FISCAL POLICY AND SECTORAL OUTPUT GROWTH IN NIGERIA: A NEW EMPIRICAL EVIDENCE

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ABSTRACT
Fiscal policy actions can be used to stimulate sectoral growth, either by increasing or decreasing government spending or tax. Thus, this study examined the effect of fiscal policy on sectoral output in Nigeria based on annual time series data from 1981 to 2021. An endogenous model, fashioned in line with the standard production function formed the basis of the model specification for the variables of interest. An ARDL model was adopted in order to capture both the short-run and long-run dynamics of the model. The ARDL Bounds Test method of establishing cointegration provided evidence that there is cointegration when Mining (MIN), Manufacturing (MAN), Building and Construction (BCN) and Wholesale retail (WRT) are used as dependent variables. However, when Agricultural output (AGR) and Service (SER) are used as the dependent variable, there is no cointegration. The ARDL long run results revealed that fiscal policy, as measured by total government expenditure has a significant negative effect on the overall output. With regards to sectoral output, fiscal policy variable had a significant long-run negative impact on Agricultural output, Building and Construction, Mining and Services while it has a positive impact on manufacturing and Wholesale and Retail output. In the short run, fiscal policy has a significant positive impact on agricultural output, manufacturing and mining sectors while the impact is negligible on Building and Construction, Wholesale and retail and service output. As a policy prescription, a sector specific fiscal spending must be put in place to drive sectoral output growth in Nigeria.

Keywords: Fiscal Policy, Sectoral Output, Endogenous model, ARDL
JEL Classification: E62, F43, O4

1. INTRODUCTION
Concerns regarding the potential contribution of fiscal policy to economic growth and stabilization have grown in recent years. Governments can modify the number and types of taxes paid, the amount and makeup of spending, and the amount and type of borrowing by changing their fiscal policies (Golpe, Sánchez-Fuentes and Vides, 2023). Fiscal policy, especially in the form of public spending, is essential for preserving macroeconomic stability. However, at the micro level, well-planned expenditure policies can boost productivity, investment, and employment (IMF, 2015). It is therefore imperative to underline the link between public spending and output in light of this.

Fiscal policy goals differ from one another in addition to delivering commodities and services like public safety, roadways, or primary education. In the short term, governments may place a higher priority on macroeconomic stabilization by, for example, expanding spending or lowering taxes to stimulate a sagging economy or lowering spending or raising taxes to combat rising inflation or minimize external vulnerabilities. The longer-term objective may be to create sustainable growth or lessen poverty via supply-side actions to improve infrastructure or

education. Although these objectives are similar across most countries, their relative importance changes depending on local circumstances (Horton and El-Ganainy, 2023). When compared to comparable countries, Nigeria spends a lot less on social programs including social protection, health care, and education. In 2021, as the country battled the COVID-19 pandemic, the ordinary Nigerian received about $15 in public health services yearly, compared to $55 in Indonesia. Low social investment limits the quantity and quality of health and educational services that Nigerians may expect to get. Private investment outside the oil business is limited due to less public spending that promote infrastructure (World Bank, 2022).

Despite the significance of fiscal policy, empirical data to date have contradicted theoretical assumptions. While Keynesians agree that fiscal policy can affect output by bolstering aggregate demand, neoclassical economists argue that expansionary fiscal policy might stifle economic growth by driving out the private sector (Kim, et al., 2021; Kong and Feng, 2019; Papaioannou, 2019). Although well-designed spending policies can increase employment, investment, and productivity at the micro level, fiscal policy, particularly in the form of public spending, is crucial in sustaining macroeconomic stability at the macro level (IMF, 2015). Therefore, it is crucial to recognize the connection between public spending and output. According to some research, there have been significant practical concerns about whether fiscal policy can affect the actual output of the various economic sectors. According to recent research, the impact of government spending on sector productivity differs. This gap may be caused by a distinct fiscal spending channel that affects some sectors more than others (Loto, 2011).

The government has engaged in many stabilization strategies through fiscal spending to restructure and deepen the economy. Despite the importance of this policy in achieving sustainable development, it appears that no thorough study has specifically looked at how fiscal policy affects sectoral output growth in Nigeria. While studies on sectoral output concentrate on its productivity, bank loans, economic growth, global economic meltdown, monetary policy, banking sector restructuring, and performance, most studies on fiscal policy focus on its causes, its impact on capital formation, its impact on capital stock, shortfalls, and macroeconomic variables. Although sectoral output is greatly impacted by government spending, research on their relationship, there seems to be little attention on the effect of fiscal policy on sectoral output growth in Nigeria.

Studies by Ekpo (1994), Omitogun and Ayinla (2007), Ogunmuyiwa (2008), Nurudeen and Usman (2010), Ogunmuyiwa (2011), Oseni and Onakoya (2012), Patricia and Izuchukwu (2013), Abubakar (2016), Amah (2019), Oriakhi (2021), Ikubor, et al. (2022), and Temidayo et al (2022) in Nigeria had disregarded industry-specific research. The current literature's neglect of these fundamental issues created an empirical gap that can be filled with more study, especially for a developing nation like Nigeria. Understanding this relationship should provide policymakers with the knowledge they need to suggest programs that will help Nigeria achieve sustainable development. Given these issues, it is important to ask whether fiscal policy affects Nigeria's real GDP level. What impact does government expenditure have on the different economic sectors?

