# Tax Reforms, Digitalisation and Government Revenue in Nigeria

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Abstract- In Nigeria, tax income collection has become a crucial policy goal for the government. While the government can do little in the near short run to affect the structural drivers of tax revenue (which arise from the economy's fundamental dimensions), it can change other elements that influence the contribution of taxes to overall revenue by implementing relevant reforms. The influence of tax reforms and digitalisation on government income in Nigeria is therefore investigated in this study. The study focuses on evaluating the distributional outcomes of tax revenue and digitalisation on both federal and state government revenues. Ex-post facto research design is adopted in the study and both descriptive and inferential analysis of the hypothesized relationships is performed in this paper. The relationships are analyzed using annual secondary data from 1996 to 2020 and a dynamic framework based on the autoregressive distributed lag (ARDL) approach to cointegration. The study established that over time, Companies Income Tax reforms improved federal government revenues, but inhibited state government revenues (SGR) in Nigeria. It is therefore recommended that the conduct of fiscal reforms in Nigeria should evolve to become more of a bottom-top approach where all tiers of government (Federal, State and Local) are carried along at all times.

Keywords- Government Revenues, Tax Reforms, Digitalisation, CIT, VAT, TIN

## 1. Introduction

Globally, tax revenue mobilisation in all its forms and ramifications has been identified as a pertinent issue affecting economic sustainability and growth (Olaoye, 2017). While in Nigeria, it is said to be inconsistent with prevailing economic reality as Nigeria's tax laws do not conform to global best practices (Ndekwu, 2018). Tax reforms is a multifaceted and rapidly evolving phenomenon in taxation of any economy. The money that a government collects from taxes and non-taxes sources to pay government spending is known as government income. Money, as well as proper public investment and social services, are required by governments to augment their spending. Nigeria's three tiers of government need more money to provide basic services to the country's citizens. There are various sources of revenue for governments, with taxes being one of the most important in both developing and developed

countries (Álvarez,García-Marín and Ilabaca, 2018).

One of these tax reforms initiative is the introduction of direct sales tax that evolves throughout the value chain of production to consumption of taxable goods and services; this tax reform dynamism has placed these economies in the frontier of what constitute the overall best practices in modern tax revenue mobilisation (Strawczynski & Zeira, 2017). The adoption of digital technologies has skyrocketed in African countries such as South Africa, Kenya, Ghana, and Cape Verde, and the presence of Fintech firms such as Uber, Amazon, Jumia, Spotify, and Ali Baba Express in these countries could be said to justify the resolution to keep pace with digital transformation. While the deployment of digital sophistication and stringent regulations have also been identified as a key determinant of government capability to capture financial inflows through the internet domain and prevents capital flights that are directly not invested in the host countries. These funds are creatively repatriated to the domestic country with the view to evade tax where incomes, profits, and revenues are initially generated, derived and, or earned.

Section 30 of the Finance Act 2020, emphasises the introduction of tax identification numbers as a prerequisite for opening a bank account that could mitigate tax avoidance and evasion, thereby bringing more taxpayers to the tax net (Price Waterhouse Coopers, 2020). Section 36 of the Finance Act also repealed old section 4 of VAT. Under the new section, VAT increased from 5% to 7.5% with the view to boost revenue to settle the budget deficit of the country. Extant literature underpinning the nexus between tax reforms and government revenue is limited in scope and diversity from the Nigerian perspective.

Furthermore, there has been a perceived methodology gap proposing a model framework that depicts the exactness of tax reforms in quantitative measures from Nigeria context as extant literature are limited in statistical estimations and projections of the real economic reality of the impacts of tax reforms on government revenue, which makes it nonexistent from a single study in Nigeria.

Finally, there is a consensus among existing studies that oil revenue dominance has been the major constituent of setbacks for the country, whereas, against this perception, the real-time circumstance bedeviling the country's government revenue is inconsistent tax reforms that align with loss of value for stakeholders i.e., taxpayers. It is therefore against these backdrops that this study seeks to examine tax reforms and government revenue in Nigeria with digitalisation nexus.

## 2. Literature Review

The concept of taxation has been consistent in many scholarly pieces of literature. As a widely discussed phenomenon, taxation cannot be regarded as undeserved. Although in a discipline such as management science, there is a perceived difficulty in reaching consensus about a universally acceptable definition for taxation to many, nevertheless, several attempts to gain insights into the concept have been consistent in a manner that is acceptable and compatible with economic reality. From a social science perspective, taxation is regarded as a legal framework or concept adopted by the government to collect money and any other valuable resources from a member of the public with the view to provide social infrastructures arising from such proceeds as stipulated by the law.

Direct tax is imposed on the wealth and income of corporate entities and individuals as the case may be under normal operating frameworks. It is a tax rather not charged on expenditure and consumption of the same source but is payable by statutorily enabled economic agents such as persons or association of persons characterised by physical identity and or entities with legal status. Joseph, Mahmoud and Nurudeen (2020) opined that direct tax is charged based on specific rates on the application for different assessment years as deemed fit by relevant tax authorities within the taxpayer’s jurisdiction and incorporated into budgetary frameworks of government.

The conceptual contrivance of indirect tax in Nigeria is made up of advertisement taxation, capital transactions, and excise and customs duties. The administrative subject of indirect tax is established by the Nigerian government at local and state jurisdictions to include tax proceeds from entertainment, sales tax, motor vehicle

taxation, excise charges, stamp duties, and taxes from other commercially viable operations in the country.

The conceptual analogy of government revenue can be postulated alternatively. Although a quite increasing number of independent researchers have investigated the phenomenon and their perceived idea, also vary across the board. Adam; (2017) in an empirical examination of taxation referred to government revenue as funds maintained by the government with the underlying objective of financing economic level of activates precipitated by the provision of necessities such as capital expenditures and the likes. Government revenue usually is generated from legal sources such as borrowing, fees, fines, and or taxes as the case may be under normal economic working conditions. Furthermore, revenue connotes the aggregate amount accrued to an entity from all sources of income regardless of the size, age, and corporate status at any time (Asnafi & Hamid, 2018).

