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Determinants of Tax Performance in Nigeria: An ARDL Analysis of Economic, International, and Financial Factors

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Abstract

In the Nigerian context the drop-in oil revenue calls for the need to diversify the economy by improving on the non-oil tax revenue generation means to meet up with contemporary challenges. Also, the shortage of tax revenue due to low budgets in developing countries may be a result of public institution's inefficiencies and economic ills. This study investigated the determinants of tax revenue in Nigeria. The secondary data was sourced from the Central Bank statistical bulletin and the World development indicators from the period 1991 to 2022. The study employed the Auto-regressive distributed lag, which helps to determine the short-run and long-run relationship between the dependent variable and independent variables. The finding revealed that the GDP per capita has a positive significant effect on tax revenue while the Inflation rate has a negative significant effect on tax revenue both under the economic factors. The international factors of foreign direct investment have a positive significant effect on tax revenue while the financial factor of the loan-to-deposit ratio has a negative significant effect on tax revenue. It therefore concluded that economic factors, international factors, and financial factors selected in this paper, have the peculiarity to improve the tax performance and revenue in Nigeria. Based on this findings it is recommended that the government should enhance fiscal policies through leveraging on the positive impacts of GDP per capita and foreign direct Investment on tax revenue. The challenges posed by inflation and loan-to-deposit ratio could affect the financial stability and intermediation prowess of the institution which would have a long-run impact on the country's tax revenue.

Keywords: *Tax Performance; Economic factors; International factors; Social factors; Financial Factors; ARDL; Nigeria.*

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Introduction

Improvement and sustenance of economic development are the goals of every developing and developed economy. In their quest to attain this development, macroeconomic policies, fiscal policies, and trade policies are government tools deployed at times to ensure scarce resources are efficiently utilized to meet the welfare needs of the populace. In developing countries like Nigeria, the problem of fiscal deficit is significant due to the gap in understanding the macroeconomic determinants that will help the country stabilize and increase overall tax revenue and performance (Olaoye et al., 2018; Akintoye et al., 2019).

However, in the government's quest to solve this fiscal deficit, they are exposed to raising resources through borrowings, receipt of aid, printing of money, and taxation. It is important to note that taxation is a fiscal tool used to increase government revenue, not merely receipts. Akintoye et al. (2019) investigated the institutional and economic factors that influence tax revenue in Nigeria. Studies by Zarra-Nezhad et al. (2016), Ade et al. (2018), Awadh et al. (2023), Ibrahim & Jairo (2023), Nugraha & Wijaya (2023), Wijaya & Dewi (2023), Mondjeli & Nomo-Beyala (2023), and Manan et al. (2022) revealed various factors in terms of international, taxation-related, economic, institutional, and socio-economic aspects that determine tax performance in an economy. Despite these studies, which focus mainly on developing economies, the role of financial factors in determining tax performance in Nigeria remains unanswered. This inquiry examines the impact of economic, international, social, and financial factors on tax performance in Nigeria.

Taxation, which is a key component of tax performance, is the most viable revenue channel to finance government spending on goods and services demanded by society (Nugraha & Wijaya, 2023). Economic growth is one of the indicators that determines the sustainability of governments in funding health, education, and infrastructural amenities (Al-Qudah, 2021), which reflects the level of tax performance in an economy, measured by the proportion of tax revenue to the country's gross domestic product (Olaoye et al., 2018). The inflation rate is another economic factor that reflects economic instability. Casteneda Rodriguez (2018) and Maka et al. (2021) show that inflation negatively impacts tax revenue.

Moreover, international factors are policies that facilitate the inflow of technology, increase workforce capacity, and boost industrial and manufacturing productivity, which ultimately improves tax revenue (Ferguson & Langer, 2021). The influx and continuous increase in foreign direct investment can increase overall taxation, which in the long run would improve the tax performance of the economy (Piancastelli & Thirlwall, 2021; Sonia & Suparmu, 2019). Trade openness, the result of trade liberalization and globalization between countries seeking trade advantages, can improve technology transfer and stimulate tax revenue in recipient countries (Min Ha et al., 2022; Eilu, 2018).

Furthermore, financial factors play a crucial role in stimulating the tax revenue of an economy. These factors include the ability of financial institutions, especially deposit money banks, to provide viable loans and advances to deficit sectors, which stimulate investment and increase the government's tax revenue (Rauf et al., 2021; Mana et al., 2022). A high loan-to-deposit ratio within deposit money banks can increase economic growth, investment, and employment levels in the country (Ozili, 2019; Mana et al., 2022). The buoyancy and responsiveness of state-owned and private institutions in paying their corporate income tax and reducing tax avoidance would enhance tax revenue, which in the long run would spur economic growth and development (Besley & Persson, 2014). The availability of education, improvements in healthcare infrastructure, and increases in per capita income would, at the micro-level, enhance individuals' earning capacity and stimulate their savings-investment culture, creating a micro-dynamic that would positively affect personal income tax and excise duty tax once their savings translate into investments. It is on this premise that this study investigates the determinants of tax performance in Nigeria.