In light of this, the goal of this study is to determine how Nigeria's fiscal policy affect sectoral output. The study specifically focuses on six sectors: agriculture, mining, manufacturing, building and construction, wholesale and retail trade, and services. It aims to investigate the effects of government spending on Nigeria's economy. Following the introduction, section two reviews prior research on the topic, including studies from Nigeria. The third section of the

study looks at the methodology and theoretical foundation used for the investigation. Section four of the study presents estimation techniques and empirical findings, and section five provides the conclusion and policy recommendation.

2. REVIEW OF LITERATURE

2.1. Theoretical Literature

The debate over the relationship between fiscal policy and economic growth has been framed by a number of hypotheses. Keynesian theory, the Harrod-Domar growth model, neoclassical views, endogenous growth models, and the Ricardian equivalence theory are prominent examples of these. Government intervention is essential for resolving economic issues, according to Keynesian philosophy (Barro 1999). Since prices are somewhat stiff, changes in all types of spending, including government, investment, and consumer spending, have an impact on output, according to Keynes. For instance, if government spending increases while all other spending components remain constant, output will increase. Keynes stated that when an economy faces high unemployment and slow economic progress, it should undertake an expansionary fiscal policy in order to expand the economy and promote economic activity. It is possible to do this through decreasing taxes or increasing government spending. The Harrod-Domar growth model, however, contends that policies that raise the savings rate could promote growth. However, its usefulnes is limited to illuminating actual life situations due to the assumptions that the capital production ratios are predetermined and that technology has no effect on growth.

Neoclassicals promote a laxer approach to fiscal policy in order to support price stability and economic growth, in contrast to Keynesians' point of view. They believe that low tax rates and restrained government spending will foster expansion of the private sector and the economy as a whole. The neoclassicals opposed budget deficits and expansive fiscal policy. They argued that if there was a budget deficit, the crowding-out effect indicated by the traditional IS-LM analysis would always take place. The neoclassical perspective is backed by several academics, including Auerbach and Kotlikoff (1987), Diamond (1965), and Taylor (2009), among others. The endogenous growth model contends that government spending and taxation will influence growth both temporarily and permanently in order to remedy the shortcomings of neoclassical models (Barro, 1990). According to the endogenous growth theory, any fiscal policy that promotes savings and investment—including financial investments in R&D, technical innovation, and human capital—would lead to more growth (DeLong and Summers, 1991). Technical expertise is essential for boosting savings and investment to promote economic growth.

Last but not least, David Ricardo's equivalency theory holds that financing government spending with current taxes or future taxes (and current deficits) will have similar consequences on the overall economy. According to the hypothesis, neither fiscal expansion nor running a deficit have a major impact on overall demand, investment, or the pace of GDP growth (Dalyop 2019). A rise in the fiscal deficit won't lead to a rise in aggregate demand or economic growth, according to the Ricardian equivalence theory (Corden, 1991).

2.2 Empirical Literature

Empirically, a number of studies have looked at how fiscal policy affects output or economic growth in both developed and developing nations, with varying degrees of success. Numerous studies have examined the interactions between various aspects of fiscal policy and economic growth across a wide range of countries and analytical frameworks. For instance, Gregorious

and Ghosh (2007) used a cross-country study to examine the effect of government spending on economic growth in a heterogeneous panel for a sample of developing nations. They did this by using generalized method of moments (GMM) approaches. Their findings imply that nations with significant government spending typically have higher economic growth. The effect of fiscal policy on the economic growth of MENA countries was examined by Benanaya et al. (2014) using dynamic panel data analysis. The study's findings indicated that fiscal policy and economic growth have a long-term relationship. The existence of positive causality between economic growth and fiscal revenues was demonstrated by the correlation pattern between GDP and budgetary revenue.

Devarajan and Vinay (1993) examined the effects of several functional types of government spending (health, education, transportation, etc.) on economic production using panel data from 14 industrialized nations for the years 1970 to 1990. They discovered that while education and defense hurt economic growth, health, transportation, and communication have a considerable positive impact. Mitchell (2005) looked into how various industrialized countries' economies were performing in relation to government spending. His research demonstrated that stronger economic performance is not a result of an expansive and expanding government. He added that shrinking the size of the government will increase incomes and strengthen American competitiveness. Similar to this, Anjade, Ahemen, and Ijirshar (2020) investigated the effect of government spending behavior on growth of national income and unemployment in Africa using the dynamic panel model approach. According to the authors, while cutting government spending has a significant negative impact on national income growth and a significant positive impact on unemployment in the countries, increasing government spending has a strong positive impact on national income growth and a negative impact on unemployment among African countries.

In addition to the aforementioned panel studies, research at the country level have also examined the potential impact of fiscal policy on the rate of output growth. Alfonso and Fulcari (2010) looked at the extent and unpredictability of the effect of government spending and revenue on economic growth. The results demonstrated that considerable and detrimental effects on growth are caused by large government consumption and investment expenditures. Joharji and Star (2010) investigated the short- and long-term relationships between government and non-oil GDP in Saudi Arabia during the period of 1969-2005 using the co-integration approach and vector error correction model (VECM). The results of the study demonstrated that government spending had a considerable and favorable long-term impact on economic growth. Alsharani and Alsadiq (2014) used a vector error correction model to examine the effect of fiscal policy on economic development over the period of 1969–2010 using various types of government spending.

