may reduce domestic economy consumption base and VAT revenue if proper measures are not taken by relevant Revenue Authority.

3.2 Sources and nature of data

The source of data for the study is secondary. Quarterly time series data from 2010 to 2017, were obtained from Central Bank of Nigeria (CBN) statistical bulleting 2018.

3.3 Technique of data analysis

Auto Regressive Distributed Lag (ARDL) Model and Vector Error Correction Model (VECM) were employed to achieve the objective of this study. The ARDL was utilised because, according to Nkoro and Uko (2016), ARDL cointegration technique is preferable when dealing with variables that are integrated of different order, I (0), I (1) or combination of both. To avoid misleading characteristics of time series macroeconomic variables which in most cases are non-stationary in regression analysis, we examined the time series properties of all the variables under investigation using the two conventional unit root tests such as the Augmented Dickey-Fuller (1981) and Phillip-Perron (1988) to confirm the validity of the stationarity level in the data sets. The ADF test involves in running the following regression is specified as:

$$\Delta y_t = \beta_1 + \beta_2 t + \theta y_{t-1} + \sum_{i=1}^n \phi_i \Delta y_{t-i} + \epsilon_t$$

Where y_t represents the relevant variables under investigation and ϵ_t is a random term.

The study also employed Bounds co-integration test technique to ascertain whether the variables are co-integrated that is, if there is long run equilibrium relationship among the variables.).

3.4 Model Specification

Autoregressive Distributed Lag (ARDL) Model was used to examine the relationship between the dependent variable and the independent variables. Thus, the model is specified as:

$$VATR = f(\text{CONT}, \text{ECOM}, \text{EXEM})$$

2

$$VATR = b + b_1 \text{CONT}_t + b_2 \text{ECOM}_t + b_3 \text{EXEM}_t$$

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + \alpha_3 x_{t-3} + \epsilon_t$$

Where VATR = Value Added Tax Revenue Generated quarterly,

CONT = National Consumption Quarterly,

ECOM = E-Commerce, value of webpayment was used as proxy. (The actual value of e-commerce may be higher than this, because some transaction were paid in cash, and some using mobile phones, but the study doesn't want to overestimate the influence of the e-commerce.)

EXEM = VAT exemption, and expenditure on agriculture, health and education were taken as proxy.

ECT = Error Correction Term

E_i = Error term in i year

IV. RESULT AND DISCUSSION

4.1 Lag Length Selection

Sometimes the impact of independent variable(s) on dependent variable is not instantaneous, but after a period of time (lag), to avoid the problem of misled interpretation; the study embarked on lag selection procedures, with a view to select an appropriate lag for the model. The lag selection criteria favours lag 2 for the

model. This means that the presence VAT Revenue collection is influenced by the behaviour of the VAT Revenue, consumption, e-commerce and value of VAT exemption of two previous quarters.

4.2 Unit Root Test

In the quest for an accurate estimate and prediction, to avoid the problem of spurious regression, and select an appropriate model, the study conducted Augmented Dicker Fuller (ADF) Test and Phillip Peron (PP) Test to confirm the stationarity of the variables. The Variables are transformed to stationarity at different stages as are shown in table 1 below.

Table 1: Unit Root Test Output Table.

Test	ADF			PP			Remark/Decision
	Level	1st Diff.	2nd Diff.	Level	1st Diff.	2nd Diff.	
Vatr		I(1)			I(1)		Stationary at First Difference
Cons		I(1)			I(0)		Stationary at First Difference
Ecom		I(1)				I(2)	Stationary at First Difference
Exem	I(0)				I(1)		Stationary at Level

Source: Authors computation 2019 from eviews 8.0, where there is difference between ADF Test and PP Test, the ADF Test super cedes.

