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Responsiveness of the Construction Sector to Fiscal Policy in Nigeria

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Abstract: The influence of fiscal policy measures on the economy is reflective of sectorial outputs like the construction sector industry. However, the extent of the influence in countries such as Nigeria is vague, making their interaction a concern. This study investigated and examined the relationship between the construction sector and selected fiscal policy measures, namely government revenue, public capital expenditure, gross fixed capital formation and deficit finance. Using time series, data of the study variables between 1980 and 2019 were analysed using cointegration estimation and pairwise casualty techniques. The study's findings showed that there were long-term and short-term relationships between all variables, but they were not significant, except for the government revenue. Similarly, the pairwise Granger causality test confirmed that deficit financing and public capital expenditure had no casualty effect on the construction sector. It is concluded that the construction sector is not responsive to changes in fiscal policies in Nigeria. Subsequently, the study recommends the need for increased public and private capital investment, improvement in revenue generation and efficient use of debt revenue on infrastructure development to strengthen domestic growth across economic sectors.

Keywords: Building sector, Construction sector, Debt finance, Nigeria's economy, Fiscal policies

INTRODUCTION

The construction sector of any country is a central and strategic subsector of the economy. Public infrastructure development is provided through public capital spending and investments. Theoretical thoughts by the Keynesian neoclassical theorists underscore this position but not without the influence of fiscal measures. For example, Cornelius, Ogar and Oka (2016) assert that taxes such as personal income tax, company tax and value-added tax accrue as revenue to governments and are derived from utility or satisfaction by individuals and firms. However, resultant capital investment expenditures such as infrastructure development via the annual budgets remain grossly invisible in the economy, as evident in events including the weakening value of fixed capital formation, low industrial output and welfare of citizens and high unemployment rate (Ayeni and Afolabi, 2020). Indeed, the extent of its centrality and influence on economic growth and development is reflected by macroeconomic variables, especially with essential fiscal policy measures (Oladinrin, Ogunsemi and Aje, 2012; Fasoranti, 2016). Several reports

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confirm the economic performance and contributory trajectory of Nigeria's construction sector. In 1960, the construction sector accounted for 3.8% of the gross domestic product (GDP). In 1980, the construction sector accounted for a massive 10% of GDP, but it declined to 3.47% in 1990 and further to 1.77% in 2000 before it rose to 2.88% in 2010 (NBS [National Bureau of Statistics], 2014; Central Bank of Nigeria, 2015). In 2016, the GDP was 3.70%. The Federal Government of Nigeria (2017) predicted that the construction sector had the potential to grow the GDP by over 15% by 2020. In 2020, the construction sector recorded a total market size of approximately NGN1.164 trillion. However, between 2005 and 2017, the Nigerian government spent NGN53 trillion on loans, payroll and pension and about NGN15 trillion on infrastructure development (Debt Management Office, 2018).

Fiscal policy dwells on the range of public sector finances such as government revenue generation, expenditure and debt control (Agu et al., 2014; Etale, 2019), through taxes, budgetary instruments as well as government revenue, public capital expenditure, gross capital formation, deficit finance and other means for macroeconomic stabilisation, income distribution, economic control and attainment of desirable socioeconomic welfare goals (Oke, 2011). The construction sector oversees the development of infrastructure such as transportation, energy, water supply and sanitation, housing and telecommunications, as social and economic, long-term and capital-intensive assets (Ojo, 2021) because infrastructures are related to economic growth and development and as macroeconomic indicators in many countries (Oladipo and Oni, 2012; Pereira and Pereira, 2018; Chakrabarti, 2018; Babatunde, 2018; Zhang, 2019).

The contribution and influence of fiscal policy measures to the economy are reflective of sectorial outputs since the government is believed to be the major client of the construction sector in Nigeria (Anjiba and Adu, 2017). To illustrate, the Nigerian Federal Ministry of Finance (2021) report revealed that from 2000 to 2020, the public capital expenditure amounted to about NGN1.845 trillion, with the highest and lowest capital spending being NGN2.286 trillion and NGN239 billion in fiscal years 2019 and 2000, respectively. The country's debt stock subsisted in increase to about NGN41 trillion (USD104 billion), including the off-budget capital investment, through the USD6.3 billion foreign loans as of March 2022 according to Debt Management Office (2018; 2022). This pattern hampered infrastructure investment needed to support production for growth and underscored the nexus of the construction sector and fiscal policy, either of impairment or impetus, to the economy in Nigeria.

