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Trade Openness and Non-oil Tax Revenue in Nigeria

Abaneme, A. A. [a*] and Tella S. A [a]

[a] *Department of Economics, Babcock University, Ilishan Remo, Ogun State, Nigeria.*

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The study empirically examined the effect of trade openness on non-oil tax revenue in Nigeria for the period 1986-2022. Data were collected from Central Bank of Nigeria (CBN) statistical bulletin 2022 and World Development Indicator database. Unit root test was conducted and the result indicated that the variables were not in the same order of integration. Autoregressive Distributed Lag Model (ARDL) bound test was conducted and it was found that there is a co-integration among the variables. Result from ARDL long run model showed that trade openness and real gross domestic product had significant positive effect on non-oil tax revenue while inflation rate, exchange rate and foreign direct investment had no significant effect on non-oil tax revenue in Nigeria. The study therefore recommended international trade should be encouraged as it generates income through taxation in Nigeria. However, concern should be to encourage more exportation in other to have favorable balance of payment in Nigeria.

Keywords: Trade openness; non-oil tax revenue; exchange rate; trade liberalization.

**Corresponding author: E-mail: arthurlewechi@yahoo.com;*

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1. INTRODUCTION

Trade openness is the measure of the extent of freedom that exists in an economy for trade between countries. This is measured by the level of non-restriction of free movement of goods and services across international boundaries. Trade openness, as a policy, potentially enhances economic growth through accessibility of goods and services, allocative efficiency, resource mobilization and utilization to improve total productivity. It is expected that a country that adopted this policy will benefit in terms of increase in output production, low price levels of goods and services due to competition, increase in revenue arising from increase in GDP (Gaalya, Edward & Eria, 2017). It is adduced that trade openness brings the following gains; a) allows a country to export those goods and services it has higher productive efficiency and import goods and services which it has low productive efficiency. b) brings about lower prices enabling increase in real income thereby increase both producer and consumer welfare, c) increases factor productivity by exposing engaged countries to new production technologies, d) stimulates income growth in participating countries (Loganathan, Ahmad & Subramanian, 2020). The contention is that countries should open up their borders for international trade by removing all barriers that hindered free flow of goods and services. Proponents of trade openness argue that freer trade have positive contributions to tax revenue (Terefe & Teera, 2018; Turan & Karakas, 2016). Besides, economic history is replete with literature of how trade was used as a spring board by developed countries to advance their economic growth (Cage & Gadenne, 2016; Zarra-Nezhad, Ansari and Moradi, 2016).

Furthermore, trade openness and trade liberalization have failed to deliver the expected outcome to the economies of LDCs contrary to policy expectations (Subasat, 2009). This is the reason for various intervening policy changes amongst the developing economies. Some have focused on import substitution as a major policy plank for overcoming revenue shortfall and negative balance of trade situation, while others engaged export promotion strategy to achieve economic growth and attendant increase in revenue generation. Some studies like Mickey and Milner (2002) had argued that import substitution and export promotion implementation neutralize each other, and that trade liberalization is therefore required. Subasat (2009), however argued that import substitution strategy and export promotion policy are not mutually exclusive but complements each other, and that export promotion as a policy can be achieved and successful without trade liberalization.

The funding of government expenditure comes from revenue in form of tax on individuals, corporate entities, product and services or royalties on natural endowments. Revenue generation is a major challenge of every government no matter the level of development of the economy. For some developed economies, the revenue base represented diverse components that ensure steady and sustained inflow of income. For developing countries, the mobilization of revenue through taxation is a herculean task, and that had constrained infrastructural development.

Nigeria has one of the lowest revenues to GDP ratios in the World, this exposes it to fiscal vulnerability (Jung, 2023). Federal government revenue is 7.3% of GDP in 2021 which is less than half of the average in ECOWAS, and one-third of Sub-Sahara Africa (Jung, 2023). The country's revenue is heavily dependent on oil, and the country does not have control over the pricing and production levels. Thus, non-oil revenue which has stagnated between 4-5% (Jung, 2023) is an important and critical element in the fiscal stability and sustainability of the economy.

Studies on the impact of trade openness on trade tax revenue in Nigeria so far have not shown a definite result of short run benefits or long run losses so as to define specific policy mix needed to improve the revenue generation from trade openness, and export incentives strategies. The major problem is that the exact impact of trade policies on tax revenue in Nigeria is ambiguous and uncertain.

The Nigeria's Minister of Finance, Budget and National Planning, Shamsuna Ahmed, aptly said during 2022 budget breakdown that the problem with Nigeria's borrowing is not the debt ratio to GDP, but the revenue ratio to GDP, especially as tax income in 2021 has been abysmal. Nigeria's debt service to revenue ratio was 73% as at August 2021, and it was the highest in Africa. This underscores the revenue challenge the country is facing, and progressively, the manufacturing sector's contribution to GDP is reducing too. From 6.3% in 1986, 6.83% in 2013 to an average of 5.87 % in 2018 (Dalhat, 2019).

The overall statistics show that Nigeria's balance of trade on non-oil has been negative, and it is increasing progressively. The revenue profile from trade tax and other non-oil tax revenue channels that are directly connected with international trade have been poor. In 1996, VAT was N31b, CIT N22b and CED 55b. In 2000, VAT was N58.8b, CIT N51.1b and CED N101.5b. In 2010, VAT was 275b, CIT 658.4b and CED N309.2b. By 2020 and 2022 respectively, they were VAT N1531.17 & N2511.52, CIT N1275.58b & N2649.19b and CED N1562b & N2600 (FIRS, 2022 & NCS 2022). It is to be noted however that the exchange rate of Naira to US dollar and other foreign currencies had depreciated considerably. Comparatively, there was improvement in non-oil revenue collection between 2010 and 2022. However, the increase had not matched the increasing expenditure of the government as expected, and thus, the pressure on revenue profile of the economy became more precarious.

The non-oil tax income of the government is low and contributes less than 10% of the GDP, non-oil export contributes less than 15% to the GDP reflecting an abysmal performance over the years (CBN Bulletin, 2022). Thus, non-oil export contribution to tax revenue is negligible, and it does seem that it is not boosting revenue because of waivers and incentives granted. Jung, (2023) claims that tax holidays, waivers and exemptions for 2021 was about 6.8trillion Naira.

Egwakhe, Akinlabi and Odunsi (2018) report that trade openness affected trade tax revenue negatively, Atolagbe and Abiodun, (2021) report positive and significant effect on domestic revenue, whilst, Nwosa, Saibu and Fakunle (2012) indicate insignificant relationship, thus it is paradoxical that despite implementing trade and economic reform policies, revenue performance shows that Nigeria is experiencing lower tax revenue performance. Its therefore on the bedrock that this study seeks to empirically examine the effect of trade openness on non-oil tax revenue in Nigeria giving that government revenue is very pertinent to Nigeria economy considering their revenue history.