Review of Related Theoretical Literature

Tax Performance

Tax revenue includes payments made in the form of payroll taxes, sales taxes, social security benefits, payroll taxes on goods and services, income and profit taxes, and other taxes (Tyokoso, 2021). Tax revenue is the name for the money that governments make through collecting taxes. Taxation is the main source of income for a state. Potential sources of income include people, businesses, governments, royalties from the use of natural resources, and international aid (Ayeni and Cordelia, 2022). Duty on imports is regulated by the Customs and Excise Act 91 of 1964. In

the schedules of the Customs and Excise Act, they are frequently calculated as a percentage of the item's value. Contrarily, certain goods such as meat, fish, tea, some textiles, and some guns are subject to duty rates that are determined as a percentage of the value or as cents per unit (such as per kilogram or meter), according to Odusola (2006).

Customs duties are the oldest type of modern taxation in Nigeria. They are referred to as import duties and were first implemented in 1860. The taxes on imports into Nigeria are imposed either as a fixed amount depending on quantity or as a percentage of the goods' value. The most lucrative indirect tax in the nation is the spending tax known as import tariffs. Customs taxes were as high as 300 percent before the Structural Adjustment Programme (SAP) was put into effect in 1986, but they now fall between 2 and 75 percent. The tax was enacted with the support of the Customs and Excise Management Act of 1958 and its revisions (Yaro and Adeiza, 2021). The Customs and Excise Acts of 1962 and 1965, as well as the Customs and Excise Tariff Decree of 1995, all impose excise duties, which were initially enacted in 1962, as an ad valorem tax on the production of manufactured goods. Items created in Nigeria and included in the fifth schedule to the Act are subject to excise duties at the rates specified in the duty column of the schedule, according to Part III Section I of the Customs, Excise Tariff (Consolidation) Act 1995.

The New Growth Theory

The New Growth Theory is an economic framework that combines both internal and external factors to explain and enhance economic growth. Unlike traditional neoclassical growth theories, which often focused on diminishing returns to capital and exogenous technological progress, the New Growth Theory, developed in the late 20th century, emphasizes the role of endogenous factors, such as human capital, innovation, and knowledge accumulation, as well as the influence of external factors like technology spillovers, international trade, and institutions (Romer, 1990; Barro and Sala-i-Martin, 2003). The New Growth Theory builds upon and extends the insights of Endogenous Growth Theory, incorporating elements that were previously considered exogenous. This theory suggests that policy interventions, investments in education, research and development, and improvements in institutions can foster sustained economic growth. (Howitt, 2000; Acemoglu, Johnson, and Robinson, 2005). Additionally, it recognizes the importance of external factors, such as the diffusion of technology across borders and the impact of globalization on economic development. Prominent economists associated with the development of the New

Growth Theory include Paul Romer, Robert Lucas, and Robert Solow. Their work has contributed to a more comprehensive understanding of the factors driving economic growth and has influenced policy discussions on how to promote long-term economic development (Romer, 1990; Barro and Sala-i-Martin, 2003; Howitt, 2000; Acemoglu, Johnson, and Robinson, 2005). This inquiry intends to test the validity of the theory in the context of tax revenue, which is a micro and fiscal enabler in the attainment of economic growth and development in any economy. The internal factors according to this theory and inquiry are the economic factors (GDP per capita, Exchange rate, and inflation rate) and social factors (human development index), financial factors (loan-to-deposit ratio) while the external factors according to this theory and inquiry are the international factors (foreign direct investment, external debt, and trade openness).

Benefit-Received Theory

The principle of benefit received is a concept present in both the domains of tax philosophy and public finance theory. The benefits metric was developed by two Swedish economists, Johan Gustaf Knut Wicksell (1851 –1926) and Erik Lindahl (Chauke, 2023). These two Swedish economists originally developed its use for evaluating the effectiveness of taxation and assessing fiscal policy between 1891 and 1960 (Chauke, 2023). This idea posits that the tax revenue collected to fund public goods should be commensurate with the degree of political preparedness to do so (Dodge, 2005). In accordance with this concept, an individual's tax obligations should be commensurate with the advantages they receive from the government (Dodge, 2005; Bala, Enoch, & Yakubu, 2021). The benefit-received theory of taxation posits that individuals and firms should obtain government products and services in a manner similar to the acquisition of other commodities (Dodge, 2005; Bala, Enoch, & Yakubu, 2021). Road user charges serve as a compelling example of this phenomenon. Individuals who have the right to operate vehicles on public roadways bear the responsibility of contributing to the expenditures that support their maintenance and expansion. Primary reasons or applications of the benefit principle of taxation are as follows: the theory recognizes that the purpose of taxation is to finance government services and that individuals should pay taxes based on the benefits they receive from government expenditures (Dodge, 2005; Minh Ha, et al., 2022; Bala, Enoch, & Yakubu, 2021).

The benefit principle posits that taxes serve a function similar to price in private markets (Chauke, 2023). This approach may lead to an economically efficient outcome since the allocation of

resources through the public sector will effectively respond to consumer demands (Chauke, 2023). Pertaining to certain specific taxes, such as the fuel tax or the betterment tax, it also considers the benefits individuals obtain from paying these taxes (Chauke, 2023). The core concept of this tax has faced significant criticism due to its inherent nature as a mandatory payment, without any direct exchange of services for monetary worth (Chauke, 2023). Hence, if the state upholds a specific correlation between the benefits administered and the advantages acquired, this concept contradicts the basic principle of taxation as it contradicts its underlying logic.