4.3 Short Run Impact of E-Commerce on VAT

4.3.1 Short Run ARDL Model

Table 2: Short Run ARDL Output

Variables	Coefficients	P.Values	Others
C	35.67581	0.0227	R-squared =0.811400
D(VATR(-1))	0.026947	0.0198	Adjusted R-squared=0.669950
D(VATR(-2))	0.034913	0.0478	F-statistic =15.73630
D(CONS(-1))	0.010858	0.0075	Prob(F-statistic)= 0.000827
D(CONS(-2))	0.006874	0.0145	Durbin-Watson stat=2.288891
D(ECOM(-1))	-0.012691	0.0356	
D(ECOM(-2))	-0.015821	0.0446	
D(EXEM(-1))	-0.037388	0.0156	
D(EXEM(-2))	-0.029861	0.0068	

Source: Authors computation 2019 from eviews 8.0

The coefficients of the variables VAT Revenue (VATR) at both lag 1 and 2 are all positive and statistically significant, this indicates a statistically significant positive relationship between the variables and present VATR. The coefficients and P.Values of VATR at lag 1 and lag 2 are 0.026947(0.0198) and 0.034913(0.0478) respectively. If at lag 1 the VATR increase by N1 billion, the present VATR will increase by N26.9 million, and if at lag 2 the VATR increases by N1 billion the present VATR will increase by N34.9, or if at lag 1 the VATR increase by one point, the present VATR will increase by 0.269 point and if at lag 2 the VATR increase by one point the present VATR will increase by 0.0349 point.

The coefficients of the variables Consumption (CONS) at both lag 1 and 2 are all positive and statistically significant, this indicates a statistically significant positive relationship between the variables and present VATR. The coefficient and P.Values of CONS at lag 1 and lag 2 are 0.010858(0.0075) and 0.0006874(0.0145) respectively. If at lag 1 CONS increase by N1 billion the present VATR will increase by N10.8 million, if at lag 2 VATR revenue increase by N1 billion the present VATR will increase by N6.8million; or if at lag 1 CONS increase by one point, the present VATR will increase by 0.0186, and if at lag 2 CONS increase by one point the present VATR will increase by 0.0069point. The low response of VATR to consumption may be due to exemption and VAT evasion.

The coefficients of the variables E-commerce (ECOM) at both lag 1 and 2 are all negative and statistically significant, this indicates a statistically significant negative relationship between the variables and present VATR. The coefficient and P.Values of ECOM at lag 1 and lag 2 are -0.012691(0.0356) and -0.015821(0.0446) respectively. If at lag 1 ECOM increase by N1 billion, the present VATR will decrease by N12.6 million, and if at lag 2 ECOM increase by N1 billion, the present VATR will decrease by N15.8 million; or if at lag 1 ECOM increase by one point, the present VATR will decrease by 0.01269 points, and if lag 2 ECOM increase by one point the present VATR will decrease 0.0158 point.

The coefficients of the variables Exemption (EXEM) at both lag 1 and 2 are all negative and statistically significant, this indicates a statistically significant negative relationship between the variables and present VATR. The coefficients and P.Values of EXEM at lag 1 and lag 2 are -0.037388(0.0156) and -0.029861(0.0068) respectively. If at lag 1 EXEM increase by N1 billion the present VATR will decrease by N10.56 million, and if lag 2 the EXEM increase by N1 billion, the present VATR will increase by N6.8 million; or if at lag 1 EXEM increase by one point the present VATR will decrease by 0.0374 point, and if at lag 2 the EXEM increase by one point, the present VATR will decrease by 0.0299point.

The F Statistic value of the model is 15.73630, the high F Statistic is implying that the combination of the independent variables can give good explanation of the variation of VATR. The P Value of the F. Statistic is 0.000827, which is less than 0.05, meaning that the combination of the four variables are statistically significant in explaining the variation of VATR in Nigeria.

The R- Squared value of the short run model is 0.811400, which 81.14 percent. The result means that the model is able to explain 81.14 percent short run variation or movement of VATR in Nigeria.

4.3.2 Short Run Causality Test

Wald Test confirmed that, in the short run the lag of all the independent variables are statistically significantly different from zero. The study therefore accept that the independent variables granger cause the variability or movement of VATR in the short run.