2. LITERATURE REVIEW

2.1 Tax Revenue

Taxes are used to raise revenue required to fund social programs and public investment. World Bank (2000) defines tax as a compulsory relocation of incomes from the rest of the economy to the government. Every government must therefore develop an economic framework, and ability to manage taxes, and its use for the needs of the society. Nigeria National tax policy of 2008 defines tax as a financial obligation levied on individuals or corporate entities, a burden on persons and property to generate revenue to fund government expenditure.

Musgrave and Musgrave (1984) describe taxes as withdrawal from private sector without liability to the payee by government. They are compulsory imposts, and they are classified according to their impact. Musgrave and Musgrave (1984) also posits that a good tax system should ensure that tax burdens are equitable where everyone pays his fair share, it should minimize interference with economic decision in efficient market, and where tax policy is used to achieve other objectives like investment incentives, it should be done such that it minimizes interference with equity of the system, it should permit fair and non-arbitrary administration and compliance costs such that the tax payer understands.

Musgrave (1959) taxes can be classified as direct or indirect depending on where the final burdens lie. Direct taxes are levied on individuals or organizations based on tax payers' ability, example income tax and corporate income tax. Indirect taxes are levied on production and consumption of goods and services on transaction including imports and exports. He further postulates that the purpose of taxation apart from raising funds for government expenditure has micro-economic effect (distribution of income and efficient use of resources) and macro-economic effect (on the level of capacity output, employment, prices and growth).

Tax revenue: According to Ajayi and Micah (2019) tax revenue is the total revenue generated by government of a country from natural and non- natural activities. Adam Smith (1776) defines tax revenue as compulsory payment levied by the government on individuals or companies to meet the expenditure. His famous canon of taxation emphasized the importance of tax revenue as the primacy required for government functioning and it is incumbent on every citizen to pay. According to Smith, (1776), everyone should contribute his fair share to the cost of government. His postulation was a combination of benefit principle and ability to pay principle. He posits that subjects (citizens)

ought to contribute towards the support of the government as nearly as possible in proportion to their respective abilities. In other words, a good tax system should have equity, efficiency and ease of administration Smith (1776).

2.2 Trade Openness

"Trade openness is the measure of the extent of freedom that exists in an economy for trade between countries" (Gaalya et al., 2017). There are various definitions and measurement of trade openness. Krueger (1978) "describes an open economy as one that employs favourable export-oriented policies, for example exchange rate." Harrison (1996) "in contrast sees an open economy in terms of the neutrality of the incentives between the savings from import substitution and earnings from exports. (A good measure trade policy captures difference between neutral, inward oriented and export promoting regimes)".

Squalli and Wilson (2011) "define the measure of openness as one which captures the two basic dimensions of international trade; a relatively high share of trade to overall economic activity and substantial interaction and interconnectedness with the rest of the world. An open economy must trade heavily and must be substantial contributor to world trade. Trade openness has been measured by many scholars as the ratio of import plus export to GDP."

According to Squalli and Wilson (2011), there are three popular and traditional measures used when talking about trade openness. They are (1) Import/ GDP (M/GDP) – import ratio. This measures the ratio of import to GDP. It gives an idea of how import dependent or not a country is. (2) Export/GDP (X/GDP)- export ratio. This measures the ratio of export to GDP. It gives an idea of the level of export activities in relation to the GDP. (3) Import + Export/ GDP (X+M/GDP) – trade share. This measures the relative skewness of trade with respect to the GDP. The level of skewness is what has been used to describe the level of openness of that economy. This is the conceptual understanding of trade openness and the measurement parameters adopted in most of the studies on trade, globalization and growth with respect to international trade.

2.3 Stylized Facts

Total non-oil tax revenue (TTR) trend in Fig. 1B showed an increase from 1996 through to 2001, and there was a leap from 2005 forward. The explanation for these changes emanates from introduction of VAT in 1994, review and changes in tax laws and administration as well as international trade policy. Custom duties in grey line showed a flat trend from 1999 to 2006. There was progressive increase from 2006 to 2010 with a sharp rise between 2010 and 2014. There was a sharp increase from 2014 upwards which may be due to a number of factors beyond trade openness.

The Trade Openness (TOP) trend as shown in Fig. 2 depicted initial flatness prior to 1994. Following SAP in 1986, there was consistent increase thereafter with a sharp rise from 1996 in the level of openness as the ratio increases. There was slow down between 1997 and 1998, which may be due to early stages of the incentive implementation. There was sharp rise from 1999 upwards and peaked at 2011, and the changes in trend reflects changes in economic policies and post covid 19 pandemic. There were two major deeps in the trend 2016 and 2020, while 2016 was as a result of policy changes, 2020 was more as a result of Covid 19 pandemic.

2.4 Theoretical Review

2.4.1 Laffer curve theory

The Laffer curve (Laffer, 2004) is a theory developed by supply-side economist, Arthur Laffer. "It depicts the relationship between tax rates and tax revenue that government receives. In other words, it states that a single tax exists that maximises the amount of revenue that government obtains from taxation. The curve illustrates the concept of taxable income elasticity (taxable income changes as a result of changes in the rate of taxation). The curve is usually used to describe the behaviour of individual income rates levied by government. The Laffer Curve illustrates two effects of tax revenue based on tax theory developed by Arab Scholar Ibn Khalid (1432). The theory distinguishes two tax effects for any change in tax rate as thus;"

The arithmetic effect – is the resulting impact on revenue from an increase or decrease in tax rate. for instance, if tax rate increases, the corresponding increase in tax revenue is the arithmetic effect, and vice versa. The economic effect: is the impact of the increase or decrease of the tax rate on output and employment.