The Social-Political Theory

German economist Adolf Wagner played a significant role in the development of the socio-political theory of taxation. Wagner's socio-political theory of taxation underscores the need of using taxation not just for revenue generation, but also for the purpose of addressing social and economic disparities, advancing social welfare, and guaranteeing sustained economic stability. This idea is based on the proposition that the state has a responsibility to redistribute wealth and resources in order to attain social fairness and enhance the general welfare of its population. Ogbonna and Appah (2012) supported this rationale and provided validation for the implementation of taxes to fund governmental operations and to establish a framework for distributing the tax burden among individuals in society. They proposed a tax system that is not intended to benefit individuals, but rather to address the fundamental problems of the society as a whole.

The society comprises individuals but it transcends the mere aggregation of its individual members. Therefore, the tax system should be orientated towards the well-being of the society as a whole, as individuals are an essential component of the larger society (Chigbu, 2016). This idea argues that the tax system established by the state should not be designed to benefit some individuals to the detriment of the broader population. The socio-political theories of taxes encompass a wide array of viewpoints regarding the nature of government, the allocation of resources, and the concepts of fairness and equality. Each theory provides distinct perspectives and recommendations on the specific design and execution of tax policy to accomplish diverse social, economic, and political objectives.

Review of Related Empirical Literature

Ibrahim and Jairo (2023) explore the determinants of tax revenue performance among countries in East African countries (Burundi, Kenya, Rwanda, Tanzania, and Uganda). The theme of the study was to investigate how GDP per capita, population growth, trade volume, agricultural value, and corruption index. Also, apart from the above the administration efficiency was deployed in testing impact tax revenue. The results revealed that deployed administrative efficiency has a positive significant effect on revenue performance while the long run shows that per capita income and institutional variables affect tax revenue.

Mondjeli and Nomo-Beyala (2023) examine the influence of economic complexity on improving tax revenue. The theme of the inquiry was to determine how the human development Index, Income inequality, and other economic factors improve the tax revenue of 124 developed and developing countries. The finding from the correlation and regression analysis depicts that economic complexity improves economic development and human capital and reduces income inequality, which helps to improve tax collection and performance. This study only considers the social and economic factors that can improve tax performance which was different from the inquiry of Awadh et al (2023) that combines three (Economic, Institutional, and Structural) and NUgraha & Wijaya (2023) that capture only the international factors and measure that can affect tax revenue.

Nugraha and Wijaya (2023) in their inquiry examine into determinants of tax revenue in Latin America and the Caribbean (LAC) from 2002 to 2019. The theme of this is to investigate the influence of international transactions in the measures of foreign direct investment, trade openness, and External Debt, how this international construct increases or decreases the overall tax revenue of the country, niching on the liberalization prospect of the country depending on external capital and interaction.

The secondary data was sourced from World Bank indicators from 2002 – 2019. The study employed the Pooled Regression analysis, for inference determinants, the finding revealed foreign direct investment hurts tax revenue, but the combination of external debt and trope openness income. Positive significant impact on tax revenue. This study only focuses on the International factors of the determinants of tax revenue, different from the works of Ibrahim & Jane (2023),

Aduahet (2023), Nugraha & Wijaya (2023) that capture the administrative factor of tax, structural factor, Economic factors, and institutional factors to effect a positive impact on tax revenue and performance.

Awadh, Ngowi, and Rwezaula (2023) in their inquiry investigated the determinants of tax productivity performance in Nigeria. The theme of the study was to examine the combined effect of economic factors (GDP, GDP per capita), structural factors (Trade volume, Agricultural sector to GDP, Industrial sector to GDP), and Institutional factors (control of corruption and regulatory quality) on tax revenue level in Tanzania. The secondary data was from 1996 to 2020, which is a total of twenty-six time series data. The multiple regression analysis was employed which revealed that the two economic factors, agricultural to GDP and regulatory quality have positive significant effects on total tax to GDP. The study could give a short and long-run inference by deploying better econometric modeling. The findings correlated with the works of Zarra-Nezhad et al. (2016) that economic factors would increase the tax revenue in an economy.

Lestari and Yolanda (2023) the study examined the determinant factors that shed light on the relationship between taxation and the Human Development Index. The theme was to focus on the factors that spur tax revenue and HDI determines the volume and directional impact on the tax revenue. The explanatory variables of tax revenue include tax ratio, Genus bunga, No of working age population, Export, and Human Development Index while outcome variable or tax revenue. The study employed the co-integration test, and multiple regression analysis depicts that interest rates, tax ratios, working-age population, and exports affect tax revenue in the long run and short run which have a holistic impact on Economic growth

Wijaya and Dewi (2022) in their inquiry examine the influence of determinants of tax revenue in Indonesia before the occurrence of COVID-19. The theme of the study was to examine various macroeconomic, institutional social, and international factors that impacts tax revenue. The study employed the FEM.GLS Heteros Auto-regressive Model from the period of 2014 -2019, the finding reveals that FDI, HDI, population, corruptional level, inflation rate, Trade openness, and market size have a positive significant effect on tax revenue.

Manan, Nawaz, Ahmed, and Talib (2022) examined the determinants of tax revenue: empirical from Pakistan. The theme of the study is to test the impact of economic and financial factors on tax revenue. Economic variable (GDP per capita, Foreign aid, and broad money) while financial factor (Bank capital total asset ratio, Bank Non-performing loan-to-total gross loans, and the risk premium on lending. The theory in the inquiry includes benefit received theory, socio-political theory, and Ricardian equivalence theory. The secondary data was between 1980-2019, which allowed the Auto-regressive distributed lag to be used to determine the short and long-run relationship. The findings revealed that all the selected financial variables have a positive significant impact on tax revenue while economic variables also have a positive effect apart from GDP per capita.