Papaioannou (2018) recently conducted an analysis of the potential effects of public spending on output and the Greek economy using a Markov Switching regression model framework. The findings point to asymmetries in how government expenditure affects output over the course of the business cycle. Recessions were when the greatest influence was seen. On the other hand, its impact is detrimental during expansionary eras. The study found that while trade openness and spending in the housing industry spur growth in the short term, government investment and spending in the healthcare sector improve growth in the long run. Popiel (2020) analyzed fiscal policy, uncertainty, and US output in Uganda using a common structural vector autoregression (SVAR) model. The results demonstrated that output, uncertainty, or fiscal policy are not consistently correlated with one another.

In particular, a number of academics have also looked at the difficulties surrounding the influence and/or connection between fiscal policy and output growth in Nigeria. Some of their conclusions remained mixed, In the context of the traditional Solow growth model, Omitogun and Ayinla (2007) employed the ordinary least square method to investigate the impact of fiscal policy on the Nigerian economy (1981-2004). Their findings demonstrated that fiscal policy has not been successful in fostering long-term economic growth. Appah (2010) investigated the connection between Nigeria's fiscal policies and economic growth for the years 1991 to 2005 using multiple regression analytic methodologies. The findings show a strong correlation between the fiscal policy variable and economic growth. The study also showed that government recurrent and capital expenditures are the specific factors that contribute to the GDP. Similar to this, Medee and Nendee (2011) looked into how fiscal policy variables affected Nigeria's economic growth between 1970 and 2009. The outcome of the vector autoregression and error correction mechanism methodologies demonstrated that the fiscal policy variable and economic growth in Nigeria have a long-run equilibrium relationship.

Babalola and Aminu (2011) looked into how Nigeria's fiscal policies and economic growth interacted between 1977 and 2009 using the Engle-Granger approach to co-integration. The results of the estimation revealed that positive and statistically significant productive expenditure was discovered. Abubakar (2016) used the Structural Vector Autoregression (SVAR) for the period of 1981–2015 to analyze the impact of fiscal policy shocks on output and unemployment in Nigeria. The findings demonstrate that both revenue and public expenditure shocks have a long-lasting positive impact on output, with revenue shock having a smaller impact than public expenditure shock. Amah (2019) discovered that tax is a poor policy instrument in Nigeria and that it showed an abnormally favorable link with national output when conceptualizing the transmission mechanism of policy instruments and their efficiency in creating growth and employment goals.

Additionally, the findings of a study by Oriakhi (2021), also in Nigeria, revealed a bidirectional causal link between total government spending, growth, and poverty. Mohammed et al. (2021) do a non-linear study using the Smooth Transition Regression (STR) model to assess how government spending affects economic growth. Nigeria's economic growth was found to be significantly and favorably impacted by public spending. According to Ikubor et al.'s study from 2022, there is a significant positive correlation between government spending and economic growth in Nigeria's economic services sector. Okonkwo et al. (2023) examined the impacts of government capital expenditure in aggregate form on Nigeria's economic growth rate from 1981 to 2021 within the framework of an autoregressive distributed lag model. The ARDL technique indicated a positive correlation between administrative and economic services and Nigeria's pace of economic expansion, and the bound test revealed a long-term association between the analyzed variables.

Temidayo et al. (2022) showed that public investment on education, transportation, and communication had a tiny but beneficial impact on economic growth in Nigeria at a more in-depth level. In a similar vein, Nwude, Nwaeze, and Nwude (2023) looked into the impact of government spending in Nigeria between 1981 and 2020 on pensions, benefits, agriculture, education, and health. The results show that making educational investments has positive, considerable, long- and short-term effects on economic growth. Spending on health and agriculture has a positive and significant impact on economic growth, in contrast to pensions/gratuities and public debt servicing, which have favorable short-term benefits on economic growth but negative long-term consequences.

From the literature reviewed above, it can be inferred that some studies, including Devarajan and Vinaya (1993), Joharji and Star (2010), Apah (2010), Medee and Nendee (2011), Babalola and Aminu (2011), Benananaya et al. (2014), Abubakar (2016), Amah (2019), and Ikubor, et al. (2022), found a positive relationship between public expenditure and output growth, while other studies Given the abundance of studies conducted in Nigeria, it is clear that the conclusions reached by the various authors differ, and the majority of the studies give less consideration to the various effects of fiscal policy components, whether from the expenditure side, revenue side, or debt side, on output indicators that are broken down by sector. As a result, more research is needed to determine how fiscal policy affects sectoral output, which is what this study tries to do.

3. METHODOLOGY

3.1. Theoretical Framework

The endogenous model constructed in accordance with the common production function served as the foundation for this study's framework. According to the model, changes in total government spending are regarded to represent fiscal policy, while a combination of fiscal and non-fiscal variables affect aggregate output. As a result, aggregate output may be written as:

$$Y_t = f(X_t, Z_t) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .. (1)$$

where t stands for the period under consideration, *Y* stands for the economy's overall sectoral output, *X* for total fiscal spending, and *Z* for a group of non-fiscal factors. Trade openness *(TROPEN)*, inflation *(INF)*, interest rate *(INT)*, and population *(POP)* are among the non-fiscal variables, and total government expenditure *(TOE)* is utilized as a stand-in for the fiscal policy variable. As a cause of macroeconomic instability, trade openness is inversely correlated with real output, according to Rodrik (1998). It was emphasized that inflation is a key factor in the explanation of changes in real output. Additionally, a key demographic component in an economic fluctuation model is population (Bejan, 2006). The relevance of interest rates as a tool utilized by the monetary authority for economic management was emphasized by Saibu and Nwosa (2011). The operational model for output in log-linear form can be determined from equation (1) as follows:

$$InY_t = \beta + \sum_{i=0}^{k} \delta_i \, InX_t + \sum_{j}^{p} \gamma_j \, InZ_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots . (2)$$