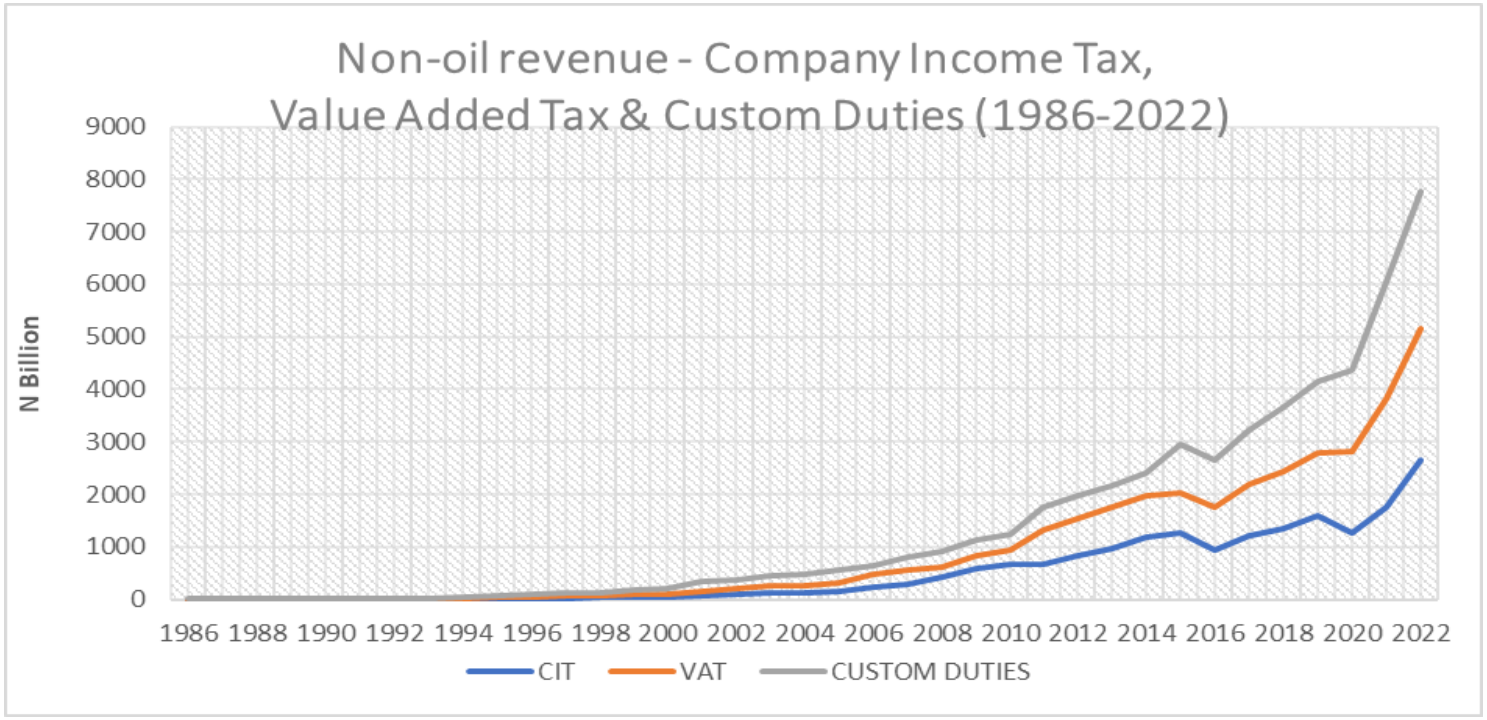

Fig. 1A. Showing non-oil tax revenue - CIT, VAT & CED in Nigeria (1986-2022)
Source: Data from CBN Statistical Bulletin 2022

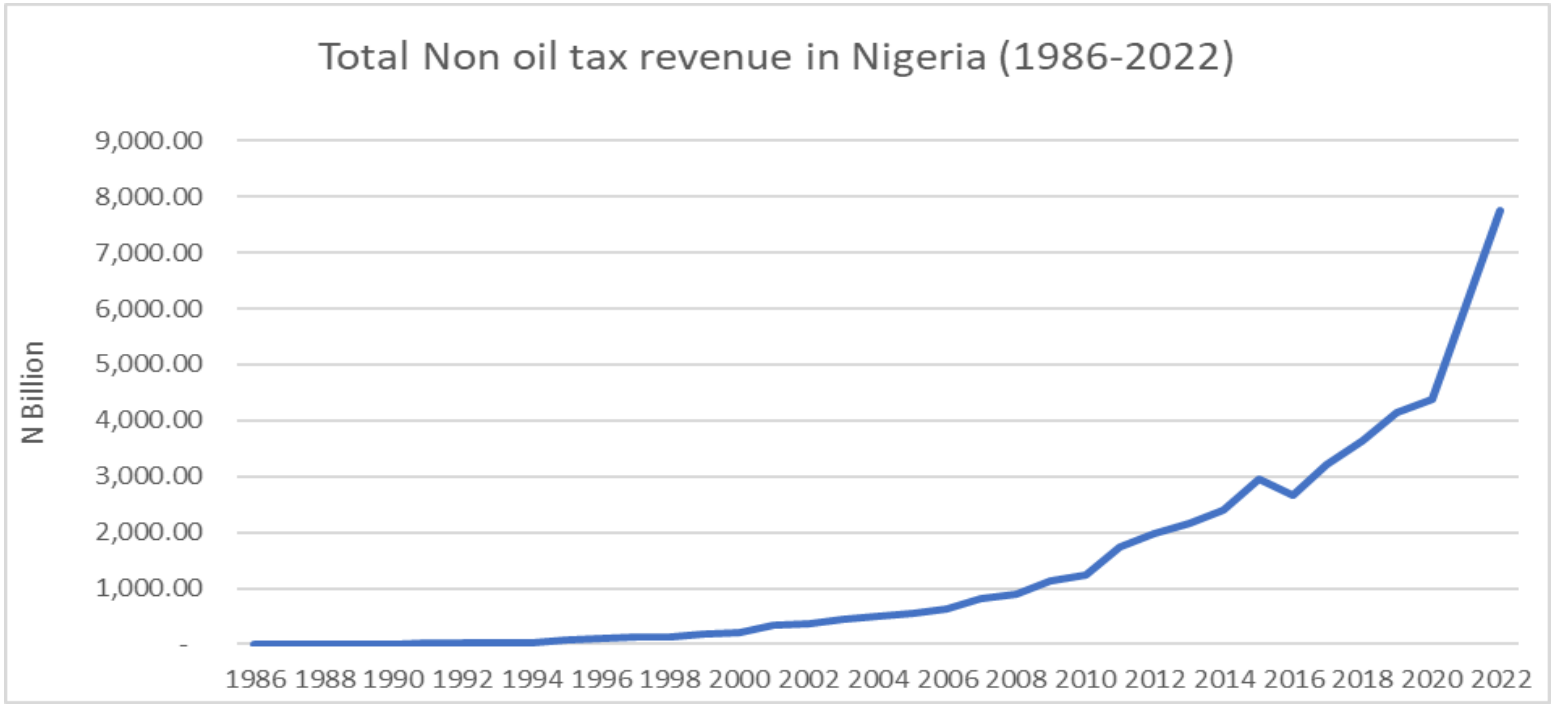

Fig. 1B. Showing total non-oil tax revenue in Nigeria (1986-2022)
Source: Data from CBN Statistical Bulletin 2022