While some researchers and practitioners decry the impairing relationship in the economy in recent two decades, from 1999 to 2019 (Festus and Saibu, 2019), policymakers are of different opinions (Agu et al., 2015; Olaoye, 2016; Nigerian Institute of Building, 2018), hence the contentious economic discourse. The convergent and divergent views concomitantly with the noticed gap in practices and studies in the Nigerian economy have attracted this study. This study, therefore, attempted to query the nature of the relationship between fiscal policies and the construction sector in Nigeria and if fiscal policies influenced the performance of the construction sector in Nigeria. Also, the study intended to investigate the response and performance of the construction sector to fiscal policy dynamics as a general objective and specifically to examine the relationship and casualty between deficit financing, government revenue and public capital expenditure on construction sector contribution to GDP in Nigeria, covering a period of 40 years from 1980 to 2019. This scope was on the acclaimed increased infrastructure investment and

development in the face of turbulent fiscal policies in Nigeria. The findings of this study help policymakers and practitioners to make informed decisions in Nigeria. The rest of this article is organised as follows: literature review, methodology, analysis, discussion of findings, conclusion and policy recommendations.

LITERATURE REVIEW

The construction sector as an economic sector is connected to infrastructure development. Johnson et al. (2013) revealed that the construction sector executes infrastructure projects and allows for engagement in multidisciplinary skilled and non-skilled workforce services, resulting construction sector being the second largest economic subsector after agriculture in Nigeria. The construction sector averaged a 2.25% contribution to GDP growth between 2000 and 2015 (Federal Government of Nigeria, 2017), but not reflective of the investment expenditure in Nigeria. Infrastructures are categorised into social and economic types and cover energy, transportation, water supply, housing, information and communication technologies. They are types of social overhead capital and distinctive factor inputs assets, such as the electric power plant, roads, railways, housing, water plants and telecommunications equipment, that directly benefit the process of production that is characterised by long-term, capital-intensive, environmentally impacting and long-life cycle in any economy (Olaseni and Alade, 2012; Iyortyer, 2017; Zhang, 2019).

Nevertheless, poor capital spending on infrastructure development hinders economic growth in Nigeria, even though that infrastructure can deliver steady long-term national fixed capital appreciation and industrial development, as well as generate employment opportunities and a good overall economy (Babatunde, 2018). As a result, efforts towards public and private partnerships in infrastructure investments using small, medium and large construction firms and expert capacities have been taken. According to Anjiba and Adu (2017), the effort has enhanced fixed capital formation for about 35% of the GDP in Nigeria, far less than the 70% GDP international benchmark.

Linguistically, the word "fiscal policy" is derived from Latin as "state put" lopsided into revenue by way of taxes only. Research, studies and state practices have revealed that fiscal policies encompass revenue/income, expenditure/spending of government and debt finance within the scope of public finance management (Sullivan and Steven, 2003; Adefeso and Mobolaji, 2010; Oseni and Onakoya, 2012). Two approaches to the fiscal policy are identified as being compensatory and discretionary, asserting that the former is the mechanism of balancing government finance to reimburse for fluctuations in national income, using syndication of deficit and surplus financing, taxation and public spending, while the latter are efforts against effects of periodic fluctuations and recurring instability in the economy and on private enterprise coordination.

Fiscal policy decisions can be grouped into expansionary (reduction in taxes or increase in public spending to induce increased demand, aggregate consumption, investment and production levels) and contractionary (efforts including encouraging deficit budget financing and ambitious spending on social overhead capital). Critical examples of expansionary fiscal policy decisions include Nigeria's economic depression experience of –1.9% GDP in the year 2016, informed NGN6.05 trillion actual total spending more than the revenue of

NGN2.71 trillion, leading to budget deficit of NGN3.34 trillion (41.77%) in fiscal year 2017 (Debt Management Office, 2018; BudgIT, 2018). Also, the decision to increase VAT from 5% to 7.5% via the Finance Act 2020 meant to discourage consumption of certain imported goods and increase revenue to the government amounts to a contractionary fiscal policy. However, contemporary public sector economics discourse resolves around budgetary appropriations, which are the most important encompassing periodic fiscal policy documents of government (Ogujiuba and Ehigiamusoe, 2013; Oyedele, 2015; Olaoye, 2016).