Moreso, Natural resources, particularly those employed in the extractive industry, have been shown to promote income and economic success in many countries. Despite the favorable experience in industrialized countries with natural resource earnings and economic development, resource-rich emerging countries have found the contrary to be true. For most emerging countries, natural resource profits have proven to be more of a curse than a blessing. Government revenues from the extractive industries (EI) sector are known as natural resource revenues. These revenues include rents, royalties, and taxes. Rents are the surplus value gained after all costs, both money and opportunity costs, are subtracted from revenues arising from the sale of EI resources. Royalties are generally given to the state as a percentage of the sale of EI resources. Tax revenues are typically profit taxes, but can also include corporate income taxes, sector-specific 'special' taxes, or export taxes (Boadway & Keen, 2013).
Digitalisation has become necessary for proper creation and dissemination of information between taxpayers and the government. Digital infrastructures are modernized tools for creating and disseminating information between persons and entities. Some of the available digitalisation gadgets commonly used today encompass hardware (modems, computers, and mobile phones) while major software includes phone applications and computer programs and networks of integrated wireless service providers such as the internet and other available communications tools through the digital process. However, these tools are enabled for processing, collecting, transmitting, and storing information relevant to support the operational capacity of management decisions for effective organisational functions (Adewoye & Olaoye, 2019). Meanwhile, digitalisation development provides the basis for harnessing historical, current, and projected information so that appropriately summarized forms of decisions are made about institutional quality (Adigbole & Olaoye, 2018). In the same vein, Obi, (2018) conceptualised the development of digitalisation from the premise that decision making is central to self-monitoring disturbances evident in a system thereby determining the favorable course of planned action in getting the system under control.
As a result of digitalisation, which has taken center stage in the nation's economic activity, traditional tax procedures and methods have become inefficient. As a result, the digital era has risen to the forefront of all human pursuits. Today, information technology controls the world, producing the digital economy, e-commerce, and tax changes that have altered the face of tax administration in governments and given unprecedented speed to corporate transactions (Obe, 2019). Taxation is the government's principal source of revenue, and tax administration is the hub for tracking how much money is owing to the government. The purpose of information technology is to assist tax administrators in performing their duties more efficiently while reducing tax avoidance and evasion. Furthermore, information technology speeds up and improves the accuracy of tax data analysis. The government commonly uses taxation to influence social amenities and citizens' social lives (Dimitropoulou, Govind, & Turcan, 2018).

# 3. Theoretical framework and Model Specification

### 3.1. Theoretical framework

**Optimal Taxation Theory**

The Optimal Taxation Theory analyses how taxes can be stretched to produce the best social welfare effects (Hellerstein, 1997). The Ramsey rule and the Laffer curve model are two of the models included. Ramsey's rule: The model generates the functions specified by (Ramsey, 1927), He proposed that the excess burden of taxation could be reduced by making the tax rate inversely proportionate to the price elasticity of demand for physical and intangible electronic goods. This model implies that governments try to reduce the excess burden (efficiently loss) of taxing to meet a specific revenue target. Ramsey's rule defines "optimal" taxes as the rate that reduces the extra burden of taxing while still producing the requisite income from physical and intangible electronic transactions.

The Laffer curve is a graph that depicts the relationship between two variables. Economist Arthur Laffer created the Laffer curve model of optimal taxation. The model implies that the government will try to generate as much revenue as feasible, regardless of the efficiency losses that taxes cause. The government's quest for more money can only be limited by constitutional limits and other legislation. The Laffer curve takes into account the inverse relationship between taxation and tangible and intangible electronic products, as well as the influence this relationship has on tax revenues.

In electronic commerce transactions, the research shows that a higher tax rate is not always the most revenue-maximizing rate; in fact, a lower tax rate may produce more money than a higher tax rate (Effiong & Attah, 2018).

**Expediency Theory**

From the purview of taxation, it is pertinent that its proposition must align with practicality as a test required to understand what tax core objectives are and to what extent they can be achieved under normal economic working conditions and operations. However, the sole consideration for weighing the choice of tax propositions is vested with relevant tax authorities who determine the appropriate and correct tax to be paid. Otu and Adejumo, (2018) also are of the concerned argument that overall tax propositions ought to be required to pass normality test posited as practicality, and such that the sole consideration that underlies the choice of policies governing tax practices is embedded within the capacity of relevant agencies acting in the best interest of the government. However, the position of this theory is in concordance with the conceptual foundation of canon to tax which is: efficiency, economy, and effectiveness. The expediency theory on taxation provides the frameworks that set out the policies and guidelines by which relevant tax authorities effectively administered tax with the view to remedying social and economic ills such as regional differences, income inequality, and unemployment (Afuberon & Okoye 2018).

## 3.2. Model Specification

$$Y_i = \beta_{0i} + \beta_1 X_t + \beta_2 C_i \tag{3.1}$$

Where $Y$ is the dependent variable. $X$ is the explanatory variable and C includes the battery of control variables. In furtherance of the earlier model, the following includes the explicit model for this study:

**Model 1: Government Revenue and Tax Reforms**

The model specification is expressed as follows:

$$GREV_i = \sigma_0 + \sigma_1 Tax\_REF_i + \sigma_2 Trade_i + \sigma_3 Inflation_i + \eta_i + \varepsilon_i \tag{3.2}$$

See Table 3.1 for the definition of Variables

**Model 2: Government Revenue and Digitalisation**

$$GREV_i = \sigma_0 + \sigma_1 Digitalization_i + \eta_i + \varepsilon_i \tag{3.3}$$

See Table 3.1 for the definition of Variables

**Model 3: Government Revenue, Tax Reforms and Digitalisation**

$$GREV_i = \sigma_0 + \sigma_1 Tax\_REF_i + \sigma_2 Digitalization_i + \sigma_3 Tax\_REF_i * Digitalization_i + \sigma_4 Trade_i + \sigma_5 Inflation_i + \eta_i + \varepsilon_i \quad (3.4)$$

See Table 3.1 for the definition of Variables

$\beta_0$ = Intercept of the regression line, regarded as constant.

$_t$ = 1, 2, 3 ….41 indicating the period that will be used for this study (1995- 2020)

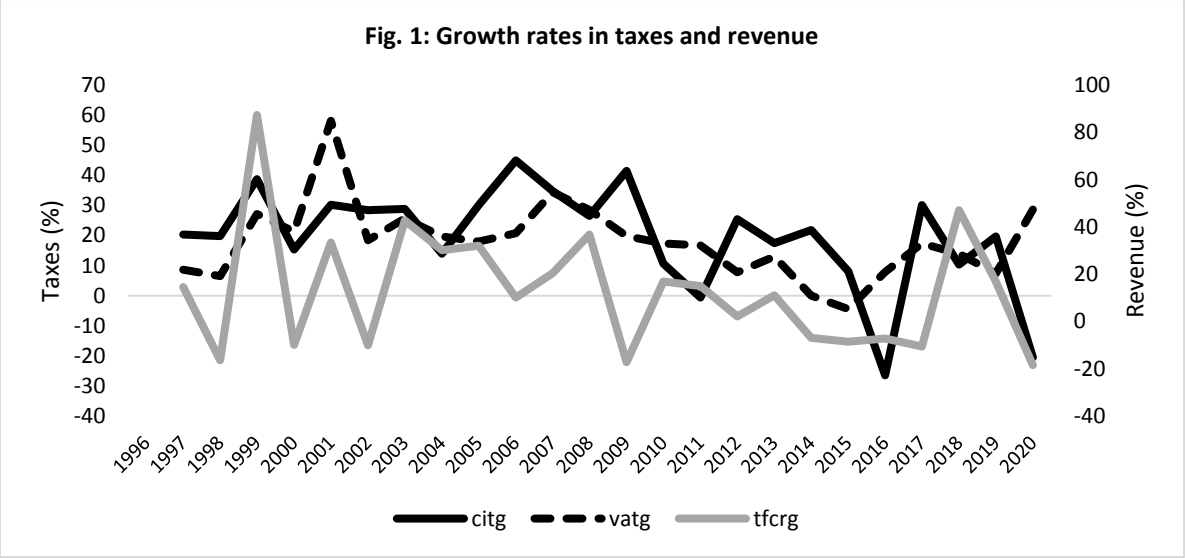
$\beta_{1\text{-}5}$ = Coefficient or slope of the regression line or independent variables.

