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Public Expenditure and Infrastructural Development in Nigeria: A Stepwise Regression Approach

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Abstract: This study examines the relationship between public expenditure and infrastructural development in Nigeria, addressing a persistent methodological gap in the literature: the tendency to specify functional expenditure categories based on theoretical assumptions rather than formal statistical testing of their independent explanatory power. Since Nigeria's four functional expenditure categories administration (ADEX), economic services (ECEX), social and community services (SOEX), and transfers (TREX) are drawn from the same constrained budget envelope and tend to move together in response to common macro-fiscal shocks, models that retain all categories simultaneously risk multicollinearity, unstable coefficients, and inflated standard errors. To address this, the study applies a stepwise regression approach forward selection, backward elimination, and bidirectional stepwise procedures to 35 annual observations (1991–2025) obtained from the CBN, NBS, Budget Office of the Federation, and World Bank WDI, in order to identify which categories are genuinely significant, non-redundant predictors of the Infrastructure Development Index (IFDI). Forward selection and backward elimination independently converge on an identical three-variable model retaining ADEX, ECEX, and TREX, while excluding SOEX as statistically redundant, explaining approximately 97% of the variation in IFDI (Adjusted $R^2 = 0.9684$; $F = 348.238$, $p = 0.0000$). All three null hypotheses are rejected. While TREX's significant negative coefficient is consistent with a crowding-out mechanism, the positive ADEX and negative ECEX coefficients diverge from a priori expectations and prior Nigerian evidence, plausibly reflecting collinearity-induced suppression. The study concludes that expenditure composition, not merely volume, matters for infrastructural outcomes, and recommends further diagnostic testing before treating these provisional findings as policy-actionable.

Keywords: *Public expenditure; Infrastructural development; Infrastructure Development Index (IFDI); Stepwise regression; Forward selection; Backward elimination; Nigeria.*

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Introduction

Public expenditure remains the primary fiscal instrument through which the Nigerian government seeks to address the country's persistent infrastructure deficit. Over the years, government capital spending has increased substantially, rising from ₦351.3 billion in 2006 to over ₦2.98 trillion in 2023 (Federal Ministry of Finance, 2023; Central Bank of Nigeria, 2023). Despite this significant increase, infrastructural development has not improved proportionately, as Nigeria ranked 132nd out of 141 economies on the World Economic Forum's infrastructure competitiveness index in 2023 (World Economic Forum, 2023). This disparity reflects a broader trend across many developing economies, where rising public expenditure has not consistently translated into improved infrastructure due to inefficiencies in expenditure allocation and implementation (Foster et al., 2022). Existing empirical studies have extensively examined the relationship between public expenditure and infrastructural development, but most rely on aggregate expenditure measures or include all functional expenditure categories based primarily on theoretical assumptions (Ukoh & Nwaoha, 2024; Edet et al., 2024). Nigeria's functional expenditure categories administration, economic services, social and community services, and transfers originate from the same budget envelope and often move together in response to common macroeconomic shocks such as fluctuations in oil revenue, exchange rate movements, and debt servicing obligations. Consequently, including all expenditure categories simultaneously in regression models without testing their independent contributions may introduce multicollinearity, resulting in unstable coefficient estimates, inflated standard errors, and unreliable policy conclusions (Naluba et al., 2023).

Although some studies acknowledge multicollinearity, they commonly address it through data transformations rather than determining which expenditure categories genuinely contribute to infrastructural development (Adeyemi, 2023; Naluba et al., 2023). This creates a methodological gap, as policymakers may continue to prioritize expenditure categories that are statistically redundant while overlooking those that exert significant independent influence on infrastructure outcomes. In addition, retaining all expenditure categories without assessing their explanatory

relevance may lead to over-specified models with limited predictive accuracy and reduced policy usefulness. Stepwise regression provides a more objective and data-driven approach to resolving this challenge. Through forward selection, backward elimination, and bidirectional procedures, stepwise regression systematically identifies the subset of variables that provides significant explanatory power while eliminating redundant predictors (Lin et al., 2023). The technique has been successfully applied in related studies to isolate the most influential predictors of economic growth and fiscal performance from highly correlated variables (Kanwal et al., 2024; Lin et al., 2023). Given the interdependence among Nigeria's functional expenditure categories, this approach offers a more parsimonious and statistically robust framework for identifying the expenditure components that genuinely drive infrastructural development. Accordingly, this study addresses the existing methodological gap by applying stepwise regression techniques to determine which of Nigeria's four functional public expenditure categories are significant independent predictors of infrastructural development. By allowing the data, rather than theoretical assumptions alone, to determine the most relevant expenditure categories, the study provides stronger empirical evidence for expenditure prioritization and more effective infrastructure financing policies in Nigeria.