On the revenue/income side, different taxes, proceeds from sales of mineral resources especially crude oil sales and external and internal borrowings have been the mainstay of government income in Nigeria. For example, crude oil mineral, the main driver of Nigeria's economic growth, accounts for about 90% of gross exports and 85% of the federal government's foreign revenue (Federal Government of Nigeria, 2017), while non-oil taxation accounts for 6% of national income (Ojo and Oladipo, 2014). External and internal borrowings are substantial income sources though they constitute a huge debt stock (Debt Management Office, 2012; 2014; 2019). Figure 1 shows the national debt profiles in Nigeria.

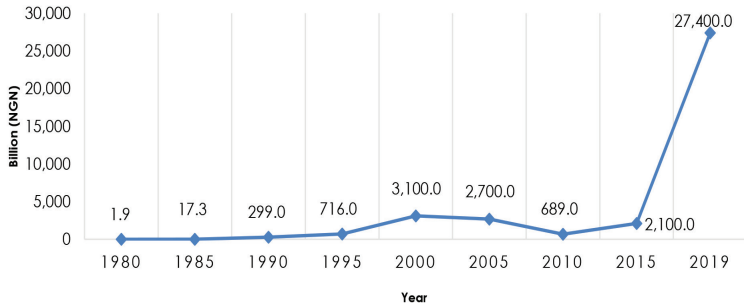


Figure 1. The trend of national debt stock in Nigeria (1980–2019)
Sources: Debt Management Office Reports (2002; 2014; 2018; 2022)

Nigeria's public sector debt history predated 1960. In 1960, the public sector's debt was USD23million (1.0% GDP), it was NGN1.89 billion (16.2% GDP) in 1980, the debt reached NGN3.10 trillion (83.6% GDP) in 2000, stood at USD6.54 trillion (17.8% GDP) in 2012 and at N2GN7.4 trillion (24.5% GDP) in 2019. The rise in the public debt was a pandemic due to the increased population and widening fiscal deficit at the national level with the consequence of debt service to revenue ratio at over 60%, which means for every NGN100 earned, it spends N60 in servicing debt. For example, in the fiscal year 2017, domestic debt constituted 68.5%, while external debt accounted for 31.5% of the total debt stock (Central Bank of Nigeria, 2017).

While most of the purported obtained foreign and domestic loan facilities are meant for infrastructural development, the construction sector of the economy remained unimpacted, evidenced by the parlous state of infrastructures in Nigeria (Alufohai, 2012). On the expenditure, windows are recurrent and capital expenditures with lopsided size, structured and grow in favour of huge recurrent expenditure and its attendant consequences on construction sector growth (Iheanacho, 2016) as illustrated in Figure 2. The trend of high recurrent expenditure, which is more than 70% of the national budget, as compared to the 25% capital

expenditure of the national budget, does not make any indelible impact on the infrastructure development but has abysmal attendance on the peoples' welfare and growth (BudgIT, 2015).

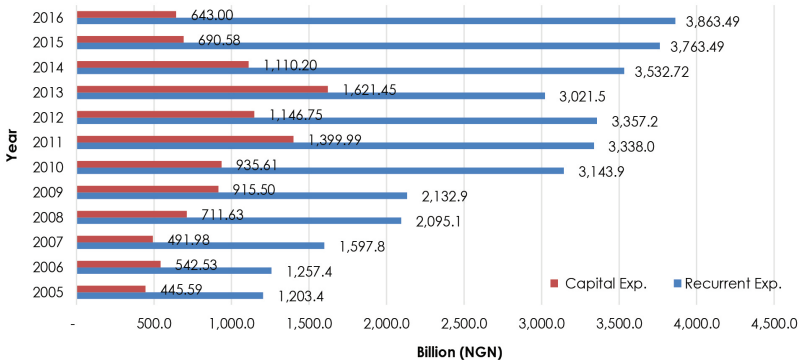
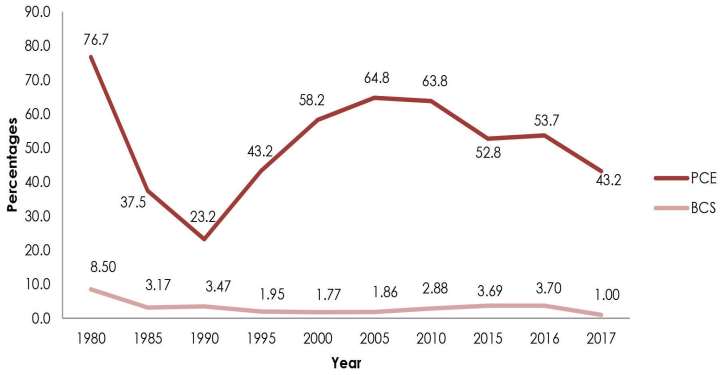