$\dot{e}_{it}$ = The error term which accounts for other possible factors that could affect the dependent variable not captured in the model. (The stochastic error term is assumed to be identically and independently distributed

# 4. Discussion and Implications

## Discussion

The growth rates in the two tax components along with the growth rate in TFCR are also shown in Figure 1. It can be seen that annual changes in TFCR is far more rap id than the annual changes in both CIT and VAT. Between 1996 and 2002, annual changes in TFCR were very rapid. For the tax revenues, company income taxes where more unstable than the other tax components, and there was a sharp decline in 2016, compared to the steadier transitions in VAT. There is therefore some evidence here that VAT is a provides a smoother revenue source than CIT and that planning with VAT (which is linked to consumption taxes) ensures more predictability in Nigeria.




**Growth rates in taxes and revenue**

## Table 1: Descriptive Statistics (Revenue variables)

| Variable | Mean | Max. | Min. | SD | Skew. | Kurt. | J-B | Prob. |
|---|---|---|---|---|---|---|---|---|
| TFCRG | 12.98 | 87.32 | -18.42 | 25.60 | 0.96 | 3.94 | 4.57 | 0.10 |
| FAR | 59.27 | 92.74 | 27.24 | 18.68 | -0.32 | 2.16 | 1.17 | 0.56 |
| FGRR | 45.49 | 76.30 | 31.33 | 13.68 | 1.09 | 2.98 | 4.99 | 0.08 |
| IGRR | 40.73 | 72.76 | 7.26 | 18.68 | 0.32 | 2.16 | 1.17 | 0.56 |
| SGRR | 33.16 | 53.48 | 16.64 | 9.39 | -0.20 | 2.55 | 0.38 | 0.83 |
| FAG | 17.37 | 124.15 | -53.14 | 39.19 | 1.26 | 5.21 | 11.30 | 0.00 |
| FGRG | 12.98 | 87.32 | -18.42 | 25.60 | 0.96 | 3.94 | 4.57 | 0.10 |
| IGRG | 47.07 | 387.20 | -84.37 | 114.67 | 1.77 | 5.89 | 20.92 | 0.00 |
| SGRG | 19.48 | 112.48 | -22.14 | 28.05 | 1.46 | 6.19 | 18.70 | 0.00 |

Source: Authors Computation

Table 1 presents the descriptive statistics for the tax variables as well as other control indicators. The tax components are summarized in terms of their shares in total tax revenue (CITR and VATR), there shares in GDP (CITGDP and VATGDP) and their annual changes (CITG and VATG). From the Table average CIT share in total revenue is 21.17 percent, while average share of VAT in total tax revenue is 20.47. This indicates that CIT tax revenues just shades VAT as components of taxation in Nigeria, although the share of VAT may have risen strongly in recent years. The ratio of CIT to GDP is 0.752 on average, while the ratio of VAT to GDP is 0.994. None of the tax components examined in this study has a contribution of up to 1 percent of total GDP on average over the period, although both CIT and VAT have maximum values that are greater than 2 percent. This implies that the tax revenues are generally low in the country.

The Jacque-Bera (J-B) statistic, which reveals the pattern of probability distribution of datasets, is another significant statistic computed in descriptive statistics. This pattern of probability distribution is critical for the estimating system used in the study. The J-B statistics for the majority of the variables (including the dependent variable) are negligible in both Tables 1 and 2, indicating that the hypothesis of non-normality of the data series may be rejected at the 5% level. As can be seen, the majority of the series are normally distributed, allowing the data to be estimated using a time series-based estimation framework such as the one used in this study.

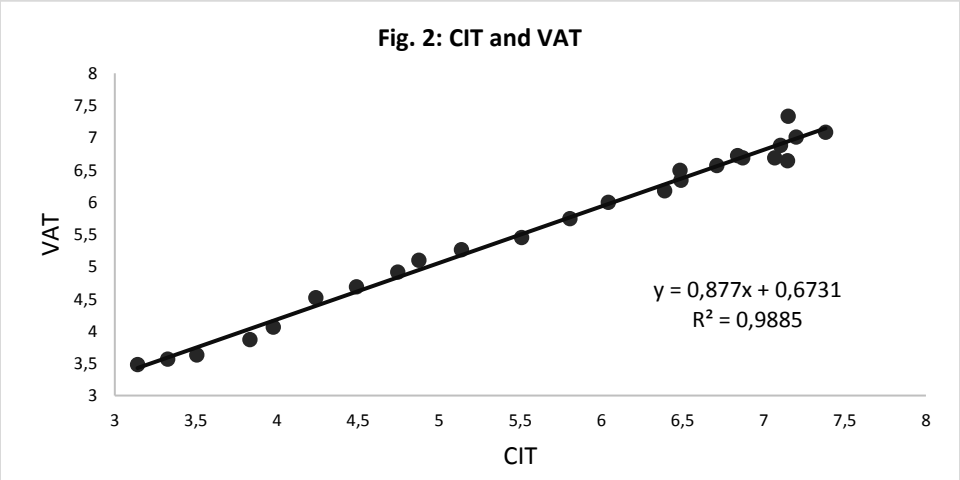
## Table 2: Descriptive statistics [ Tax variables}

| Variable | Mean | Max. | Min. | SD | Skew. | Kurt. | J-B | Prob. |
|---|---|---|---|---|---|---|---|---|
| CITR | 21.17 | 33.91 | 9.77 | 7.32 | 0.08 | 1.85 | 1.40 | 0.50 |
| VATR | 20.47 | 37.83 | 11.06 | 6.83 | 0.69 | 2.86 | 1.98 | 0.37 |
| CITGDP | 0.752 | 2.250 | 0.210 | 0.417 | 1.489 | 6.059 | 28.852 | 0.00 |
| VATGDP | 0.994 | 2.110 | 0.250 | 0.455 | 0.824 | 3.255 | 2.895 | 0.23 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CITG | 19.56 | 44.95 | -26.43 | 17.19 | -1.14 | 4.24 | 6.71 | 0.03 |
| VATG | 18.03 | 58.10 | -4.44 | 12.64 | 1.08 | 5.52 | 11.06 | 0.00 |
| DIGIT | 11.83 | 34.93 | 0.01 | 12.15 | 0.62 | 1.96 | 2.71 | 0.26 |
| INFL | 12.36 | 29.27 | 5.39 | 4.99 | 1.51 | 6.35 | 21.18 | 0.00 |
| OPEN | 37.64 | 53.28 | 20.72 | 9.12 | -0.09 | 2.22 | 0.67 | 0.72 |
| EXRT | 161.51 | 316.70 | 76.28 | 75.45 | 1.09 | 2.90 | 4.93 | 0.08 |
| DDYR | 9.48 | 14.50 | 5.77 | 2.19 | 0.13 | 2.70 | 0.17 | 0.92 |
| EXDYR | 12.85 | 47.01 | 1.24 | 15.01 | 1.14 | 2.84 | 5.48 | 0.06 |