Maryantika and Wijaya, (2022) examined the determinants of tax revenue, using economic growth as a mediating variable. The theme was to capture social factors (human development, corruption, and government spending) and how they inter-change and contribute to tax revenue. The study was conducted in 10 provinces between 2010-2019 using the purposive sampling technique. The multiple regression analysis revealed that government spending, human development, and economic growth have a positive effect on tax revenue while corruption hurts tax revenue.

Hanrahan (2021) investigated the concept of digitalization being a determinant of tax revenue in OECD countries. The theme of the study includes the measure of digitalization (IP addresses IPv4 and IPv6) on; contribution to tax revenue with another above-mentioned variable on tax revenue. The secondary sources are from 1995 to 2018. The OECD countries were employed for this inquiry, and usage of static and dynamic panel analysis revealed that digitalization hurts tax returns in the selected countries.

AL-Qudah (2021) investigated the determinants of tax revenue. The study employed the ARDL Bound test to determine the short-run and long-run relationship between the explanatory variables of the industrial sector to GDP, Per capita GDP, Fiscal deficit, Foreign aid, Government expenditure, and Economic openness on tax revenue. The secondary data was sourced between 1990 to 2019. The findings revealed that per capita GDP, Fiscal deficit, foreign aid, and government expenditure are good determinants of tax revenue in the short-run and long-run

Piancastelli and Thirlwall (2021) examined the determinants of tax revenue and tax effort in developed and developing countries. This inquiry captured some of the determinants in Wijoya and Dewi (2022) and Ibrahim and Jaro (2023) which are the productive structure and financial transaction of financial deepening. The study combined the attributes of developed economies and developing economies. The secondary was sourced between 1996 – 2015, which revealed that institutional variables to measure tax effort differ with percentage differences from South Africa and Switzerland.

Akintoye, Adegbie, and Awotomilusi (2019) in their inquiry examined the determinants of tax revenue in Nigeria. The subject matter was to test the direction and percentile influence of political stability, absence of violence (Institutional factor), and economic factors of industry share in GDP, Agriculture share in GDP, trade openness, and inflation on tax revenue in Nigeria. The study sourced secondary data CBN Statistical Bulletin and, the World Bank Development Index from the period of 1984 to 2017. The study was anchored on fiscal exchange theory, while the auto-regressive distributed Lagged (ARDL) was used to determine the short-run and long-run relationship between the outcome variable and explanatory variable. The findings depict that political stability and the absence of terrorism positive relationship with tax revenue while other variables revealed otherwise with tax revenue in Nigeria.

Ade Rossouw and Gwatidzo (2018) in their inquiry investigated the determinants of tax revenue performance in Southern African Development. The theme is to test the causal and bi-directional impact of foreign direct investment, tax-related measures, and some control variables on tax performance and fifteen southern African development countries. The least Square dummy variables and Generalized Least square were employed to draw inferences that revealed that foreign direct investment inflows towards tax revenue collected is the SADC and the existence of revenue causality.

Zarra-Nezhad, Ansari, and Moradi (2016) examine the determinant of tax revenue. Does trade liberalization enhance tax revenue or affect it negatively. The theme of the inquiry is to empirically investigate the aftermath of trade liberalization which allows various determinants of economic indicators, socio-demographic indicators, and political indicators on how they improve the tax revenue of the economy. The Generalized Method of Moment was employed where panel data

was sourced for eighty-three developing countries. The dynamic panel estimator depicts that trade liberalization is an international economic strategy that would improve the tax revenue in developing countries along with the determinant variables.

Ayenew (2016) examined the determinants of tax revenue in Ethiopia. The theme of the study was to investigate the factors peculiar to the fiscal deficit strategy of Ethiopia that would reduce the imbalance of tax revenue in the economy. The study captures policy variables, and tax base variables on the overall tax revenue of the country. The secondary data was sourced from the Ministry of Finance and Economic Development and the World Bank from the period of 1975 to 2013. The Johansen maximum likelihood co-integration approach was used to determine the short-rum and long-run of the model. The findings depict that in the long run GDP per capita, foreign aid, and industrial value added have a positive significant effect on tax revenue while inflation hurts tax revenue.

Method of Analysis

This study employed measure tax performance with tax revenue in the country while the determinant was captured in four different factors which include; economic factors (GDP per capita, Exchange rate, Inflation rate), International factors (Foreign direct investment, External Debt, Trade openness), Social factors (Human development index) and Financial factors (Loan-to-deposit ratio of deposit money banks in the country). The secondary data was sourced from the Central Bank Statistical Bulletin and World Development Indicators between 1991 to 2022. The thirty-one year increases beyond the time period that is required for ordinary least square estimation in time series data and analysis.

Model Specification

The study adopted and adjusted the works of Awadh et al (2023), Wijaya and Dewi (2022), and Akintoye et al (2019). The equation is present below in its linear and auto-regressive form.