Figure 2. Comparison of capital and recurrent expenditures in Nigeria (2005–2016)
Source: National Budget Office (2019)

Fiscal policy measures, such as taxes, capital spending patterns and government revenue, are significant in creating effects on the aggregate demand, unemployment rate, sectorial output and income, foreign capital flows, price stability of construction sector materials and products, savings and investments, capital asset formation, social welfare outcome, production and growth. For example, the 2016 fiscal year expansionary fiscal policy decisions of paltry public capital expenditure of NGN643 billion due to the failure of oil price revenue (Federal Ministry of Finance, 2017) negatively impacted the construction sector and the aggregate economy, leading to the increased unemployment rate and abandonment of road, water and power infrastructure projects (Ojo and Gbadebo, 2014).



Note: PCE = Public capital expenditure; BCS = Building and construction sector.

Figure 3. Comparison of public capital expenditures and building and construction sector share of GDP in Nigeria (1980–2017)
Source: NBS (2019)

In contrast, Deloitte (2014) submits that construction sector high operating costs are created by multiple tax challenges for companies, resulting in low-profit margins, discouraging investment and savings and reducing aggregate demand and consumption of construction products and services due to reducing disposable income. The Nigerian government's Economic Recovering and Growth Plan (ERGP) 2017 report showed only 35% of GDP in its total infrastructure stock (i.e., fixed capital asset formation). In practice, the construction sector appears not to be favoured when government contractionary fiscal policy decisions ensue, especially in increased taxes, decreased revenues and decreased public capital expenditure by, for example, influencing fixed capital formation, poor infrastructure development, industrial production output and discouragement to acquire new plant/equipment (Ojo, 2017). Further, researchers and practitioners (e.g., Sullivan and Steve, 2003; Pricewaterhouse Coopers, 2012; PKF International Limited, 2013; Ojo and Awodele, 2013; Olaoye, 2016) have discovered that fiscal policy exerts varied time horizon effects, such as resulting in short-run, medium-run and long-run across economic sectors, altering potential output and influencing economic objectives and overall economic progress.

This study was premised on the duo of benefits theory of taxation, first by Lindahl in 1919, which assumes a direct exchange relationship between government tax and citizens' derived benefits and second, the Keynesian theory of public expenditure. The former stipulates that public finance management should employ taxes on individuals and other economic agents based on derived benefits from social goods and services rendered by the government. On the other hand, the latter stresses proficient government interventions in the economy through influencing growth variables in the long run, which contrasts with the classical economic theory.

Government revenue or income arises partly from fiscal measures deliberately expended to achieve desired economic and social objectives, including infrastructure development and employment. This proposes the direct proportionality of the government's revenue and consumption expenditure with multiplier effects on aggregate demand. Blinder (2008) emphasises that an increase in government expenditure, as a derivative of income from sources such as taxes, import and export revenues and borrowings (debt capital), expands on the provision of public goods such as social overhead capital (infrastructures) create effects and impacts the economy like shifting the aggregate demand, creating more employment, escalating money supply, correcting market disequilibrium and enhancing the stability of price level in the economy. In contrast, Mitchell (2005) and Aregbeyeni and Kolawole (2015) argue that Keynesian theory failure due to lower tax rates and tax concessions and increased capital spending enhances sectorial economic growth, inflates the economy and neglects private sector investment contribution and influence on the construction sector, especially in the developing economies. Hence, from the divergent views, it underscores that the increase or decrease in the public sector's investment expenditure via budgetary allocation and or public income finance through borrowings and taxes ultimately reduces or increases the level of a sectorial capital formation such as in the construction sector, especially in the developing economies, where the government is believed to be the major client of the construction sector.

A plethora of economic narratives and studies on the construction sector have been largely polarised to infrastructure development linked with economic growth, development and macroeconomic variables but with mixed results. Oke

(2011) used historical data of the Lagos state government annual budget between 1980 and 2006 on taxation and government capital spending as on fiscal policies to investigate their effects on Nigeria's construction sector by adopting Pearson moment correlation coefficient(r) and regression analysis as estimation techniques. He found that fiscal policies through government expenditures and tax reductions stimulate private consumption and investment spending, establishing a significant relationship between taxation and government spending on the construction sector in Lagos state and he recommended consistent fiscal policy decisions to influence the level of aggregate demand in the economy and improve investment in construction work. Ojo and Awodele (2013), on Nigeria's domestic debt and the construction sector's viability using time series data on the unemployment rate and exchange rate and building and construction sector share of GDP between 2001 and 2011 and multiple regression analysis, establish long-run relationships and recommend appropriate macroeconomic policy guidance by policymakers to attract investors with a focus on the building and construction subsector of the economy.