Source: Authors Computation

The descriptive statistics for the tax variables as well as other control indicators are also presented in Table 2. The tax components were summarized in terms of their shares in total tax revenue (CITR and VATR), their shares in GDP (CITGDP and VATGDP), and their annual changes (CITG and VATG). From the Table average CIT share in total revenue is 21.17 percent, while the average share of VAT in total tax revenue is 20.47. This indicates that CIT tax revenues just shade VAT as components of taxation in Nigeria, although the share of VAT may have risen strongly in recent years. The ratio of CIT to GDP is 0.752 on average, while the ratio of VAT to GDP is 0.994. None of the tax components examined in this study has a contribution of up to 1 percent of total GDP on average over the period, although both CIT and VAT have maximum values that are greater than 2 percent. This implies that the tax revenues are generally low in the country.




In Figure 2, the relationship between the two taxes included in the study are represented. A straight line or direction positive relationship is observed in the chart, which shows that as one tax component rises, the other also increases. The plotted regression line indicates that the slope coefficient of 0.877 in the relationship. This is a very elastic relationship, indicating that every one percent rise in CIT will also lead to a 0.877 percent rise in VAT. This is a very strong interaction which also suggests that tax revenue in Nigeria is linked. This may however present some risk to the tax system since a shock to one

tax component may directly lead to decline in the other.

In this study, the test for stationarity of the data series is performed using two different methods namely, the Augmented Dickey Fuller (ADF) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) procedure. While the ADF test is an indirect process of testing for unit roots, the KPSS tests are more direct in terms of the null hypothesis. Table 3 displays the results of the unit root testing. The ADF test statistics for each of the variables in levels (excluding...) are less than the 95 percent critical values, as can be seen from the results of the ADF tests presented in the first panel of the Table 3. The test statistic values for the series in first differences, on the other hand, are bigger than the crucial values at the 5% significance level. As a result, those variables are non-stationary in terms of levels, but their first differences are stationary. This means that all of the variables in the study (excluding...) are integrated on a one-to-one scale (or I [1]). ... variables, on the other hand, are integrated to order zero (or I [0]).

## Table 3: Unit Root test for Variables

| Variable | ADF Test | | KPSS | | Order of Integration |
|---|---|---|---|---|---|
| | *Levels* | *First Difference* | *Levels* | *First Difference* | |
| *TFCR* | -2.066 | -4.267 | 0.623 | 0.349 | I(1) |
| *FA* | -1.491 | -3.466 | 0.512 | 0.371 | I(1) |
| *FGR* | -1.776 | -6.303 | 0.669 | 0.339 | I(1) |
| *IRG* | -1.678 | -5.62 | 0.619 | 0.339 | I(1) |
| *SGR* | -0.933 | -3.919 | 0.632 | 0.378 | I(1) |
| *CIT* | -2.586 | -3.539 | 0.707 | 0.314 | I(1) |
| *VAT* | -1.803 | -3.053 | 0.711 | 0.293 | I(1) |
| *DIGIT* | -4.062 | -1.213 | 0.667 | 0.501 | I(1) |
| *INFL* | -6.221 | -4.831 | 0.106 | 0.208 | I(1) |
| *OPEN* | -2.349 | -5.772 | 0.530 | 0.500 | I(1) |
| *EXRT* | -0.229 | -3.144 | 0.627 | 0.243 | I(1) |
| *DDYR* | -3.141 | -4.170 | 0.185 | 0.125 | I(1) |
| *EXDYR* | -3.551 | -3.244 | 0.409 | 0.120 | I(1) |

Source: Authors Computation

According to the unit root test, the majority of the variables are I (1), while a handful are I (2). (0). This shows that determining the long run relationship may require more than the standard test for common stochastic trends in data series (or cointegration test). As a result, the study uses an ARDL technique to cointegration, as suggested by Pesaran (2001). This study uses the Bounds testing approach for cointegration in this direction. Furthermore, the use of error correction algorithms (based on the ARDL method to cointegration) emphasizes the importance of cointegration tests. It's also important to figure out whether the model's explanatory components are forcing variables. As a result, the Bounds test is performed, which includes all of the variables found on the LHS (Pin, 2014; Ahmed, Muzib & Roy, 2013). If and only if the equation with the dependent variable (Y) passes the cointegration test, strong cointegration is found. Table 4 shows

the findings of the Bounds test for cointegration, which are based on the crucial F-statistic values for the lower and upper bounds.

## Table 4: Results of Bounds Approach to Cointegration Test

| Equation (Dependent variable) | Level of interaction | F-stat | I0 Bound (5%) | I1 Bound (5%) | Cointegration |
|---|---|---|---|---|---|
| Total federally collected revenue (TFCR) | *None* | 40.14 | 1.98 | 3.04 | Yes |
| | *tax & reform* | 15.23 | 1.98 | 3.04 | Yes |
| | *tax & digit* | 68.12 | 1.98 | 3.04 | Yes |
| | *digit & reform* | 5.96 | 1.98 | 3.04 | Yes |
| State government revenue (SGR) | *None* | 33.36 | 1.98 | 3.04 | Yes |
| | *tax & reform* | 12.96 | 1.98 | 3.04 | Yes |
| | *tax & digit* | | 1.98 | 3.04 | Yes |
| | *digit & reform* | 14.29 | 1.98 | 3.04 | Yes |
| Federation account (FA) | *None* | 13.11 | 1.98 | 3.04 | Yes |
| | *tax & reform* | 7.03 | 1.98 | 3.04 | Yes |
| | *tax & digit* | 12.30 | 1.98 | 3.04 | Yes |
| | *digit & reform* | 9.77 | 1.98 | 3.04 | Yes |
| Federal government revenue (FGR) | *None* | | 1.98 | 3.04 | Yes |
| | *tax & reform* | 7.49 | 1.98 | 3.04 | Yes |
| | *tax & digit* | 31.08 | 1.98 | 3.04 | Yes |
| | *digit & reform* | 13.18 | 1.98 | 3.04 | Yes |
| Independent revenue of government (IRG) | *None* | 37.83 | 1.98 | 3.04 | Yes |
| | *tax & reform* | 14.48 | 1.98 | 3.04 | Yes |
| | *tax & digit* | 41.47 | 1.98 | 3.04 | Yes |
| | *digit & reform* | 6.19 | 1.98 | 3.04 | Yes |

On the basis of their lag structures, cointegration-based studies (such as the ARDL) are generally prone to fluctuations and instability. For autoregressive estimations, this is more problematic (Greene, 2011). As a result, the lag selection test is used to establish the maximum lag that can provide optimum values for the coefficients in the ARDL estimation, assuming that the collection of variables in the study is expected to be cointegrated (see the Bounds tests in Table 4). The Akaike Information Criterion (AIC) and the Schwarz–Bayesian Criterion were used to determine the model's optimality in the lag selection (SC). The least values for the test coefficients are used to establish the optimal lag length. The result is displayed in Table 5, and it shows that the first lag has the lowest value for each of the equations (based on all of the test results). Because each of the selection tests suggests the first lag as the ideal lag length, only the first lag is predicted to be preserved for the ARDL estimation. As a result, a one-period lag structure is chosen to reflect the structure that will assure more consistent coefficient estimates. The low optimal lag structure may be related to the small sample used in the study as suggested by Ighodaro and Adegboye (2020).