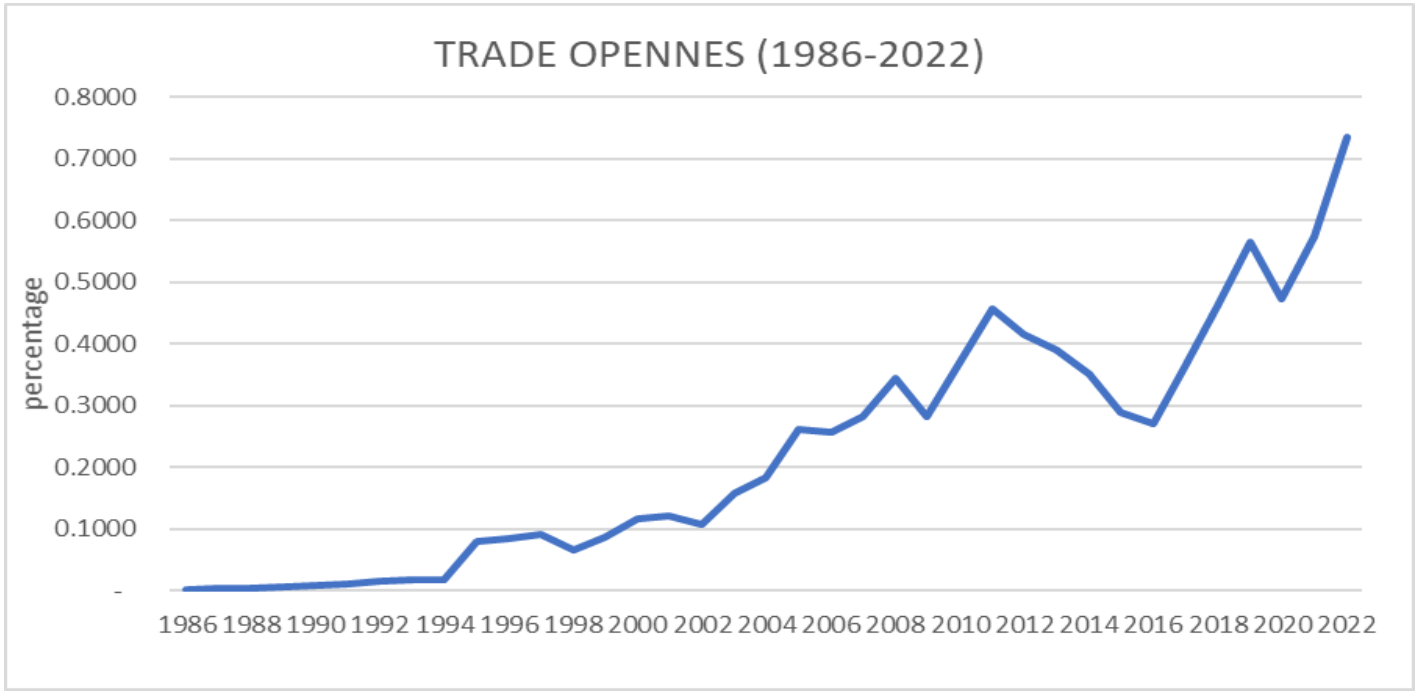

Fig. 2. Trade openness in Nigeria (1986-2022)
Source: Data from CBN Statistical Bulletin 2022

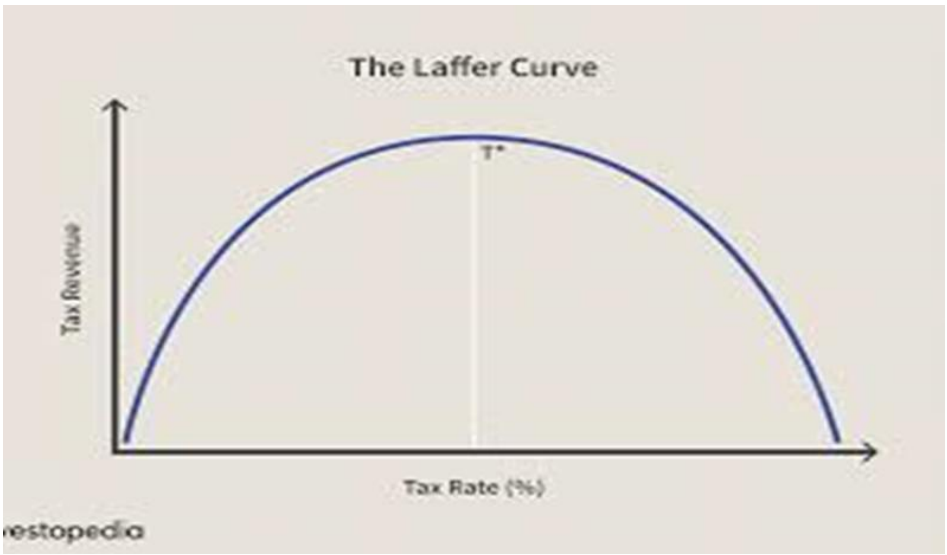

Fig. 3. Laffer curve
Source: Laffer tax theory (Laffer, 2004)

This is because tax rates act as incentives (disincentives) created to increase (decrease) work, output or employment. The economic effect of Ibn Khalid theory implies that reducing tax rates will motivate people to work more and produce more, leading to more revenue, raising tax rates produces opposite effect.

2.5 Empirical Review

Egwakhe, Akinlabi, and Odunsi (2018) investigated trade openness and tax revenue performance in Nigeria from 1987 to 2016. "The result of the study indicated that trade openness is negatively related and significant with tax revenue performance, such that 1% increase in trade openness results in over N67.323millionn loss of tax revenue, thus attributing the reason to higher import duty rates in Nigeria compared to other countries. However, this study did not indicate the effect of trade on other tax components and which tax revenue handle accounted for the impacts."

Odunsi, Egwakhe and Akinlabi (2018) assessed the effect of macroeconomic variables on tax revenue from 1987 to 2016, found a significantly positive effect of exchange rate and real gross domestic product on tax revenue performance. Inflation rate had negative but insignificant effect on tax revenue performance within the time frame. This result reinforces the call for appropriate management of macroeconomic variables. Equally the studies by Oyebanji, Adeigbe, Akintoye, and Ogundajo, (2019) on the effect of the real sector output on tax revenue in Nigeria, and Atolagbe and Abiodun (2021) on the impact of some macroeconomic variables on tax revenue in Nigeria show similar results with respect to exchange rate which affected tax revenue positively. Whilst Atolagbe & Abiodun (2021) investigation showed that all macroeconomic variables used in the study including inflation had positive effect on tax revenue, Oyebanji et al (2019) result showed that inflation negatively impacted tax revenue. It is consistent with Loganathan et al (2017) and Workineh (2016).