4.4 Long Run Impact of E-Commerce on VAT

4.4.1 Bounds Cointegration Test

Wald Statistics was employed to test the long run relationship of the variables. The result revealed the existence of long term relationship among the variables. The Statistics obtained from the Wald Statistics Test is 14.73 which is higher than the both lower and upper bound values of Pesaran Critical Bound Values which are 3.79 and 4.85 respectively at 5% level of significance. The study therefore reject null hypothesis which says there is no long run relationship among the variables, and accept the alternative hypothesis.

4.4.2 Long Run Model

Table 2: Long Run Model's Output

Variables	Coefficients	P.Values	Others
C	338.2600	0.0020	R-squared =0.692387
CONS	0.088815	0.0433	Adjusted R-squared=0.628301
ECOM	-0.046251	0.0356	F-statistic =10.80403
EXEM	-0.058560	0.0000	Prob(F-statistic)= 0.000016
ECT	-0.076617	0.0132	Durbin-Watson stat=2.481881

Source: Authors computation 2019 from eviews 8.0

From the above table 2:

The coefficient of the variable E-commerce (ECOM) is 0.088815 which indicates a positive relationship between the Consumption and Value Added Tax Revenue in Nigeria. If the consumption increases by ₦ 1 billion, then Value Added Tax Revenue will increase by ₦ 88.815 million or any 10 percent increase in national consumption will leads to 0.88815 percent increases in Value Added Tax Revenue. The P Value of the variable is 0.0020 which is less than 0.05, this means the consumption is a statistically significant variable that influences or determines Value Added Tax Revenue collection in Nigeria

The coefficient of the variable Consumption (CONS) is -0.046251 which indicates a negative relationship between the E-commerce and Value Added Tax Revenue in Nigeria. If the Ecommerce increases by ₦ 1 billion, then Value Added Tax Revenue will decrease by ₦ 46.251 million or any10 percent increase in E-commerce will leads to 0.46251 percent decreases in Value Added Tax Revenue. The P Value of the variable is 0.0356 which is less than 0.05, this means the e-commerce is a statistically significant variable that influences or determines Value Added Tax Revenue collection in Nigeria. However the negative relationship between e-commerce and Value Added Tax Revenue is largely due to the erosion of taxable domestic consumption base and increased in the importation of de minimis items through the e-commerce window.

The coefficient of the variable Exemption (EXEM) is -0.058560 which indicates a negative relationship between the Exemption and Value Added Tax Revenue in Nigeria. If the exemption increases by ₦ 1 billion, then Value Added Tax Revenue will decrease or fall by ₦ 58.560 million or any10 percent increase in the Value of Exemption will leads to 0.58560 percent decreases in Value Added Tax Revenue. The P Value of the variable is 0.0000 which is less than 0.05, this means the exemption is a statistically significant variable that influences or determines Value Added Tax Revenue collection in Nigeria. However the negative relationship between exemption and Value Added Tax Revenue is expected by the study, because any item that was exempt there is

no VAT on it, and the exemption has also spillover effect because most of the goods and services exempted were not properly defined by the Value Added Tax Act, this provides a room for debate and argument between the Revenue Authority and taxpayers, it also serves as a tool for VAT avoidance in Nigeria.

The F Statistic value of the model is 10.80403, the high F Statistic is implying that the combination of the independent variables can give good explanation of the long run variation of Value Added Tax Revenue in Nigeria. The P Value of the F. Statistic is 0.000016, which is less than 0.05, meaning that the combination of the independent variables are statistically significant in explaining the long run variation of Value Added Tax Revenue in Nigeria. The R- Squared value of the long run model is 0.692387, which is 69.23percent. The result means that the model is able to explain 69.23 percent long run variation or movement of Value Added Tax Revenue in Nigeria, while the remaining percentage might be explain by other variables, such as the VAT rate, tax policies, tax administration, business culture, laws, political and economic settings of the country.

4.4.3 Vector Error Correction Term of the Model

Vector Error Correction Model was employed to measure how fast the system can correct it previous disequilibrium. The error correction term (ECT) is -0.076617, the negative sign implies that the model can be able to correct it previous disequilibrium at the rate of 7.6617 percent per quarter. The probability value of the ECT is 0.0132, which is less 0.05, this means that the model possess the significant statistical ability to correct the previous disequilibrium. The lower rate of the adjustment term implies that the Revenue Authority has to employ more effort and strategies to improve VATR collection in Nigeria.