**Table 5: Lag Length Selection Criteria**

| *No of Lags* | TFCR | | SGR | | FA | | FGR | | IRG | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *AIC* | *SC* | *AIC* | *SC* | *AIC* | *SC* | *AIC* | *SC* | *AIC* | *SC* |
| 0 | 3.88 | 4.18 | 3.12 | 1.34 | 2.42 | 1.04 | 3.28 | 0.55 | 3.12 | 0.34 |
| 1 | -5.81* | -1.74* | -4.89* | -1.52* | -4.93* | -1.56 | -5.41* | -1.72* | -4.27 | -1.76* |
| 2 | -2.68 | -0.83 | -1.29 | -0.41 | -0.98 | -1.02 | -2.27 | -0.71 | -4.29* | -0.84 |

In Table 6, the results of the short run estimates for the dynamic relationships for the linear relationships are presented. The cointegrated results were obtained based on the lag selection test performed earlier. The diagnostic test in each of the equations in based on the adjusted R-squared values. In the estimates, the R-squared values are all very large, with the least being … This shows that tax reforms, digitalisation and the other variables explain over 98 percent of short-term variations in the revenue variables in Nigeria. This provides a background to demonstrate that the models exhibit impressive predictive capacity. In terms of the individual performance of the explanatory variables, the result shows that the coefficient of reform in CIT is significant at the 1 percent level in four of the five equations and each of the coefficients is positive. For the VAT reform variable, the coefficient is significant in all the equations, although the sign is negative for state government revenues and federation account. These two outcomes provide important highlight on the role of reforms on revenues of government.

The coefficient of CIT reform only failed the significance test even at the 5 percent level, which shows that reforming the CIT did not have any significant impact on state government revenues in Nigeria in the short run. On the other hand, the CIT reform coefficient was significant and positive for all the federal government-related revenues. It is also seen that the coefficient of VAT reform had significant negative impact on state government revenue as well as federal government revenue in the short run. The negative impact on state government revenue also indicates that VAT reforms generated a negative structural break (downward shift) in the state government revenue curve in Nigeria. The same VAT reform however had a significant positive impact on three of the federal government-related revenues in the short run.

## Table 6: Estimates for Linear Relationships

| Variable | TFCR | SGR | FA | FGR | IRG |
|---|---|---|---|---|---|
| ΔCIT_reform | 0.486**<br>(0.02) | 0.004<br>(0.02) | 0.356**<br>(0.03) | 0.147**<br>(0.04) | 2.403**<br>(0.07) |
| ΔVAT_reform | 0.357**<br>(0.02) | -0.357*<br>(0.01) | -0.274**<br>(0.02) | 0.602**<br>(0.07) | 0.869**<br>(0.04) |
| ΔCIT | 0.735**<br>(0.02) | -0.015<br>(0.03) | 0.261**<br>(0.04) | | |
| ΔVAT | 1.891**<br>(0.02) | | 0.370**<br>(0.04) | 1.106**<br>(0.09) | 3.979**<br>(0.10) |
| ΔOPEN | 1.334**<br>(0.02) | 0.087*<br>(0.02) | 0.839**<br>(0.03) | | 2.608**<br>(0.05) |

| | | | | | |
|---|---|---|---|---|---|
| ΔDDYR | -1.476**<br>(0.02) | -0.326**<br>(0.05) | | -0.244*<br>(0.10) | -3.879**<br>(0.16) |
| ΔDIGIT | 0.357**<br>(0.02) | -0.035*<br>(0.01) | 1.451**<br>(0.03) | 0.436**<br>(0.04) | -0.917**<br>(0.04) |
| ΔEXDYR | 0.283**<br>(0.02) | 0.160**<br>(0.01) | | | 0.370**<br>(0.02) |
| ΔLEXRT | -0.187*<br>(0.02) | | -2.543**<br>(0.05) | | 1.771**<br>(0.15) |
| Δ GFCF | -0.575**<br>(0.02) | 0.039<br>(0.03) | 0.955**<br>(0.01) | 0.253*<br>(0.08) | 0.138<br>(0.09) |
| $ECM_{t-1}$ | -1.099**<br>(0.02) | -0.937**<br>(0.02) | -0.476**<br>(0.06) | -1.158**<br>(0.07) | -1.514**<br>(0.03) |
| *Adj. R-sq.* | 0.998 | | | | |

Source: Authors Computation

The result for the long run linear relationships are presented in Table 7. Note that the long run results obtained from the ARDL procedure show the effects of the independent variables on the dependent variables after all short-term adjustments have been made. The R-squared results are not included since the estimates are asymptotic. In the estimates, the coefficient of CIT reform is significant for the TFCR, SGR, FGR, and IRG equations. Thus, it is seen that although the CIT reform did not have significant impact on state government revenues in the short run, the long run impact was highly significant. In the long run, the CIT reform is estimated to have resulted in a 0.602 percent increase in total federally collected revenue and a 0.407 percent increase in state government revenues. In Nigeria, it appears that state administrations take some time to see favorable results from CIT changes. For the TFCR and the other two federal-related revenues, the VAT reform coefficient is substantial.

However, the impact on SGR is negative and significant at the 1 percent level. Essentially, even after all adjustments have settled, the VAT reforms actually inhibited state governments revenue in Nigeria. It is seen that the share of negative impact of the VAT reform on SGR was almost as large as the scale of the positive impact on TFCR.