Linear Model:

$$TAXR_i = (\gamma_0 + \beta_1 GDPer_i + \beta_2 EXC_i + \beta_3 INF_i + \beta_4 FDI_i + \beta_5 ExtD_i + \beta_6 TRD_i + \beta_7 HDI_i + \beta_8 LDR + \varepsilon_t)$$

The study adopted the auto-regressive distributed lag model due to the stationary test that revealed that tax revenue, foreign direct investment, external debt, and trade openness are stationary at first difference while GDP per capita, inflation rate, human development index, and loan-to-deposit ratio are all stationary at level. This agrees with the work of Pesaran, Shin, and Smith (2001) to validate the usage of econometric modeling to draw inferences. The Auto-regressive Distributed Lag (ARDL) approach by Pesaran, Shin, and Smith (2001) is used for testing the existence of co-integration relationship and error-correction estimation. The ARDL approach is been applied to the exogenous and endogenous variables of a different order of co-integration (Pesaran and Pesaran, 1997). This approach allows the estimation of short and long-run parameters concurrently. The short-run (error-correction model) model and the long-run model (co-integration model) of the ARDL model equation can be specified below is written as:

$$\begin{aligned}\Delta LTAXR_t = {} & \rho\varrho_{t-1} + \sum_{i=1}^{q} \alpha_{1i}\,\Delta LTAXR_{t-i} + \sum_{i=0}^{q} \alpha_{2i}\,\Delta LGDPer_{t-i} + \sum_{i=0}^{q} \alpha_{3i}\,\Delta LEXC_{t-i} \\ & + \sum_{i=0}^{q} \alpha_{4i}\,\Delta LINF_{t-i} + \sum_{i=0}^{q} \alpha_{5i}\,\Delta LFDI_{t-i} + \sum_{i=0}^{q} \alpha_{6i}\,\Delta LExtD_{t-i} \\ & + \sum_{i=0}^{q} \alpha_{7i}\,\Delta LTRD_{t-i} + \sum_{i=0}^{q} \alpha_{8i}\,\Delta LHDI_{t-i} + \sum_{i=0}^{q} \alpha_{9i}\,\Delta LDR_{t-i} + \beta_1 LGDPer_{t-1} \\ & + \beta_2 EXC_{t-1} + \beta_3 LINF_{t-1} + \beta_4 LFDI_{t-1} + \beta_5 LExtD_{t-1} + \beta_6 LTRD_{t-1} \\ & + \beta_7 LHDI_{t-1} + \beta_8 LLDR_{t-1} + \varepsilon_t \end{aligned} \tag{1.1}$$

The short-run model (Error-correction model):

$$\begin{aligned}\Delta LTAXR_t = {} & \rho\varrho_{t-1} + \sum_{i=1}^{q} \alpha_{1i}\,\Delta LTAXR_{t-i} + \sum_{i=0}^{q} \alpha_{2i}\,\Delta LGDPer_{t-i} + \sum_{i=0}^{q} \alpha_{3i}\,\Delta LEXC_{t-i} \\ & + \sum_{i=0}^{q} \alpha_{4i}\,\Delta LINF_{t-i} + \sum_{i=0}^{q} \alpha_{5i}\,\Delta LFDI_{t-i} + \sum_{i=0}^{q} \alpha_{6i}\,\Delta LExtD_{t-i} \\ & + \sum_{i=0}^{q} \alpha_{7i}\,\Delta LTRD_{t-i} + \sum_{i=0}^{q} \alpha_{8i}\,\Delta LHDI_{t-i} + \sum_{i=0}^{q} \alpha_{9i}\,\Delta LLDR_{t-i} + \varepsilon_t \end{aligned} \tag{1.2}$$

Where TAXR: Tax revenue, GDPer= GDP per capita, EXC= Exchange rate, INF= Inflation rate, FDI= Foreign Direct Investment, ExtD= External debt, TRD=Trade Openness, HDI=Human development Index, LDR=Loan-to-deposit ratio $\boldsymbol{\rho\varrho_{t-1}}$ is the lagged error correction term for equation 1.1-1.2; α1- α8 are the short-run coefficient; β1- β8 is the long-run parameter for the explanatory variables, t is the period in the inquiry, i= is the lagged period of previous year. $\boldsymbol{\varepsilon_t}$ are the error term.

The Lag length is essential because it impacts the model accuracy, the precision of forecasts and the validity of inferences. It helps to predict the current value of the dependent variables. This employed a lag length of (2), which implies the tax revenue rate from the last two period to predict the current period tax revenue level. The bound Test is a crucial step in the Autoregressive Distributed Lag (ARDL) model, particularly when testing for the existence of a long-run relationship between variables. The ARDL technique is widely used in econometrics to model both short-run and long-run dynamics between time series variables, especially when the variables are integrated of different orders (I (0), I (1), or a mix of both). The secondary data was sourced from the Central Bank statistical bulletin and the World development indicators from the period 1991 to 2022.

Table 1:
Description of Variables and Expected Sign

S/N	Description	Unit	Expected Sign in the long-run	Expected sign in the short-run	Source to the expected sign
1	Tax revenue (TAXR)	₦' Billion	-	-	-
2	Foreign Direct Investment (FDI)	₦' Billion	+	+	+
3	Trade Openness (TRD)	Percentage	+	+	+
4	External Debt (ExtD)	US Dollars	+	+	+
5	Inflation (INF)	Rate	-	+	-
6	Exchange rate (EXC)	Rate	+	-	-
7	Human Development Index (HDI)	Percentage	+	+	+
8	Loan-to-Deposit ratio (LDR)	Ratio	+	+	+
9	Gross Domestic Product per capita (GDP)	₦' Billion	+	+	+

Source: Author's Compilation, 2024

Results and Discussions

Descriptive Analysis

The table below shows the measure of central tendency (mean, median, minimum and maximum), measure of dispersion (skewness, kurtosis) and measure of normality (jarque-bera).