In addition, Edame, Udude and Ugwu (2014) adopted multiple regression analysis, Johansen Maximum Likelihood (JML) and Ordinary Least Squares (OLS) as the estimation procedures when using time series data from 1970 to 2006. From the data, they assert that public expenditure on infrastructures stimulates economic growth by increasing public capital expenditure on key economic infrastructure. Osinowo's (2015) study, adopting autoregressive distributed lag (ARDL) and error correction model (ECM) techniques, finds that total fiscal expenditures positively contributed to the output of all economic sectors, except for agriculture in Nigeria from 1970 to 2013. He recommends the adoption of a sector-wide fiscal policy mechanism framework in the economy. Onodugo et al. (2017) found that the Nigerian economy grew by 6% from 1980 to 2013 with medium- to long-run effects on unemployment using multiple regression models as an estimation technique. The growth resulted from the public capital, recurrent expenditures and private investment, hence recommending a systematic increase in capital expenditure in the budget with policy incentives to private sector investment. Festus and Saibu (2019) adopted the ARDL model estimation technique to the established long- and short-run relationships between external debt and economic growth in Nigeria, though with negative contributions from external debt to growth from 1981 to 2016. They recommend efficient acquisition and use of debt for productive motives.

The study by Yahaya and Yusuf (2019) used time series data from 1980 to 2019 and ARDL found a significant positive relationship between economic growth and company income tax, value-added tax and custom and excise duties tax. They, therefore, recommend the government focus on and strengthen regulations that can increase revenue collection efforts and investment in infrastructural developments to boost economic growth in Nigeria.

Research Gap

Previous studies reviewed the relationship between fiscal policy variables and economic growth, but not the construction sector in Nigeria, using various estimation techniques. However, Oke's (2011) study, which is related to the current study is lopsided in that: (1) the scope was limited to Lagos State, (2) the variables analysed were limited to taxes and government capital spending components and (3) the

study did not employ econometric models as estimation techniques but adopted Pearson moment correlation and regression analysis.

Therefore, the current study fills these gaps by expanding the study scope to include the entire Nigerian economy, fiscal policy variables inclusive of debt stock, government revenue and gross fixed capital formation and by applying econometric models and estimation techniques.

METHODOLOGY

The current study explored the avalanche of related literature qualitatively. The study also adopted quantitative analysis based on the theoretical production function (linear relationship), endogenous framework and empirical model from work with modifications (Festus and Saibu, 2019). The regression equation was also used to capture the relationship between external debt and the Nigerian economy, where the GDP proxy of the Nigeria economy served as the dependent variable and external debt decomposed into external debt stock, real gross domestic product, trade openness and gross fixed capital formation expressed a percentage of GDP as explanatory variables. Therefore, the following model was formulated:

$$RGDP = f\ (EXDG, TOP, INV, EXCH, INF)$$

where RGDP = Real gross domestic product, EXDG = External debt stock, TOP = Trade openness, INV = Gross fixed capital formation, EXCH = Exchange rate and INF = Inflation.

This model was limited in that debt stock and other variables were not directly sufficient, as they only influenced fiscal policies in the construction sector. Hence, a modified endogenous regression model was used to capture the relationship between construction sector and fiscal policies in explaining the relationship and effects of the independent variables on dependent variables. Equation 1 was then formulated.

$$CS = f\ (\text{Fiscal Policy}) \qquad \text{Eq. 1}$$

The CS, which was a by-proxy in the building and construction sector (BCS), shares of GDP as the dependent variable, while fiscal policy is a by-proxy in the government revenue (GRE), public capital expenditure (PCE), gross capital formation (GCF) and deficit finance (DFS). The mathematical relationship was represented in Equation 2.

$$BCS = f\ (GRE, PCE, GCF, DFS) \qquad \text{Eq. 2}$$

A set of fiscal variables was utilised in the current study due to their strong influence, significance, contribution and relevance to the building and construction sector in any economy. Time series secondary data for the current study were obtained from the Nigeria Bureau of Statistics' annual bulletins, Nigeria National Budget Office and Central Bank of Nigeria's annual reports and the African Development Bank (AfDB) Socioeconomic database, spanning from 1980 to 2019.