Further on the impact of economic variables on tax revenue, Ikhatua, and Ibadin (2019) investigated tax revenue effort in Nigeria, and found that agriculture productivity sector, tourism sector and human capital development had significant and positive impact on tax effort, manufacturing, sector, telecommunication and capital flight had significant but negative impact on tax effort in Nigeria. The study underscores the need to ensure strict and meticulous enforcement of tax rules and regulations. The need for synergy on the management of economic variables that affect tax revenue was highlighted by Ajayi and Micah (2019) on how economic variables affect taxation and tax revenue in Nigeria covering the period from 2005 to 2015. The study found that human capital development and foreign direct investment had no significant impact on tax revenue, while GDP had significant and positive effect on tax collection. Fiscal discipline and price stability is important for progress to be made.

Abomaye-Nimonebo, Eyo and Friday (2018) study on empirical analysis of tax revenue and economic growth in Nigeria from (1980 to 2015) found that petroleum profit tax, company income tax and custom & excise duties had no significant impact on economic growth in Nigeria. They also reported a unidirectional causality between petroleum profit tax, custom & excise duties and GDP, while company income tax had independence causality with GDP. Yahaya and Kabir, (2019) investigated the impact of non-oil tax revenue on economic growth in Nigeria between 1981 and 2018. The result indicated that corporate income tax (CIT) had positive and significant effect on economic growth (GDP), value added tax (VAT) and custom duties (CED) were positively related to GDP but the relationship was statistically insignificant.

Onoja and Ibrahim, (2021) on tax revenue and Nigeria economic growth and Omesi and Appah (2021), tax structure and economic growth in Nigeria: An autoregressive distributive lag evidence (1980-2018). Both studies found that there was positive and significant effect on economic growth by CIT, CED and VAT. Although, PPT was positive in the case of the study by Onoja and Ibrahim (2021), its effect was insignificant and the same is consistent with Cornelius et al (2016).

Agyei and Amankwaah (2022) on trade tax revenue and trade openness in Ghana agrees that trade openness had positive effect on trade tax revenue. The evidence suggests that the variable that influenced tax revenue significantly was trade openness. The findings indicated that trade openness positively affected trade tax revenue both in the long run and short run. Gobachew, Debela & Shibiru (2018) on determinants of tax revenue in Ethiopia result indicates that industry sector share, per capita income, foreign direct investment and trade openness had positive and significant effect on tax revenue, while agriculture share and inflation had negative and significant impact on tax revenue. This result confirms the assertion that differences in economies influence the outcome of economic variables on tax revenue and there are other variables that affect tax revenue mobilization.

2.5.1 Literature gap

Various research on this topic and related topics have used different approaches and estimation methods to show the relationship between trade openness and tax revenue, or trade openness and economic growth. This study recognises the on-going debate on the impact of trade openness and tax revenue growth. The reason for the arguments is the failure of research on trade openness on tax revenue to deliver consistent empirical results. The reason for this variability is due to conceptual and definitional understanding of what trade openness is and how it is measured (Squalli & Wilson, 2011).

3. METHODOLOGY

The study covered the period 1986-2022. The choice of this period is based on the remarkable policy changes. It marked the commencement of structural adjustment programme (SAP), which heralded a comprehensive non-oil export strategy in Nigeria. The variables of interest include total non-tax revenue (TNTR), trade openness (TO), foreign direct investment (FDI), real exchange rate (REER), inflation rate (INF), tax rate (TAXR) and real gross domestic product (RGDP). The variables were collected from CBN statistical bulletin (2022) and World Development Indicator database. These variables are directly connected with international trade, and they have interrelationship with non-oil tax revenue.

$$TNTR = f(TOP, FDI, REER, INF, RGDP) \quad ..3.1$$

$$\ln TNTR_t = \beta_0 + \beta_1 TOP_t + \beta_2 INF_t + \beta_3 \ln FDI_t + \beta_4 REER_t + \beta_5 RGDP_t + \varepsilon_t \quad ....3.2$$

$$\Delta \ln TNTR_t = a_0 + \alpha_1 \sum_{i=1}^{p} \Delta \ln TNTR_{t-1} + \alpha 2 \sum_{i=1}^{p} \Delta TOP_{t-1} + \alpha_3 \sum_{i=1}^{p} \Delta INF_{t-1} + \alpha_4 \sum_{i=1}^{p} \Delta \ln FDI_{t-1} + \alpha_6 \sum_{i=1}^{p} \Delta REER_{t-1} + \alpha 7 \sum_{i=1}^{p} \Delta \ln RGDP_{t-1} + \beta_1 \sum_{i=1}^{p} \Delta TOP_{t-1} + \beta_2 \sum_{i=1}^{p} \Delta INFt\text{-}1 + \beta_3 \sum_{i=1}^{p} \Delta \ln FDI_{t-1} + \beta_4 \sum_{i=1}^{p} \Delta REER_{t-1} + \beta_5 \sum_{i=1}^{p} \Delta \ln RGDP_{t-1} + \mu_t \quad .....(3.3)$$

Where:

Δ are the first difference operator,
α_0 denotes the constant term,
α_1 is the trend,
p is the optimal lag length,
α_2 - α_6 represent the short-run dynamics of the model
β_1 - β_5 are the long-run coefficients,
is the white-noise error term
ECT_{t-1} = the error term

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Table 1. Tabular representation of descriptive statistics

	FDI	INF	REER	TNTR	TOP	RGDP
Mean	2.76E+09	19.40027	111.6616	1377.386	0.224365	41360.85
Median	1.88E+09	12.87000	100.4900	489.7000	0.182758	36057.74
Maximum	8.84E+09	72.83000	275.2900	7760.710	0.735103	72393.67
Minimum	1.87E+08	5.380000	50.16000	2.830700	0.000876	17007.77
Std. Dev.	2.57E+09	17.33909	53.71469	1867.828	0.196212	20455.24
Skewness	1.026189	1.764573	1.833642	1.716898	0.629117	0.341551
Kurtosis	2.891778	4.835454	5.776380	5.578038	2.543634	1.465798
Jarque-Bera	6.511954	24.39496	32.61744	28.42406	2.761779	4.348126
Probability	0.038543	0.000005	0.000000	0.000001	0.251355	0.113715
Sum	1.02E+11	717.8100	4131.480	50963.30	8.301499	1530351.
Sum Sq. Dev.	2.38E+20	10823.18	103869.6	1.26E+08	1.385972	1.51E+10
Observations	37	37	37	37	37	37

Source: Authors computation using E-views 9 (2024)

From the result at Table 1, it is observed that there is a significant difference between the minimum and maximum values of the series. These differences show that within the period under study, there is a significant variation in the trends of the variables. Statistical distribution of the series denotes that all the variables are positively skewed and the kurtosis result shows that foreign direct investment and trade openness are platykurtic in nature while inflation rate, real effective exchange rate, total non-oil tax revue are leptokurtic in nature. The implication of this is that the sample data are normal distribution.