Table 2:

Statistical Summary

	EXC	EXTD	FDI	GDPER	HDI	INF	LDR	TAXR	TRD
Mean	1.834937	3.257194	3.436059	4.315135	0.448047	19.76439	1.800588	2.861764	0.525288
Median	1.983983	3.177383	3.519480	4.487883	0.439500	12.00000	1.797458	3.028932	0.518750
Maximum	2.282464	4.534918	4.593828	5.299586	0.577300	76.75887	1.985952	3.824655	0.855000
Minimum	0.996051	2.516469	1.951823	2.775279	0.342300	0.223606	1.574719	1.549616	0.263500
Std. Dev.	0.343832	0.538937	0.700928	0.738215	0.062504	18.60522	0.095312	0.694454	0.131781
Skewness	-0.866853	0.622304	-0.457250	-0.479841	0.120284	1.865195	-0.419390	-0.580920	0.281587
Kurtosis	2.537257	2.453186	2.375879	2.040561	2.190017	5.231784	2.910609	2.121059	2.691377
Jarque-Bera	4.293153	2.464072	1.634449	2.455350	0.951927	25.19556	0.948726	2.829881	0.549883
Probability	0.116884	0.291698	0.441656	0.292973	0.621286	0.000003	0.622281	0.242940	0.759617
Sum	58.71799	104.2302	109.9539	138.0843	14.33750	632.4605	57.61883	91.57644	16.80920
Sum Sq. Dev.	3.664839	9.004039	15.23031	16.89380	0.121109	10730.78	0.281613	14.95025	0.538352
Observations	32	32	32	32	32	32	32	32	32

Source: Author Compilation, 2024

The descriptive statistics reveal important insights about the economic indicators studied. Tax revenue (TAXR) has a mean value of 2.86%, while GDP per capita averages at 4.31%, with both variables showing negative skewness, indicating distributions with values concentrated towards the higher end. The exchange rate (EXC) and external debt (ExtD) display positive skewness, suggesting that their distributions have long tails on the right, meaning that most observations are below the mean. Inflation (INF) has a particularly high variation with a standard deviation of 18.60 and is highly positively skewed, reflecting significant inflation volatility. Other variables like foreign direct investment (FDI), trade openness (TRD), and the Human Development Index (HDI) also show varying levels of skewness and kurtosis, which suggest their distributions deviate slightly from normality. The kurtosis of most variables, such as tax revenue (TAXR), GDP per capita, and external debt, indicates leptokurtic distributions, meaning their data have more extreme values than a normal distribution would predict. On the other hand, inflation (INF) is platykurtic,

implying a flatter distribution with fewer extreme outcomes. Given the skewness and kurtosis of these economic variables, policymakers should aim to reduce volatility and foster more stable economic conditions. The high volatility of inflation requires targeted interventions, such as better monetary policy management to stabilize prices. The positive skewness in the exchange rate and external debt suggests that these variables are prone to sudden spikes, indicating the need for measures to manage external debt responsibly and stabilize exchange rates through prudent fiscal and monetary policies. Moreover, the negative skewness in tax revenue and GDP per capita implies the need for reforms in tax collection and broader economic policies aimed at achieving more balanced economic growth and equitable income distribution. Efforts to increase tax revenue, boost foreign direct investment, and improve human development should be prioritized, ensuring sustained economic growth.

Lag Length Selection Criteria

This pre-estimation table helps to indicate the accurate lag length that would be employed in carrying out the test of auto-regressive distributed Lag length.

Table 3:

Optimal Lag Length Determination

Lag	LogL	LR	FPE	AIC	SC	HQ
0	3.804322	NA	1.14e-11	0.346379	0.766738	3.804322
1	240.7014	315.8627	4.45e-16	-10.04676	-5.843165	240.7014
2	405.9066	121.1505*	9.88e-18*	-15.66044*	-7.673616*	405.9066

Author's Compilation, 2024

The Akaike information criterion reveals the lag length order to be at (II) for the model selected. The lag length order aids the ARDL short and long-run equation to be estimated and explained below.

ARDL Bound Test

The ARDL Bound test helps to ascertain whether there is a long-run Co-integration relationship between the outcome variable tax revenue (TAXR) and explanatory variable GDP per, INF, FDI, ExtD, TRD, HDI and LDR

Table 4:

Test for a Long-run Relationship

t-statistics	Value	K	I(0)	I(I)
F-statistics	16.18168	8	2.22	3.39

Source: Author's Compilation, 2024

The result of the F-statistics value of 16.18168 is higher than the lower bound critical value I(I) and higher bound critical value I(0) which are 2.22 and 3.39 at a 5% level of significance. It depicts that there is a long-run co-integration relationship between the outcome variable (tax revenue) and explanatory variables (GDP per, Inflation rate, foreign direct Investment (FDI), External Debt, Trade Openness, Human Development Index, and Loan-to-deposit ratio.

ARDL Short-run Dynamics:

The table helps to indicate the short-run estimate of the model. It indicates the speed of adjustment outcome and explanatory variables.