The function in Equation 2 was further transformed into an econometric model, as shown in Equation 3:

$$BCS = \beta_0 + \beta_1 PCE + \beta_2 GRE + \beta_3 GCF + \beta_4 DFS + U_t \qquad \text{Eq. 3}$$

where β_0 = Intercept term, β1 = Coefficient of PCE, β_2 = Coefficient of GRE, β_3 = Coefficient of GCF, β_4 = Coefficient of DFS and U_t = Stochastic or disturbance term. On a priori ground, the various theoretical expectations explained were represented in the following equation:

$$\frac{\partial y}{\partial \log PCE} = \beta 1 > 0, \frac{\partial y}{\partial \log GRE} = \beta 2 > 0, \frac{\partial y}{\partial \log GCF} = \beta 3 > 0 \frac{\partial y}{\partial \log DFS} = \beta 4 > 0$$

As the variables of the model were not in the same unit scale, a logarithm transformation of selected variables in Equation 3, as expressed in Equation 4 was conducted. This resulted in a general, static and long-run model.

$$BCS_{t-1} = {}_{\beta 0} + {}_{\beta 1} \ln PCE_{t-1} + {}_{\beta 2} \ln GRE_{t-1} + {}_{\beta 3} GCF_{t-1} + {}_{\beta 4} \ln DFS_{t-1} + U_t \quad \text{Eq. 4}$$

Estimation Analysis

The analysis of the current study involved three stages: preliminary test, estimation techniques analysis and post-estimation diagnostic tests. The preliminary analysis involved a stationarity test (Unit Root Test) to determine the stationarity of the variables in order to avoid spurious and unpredictable results in time series. The regression model used was Augmented Dickey-Fuller (ADF) to test at levels. The first differencing was to examine their order of integration at 5% significance expressed in Equation 5.

$$\Delta Yt = \mu + \aleph Y_{t-1} + \Sigma_\beta \Delta Y_{t-1} + e_t \quad \text{Eq. 5}$$

For example, at the first difference, μ is the intercept, Y_t is the vector of the variable of interest, Δ is the first difference operator, t is the time trend, Y_{t-1} is the lag variable of interest, $\aleph$ is the coefficient of the vector variable, ΔY_{t-1} is first difference lagged and e_t the error term. A series is stationary where the *t*-stat absolute value > *P*-value has no unit root or vice versa. The estimation analysis adopted cointegration and causality tests. The cointegration test used the bound test approach of the ARDL model, which is useful and applicable to variables at varied orders of integrations using Equation 6.

$$\Delta BCS = {}_{\beta 0} + \Sigma \Delta BCS_{t-1} + \Sigma \Delta_{\beta 1} \ln PCE_{t-1} + \Sigma \Delta_{\beta 2} \ln GRE_{t-1} + \Sigma \Delta_{\beta 3} GCF_{t-1} + \Sigma \Delta_{\beta 4} \ln DFS_{t-1} + \pi ECT_{t-1} + U_t \quad \text{Eq. 6}$$

This formed the short-run and error correction mechanism estimates for the model conducted at the lag length of one, where the error correction term (ECT) was the residual of the long-run model. These were used to test for the nature of the cointegration relationship among variables, especially whether a long-run or short-run relationship exists between the dependent variable and the independent variables of interest or otherwise, as first developed in the work of Pesaran, Shin and Smith (2001). A causality test to describe the causal and direction of effects between two sets of variables was conducted, particularly to investigate the direction of the causal relationship between the endogenous and exogenous variables in a model adopting the Pairwise Granger causality test specified in Equation 7:

$$\mu \Delta y_t = \Sigma \delta Z_{t-1} + \Sigma \psi \Delta X_{t-1} + e_i \quad \text{Eq. 7}$$

In Equation 7, *Y*, *Z* and *X* are the vectors of any series variables, at the appropriate number of lags, that Granger causes one another. While *δ*, ψ and *μ* are their respective coefficients, which are not equal to zero to give bi-directional situations. The null hypothesis of no causality between two variables cannot be

rejected if the probability value of the *F*-statistics is > 0.05 ($p > 0.05$) or rejected if otherwise. For the post-estimation diagnosis, serial correlation and cumulative sum of squares of recursive were used to test the series and model degree of correlation and stability at a given lagged version.

ANALYSIS AND DISCUSSION OF FINDINGS

Table 1 presents the results of the stationarity test and orders of integration using the absolute value of test statistics for the series.