## Table 7: Results for Tax Reforms, Digitalisation and Government Revenue

| Variable | TFCR | SGR | FA | FGR | IRG |
|---|---|---|---|---|---|
| CIT reform | 0.602*<br>(0.09) | 0.407*<br>(0.16) | 0.052<br>(0.27) | 0.329*<br>(0.13) | 2.851**<br>(0.20) |
| VAT reform | 0.569*<br>(0.06) | -0.550**<br>(0.07) | 0.155<br>(0.21) | 0.310*<br>(0.14) | 0.945**<br>(0.14) |
| CIT | 1.291*<br>(0.16) | -0.118<br>(0.17) | 4.866**<br>(0.79) | 1.288*<br>(0.44) | 0.924*<br>(0.21) |
| VAT | -0.456 | 0.472*<br>(0.14) | -7.038**<br>(1.09) | -0.745<br>(0.46) | 0.397<br>(0.23) |

| | | | | | |
|---|---|---|---|---|---|
| | (0.18) | | | | |
| DIGIT | 0.216*<br>(0.07) | 0.360**<br>(0.06) | 1.760**<br>(0.22) | 0.082<br>(0.09) | -0.492<br>(0.11) |
| OPEN | 1.102**<br>(0.09) | 0.457*<br>(0.11) | 2.728**<br>(0.41) | 0.556*<br>(0.18) | 1.833**<br>(0.17) |
| DDYR | -0.774<br>(0.28) | 0.888*<br>(0.30) | 3.228*<br>(0.86) | -0.664<br>(0.52) | -1.364*<br>(0.48) |
| EXDYR | 0.454**<br>(0.03) | 0.103<br>(0.04) | 0.298**<br>(0.09) | 0.162<br>(0.08) | 0.374*<br>(0.10) |
| EXRT | -1.512*<br>(0.16) | -0.730**<br>(0.13) | -3.173**<br>(0.37) | -0.568*<br>(0.19) | -0.043<br>(0.24) |
| GFCF | 0.075*<br>(0.12) | -0.323*<br>(0.11) | -0.729*<br>(0.25) | -0.060<br>(0.17) | 0.789*<br>(0.24) |
| C | 6.540**<br>(0.61) | 5.899**<br>(0.60) | 18.043**<br>(1.64) | 5.875**<br>(1.05) | -9.092**<br>(1.42) |

Source: Authors Computation

In order to determine the exert dimension of the effects of reforms on government revenues, the slope coefficients of the dummy effects are estimated along with the initial impact of the tax components. This reflects the estimation of non-linear relationships for the equations using the interaction terms. The first interaction with short run results reported in Table 8, is the interaction between tax components and the reforms. The goal of this interactions is to observe the influence of tax reforms on the impact of the two taxes on government revenues in Nigeria. In the result, the coefficient of the interaction between CIT and its reform only passes the significance test for the TFCR and IRG equations.

The two coefficients are significant which suggest that CIT reforms increased the short run contribution of CIT to federal government revenues in Nigeria. The effect of the CIT reform on short run behaviour of state government revenue is not significant, suggesting that reforms did not immediately change the dimension of CIT contribution to state government revenue in any significantly way. For the VAT interactions, the results show that the coefficient of the interaction between VAT and its reform is significant and positive for the federal-related revenues but it is negative for the state government revenue in the short run. Thus, there is evidence that reforms in the tax system (CT and VAT) did not have any meaningful influence on the contribution of CIT to state government revenues in Nigeria. The short run effects are however very clear in terms of federal government revenue in Nigeria. The coefficient of digitalisation is positive for the federal revenues, but negative for the state government revenues. This again, suggests that digital innovations do not immediately promote state revenues, even though the effect on the federal revenues are positive and very clear.

## Table 8: Short run interaction results for Tax components and Tax Reforms

| Variable | TFCR | SGR | FA | FGR | IRG |
|---|---|---|---|---|---|
| *ΔCIT* | 0.647**<br>(0.04) | -0.072<br>(0.05) | 0.713**<br>(0.09) | 1.399**<br>(0.07) | 0.283<br>(0.16) |
| *ΔCIT*REF* | 0.155**<br>(0.01) | -0.007<br>(0.01) | 0.020<br>(0.01) | -0.014<br>(0.01) | 0.582**<br>(0.02) |
| *ΔVAT* | 2.599**<br>(0.09) | | 0.846**<br>(0.10) | 0.032<br>(0.07) | 3.605**<br>(0.21) |
| *ΔVAT*REF* | 0.060**<br>(0.00) | -0.051**<br>(0.00) | 0.012<br>(0.01) | 0.066**<br>(0.01) | 0.084**<br>(0.01) |
| *ΔDIGIT* | 1.168**<br>(0.04) | -0.114*<br>(0.03) | 1.393**<br>(0.06) | | |
| *ΔINFL* | 0.002<br>(0.01) | | | 0.526**<br>(0.03) | -0.289**<br>(0.06) |
| *ΔEXRT* | -0.276*<br>(0.07) | -0.237*<br>(0.09) | -1.468**<br>(0.16) | -1.922**<br>(0.10) | |
| *ΔOPEN* | 1.531**<br>(0.03) | 0.178**<br>(0.04) | 1.130**<br>(0.07) | 0.684**<br>(0.04) | 2.329**<br>(0.10) |
| *ΔEXDYR* | 0.031<br>(0.02) | 0.179**<br>(0.02) | 0.194**<br>(0.03) | 0.452**<br>(0.02) | 0.256**<br>(0.04) |
| *ΔDDYR* | | -0.875**<br>(0.09) | 0.090<br>(0.16) | -0.748**<br>(010) | |
| $ECM_{t-1}$ | -1.334**<br>(0.05) | -0.654**<br>(0.03) | -0.885**<br>(0.04) | -0.173**<br>(0.01) | -1.540**<br>(0.01) |
| *Adj. R-sq.* | 0.993 | 0.977 | 0.971 | 0.974 | 0.986 |

Source: Authors Computation

The result for the long run relationship based on the interactions between tax components and the respective reform is presented in Table 9. The long run results show that CIT reform has significant positive impact on TFCR and IRG given their respective positive coefficients. Thus, there is evidence that the reform in CIT not only directly improved federal revenues in Nigeria, it also indirectly impacted federal revenues by stimulating CIT component of the tax system. The overall coefficient (when the shift in the slope due to reform is considered) is 1.172 which is highly elastic. This result shows that the reform to CIT led to a long run increase in federally collected revenues by 1.17 percentage points (over a hundred percent increase). The result for the interaction of VAT with its reform shows that, while the reform had significant positive impact on federally collected revenue, the impact on state revenue is negative in the long run.

Thus, the result indicates that the current VAT system of administration has led to decreases in the contribution of VAT to state government revenues. Consider from the result that the coefficient of VAT in the SGR equation (0.701) is significant at the 5 percent level. When the VAT reform is taken into cognizance, the coefficient of the impact of VAT on SGR drops to 0.597. The coefficient of digitalisation is positive and significant for SGR and FA equations, indicating that digitalisation is good for promoting long run revenue expansions for state governments in Nigeria. Again, the coefficient of exchange rate is predominantly negative and shows that depreciation harms revenues in the long run.