Where β, δ_i and γ_j are the parameters in the model. μ_t, the error term, indicates all other variables that affect economic growth in Nigeria but are omitted from the model. The *t* with the parameters indicate time period. Other variables remain as defined above. Using the logarithm form of the equation allows the respective variables to be interpreted in elasticity concept and thus, equation (2) denotes how much a percentage change in one of the explanatory variables affect output growth. Also, the use of log-linear transformation often reduces the problem of heteroscedasticity.

3.2. Model Specification and Data Source

Based on the above discussion, expressing equation (2) in a more explicit form while accommodating other relevant variables in the model gives a simple linear equation model as summarized below:

$$InY_t = \beta_0 + \beta_1 InTOE_t + \beta_1 InTROPEN_t + \beta_1 InINF_t + \beta_1 InINT_t + \beta_1 InPOP_t + \varepsilon_t \ldots\ldots (3)$$

In capturing the effect of fiscal policy on aggregate output: Y will represent the real GDP. Equation (3) is the baseline model for the analysis of the effects of fiscal policy as measured by total government expenditure *(TOE)* on each of the sectoral outputs. The Nigerian economy was classified into six broad sectors namely: agriculture (AGR), mining (MIN), manufacturing (MAN), building and construction (BCN), wholesale and retail trade (WRT) and the service sector (SER). The non-fiscal variables: *TROPEN*, *INF*, *INT* and *POP* are as defined above. The source of data for all the variables in the study is the CBN, Statistical bulletin and the analysis covers 1981 to 2021. For estimation purpose, all the variables are expressed in their logarithmic forms.

3.3. The Estimation Techniques

3.3.1. Unit Root Testing

The model described above requires that variables employed in a given model be stable (i.e., have no unit root), which indicates that their stochastic features are time invariant. This is necessary to avoid spurious regression typically associated with time series data. Numerous investigations have revealed that nonstationary variable models frequently produce fictitious or "nonsensical" regressions as well as incorrect test statistics. However, if properly differentiated, a non-stationary variable can approach stationarity (Granger, 1986). The order of integration is the right number of differencing. This means that a time series Z is considered to be integrated of order d, represented by Z~I(d), if it becomes stationary after being differed d times. There are a number of common tests that are typically used for unit root testing. The Dickey-Fuller test with generalized least squares detrending (DF-GLS), which is used in this study, is calculated on the following regression:

$$\Delta X_t' = \beta + \rho t + \delta X_{t-1}' + \sum_{v=1}^{p} V_t X_{t-1}' + \mu_t \quad \text{(4)}$$

where X_t, is the detrended series and t is the time trend. β, δ and Δ are the constant or drift parameter, an arbitrary parameter and the first-difference operator respectively. γv represents the coefficients of the lagged difference terms and ut is a white noise error term respectively. The DF-GLS regression above tests for the unit root of X_t in the logarithm of all the variables at time t. The null and the alternate hypothesis for the presence of unit root in the variable Xt for the DF-GLS tests are:

$$H_0: \delta = 0$$
$$H_1: \delta < 0$$

If the null hypothesis: H_0: $\delta = 0$ (the variable under consideration is a unit root) is not rejected, then it indicates that the variable is non-stationary and if the alternate hypothesis: H_1: $\delta < 0$ is found to be true, then the variable under consideration is stationary.

3.3.2. Cointegration

A long-run equilibrium between two or more time series variables that are each non-stationary at their level form is known as cointegration, according to Gujarati (2009). Therefore, we use cointegration based on the Autoregressive Distributed Lag model (ARDL) in this study. The necessity to capture all dynamic reactions in the dependent variable caused by changes in its own lags and the contemporaneous and lag values of the other explanatory variables is what led to the selection of an ARDL model. To do this, the study will use the Bounds testing technique, or ARDL framework, developed by Pesaran et al. (2001), for the assessment of level connections.

Due to the following benefits, distributive lag modeling is favoured over traditional cointegration techniques. First, once the lag order of the model is determined, the limits testing approach enables OLS to estimate the cointegration relationship. The pre-testing of unit roots is not necessary, and it is possible to examine co-integration of variables regardless of their order, i.e., regardless of whether the model's regressors are purely I(0), purely I(1), or a combination of both. Thirdly, without sacrificing information about long-term relationships, autoregressive distributive lag modeling combines long- and short-term dynamics. Last but not least, the ARDL bounds testing strategy is appropriate for small samples and yields reliable results. However, I(2) series will cause the procedure to crash, thus the unit root test is run to make sure all variables are stationary at most in their initial differences. The fact that the unrestricted model of ECM appears to take acceptable lags and encapsulates the data generation process in a general-to-specific framework of specification is another benefit of ARDL bounds testing (Laurenceson and Chai, 2003). The conditional error correction version of the ARDL model for economic growth and its drivers can be stated as follows in accordance with the general model of Pesaran et al. (2001):