Table 1. Augmented Dickey-Fuller level (1980–2019)

Variable	Level		First Difference		Remarks
	t-Statistic	*P*-Value	*t*-Statistic	*P*-Value	Order of Integration
BCS	–2.939	0.002	–2.939	0.00	1(0)
lnPCE	–2.939	0.049	–2.941	0.00	1(0)
lnGRE	–2.939	0.626	–2.941	0.00	1(1)
GCF	–2.939	0.129	–2.941	0.00	1(1)
lnDFS	–2.939	0.002	–2.941	0.00	1(0)

Table 1 shows mixed orders of integration at I(0) and I(1) by the series. As a result, in this case, the ARDL bounds test approach of cointegration was appropriate, according to Pesaran, Shin and Smith (2001). On the other hand, Table 2 presents the results of the ARDL bounds test approach adopting the *F*-statistic, with the critical statistics at 5% significance for decision-making.

Table 2. ARDL bounds test

F-statistic	Critical Value Bounds		Significance	*K*
	Upper I(1)	Lower I(0)		
4.1675	2.86	4.01	5%	4

From Table 2, the *F*-statistic value of 4.1675 was higher compared with the critical values of the upper bounds (4.01) and the lower bounds (2.86) at 5% significance levels, indicating there was a cointegration and sustainable long-run relationship between building and construction sector and government revenue, public capital expenditure, gross capital formation and deficit finance in the model. Hence, the null hypothesis of no cointegration is rejected. This finding concludes that the building and construction sector is very responsive to changes in exogenous variables and underscores the studies by Edame, Udude and Ugwu (2014) and Osinowo (2015) that discovered the influence of public capital expenditure and deficit finance on building and construction sector, the output of economic sectors and economic growth in Nigeria. From the cointegration result, the short run-and-error correction mechanism estimates for the model were conducted at a lag length of one adopting Equation 6. The results are presented in Table 3.

Table 3. ARDL cointegrating form and long-run and short-run relationships

Cointegrating Form				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(lnPCE)	0.942738	1.508747	0.624848	0.5364
D(lnGRE)	–0.168560	0.928225	–0.181593	0.8570
D(lnDFS)	0.428262	1.026133	0.417355	0.6791
D(GCF)	0.011254	0.082646	0.136166	0.8925
CointEq(–1)	–0.642739	0.161009	–3.991943	0.0003
Cointeq = BCS – (1.4668*lnPCE – 0.2623*lnGRE + 0.6663*lnDFS + 0.0175*GCF –6.2419)				
Long-Run Coefficients				
Variable	**Coefficient**	**Std. Error**	***t*-Statistic**	**Prob.**
lnPCE	1.466750	2.406215	0.609567	0.5463
lnGRE	–0.262252	1.462086	–0.179368	0.8587
lnDFS	0.666307	1.625326	0.409953	0.6845
GCF	0.017509	0.127865	0.136932	0.8919
C	–6.241852	13.483062	–0.462940	0.6464

Note: Square of regression (R^2) = 0.1648; Pro(Stat) = 0.2865; *F*-test = 1.3028; Durbin-Watsin stat. = 1.9778

According to Table 3, the overall estimated value of the model was weak as the square of regression (R^2) was 0.1648 or 16% variation in the dependent variable, the building and construction sector, which was explained by fiscal policies, namely government revenue, public capital expenditure, gross capital formation and deficit finance, while the remaining 84% would be explained by other variables outside the model. Hence the model was unfit. The Durbin-Watson value (1.9778) implied that no autocorrelation existed in the model. However, the Pro(Stat) value (0.2865) implied that the overall model was not statistically significant at a 5% level. Additionally, all independent variables except lnGRE expressed a positive relationship with the building and construction sector though not significant, as indicated by their coefficients that were greater than zero and consistent with the a-prior expectation for the study.

In the short-run model, only D(lnGRE) with the coefficient of –0.168560 expressed negativity, while other variables positively correlated with the building and construction sector, but not with a significant influence represented as in Equation 7.

$$BCS_{t-1} = -6.24 + 1.466lnPCE_{t-1} - 0.2623lnGRE_{t-1} + 6.2419GCF_{t-1} + 0.6663lnDFS_{t-1} \quad \text{Eq. 7}$$

Generally, the positive signs imply that an increase in fiscal policy measures drive the construction industry at varying degree of impact but is not as significant as expected. This is partly in tandem with Edame, Udude and Ugwu (2014) and the Keynesian theory of public expenditure that public expenditure on infrastructures stimulates economic growth. However, a decrease in government revenue also negatively affected the building and construction sector though not significantly. This agrees with the positions of Fasoranti (2016). The CointEq(–1) value of –0.6437 was negative but significant because the value measured the model's speed of

adjustment flow from short-run to long-run equilibrium. The value implied that about 64% of the errors were corrected in each period and it took approximately 25 years for the construction economic sector to attain equilibrium. This underscores the unstable and unproductive nature of the industry in Nigeria, unlike other developed economies, as expressed by Oke (2011).