4.2 Stationary Test Result

The unit root test results as depicted in Tables 2 and 3 show that the variables are not integrated in the same order of integration. From the results, inflation rate (INF), non-tax total revenue (lnNTTR) and real effective exchange rate (REER)

4.3 Models' Estimation Output

4.3.1 Optimal lag length selection

The selection of an optimal lag length was very crucial in carrying out ARDL regression analysis. The results in Table 4 presents different lag length criteria and the respective lag length chosen.

The result depicts that different lag criteria has their respective lag length. The most commonly use lag criteria is Akaike Information Criteria (AIC). From the result depicted in Table 4, AIC choses lag 2 as the best lag length for the model.

4.3.2 Bound test

From the result at Table 3, f-statistics value (4.89) is greater than the upper bound value (3.79). This implies that there is co-integration among the variables. Thus, long run model result will be interpreted as there is long run relationship between trade openness and non-oil tax revenue in Nigeria.

4.3.3 Estimation result

From Table 6 panel A, lag value of non-oil tax revenue had a significant positive effect on the non-oil tax revenue (β_1 = 0.91, p-value = 0.0000 < 0.05). The result denoted that the previous value of non-oil tax revenue was significant factor in determining the current value of non-oil tax revenue in Nigeria.

Trade openness had positive insignificant effect on non-oil tax revenue in the short run in Nigeria (β_2 = 0.56, p-value = 0.086 > 0.05). However, it had a positive significant effect in the long run (α_1 = 0.609, p-value = 0.0069 < 0.05). This therefore, shows that a percentage increase in trade openness led to 61% increase in non-oil tax revenue in the long run. By implication, non-oil tax revenue in Nigeria is significantly influenced by trade openness in Nigeria. Furthermore, real gross domestic product had a long run positive significant effect on non-oil

Table 2. Tabular representation unit root test using Augmented Dickey Fuller (ADF)

Series	5% Critical Value At levels	5% Critical Value At first differences	ADF at levels (Prob.)	ADF at first differences (Prob.)	ADF Test at levels	ADF Test at first difference	Equation Specification	Order of integration
INF	-2.94	-	0.0150	-	-3.470212	-	Intercept	I(0)
LnFDI	-2.97	-2.97	0.1425	0.0000	-2.424247	-7.288912	Intercept	I(1)
LnTNTR	-2.94	-	0.0149	-	--3.467218	-	Intercept	I(0)
REER	-2.94		0.0022	-	-4.198658	-	Intercept	I(0)
TOP	-2.94	-2.94	0.9950	0.0005	-0.946188	-4.765325	Intercept	1(1)
LnRGDP	-2.94	-2.94	0.7682	0.0093	-0.925238	-3.663147	Intercept	1(1)

Source: Authors computation using E-Views 9.0(2024)

Table 3. Tabular representation unit root test using Phillip Perron Fuller (PHP)

Series	5% Critical Value At levels	5% Critical Value At first differences	PHP at levels (Prob.)	PHP at first differences (Prob.)	PHP Test at levels	PHP Test at first difference	Equation Specification	Order of integration
INF	-2.94	-	0.0497	-	-2.958276	-	Intercept	I(0)
LnFDI	-2.94	-2.95	0.1866	0.0000	-2.270484	-7.357440	Intercept	I(1)
LnTNTR	-2.94	-2.94	0.0000	-	-10.63413	-	Intercept	I(0)
REER	-2.95	-2.95	0.0016	-	-4.323583	-	Intercept	I(0)
TOP	-2.95	-2.95	0.9982	0.0006	- 1.314147	-4.667330	Intercept	1(1)
LnRGDP			0.8268	0.0074	-0.728259	-3.751091	Intercept	1(1)

Source: Authors computation using E-Views 9.0(2024)

Table 4. Lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	30.69138	NA	0.011192	-1.657509	-1.426220	-1.582114
1	71.78375	66.27801*	0.000844	-4.244113	-3.966567*	-4.153640*
2	72.87720	1.693090	0.000842*	-4.250142*	-3.926339	-4.144590
3	73.01638	0.206520	0.000893	-4.194605	-3.824544	-4.073975

Source: Author's computation using E-views 9 (2024)
** indicates lag order selected by the criterion*
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final Prediction Error
AIC: Akaike Information Criterion

Table 5. Tabular representation of bound test result

Test Statistics	Value	K
F-statistic	4.899660	5
CRITICAL VALUE BOUNDS		
Significance	10 Bound	11 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Authors Computation Using E-Views 9 (2024)

Table 6. Long and short run estimation output

PANEL A: SHORT RUN MODEL				
Variable	**Coefficient**	**Standard error**	**T-statistics**	**Probability**
LNTTR(-1)***	0.919060	0.057474	15.99083	0.0000
D(TOP)*	0.564250	0.316590	1.782270	0.0860
D(INF)*	0.003384	0.001732	1.953954	0.0611
D(LNFDI)	-0.051349	0.032855	-1.562867	0.1297
D(REER)*	-0.001167	0.000649	-1.798556	0.0833
D(LNRGDP)	-0.298182	0.188539	-1.581535	0.1254
CointEq(-1)	-0.008900	0.035113	-2.534894	0.0071
PANEL B: LONG RUN FORM				
TOP**	0.609542	0.134403	4.535183	0.0069
INF	0.180189	0.377547	0.477264	0.6370
LNFDI	2.693681	5.466212	0.492787	0.6261
REER	-0.011770	0.034437	0.341784	0.7352
LNRGDP**	0.277688	0.062674	4.430680	0.0081
C	3.316534	8.070604	0.410940	0.6844

, ** and * denote significant at 10%, 5% and 1% respectively*

tax revenue in Nigeria (α_5 **=** 0.277, p-value = 0.0081 < 0.05). This shows that a percentage increase in real gross domestic product led to 0.27% increase in non-oil tax revenue in Nigeria. It was noted from the result that inflation rate, real effective exchange rate and foreign direct investment had no significant effect on non-oil tax revenue in Nigeria. These findings are in agreement with the findings of Agyei and Amankwaah (2018) who found that trade openness has positive significant effect on trade tax revenue. However, it contradicts the findings of Egwakhe, Akinlabi, and Odunsi (2018) who found that trade openness has negative effect on tax revenue.

4.4 Post-Estimation Test

Hypothesis:

H_0: There is no serial correlation.

Table 7. Breusch-Godfre Serial Correlation LM test

F-statistic	0.227807	Prob. F(2,26)	0.7979
Obs*R-squared	0.619985	Prob. Chi-Square(2)	0.7335

Source: Authors computation using E-views 9 (2024)

The results above showed the prob. (chi-square) having a value of 0.7335 which is greater than 5% significance level. Therefore, the null hypothesis is accepted implying that there is no serial correlation in the model.