Literature Review

Conceptual Framework

The study conceptualizes infrastructural development as the outcome of a selection process rather than a simple additive function of all functional expenditure categories. Nigeria's budget is disaggregated into four candidate predictors, administration (ADEX), economic services (ECEX), social and community services (SOEX), and transfers (TREX), from which stepwise regression extracts only the subset that contributes significant, non-redundant explanatory power to the Infrastructure Development Index (IFDI), as depicted in Figure 2.1.

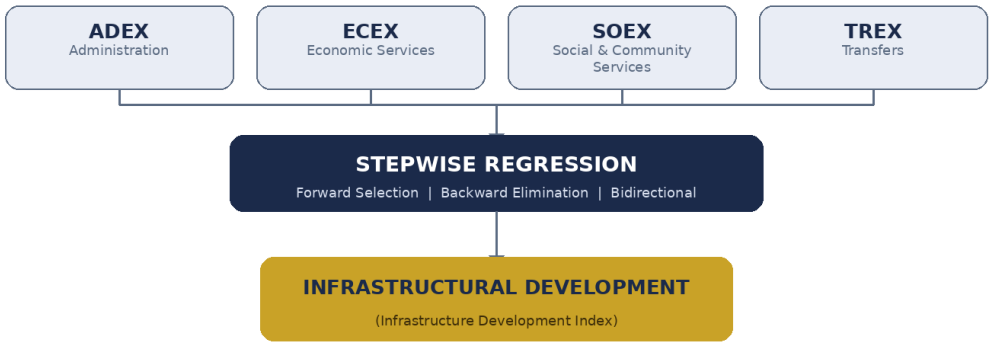

Figure 2.1: Conceptual Framework — Stepwise Selection of Significant Expenditure Predictors

Figure 2.1: Conceptual Framework

Theoretical Framework

This study is anchored on Endogenous Growth Theory, while Wagner's Law of Increasing State Activities, the Keynesian Theory of Public Expenditure, and the Peacock–Wiseman and Musgrave–Rostow theories provide complementary theoretical support. Wagner's Law of Increasing State Activities (Wagner, 1893, as cited in Olukayode, 2009) posits that public expenditure expands more rapidly than national income as economies develop. This provides the basis for expecting sustained growth in Nigeria's functional expenditure categories, although it does not assume that each category contributes equally to infrastructural development. The Keynesian Theory of Public Expenditure (Keynes, 1936) views government spending as an important fiscal instrument for stimulating aggregate demand and economic activity through the multiplier effect. Accordingly, all four functional expenditure categories are considered potential determinants of infrastructural development before empirical testing identifies those with significant independent effects. The study's principal theoretical foundation is the Endogenous Growth Theory developed by Barro (1990), which argues that productive public expenditure directly enhances long-run economic growth by improving infrastructure and productive capacity. The theory suggests that only expenditure categories that make meaningful productive contributions should significantly influence infrastructural development. This aligns closely with the study's application of stepwise regression to identify the expenditure categories that provide genuine explanatory power. For completeness, the Peacock–Wiseman Displacement Hypothesis (Peacock & Wiseman, 1961) and the Musgrave–Rostow Developmental Stages Theory (Musgrave, 1969; Rostow, 1971) are also acknowledged. These theories explain the evolution of public expenditure over time but are less central to this study because stepwise regression focuses on identifying significant predictors rather than modelling the dynamic evolution of government expenditure. Consequently, they serve only as supporting perspectives rather than the primary basis for model specification.