Table 4 shows the results of the Pairwise Granger causality test. At the lag structure of one, there was no causal effect and direction of the causal relationship between the building and construction sector, public capital expenditure and deficit finance in that they all expressed probability values greater than 0.05 or $p > 0.05$. Hence, the null hypothesis of no causality cannot be rejected. The result confirmed that lnPCE and deficit finance had no casualty effect on the building and construction sector and vice versa and further expressed the positive relationship between lnPCE and the building and construction sector, though not significant.

Table 4. Pairwise Granger causality tests

Null Hypothesis	Observations	*F*-Statistic	Prob.
BCS does not Granger Cause lnPCE	39	0.16761	0.6847
lnPCE does not Granger Cause BCS		2.55272	0.1188
BCS does not Granger Cause lnDFS	39	0.24700	0.6222
lnDFS does not Granger Cause BCS		0.41381	0.5241

Post-Estimation Diagnostic Tests

Table 5 presents the results of the Breusch-Godfrey serial correlation Lagranga metric (LM) test model. The results showed that the pro-Chi-Square value of 0.0663 was not significant at the 5% level, indicating that the null hypothesis of no serial correlation cannot be rejected. As a result, the model series has no problem with autocorrelation.

Table 5. Breusch-Godfrey serial correlation LM test

***F*-Statistic**	2.590666	**Prob. *F* (2.33)**	0.0901
Obs*R-Squared	5.428131	**Prob. Chi-Square (2)**	0.0663

Stability diagnosis used the CUSUM test, as in Figure 4. The plot for the model test with the blue line falling between and within the 5% critical bound lines, indicating that the model parameters did not suffer from any structural instability throughout the study.

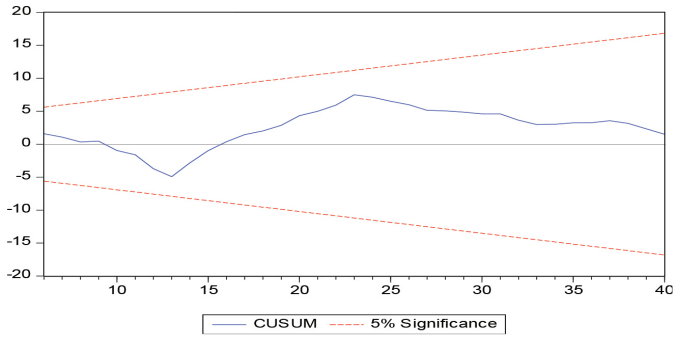


Figure 4. CUSUM test

CONCLUSIONS AND RECOMMENDATIONS

The study examined the impact of fiscal policy variables, namely government revenue, public capital expenditure, gross fixed capital formation and deficit finance on the economy of Nigeria's building and construction sector from 1980 to 2019, using appropriate cointegration test method and analysis. Specifically, the study investigated the relationship and casualty between budgetary deficit financing and public capital expenditure on building and construction sector contribution to GDP in Nigeria.

Based on the findings of the current study, there is a long-run relationship between deficit financing and public capital expenditure in the building and construction sector but not significant, as evidenced using the ARDL bound test method. In the short run, ECM shows that all other variables, particularly deficit financing and public capital expenditure, express positive correlations, but not with significant influence on the building and construction sector, except government revenue. Also, the Pairwise Granger causality test confirms that deficit financing and public capital expenditure have no casualty effect on the economy of the building and construction sector in Nigeria and vice versa.

Therefore, the current study induces appropriate policy recommendations. For instance, there is a need for increased public and private capital investment in infrastructure development in the overall interest of the economy to boost the building and construction sector and attract the avalanche of its benefits, such as employment generation. Also, public debt stock earned through foreign and local loans to finance the annual budget strategies should be properly channelled to intended infrastructure development to enhance gross fixed capital stock that will strengthen the domestic economy for sector-cross growth. More importantly, the government should improve on revenue generation strategies like enhanced taxation and blockage of revenue leakage windows to have sufficient income for infrastructure development and ultimately economic growth and development in Nigeria.

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