Table 8. Tabular representation hetroscedasticity result

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.515277	Prob. F(7,28)	0.2028
Obs*R-squared	9.890706	Prob. Chi-Square(7)	0.1949
Scaled explained SS	6.882925	Prob. Chi-Square(7)	0.4412

Source: Authors computation using E-views 9 (2024)

Hypothesis:

H0: homoskedasticity

At 5% significant level, probability level is 0.5672 which is greater than 0.05. Therefore, null hypothesis is accepted. This means that the variance for the residuals is uniform (homoscedasticity).

Normality Test:

H_0: The sample data are not significantly different than a normal population
H_1: The sample data are significantly different than a normal population

Probability > 0.05 accept the null hypothesis
Probability < 0.05 reject the null hypothesis

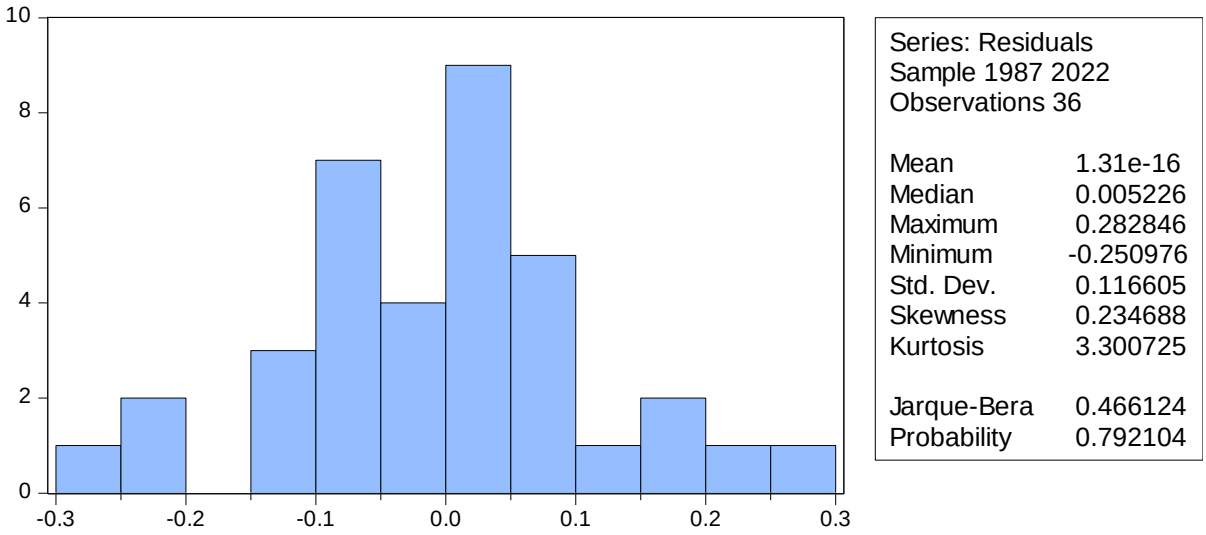

Fig. 4. Histogram of the normality test

Source: Authors computation using E-Views 9.0(2024)

From the above result, the probability is 0.792 and this is greater than 0.05 at 5% significant level and therefore the null hypothesis is accepted. This means that residuals are normally distributed.

Stability Test: The cumulative sum (CUSUM) of recursive residuals and the CUSUM of square (CUSUMSQ) tests are applied to assess the parameter stability. The CUSUM test identifies systematic changes in the regression coefficients, while the CUSUMSQ test detects sudden changes from the constancy of the regression coefficients.

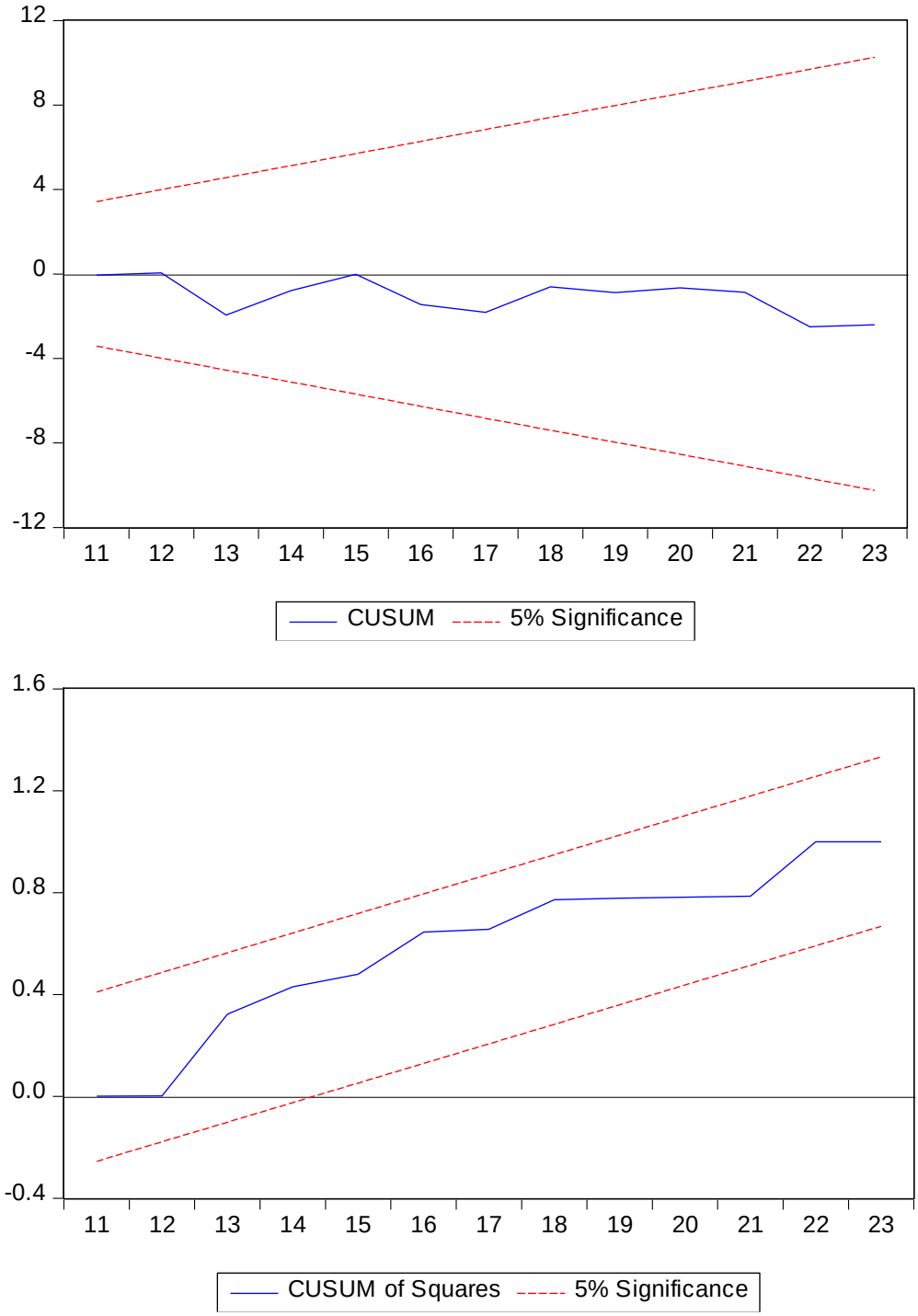

Fig. 5. Stability test

There are two important lines in the graphs above. The red lines represent 5% significant level while the blue line represents CUSUM stability line. If the blue line is in-between the two red lines, the model is stable. But if the CUSUM blue line is above or below the two red lines, the

model is not stable. Based on the results, the red line lines lie in-between the blue lines in the both graphs. This shows that the model is stable.