$$\begin{aligned}\Delta InY_t = \beta + \varphi InY_{t-1} + \gamma_1 InTOE_{t-1} + \gamma_2 InTROPEN_{t-1} + \gamma_3 InINF_{t-1} + \gamma_4 InINT_{t-1} \\ + \gamma_5 InPOP_{t-1} + \sum_{i=1}^{p} \psi_i \, \Delta InY_{t-i} + \sum_{i=1}^{q} \rho_j \, \Delta InTOE_{t-j} \\ + \sum_{i=1}^{r} \sigma_v \, \Delta InTROPEN_{t-v} \\ + \sum_{i=1}^{s} \varphi_w \, \Delta InINF_{t-w} + \sum_{i=1}^{t} \vartheta_m \, \Delta InINT_{t-m} + \sum_{i=1}^{r} \varpi_\rho \, \Delta InPOP_{t-\rho} \\ + \mu_t \ldots\ldots\ldots (5)\end{aligned}$$

where φ, γ_1, γ_2, γ_3, and γ_4 are the long-run multipliers, Δ is the first difference operator and μ_t is a white noise error term. $\psi, \rho, \sigma, \varphi, \vartheta,$ and ϖ indicate the short-run dynamic coefficients of the model. The F-statistic is calculated to determine whether the fiscal variable has a long-term impact on Nigeria's economic growth after evaluating equation (5). The critical value bounds calculated by Pesaran et al. (2001) are compared to the results of the F-test for the joint significance of the coefficients of the lagged levels of the variables. The null hypothesis (Ho) of no long-run effect (absence of cointegration) is as follows:

$$H_0: \varphi = \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0$$

is tested against the alternate hypothesis (H_1) that there exists a long-run effect (existence of cointegration):

$$H_1: \varphi \neq \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq 0$$

According to Pesaran *et al.* (2001), the lower values of the asymptotic critical value bounds, assume that the explanatory variables are integrated of order zero or *I*(0), while the upper bound critical values assume that the explanatory variables are integrated of order one or *I*(1). Therefore, if the calculated F-statistic is found to be above the upper bound critical value, the null hypothesis of no cointegration would be rejected regardless of the order of integration of the series. In contrast, if the F-statistic is below the lower bound critical value, the null

hypothesis cannot be rejected and if the F-statistic falls between the lower and the upper bound critical values, the results is inconclusive. Second, if the test results accepted the null hypothesis, then the explanatory variables cannot be treated as long-run variables for the explanation of *Y* and that, the model would be estimated in the short-run dynamic equilibrium using the first differenced variables (Reungsri, 2010). If however the test results show that there is evidence of a long-run effect among the variables concerned, then the following long-run model for economic growth is estimated:

$$InY_t = \beta' + \sum_{i=1}^{u} \psi_i' \, \Delta InY_{t-i} + \sum_{i=1}^{v} \rho_j' \, \Delta InTOE_{t-j} + \sum_{i=1}^{w} \sigma_v' \, \Delta InTROPEN_{t-v} + \sum_{i=1}^{x} \varphi_w' \, \Delta InINF_{t-w} + \sum_{i=1}^{y} \vartheta_m' \, \Delta InINT_{t-m} + \sum_{i=1}^{z} \varpi_p' \, \Delta InPOP_{t-\rho} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Where all variables remain as previously defined. ψ', ρ', σ', φ', ϑ', and ϖ' represent the long-run coefficients. The relative number of time lags will be chosen according to the evidence provided by the use of the Schwarz Bayesian Criterion. To explain the short-run dynamics, the study will finally develop an error correction model (ECM) of the form:

$$InY_t = \beta^* + \sum_{i=1}^{u} \psi_i^* \, \Delta InY_{t-i} + \sum_{i=1}^{v} \rho_j^* \, \Delta InTOE_{t-j} + \sum_{i=1}^{w} \sigma_v^* \, \Delta InTROPEN_{t-v} + \sum_{i=1}^{x} \varphi_w^* \, \Delta InINF_{t-w} + \sum_{i=1}^{y} \vartheta_m^* \, \Delta InINT_{t-m} + \sum_{i=1}^{z} \varpi_p^* \, \Delta InPOP_{t-\rho} + \omega ECM_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

where $\psi*$,$\rho*$, $\sigma*$, $\varphi*$, $\vartheta*$, and $\varpi*$ are the dynamic adjustment coefficients, ECM_{t-1} is the lag of the residual that characterizes the short-run disequilibrium adjustment of the estimate of the long-run equilibrium error term, while ω indicates the speed of adjustment. According to Banerjee et al. (1993; quoted in Baci, 2007), the ECM, which is obtained from the ARDL by a straightforward linear transformation, integrates the short-run dynamics with the long-run equilibrium without losing the long-run information.

4. RESULTS AND DISCUSSION OF FINDINGS

4.1. Unit Root Tests / Stationary Tests

In keeping with current advancements in time series modeling, unit root tests of the model's variables were run to ascertain their time series features. In order to determine if the variable being used is stationary or not, we used the Augmented Dickey Fuller test statistic as a preliminary step in testing for cointegration. Table 1 contains the results of the unit root testing. The table demonstrates that all variables—aside from SER and INF—are not stationary at levels since their test results fell within their critical range. The test results, however, exceeded their critical values at the 1% and 5% significant levels, respectively, when the variables were

only differentially considered once and exposed to the ADF test. These findings imply that most of the series are all integrated to order one (I(1)), with the exception of SER and INF that are integrated to order zero (I(0)). Because none of the variables in the model are integrated of order two, or I(2), it can be inferred from the unit root tests described above that the ARDL approach to cointegration should be used. The following stage investigates if there is evidence of a long-term effect of the fiscal policy variable on sectoral output in the example of Nigeria.