## Table 9: Long run interaction results for Tax components and Tax reforms

| Variable | TFCR | SGR | FA | FDR | IRG |
|---|---|---|---|---|---|
| CIT | 1.087* | -0.493 | 3.150* | 19.31 | -0.353 |
| | (0.28) | (0.60) | (1.01) | (67.2) | (0.71) |
| CIT*REF | 0.085* | 0.108 | -0.077 | -0.352 | 0.607** |
| | (0.02) | (0.10) | (0.08) | (1.64) | (0.05) |
| VAT | -0.533 | 0.701* | -3.427 | -24.49 | 0.762 |
| | (0.34) | (0.18) | (1.24) | (87.9) | (0.86) |
| VAT*REF | 0.098** | -0.104* | 0.094 | 0.745 | 0.092* |
| | (0.02) | (0.05) | (0.06) | (2.59) | (0.03) |
| DIGIT | 0.251 | 0.495* | 0.997* | 2.157 | -0.354* |
| | (0.08) | (0.18) | (0.20) | (7.64) | (0.13) |
| INFL | -0.196 | 0.010 | 0.148 | 5.630 | -0.376 |
| | (0.10) | (0.10) | (0.18) | (20.3) | (0.23) |
| EXRT | -1.204** | -0.959* | -3.008** | -2.073 | 0.362 |
| | (0.18) | (0.28) | (0.39) | (5.56) | (0.30) |
| OPEN | 1.065** | 0.567 | 1.593 | 5.033 | 1.755** |
| | (0.14) | (0.30) | (0.54) | (16.3) | (0.32) |
| EXDYR | 0.252* | 0.110 | 0.381* | 1.413 | 0.418** |
| | (0.05) | (0.09) | (0.13) | (4.46) | (0.07) |
| DDYR | -0.378 | 1.213 | 0.518 | -8.483 | -0.864 |
| | (0.30) | (0.90) | (0.77) | (28.5) | (0.50) |
| C | 6.681** | 5.533* | 14.88* | 27.28 | -4.041* |
| | (0.90) | (1.32) | (1.91) | (78.1) | (1.52) |

Source: Authors Computation

In Table 10, the results of the short run estimates for the dynamic relationships in terms of the interaction between digitalisation and tax components are reported. The cointegrated results were obtained based on the lag selection test performed earlier. The diagnostic test in each of the equations based on the adjusted R-squared values reveals that the model has high explanatory capability. This is due to the high adjusted R-squared values for each of the equations (over 95 percent in the least). This outcome provides a background to evaluate the estimated coefficients in the results. In the results, the role of each variable on the revenue stream is determined by observing the individual coefficients of the explanatory variables. The results show that the coefficient of reform in the interaction between CIT and digitalisation is positive in almost all the equations (including that of state government revenue). This shows that digitalisation has led to increase in the contribution of CIT to revenues of government in the short run. This result suggests that although digitalisation does not immediately have direct impact on state government revenues, it has an indirect impact. On the other hand, the immediate impact of digitalisation on federal revenues is mostly positive both directly and indirectly. This result shows that, in terms of government revenues, the main impact of digitalisation is to directly influence the dimension of the contribution of CIT revenue to overall revenues of government in Nigeria, especially in the short run.

The coefficient of the interaction between VAT and digitalisation is negative for TFCR and IRG and not observable for the other equations. This result shows that digitalisation inhibits the

contribution of VAT to revenues at the federal level in the short run. This is the first negative impact of tax or digitalisation coefficient on TFCR in the study. This result therefore gives evidence that in terms of VAT, digitalisation tends to inhibit VAT contribution to total government revenues in Nigeria. It therefore appears that digitalisation is more compatible with CIT than with VAT in the short run. High levels of digitalisation may have led to greater difficulty of VAT realisations in Nigeria. The coefficient of digitalisation again has positive short run effects on the federal revenues but negative short run effects on state revenues.

## Table 10: Short run Estimates for results with interaction between Tax and Digitalisation

| Variable | TFCR | SGR | FA | FDR | IRG |
|---|---|---|---|---|---|
| ΔCIT | -1.687**<br>(0.05) | -0.229**<br>(0.05) | -1.453**<br>(0.18) | 1.778**<br>(0.05) | -3.874**<br>(0.22) |
| ΔCIT*DIGIT | 0.368**<br>(0.01) | 0.167**<br>(0.01) | 0.182**<br>(0.05) | -0.251**<br>(0.01) | 0.740**<br>(0.06) |
| ΔVAT | 2.269**<br>(0.04) | 1.205**<br>(0.05) | -0.707**<br>(0.06) | -0.610**<br>(0.04) | 3.322**<br>(0.20) |
| ΔVAT*DIGIT | -0.566**<br>(0.01) | | | | -0.838**<br>(0.06) |
| ΔDIGIT | 2.218**<br>(0.04) | -0.677**<br>(0.06) | 3.021**<br>(0.15) | 1.454**<br>(0.04) | 2.506**<br>(0.13) |
| ΔINFL | | | | 0.445**<br>(0.01) | 0.429**<br>(0.04) |
| ΔEXRT | -0.639**<br>(0.04) | | | -1.771**<br>(0.05) | |
| ΔOPEN | 0.809**<br>(0.01) | 0.013<br>(0.01) | | 0.707**<br>(0.02) | 1.323**<br>(0.07) |
| ΔEXDYR | 0.191**<br>(0.01) | 0.232**<br>(0.03) | | 0.626**<br>(0.01) | |

Source: Authors Computation

The final sets of estimations involve interactions between digitalisation and tax reforms in Nigeria. The short run estimates are presented in Table 11. In the estimates, the adjusted R-squared values are high for each equation and indicate the strong explanatory power of the models. For the respective variables, the result for interaction between digitalisation and CIT reforms shows that the coefficient is positive for TFCR, FA, and FGR in the short run. This shows that the reform in VAT favours revenues of government during periods of improved digitalisation in the economy, especially in the short run. Indeed, the result shows that the CIT reforms are in line with expansion of digital economy in Nigeria, with the reforms appearing to aid tax compliance conditions of the digital economy in the short run. For the interaction between VAT reform and digitalisation, the result shows that the coefficient is negative for the two federal revenue components. This shows that, like the case of interaction between VAT and digitalisation, the reforms in VAT tend to limit the contribution of the digital economy to revenues in Nigeria, especially in the short run. The coefficient of digitalisation in the short run result is positive for most of the estimates which shows that more

digitalisation leads to better revenues, especially when tax reforms are taken into cognizance.

The coefficients of the error correction factors have the predicted negative signs in all five short run estimations, and they are all significant at the 1% level. The negative indication indicates that any revenue departure from its long-term trend or equilibrium will be rectified over time. Based on population and other associated indicators, this confirms the presence of long-run economic stability. For SGR and FA, the coefficient of the ECM terms is more than 1.0 (in absolute terms), implying that the changes to long-run equilibrium for these revenue streams are indirect.