Table 5:

Result of Short-run Dynamics and Speed of Adjustment

Variable	Coefficient	Std-Error	t-Statistic	Prob
D(TAXR(-1))	0.538979	0.129867	4.150242	0.0043
D(GDPER)	2.280301	0.750444	3.038603	0.0189
D(GDPER(-1))	3.937423	0.533189	7.384665	0.0002
D(EXC)	-0.047005	0.182129	-0.258085	0.8038
D(INF)	-0.003783	0.003053	-1.239193	0.2552
D(INF)	-0.003236	0.002102	-1.539279	0.1676
D(FDI)	0.292577	0.085594	3.418171	0.0112
D(FDI(-1))	-0.478158	0.210903	-2.267196	0.0577
D(EXTD)	0.461334	0.088506	5.212487	0.0012
D(TRD)	-0.651897	0.173842	-3.749940	0.0072
D(TRD(-1))	-0.438028	0.223470	-1.960119	0.0908
D(HDI)	-0.757660	0.370709	-2.043812	0.0803
D(LDR)	0.326082	0.219821	1.483401	0.1815
D(LDR(-1))	0.320661	0.222698	1.439889	0.1931
ECM(-1)	-1.385731	0.142559	-9.720377	0.0000

Source: Author's Compilation, 2024

The table above shows the short-run relational impact of economic factors, international factors, social factors, and financial factors that are the determinants of tax revenue in Nigeria. The results

show that the speed of adjustment from a quick disturbance away from the long run is represented by co-integer (-1) is negative and significant with a related coefficient of -1.385731. The value of the error correction term is 1.385731 reveals the distance from the long-run equilibrium in one year is corrected by 38%. The results further show the presence of a long-run relationship between the explanatory variables and outcome variables. At the speed of adjustment of 38%, there exists a short-run relationship between all the independent variables and dependent variables which is in tandem with the new growth theory that internal and external factors help in the development and increase of growth and development. Knowing fully that tax revenue is micro micro-fiscal component that stimulates economic growth and development.

ARDL Long-run Dynamics:

The table below shows the relationships that persist over time after any short-run deviations have been corrected.

Table 6:
Result of Long-run Dynamics

Variable	Coefficient	Std-Error	t-Statistic	Prob
GDPER	0.627299	0.221831	2.827828	0.0255
EXC	-0.033921	0.131633	-0.257690	0.8041
INF	-0.008539	0.001874	-4.556320	0.0026
FDI	0.412534	0.215789	1.911747	0.0375
EXTD	-0.067777	0.050162	-1.351147	0.2187
TRD	-0.144014	0.302507	-0.476070	0.6485
HDI	-0.310169	0.387176	-0.801107	0.4494
LDR	-0.265103	0.210662	-1.258427	0.0486
C	-0.469246	0.626203	-0.749351	0.4781

Source: Author's Compilation, 2024

The long-run coefficient revealed that Gross domestic product per capita has a positive significant effect on tax revenue which implies that a percentage increase in Gross domestic product per capita will lead to a 0.62 unit increase in tax revenue. The exchange rate has a negative insignificant effect on tax revenue which implies that a percentage increase in exchange rate will lead to a -0.03 unit decrease in tax revenue. The inflation rate has a negative significant effect on tax revenue

which implies that a percentage increase in the inflation rate will lead to a -0.00 decrease in tax revenue. Foreign direct Investment has a positive significant effect on tax revenue which implies that a percentage increase in foreign direct investment will lead to a 0.41 unit increase in tax revenue. External debt has a negative insignificant effect on tax revenue which implies that a percentage increase in external debt will lead to a -0.06 unit decrease in tax revenue. Trade openness has a negative insignificant effect on tax revenue which implies that a percentage increase in trade openness will lead to a -0.14 unit decrease in tax revenue. The human development index has a negative insignificant effect on tax revenue which implies that a percentage increase in the human development index will lead to a -0.31 unit decrease in tax revenue. The loan-to-deposit ratio has a negative significant effect on tax revenue which implies that a percentage increase in the loan-to-deposit ratio will -0.26 unit decrease in tax revenue.

Diagnostic Tests

The table below indicates post-estimation test that shows the accuracy of the findings captured in the econometric model above.

Table 7:

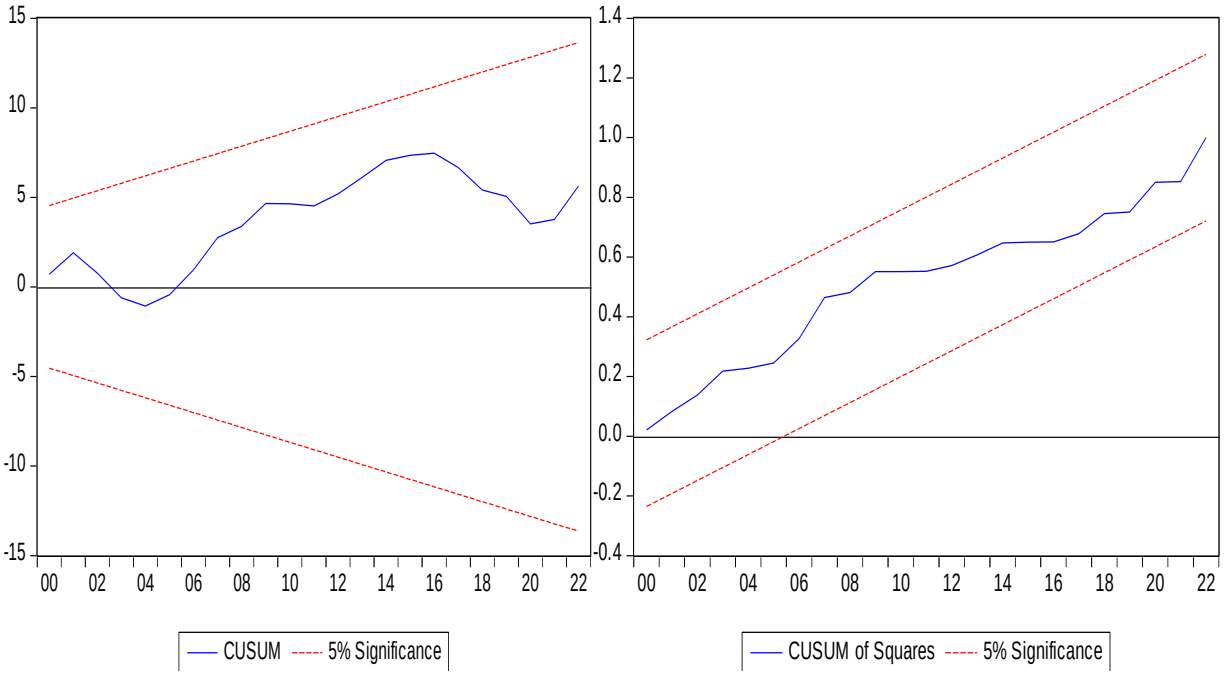
Post-estimation Tests

Test	Value	Prob
Serial Correlation LM Test	0.1369	0.8727
Breausch-Pagan-Godfrey Heteroskedasticity Test	0.4779	0.8592

Source: Author's Compilation, 2024

The F-statistics value obtained from the serial correlation LM Test and heteroskedasticity test are insignificant validating no existence of serial autocorrelation and heteroskedasticity in the regression estimate residual. These findings conclude that the model was estimated correctly.

In addition to above, the study examined the stability test that shows that the model estimates were within the critical boundaries of 5% level of significance. The results shows that the model is dynamically stable and the inferences drawn from it are reliable for policy formulation.



Source: Author's Compilation, 2024

Figure 1: Cusum and Cusum of Squares

The estimated model from the pre-estimation diagnostic test falls inside the critical boundaries at a significance level of 5%. These findings indicate that the estimated model is dynamically stable, suggesting that the explanatory and outcome variables are valid for policy recommendations and implications.

Discussions of Findings

The findings of this inquiry revealed that the GDP per capita has a positive significant effect on tax revenue while the Inflation rate has a negative significant effect on tax revenue both under the economic factors. The results of the GDP per capita, imply that with higher incomes, the tax base expands, as more people fall into taxable brackets. This would lead to an increase in the overall amount of tax revenue collected by the government. Individuals and businesses will earn more, leading to increased tax collections which in the long run will provide governments with more funds to finance public services and infrastructure projects. From the results of the Inflation rate, it implies a decrease in the general price level which would affect the real value of the revenue, this in the long run would affect the government's ability to fund its programs and services

effectively. These findings agree with the works of Ayenew (2016), Awadh, et al, (2023) and Wijaya and Dewi (2023), but disagree with the work of Zarra-Nezhad, et al (2016) and Ibrahim and Jairo (2023).

The international factors of foreign direct investment have a positive significant effect on tax revenue while the financial factor of the loan-to-deposit ratio has a negative significant effect on tax revenue. The results of foreign direct investment, imply that multinational corporations in the host country, Nigeria generate profits that are taxed by the government under the attribute of corporate tax which increases the overall density of tax revenue in the economy. This also would help the Nigerian government to reduce its over-reliance on external debt which is ever-increasing in the present administration. The results of the loan-to-deposit ratio indicate that banks are constrained in their ability to lend, which can imply economic activity. It implies that reduced lending would result in slower business expansion, investment, and job creation which will have a ripple effect on the overall tax revenue in the economy. The findings agree with the works of Ade et al, (2018), Nugraha and Wijaya (2023), and Piancastelli and Thirlwall (2021) in their studies they capture the positive relationship economic factors and external factors having the attributes to improve tax performance and that economic are viable propellant of tax revenue and performance in any economy, but disagree with the work of Lestari and Yolanda (2023), that economic factors, social factors are not the actual of tax performance determinant in developing economies.

Conclusions and Recommendations

It therefore concluded that economic factors, international factors, and financial factors selected in this paper, have the peculiarity to improve the tax performance and revenue in Nigeria. The economic factor of GDP per capita shows the level of monetary buoyancy of the populace in the economy, which when taxed would improve the overall tax performance of the economy. The International factor of foreign direct investment shows that external flows from multinational organization would increase the tax revenue of the recipient country. Finally, the financial factor of loan-to-deposit ratio would stimulate the intermediation volume of deposit money bank, which would increase the percentage of tax revenue of the government. Based on the findings it is recommended that the government should enhance fiscal policies through leveraging on the positive impacts of GDP per capita and foreign direct Investment on tax revenue. The challenges

posed by inflation and loan-to-deposit ratio could affect the financial stability and intermediation prowess of the institution which would have a long-run impact on the country's tax revenue. The study could be examined in more robustness by dividing the year either into quarterly and bi-annually to help to give accuracy more accuracy to the findings. The study could capture the theoretical framework in a more econometric modelling to shows the link from the theory to empirical validation. The other measure of tax performance in terms of corporate income tax, excise duty tax, personal income tax could also examined to empirically investigate the factors that could determine their performance in an economy.

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