Table 1: Unit root/Stationarity tests

	Level	First Difference	Order of integration
RGDP	0.7244	-3.3787***	I(1)
AGR	0.2925	-5.6395***	I(1)
MAN	1.2222	-5.0763***	I(1)
MIN	-0.4559	-3.5645***	I(1)
BCN	1.7210	-3.2802**	I(1)
SER	3.7962***	-3.1363**	I(0)
WRT	0.7731	-3.1093**	I(1)
TOE	-2.2052	-6.4741***	I(1)
TROPEN	-2.5931	-6.8721***	I(1)
INF	-3.0596**	-5.5775***	I(0)
INT	-2.9222	-6.9929***	I(1)
POP	0.07421	-9.4994***	I(1)

Note: *** and ** denotes the rejection of the null hypothesis of non-stationarity at 1 and 5 percent significance levels respectively.
Source: Output from E-view 10

4.2. ARDL Bounds Test for Cointegration

By using the ARDL bounds testing approach to cointegration, the distinct order of integration of the variables enables us to analyze the long-term relationship between the variables. The choice of the ideal lag length is a crucial consideration when using the bound testing approach to study cointegration. To continue the ARDL bounds testing of the series, the proper lag length is essential. The SBC criterion is considered for determining the lag length.

Table 2: Cointegration Tests

F_{AGR}(AGR/TOE,OPEN/INF/INT/POP	0.994167	No Cointegration
F_{MIN}(MIN/TOE,OPEN/INF/INT/POP	5.588895***	Cointegration
F_{MAN}(MAN/TOE,OPEN/INF/INT/POP	9.965734***	Cointegration
F_{BCN}(BCN/TOE,OPEN/INF/INT/POP	11.04063***	Cointegration
F_{WRT}(WRT/TOE,OPEN/INF/INT/POP	3.489814*	Cointegration
F_{SER}(SER/TOE,OPEN/INF/INT/POP	2.050044	No Cointegration
Critical bounds	Lower bound	Upper bound
1%	3.41	4.68
5%	2.62	3.79
10%	2.26	3.35

Source: Output from E-view 10

The results of the bounds test for cointegration, together with critical values of Pesaran and Shin (1996) are reported in Table 2. The bounds test indicates that the estimated F-statistics are above the upper bound critical value provided by Narayan (2005) at 1% level of significance

when *MIN*, *MAN*, *BCN* and *WRT* are treated as the dependent variable and other fiscal variables are treated as their long run forcing variables. Hence, we reject null hypothesis of no cointegration relationship for them. However, when *AGR* and *SER* are used as the dependent variable, there is no cointegration.

4.3. Long Run Analysis

Following the existence of long-run cointegration relationship between the variables and economic growth, this study further estimates the long-run coefficients of the ARDL model. In general, the results with respect to the variables in the long-run estimation are broadly consistent with literature. Table 3 shows that fiscal policy as measured by total government expenditure and interest rate have significant negative impact on economic growth while openness and population have significant positive impact on real GDP. In term of sectoral output, the fiscal policy variable shows different impact on the outputs. We observed significant negative relationship between total government expenditure (TOE) and agricultural output (AGR), Building and Construction (BCN), Mining (MIN) and services (SER), while it exerts a significant positive impact on Manufacturing (MAN) and Wholesale and Retail outputs (WRT). The outcome from the long run analysis is consistent with studies such as Okonkwo et al. (2023), Nwude, Nwaeze, and Nwude (2023), Temidayo et al. (2022), and Ikubor et al. (2022), all of whom have shown that government fiscal spending help in boosting the output of the services sectors.

Table 3: ARDL estimated Long Run Coefficients

Variables	RGDP	AGR	BCN	MAN	MIN	WRT	SER
TOE	-0.1826 (0.0203) [-8.9805]***	-0.1396 (0.0807) [-1.7309]*	-0.4103 (0.1484) [-2.7657]***	0.7559 (0.0391) [19.3143]***	-1.0012 (0.1882) [-5.3207]***	0.4720 (0.0662) [7.1239]***	-0.0757 (0.2686) [-0.2819]
OPEN	3.2889 0.1596 [20.607]***	3.1290 (0.7096) [4.4097]***	0.0858 (0.1206) [0.7114]	8.2352 (0.3482) [23.6511]***	0.1640 (0.1160) [1.4141]	0.0666 (0.0782) [0.8523]	0.0523 (0.0944) [-0.2819]
INF	0.0096. (0.0150) [0.6419]	-0.04909 (0.0481) [-1.0215]	-0.0059 (0.0987) [-0.0603]	0.0798 (0.0177) [4.5143]***	-0.2554 (0.1098) [-2.3254]**	0.0279 (0.0321) [0.8693]	-0.0849 (0.2119) [-0.4009]
INT	-0.1768 (0.0202) [-8.7775]***	-0.1567 (0.0728) [-2.1518]**	-0.0941 (0.1643) [-0.5729]	0.0041 (0.0414) [0.1005]	-0.3419 (0.2215) [-1.5435]	-0.3014 (0.0773) [-3.8991***	-0.3578 (0.1631) [-2.1936]**
POP	3.2890 (0.1596) [20.6067]***	0.1734 (0.060)1 [2.8871]***	6.5731 (1.6921) [3.8846]***	8.2352 (0.3482) [23.6511]***	9.3953 (1.5977) [5.8807]***	6.2328 (0.5006) [12.4513]**	3.3369 (1.6686) [1.9998]*