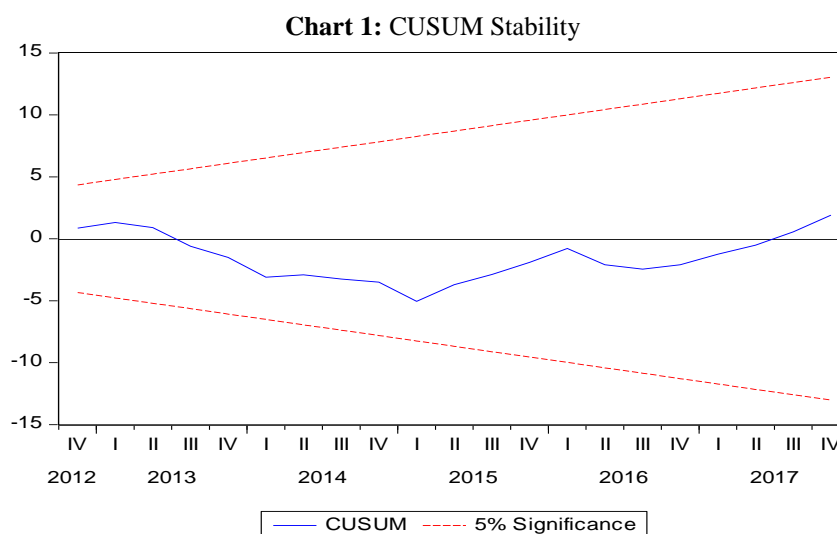
4.5 Post Estimation Test

4.5.1 Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test was employed to confirm the existence or otherwise of Serial Correlation. The probability value of the observed R Squared is 0.1560, which is more than 0.05, the study therefore accepts the null hypothesis that the variables are not serially correlated and this is desirable. Serial correlation occurs when the error terms associated with given period of time was carried over to a future period of time. This may lead to overestimation or underestimation of the model coefficient, which may affect the efficiency of the model. Positive serial correlation will make the estimates standard error smaller than the true standard error; this will lead to a conclusion that the parameter estimates are more precise than they are, and by that null hypothesis will rejected when it should not be. Serial correlation does not affect the unbiasedness or consistency of estimators but efficiency.

4.5.2 Model Stability Test

Cumulative Sum Control Chart (CUSUM) was employed to measure the stability of the model. If a model is not stable it cannot be efficiently use for forecasting.



Since the blue line is in between the two red lines, this implies that the parameters of the model are stable, and can be efficiently use for forecasting.

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Evidence obtained from the study's empirical result revealed that previous VATR collection and national consumption have positive impact on Value Added Tax Revenue collection, while e-commerce and VAT exemption have negative impact on Value Added Tax Revenue all in the short run. Furthermore in the long run national consumption have positive impact on Value Added Tax Revenue collection, while e-commerce and VAT exemption have negative impact on Value Added Tax Revenue in Nigeria.

5.2 Recommendations

Based on the empirical results, the paper proffers the following as a means of improving Value Added Tax Revenue generation in Nigeria.

- 1- The Revenue Authority should devise an efficient means of taxing e-commerce transactions; doing this will not only enhance VAT revenue collection but will also ensure equity among taxpayers.
- 2- The value of de minimis should be reduced if possible eliminated; elimination of de minimis may reduce direct importation of small items by consumers, thereby protecting domestic consumption base.
- 3- The Revenue Authority should examine why VAT Revenue response to a change in National consumption is very weak, and take necessary measures that will improve the relationship between the two variables.
- 4- All goods and services exempted by from VAT should be properly define by the Act, and the number of items exempted should be reviewed or charge VAT at a lower rate.
- 5- The Revenue Authority should employ more strategies that will enhance VAT compliance in Nigeria, because the Error Correction Term (ECT) which measures the speed at which the system can correct its previous disequilibrium is 7.6617 percent; the speed is very slow and it will take the system longer period of time to make the necessary correction without an exogenous intervention.

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