## Table 11: Short run estimates for results with interaction between Digitalisation and Tax Reforms

| Variable | TFCR | SGR | FA | FGR | IRG |
|---|---|---|---|---|---|
| ΔCIT_REF*DIGIT | 0.087**<br>(0.01) | -0.006<br>(0.16) | 0.015*<br>(0.00) | 0.045**<br>(0.00) | -0.096**<br>(0.02) |
| ΔVAT_REF*DIGIT | -0.060**<br>(0.01) | | | -0.021**<br>(0.00) | |
| ΔCIT | | | 0.813**<br>(0.08) | 0.789**<br>(0.04) | -1.746**<br>(0.34) |
| ΔVAT | -0.721*<br>(0.17) | 1.355**<br>(0.03) | 0.706**<br>(0.10) | -0.423**<br>(0.05) | |
| ΔDIGIT | 0.151<br>(0.06) | 0.282**<br>(0.01) | 1.083**<br>(0.05) | 0.529**<br>(0.02) | -0.801**<br>(0.19) |
| ΔINFL | 0.382**<br>(0.05) | -0.041*<br>(0.01) | 0.090<br>(0.03) | 0.547**<br>(0.02) | 0.695**<br>(0.12) |
| ΔEXRT | -3.484**<br>(0.27) | -0.054*<br>(0.02) | -1.311**<br>(0.15) | -2.343**<br>(0.08) | -5.109**<br>(0.74) |
| ΔOPEN | | | 0.987**<br>(0.06) | 0.996**<br>(0.03) | |
| ΔEXDYR | 0.956**<br>(0.06) | | 0.236**<br>(0.02) | 0.690**<br>(0.02) | |
| ΔDDYR | -0.724*<br>(0.20) | -0.504**<br>(0.03) | -0.364<br>(0.14) | -0.863**<br>(0.07) | -0.217**<br>(0.57) |
| $ECM_{t-1}$ | -0.164**<br>(0.01) | -1.121**<br>(0.08) | -1.113**<br>(0.05) | -0.702**<br>(0.02) | -0.872**<br>(0.06) |
| *Adj. R-sq.* | 0.946 | 0.979 | 0.976 | 0.988 | 0.906 |

Note: * and ** indicate significance at the 5% and 1 % levels respectively.

Source: Authors Computation

## Table 12: Long run estimates for results with interaction between Tax and Digitalisation

| Variable | TFCR | SGR | FA | FGR | IRG |
|---|---|---|---|---|---|
| CIT | -0.301<br>(0.17) | 0.407*<br>(0.16) | 0.144<br>(0.60) | 6.022<br>(3.69) | 0.100<br>(0.63) |
| CIT*DIGIT | -0.161<br>(0.06) | -0.550**<br>(0.08) | -0.233<br>(0.18) | 0.417<br>(0.31) | -0.968**<br>(0.17) |
| VAT | 0.041<br>(0.25) | -0.118<br>(0.17) | 0.468<br>(0.53) | -10.88<br>(7.07) | -2.021**<br>(0.74) |
| VAT*DIGIT | 0.309*<br>(0.06) | 0.472*<br>(0.14) | 0.080<br>(0.19) | 0.015<br>(0.16) | 1.552**<br>(0.17) |
| DIGIT | 0.091<br>(0.05) | 0.457*<br>(0.11) | 1.192**<br>(0.19) | 1.233*<br>(0.06) | -1.613**<br>(0.19) |
| INFL | -0.069<br>(0.03) | 0.888*<br>(0.30) | -0.218<br>(0.12) | 2.708<br>(1.88) | 0.595*<br>(0.21) |
| EXRT | -1.418**<br>(0.19) | 0.360**<br>(0.06) | -1.554**<br>(0.37) | -4.361<br>(2.26) | -0.542<br>(0.51) |
| OPEN | 0.734*<br>(0.14) | 0.103<br>(0.05) | 0.091<br>(0.23) | 3.566<br>(2.01) | 1.375**<br>(0.29) |
| EXDYR | 0.221*<br>(0.04) | -0.730**<br>(0.13) | 0.068<br>(0.10) | 1.210<br>(0.69) | 0.222<br>(0.13) |
| DDYR | -0.023<br>(0.12) | -0.323*<br>(0.11) | 0.736<br>(0.41) | -0.391<br>(0.43) | -1.856**<br>(0.39) |
| Constant | 12.657**<br>(0.74) | 5.899**<br>(0.60) | 11.095**<br>(1.88) | 30.85<br>(14.9) | 15.13**<br>(2.77) |

Source: Authors Computation

The result of the long run estimates is presented in Table 12. In the result, the coefficient of the interaction between CIT reform and digitalisation is significantly positive for two of the federal revenues and negative for the state government revenue. For the federal government revenue, the result shows that the reform in CIT tends to favour the digital economy in terms of improvement in the tax component. Thus there is evidence from the long run estimates that CIT reforms may actually be compliant with modern digital economy. The result for the state government revenue however reveals that the CIT reform interaction with digitalisation has a negative coefficient and indicates a negative impact of this interaction with state revenues. For the interaction between VAT reform and digitalisation, the result shows that the coefficient is negative for the IRG and fails the test for the other equations.

This result is similar to the short run estimates, and suggests that, like the case of interaction between VAT and digitalisation, the reforms in VAT tend to limit the contribution of the digital economy to revenues in Nigeria, especially in the short run. The coefficient of digitalisation is positive in the long run result, indicating that digitalisation could be useful for all streams of revenue in Nigeria. As stated above, such revenue expansion may not necessarily be as a result of tax expansion.

## 5. Conclusion and Recommendations

The results from the empirical analysis of the study provides effective grounds for suggesting relevant recommendations in different dimensions. First, the study has shown that tax reforms may generate differing outcomes for federal and state government revenues in Nigeria. This is a critical outcome for the dimension of policy reforms in Nigeria. The results indicate that since tax reforms are mostly generated and applied by the federal government, the impacts of reforms are mire felt by federal revenue outcomes than those of the state. This calls for a re-calibration of the fiscal reform in Nigeria. In essence, fiscal reform processes should be more of a bottom-top approach where all tiers of government are carried along so that the sub-national governments can make arrangements on how they can quickly obtain benefits from reforms. The case where reforms are passed down from the center to the states will always generate information asymmetry and further increase constraints on tax policy for the states.

Secondly, given the weak and sometimes negative direct and indirect effects of digitalisation on state government revenues shown in the results, state governments need to enhance its participation in the digital economy in Nigeria. The reason for the undesirable impacts of digitalisation on the tax revenue implications of state governments have been linked to shortages of skills, equipment and physical infrastructure to assist them in fully engaging with the digital economy.

Both state and the federal governments need to evolve systems that are useful in addressing the emerging and persistent challenges in terms of management of cyber security risks as well as data protection. With this fast-adjusting digital economy, governments' policy and regulatory guidance are critically required to develop a useful background for maximizing the tax system in Nigeria. Within the fast-adjusting digital economy. In essence, the current levels and rate of digital transformation in Nigeria calls for effective cooperation between the two government (state and federal) in order to enhance tax administration and to support effective and efficient digitalisation of the tax system as well as optimizing revenues from a highly digitized system in the country.

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