Note: Figures in (.) and [.] denote standard error and t-Statistic values respectively. ***and *, ** and *** denote statistically significant at 10, 5 and 1 percent respectively

Source: Output from E-view 10

It is also observed that the trade openness (OPEN) has a significant and positive impact on AGR and MAN. Inflation (INF) move positively with MAN output in the long run but negatively with MIN. INT significantly and negatively impact AGR, WRT and SER in the long run. One notable outcome of the long run analysis is that POP positively and significantly impact all the sectoral output at 5% level of significance while at 1% level of significance for SER.

4.4. Short-Run Dynamics

This analysis is intended to capture the effect of short run movement in the empirical models. Table 4 shows the result of the error correction representation for the underlying ARDL model. One important finding is that the error correction terms (ECT) of the models shown in Table 4 have the expected negative signs confirming that there is long run stability of the output growth

Table 4: Parsimonious Error Correction Representation for the selected ARDL Model

ARDL(1, 0, 0, 0, 2, 2) ***selected based on Schwarz Bayesian Criterion***			
Dependent variable: Agriculture Sector Output			
Regressor	**Coefficient**	**Standard Error**	**T-Ratio [Probability]**
CointEq(-1)	-0.618159**	0.218641	-2.827276 (0.0127)
C	10.68034**	4.566391	2.338901 (0.0336)
D(INF)	-0.067382***	0.022885	-2.944384 (0.0100)
D(INT)	-0.096891	0.061044	-1.587221 (0.1333)
D(POP)	1.934238**	1.026276	1.884716 (0.0790)
D(TOE)	-0.220432**	0.080948	-2.723126 (0.0157)
D(TROPEN)	0.071298**	0.027866	2.558634 (0.0218)
ARDL(2, 0, 2, 1, 1, 1) ***selected based on Schwarz Bayesian Criterion***			
Dependent variable: Manufacturing Sector Output			
Regressor	**Coefficient**	**Standard Error**	**T-Ratio [Probability]**
CointEq(-1)	-1.150139***	0.212744	-5.406206(0.0002)
C	34.28946***	5.916508	5.795557 (0.0001)
D(INF)	0.065422***	0.019844	3.296837(0.0064)
D(INT(-2))	0.187344**	0.065389	2.865050(0.0142)
D(POP(-1))	-5.333275***	1.427394	-3.736371(0.0028)
D(TOE(-1))	0.513090***	0.116363	4.409403(0.0009)
D(TROPEN(-1))	0.047785**	0.023260	2.054421(0.0624)
ARDL(1, 0, 1, 0, 0, 0) ***selected based on Schwarz Bayesian Criterion***			
Dependent variable: Mining Sector Output			
Regressor	**Coefficient**	**Standard Error**	**T-Ratio [Probability]**
CointEq(-1)	-0.290715***	0.087673	-3.315888 (0.0027)
C	9.163759***	2.372475	3.862532 (0.0007)
D(INF)	-0.074235***	0.025601	-2.899718 (0.0075)
D(INT)	0.035578	0.082438	0.431571 (0.6696)
D(POP)	2.731364***	0.729442	3.744455 (0.0009)
D(TOE)	-0.291061***	0.085471	-3.405390 (0.0022)
D(TROPEN)	0.047683*	0.027459	1.736546 (0.0943)
ARDL(3, 3, 3, 3, 3, 3) ***selected based on Schwarz Bayesian Criterion***			
Dependent variable: Service Sector Output ARDL			
Regressor	**Coefficient**	**Standard Error**	**T-Ratio [Probability]**
CointEq(-1)	-0.252690	0.340605	-0.741887 (0.4794)
C	4.453557	7.083193	0.628750 (0.5470)
D(INF)	0.023797**	0.010534	2.259087 (0.0538)
D(INT(-2))	0.043800	0.053882	0.812886 (0.4398)
D(POP(-2))	2.283064**	0.812782	2.808948 (0.0229)
D(TOE(-2))	-0.106840**	0.044796	-2.385039 (0.0442)

D(TROPEN(-2))	0.022711	0.019296	1.177025 (0.2730)
ARDL(3, 1, 1, 1, 2, 3) ***selected based on Schwarz Bayesian Criterion***			
Dependent variable: Wholesale and Retail Sector Output ARDL			
Regressor	**Coefficient**	**Standard Error**	**T-Ratio [Probability]**
CointEq(-1)	-0.486762***	0.113714	-4.280568 (0.0007)
C	12.21257***	2.967862	4.114938 (0.0009)
D(INF)	0.030521*	0.016283	1.874402 (0.0805)
D(INT)	-0.065137	0.047883	-1.360343 (0.1938)
D(POP)	0.759562	0.989223	0.767837 (0.4545)
D(TOE(-1))	0.125701*	0.070070	1.793930 (0.0930)
D(TROPEN(-2))	-0.030592	0.024003	-1.274481 (0.2219)
ARDL(1, 2, 3, 2, 3, 3) ***selected based on Schwarz Bayesian Criterion***			
Dependent variable: Building and Construction Sector Output			
Regressor	**Coefficient**	**Standard Error**	**T-Ratio [Probability]**
CointEq(-1)	-0.304941**	0.154069	-1.979247 (0.0712)
C	7.250836**	2.718193	2.667521 (0.0205)
D(INF)	-0.010041	0.025120	-0.399731 (0.6964)
D(INT)	0.178792***	0.057951	3.085207 (0.0094)
D(POP(-1))	-3.836314**	1.202565	-3.190109 (0.0078)
D(TROPEN(-1))	-0.057672**	0.02449	-2.354921 (0.0364)
D(TOE(-2))	0.139687	0.086383	1.617071 (0.1318)