5. CONCLUSION

Trade openness shows the degree at which a country is involved in international trade. It is also worth noting that no country is self-sufficient. So, almost every economy is involved in international trade. Nigeria operates an open economy. So, the country is fully involved in international trade. The country imposes both tariff and exercise duties. These taxes are injection into the economy. Therefore, it is expected that trade openness should have a positive effect on non-oil tax revenue as the economy is involved in both import and export. This study has empirically examined the effect of trade openness on non-oil tax revenue in Nigeria. The study documented that trade openness and real gross domestic product had positive significant effect on non-oil tax revenue in Nigeria. Based on the findings of this study, it is recommended that international trade should be encouraged as it generates income through taxation in Nigeria. However, concern should be to encourage more exportation to maintain favorable balance of payment.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Abomaye-Nimenibo, W. A.S, Eyo, M.J, & Friday, H.C. (2018). An empirical analysis of tax revenue and economic growth in Nigeria from (1980 to 2015). *Global Journal Human Social Science; 4(3); 57-69.*

Agyei, S.K. & Idan, G.A. (2022). Trade openness, institutions and inclusive growth in SSA. Sage open access. https//journal.sagepub.com/home

Ajayi, O & Micah, C.L. (2019). Economic variables and tax revenue in Nigeria. *International Journal of Innovative Finance and Economics Research* 7(1),128-143.

Atolagbe, S., & Abiodun, A. A. (2021). Impact of some macroeconomic variables on tax revenue

Cage, J. & Gadenne, L. (2016). Tax revenues, development, and the fiscal cost of trade liberalization, 1792-2006. *Warwick Economic Research Papers* 1132.

Dalhat, L.S. (2019). Overview of export expansion grant (EEG) scheme. Nigeria Export

Egwakhe, J.A., Akinlabi, H. A. & Odunsi, K. (2018). Trade openness and tax revenue performance in Nigeria (1987-2016*), International Journal of Academic Research in Business and Social Science*s *8*(12), 1161-1174.

Gaalya, M.S., Edward, B. & Eria, H. (2017) Trade openness and tax revenue performance in East African countries. Modern Economy,8(1), 690-711.

Gobarchew, N, Debela, K.L, & Shibiru, W. (2018). Determinants of tax revenue in Ethiopia. *Economics* 6(1), 58-64.

Harrison, A. (1996). Openness and growth: A time series, cross-country analysis for developing countries, *Journal of Development Economics*, *48*(2), 419-447.

Ikhatua J.O. & Ibadin, P.O. (2019). Tax revenue in Nigeria. sourced from https//www.afri.sciedupress.com. 8(1), 103-117. in Nigeria. *Nigerian Journal of Basic and Applied Sciences*, *29*(2), 17-29

Jung, IL. (2023). Nigeria's tax revenue mobilization: lessons from successful revenue reform episodes. International Monetary Fund.

Krueger, A.O. (1978). A re-examination of the role of income for the trade and environment debate, *Ecological Economics 68*(1) 106-115.

Laffer, A. B. (2004). The Laffer curve past, present and future. Executive summary background notes No. 1705. *The Heritage Foundation,* No. 1765.

Loganathan, N. Ahmad, N. Subramanian,T. & Taha, R. (2020). The dynamic effect of growth, financial development and trade openness on tax revenue in Malaysia. *International Journal of Business and Society* 21(1).

Mickey & Milner, (2002). On mixed strategies for development. *Review of Development Economics*, 6(3) 303-313.

Musgrave, R. A. & Musgrave, P. B. (1984). *Public finance in Theory and Practice 4th edition*. New York: McGraw Hill.

Musgrave, R.A. (1959). The Theory of public finance: A study in Public Economy.

Nwosa, P.I., Saibu, M.O. & Fakunle, O.O. (2012). The effect of trade Liberalization on trade tax revenue in Nigeria, *African Economic and Business Review*, *10*(2).

Odunsi, K. O., *Egwakhe*, J.A. & Akinlabi, H. B. (2018). Macroeconomic dynamics and tax revenue performance in Nigeria (1987-2016) *International Journal of Research Science and Management.* DOI: 10.5281/zenodo.1490735

Omesi, I., & Appah, E. (2021). Tax structure and economic growth in Nigeria: An auto regressive distributive lag evidence from 1980–2018. *BW Academic Journal*, *2021*.

Onoja, E. E. & Ibrahim, A.S. (2021). Tax revenue and Nigeria economic growth. Journal of Economics and Business Studies 7(2), 102-124

Oyebanji, J. O., Adeigbe, F. F., Akintoye, I. R., & Ogundajo, G. O. (2019). Effect of the Real Sector Output on Tax Revenue in Nigeria. Fountain University Osogbo Journal of Management (FUOJM), 4(2), 112-125. Promotion Council capacity building programme

Smith, A. (1776). *An Enquiry into the nature of causes of wealth of the Nation*. Gulbenklam, Lisbon, 163-300.

Squalli, J. & Wilson, K. (2011). A new measure of trade openness, *The World Economy,* 23-*70*

Subasat, T. (2009). Does simultaneous implementation of import substitution and export promotions neutralize each other. *Journal of Developing Areas,* 43(1) 43-63. Sourced from https//www.jstor.org/stable/40376272.

Terefe, K.D., & Teera, J. (2018). Determinants of tax revenue in East African countries: An application of multivariate panel data cointegration analysis. *Journal of Economics and International Finance, 10*(11), 134-155.

Turan, T and Karakas, M. (2016). The effect of trade openness and income on the size of a government. *Transylvanian Review of Administrative Sciences,* 47, 164-178

Zarra-Nezhad, M, Ansair, M.S & Moradi, M (2016) Determinants of tax revenue: Does liberalization boost or decline it? *Journal of Economic Co-operation and Development 37*(2) 103-126.

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