Note: *, ** and *** denote statistically significant at 10, 5 and 1 percent respectively
Source: Output from E-view 10

after the initial shock due to short run fluctuation. It is also an indication that the model is adequate and statistically efficient. Therefore, there is a significant feedback effect ranging from about 80% to 140% across the six sectoral models. This implied that there is long run stability of the output growth after the initial shock due to short run fluctuation. Thus, confirming the adequacy and statistically efficiency of the models.

In term of the coefficient of the variables in the short run, fiscal policy variable (TOE) has significant positive impact on agricultural output, manufacturing and mining sectors while the impact is negligible on Building and Construction, Wholesale and retail and service sector. Inflation has a significant positive impact on service and wholesale and retail output while it has a significant negative impact on agriculture, manufacturing and mining sectors output. Interest rate impact Building and Construction Sector and manufacturing outputs positively and negatively respectively. Population also impact agricultural, service and Building and Construction Sectors positively while it shows a negative effect on manufacturing and mining sectors. One period lag in total expenditure impacts the wholesale and retail output positively and negatively impact on agriculture, manufacturing and mining sectors.

The coefficient of the trade openness is positive and can significantly determine the magnitude of outputs in agriculture, mining and service sectors while on the other hand a negative effect is observed in the case of manufacturing and Building and Construction Sectors. From all of these, agricultural output, manufacturing and mining sectors are significantly affected by the fiscal variables, followed by service and Building and Construction Sectors. Considering the explanatory powers of the model as measured by the R-Squared, the value ranges from 0.5030 to 0.9976 across all the sectors. This implies that 50% to 99% of variation in the sector output is explained by the independent variables. The F-value for the joint significance of the

coefficients of the explanatory variables are significant at 1 percent for all the sectoral outputs except AGR (Table 5).

Table 5: Test Statistics of the Model

	AGR	MAN	MIN	SER	WRS	BCS
R-Squared	0.503030	0.99636	0.96979	0.9996	0.9976	0.9976
F-Statistics	1.229090	172.862	119.242	1056.4	406.39	263.46
Prob(F-statistic)	0.33898	0.0022	0.0000	0.0723	0.0000	0.0000
Akaike AIC	-2.04155	-2.9589	-1.6146	-4.640	3.0918	-2.9563
Schwarz SC	-1.35448	-2.0428	-1.2555	-3.541	-2.313	2.0402
Durbin-Watson stat	1.949382	2.07282	2.3656	2.6605	2.3542	2.3365

Source: Output from E-view 10

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study analyzed the relationship between the fiscal policy variable on output of the various sectors of the Nigeria economy from 1981 to 2021. An endogenous model, fashioned in line with the standard production function formed the basis of the model specification for the variables of interest. An ARDL model was adopted in order to capture both the short-run and long-run dynamics of the model. The ARDL Bounds Test method of establishing cointegration provided evidence that there is cointegration when Mining (MIN), Manufacturing (MAN), Building and Construction (BCN) and Wholesale retail (WRT) are used as dependent variables. However, when Agricultural output (AGR) and Service (SER) are used as the dependent variable, there is no cointegration. In term of sectoral output, the fiscal variables show different impact on the outputs in the long run. The main conclusion from the overall analysis and results show that, fiscal policy variable has had significant long-run impacts on different sectoral output in Nigeria in different ways. Overall, the study found that there is a significant negative relationship between total government expenditure and Agricultural output, Building and Construction, Mining and Wholesale and Trade. Likewise, in the short run, fiscal policy variable has significant positive impact on agricultural output, manufacturing and mining sectors while the impact is negligible on Building and Construction, Wholesale and retail and service output. Interest rate significantly and negatively impact Agriculture output, Wholesale retail trade and Service in the long run while population positively and significantly impact all the sectoral outputs. There is a strong indication that government spending impact sectoral output in Nigeria differently for the period examined. It is also observed that there is a wide disparity in the sectoral response to fiscal policy variable which underscored the difficulty of conducting uniform and economic wide fiscal policy in Nigeria. The policy implication of this is that, for policy makers to improve fiscal policy efficiency on sectoral output, sector specific fiscal spending must be put in place for long term growth. This should specifically be directed at promoting or boosting agriculture output, construction and, mining and wholesale and trade as the sectors have the potentials to promote overall growth. This would stimulate the interest of the private investors in those sectors and eventually increase overall output growth of the country. Again, the variance in sectoral responses to fiscal policy variables served as a reminder of how crucial it is for Nigeria to implement consistent and comprehensive fiscal policies to drive growth.

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