Empirical Review

Applications of stepwise selection to expenditure-growth relationships remain more common outside Nigeria than within it. Lin et al. (2023) used stepwise regression to isolate the government policy variables most predictive of United States GDP from a larger candidate set, while Kanwal et al. (2024) applied backward elimination to identify the financial-inclusion variables that best explain cross-country GDP growth. Within Nigeria, expenditure-growth studies have more commonly used full multiple regression without variable-selection diagnostics (Edet et al., 2024; Onabote et al., 2023), while separate Nigerian work applying variance inflation factor (VIF) analysis to macro-fiscal variables confirms that correlated fiscal series can produce unstable coefficients when retained jointly (Naluba et al., 2023). Direct comparisons of stepwise selection against fuller specifications report mixed results. Efendi et al. (2024) combined ARDL with forward variable selection for time-series prediction and found the hybrid approach improved forecast parsimony over a fully specified ARDL. Conversely, methodological studies outside economics caution that

stepwise procedures can select correlated, redundant predictors more readily than alternatives such as Bayesian model averaging, and that stepwise coefficients and standard errors carry a known selection bias (Heinze & Dunkler, cited in comparative variable-selection reviews). This suggests that, while stepwise selection offers a defensible parsimony gain over an unfiltered full model, its results should be read as indicative of relative predictor importance rather than as unbiased point estimates.

Gaps in Literature

Two gaps stand out. First, a technique gap: stepwise selection has rarely been applied to Nigeria's functional expenditure classification, despite evidence that Nigerian macro-fiscal variables exhibit the correlation structure under which stepwise selection is most useful (Naluba et al., 2023). Second, a comparative gap: no Nigerian study has directly contrasted a stepwise-selected expenditure model against the full four-category model or an ARDL specification on the same infrastructure outcome, leaving it unclear whether parsimony gains from stepwise selection come at a meaningful cost to explanatory power. This study addresses both gaps directly.

Methodology

The study adopts an ex-post facto quantitative research design using annual secondary data (1991–2025) obtained from the CBN, NBS, Budget Office of the Federation (BOF), and World Bank (WDI). Although the data are time-based, they are analyzed as a pooled cross-sectional dataset to identify the functional expenditure categories that best explain infrastructural development. The full model specifies the Infrastructure Development Index (IFDI) as the dependent variable, with Administration Expenditure (ADEX), Economic Services Expenditure (ECEX), Social and Community Services Expenditure (SOEX), and Transfers Expenditure (TREX) as explanatory variables. The study employs stepwise regression using forward selection, backward elimination, and bidirectional selection to retain only statistically significant predictors. Variables are selected based on p-value thresholds (p-in = 0.05; p-out = 0.10) and validated using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). Stepwise regression is preferred because it produces a parsimonious model, reduces multicollinearity, and identifies the expenditure categories with the greatest independent influence on infrastructural development. This is the initial model from which the stepwise procedure selects significant predictors:

$$IFDIt = \beta 0 + \beta 1ADEXt + \beta 2ECEXt + \beta 3SOEXt + \beta 4TREXt + \varepsilon t$$

where

IFDI = Infrastructure Development Index

ADEX = Administration Expenditure

ECEX = Economic Services Expenditure

SOEX = Social and Community Services Expenditure

TREX = Transfers Expenditure

β_0 = Intercept

β_1–β_4 = Parameters to be estimated

ε_t = Error term

Since your empirical results show that SOEX was excluded while ADEX, ECEX, and TREX were retained, the final estimated model becomes:

$$IFDIt = \beta 0 + \beta 1ADEXt + \beta 2ECEXt + \beta 3TREXt + \varepsilon t$$

This is the parsimonious model selected by the forward selection, backward elimination, and bidirectional stepwise procedures, indicating that Administration Expenditure (ADEX), Economic Services Expenditure (ECEX), and Transfers Expenditure (TREX) possess significant independent explanatory power for infrastructural development in Nigeria, while Social and Community Services Expenditure (SOEX) is excluded as a statistically redundant predictor.

A Priori Expectations

Table 3.1: A Priori Expectations and Expected Selection Outcomes

Variable	Expected Sign	Expected Selection Outcome
ADEX	Negative / Insig.	Likely dropped in backward elimination; consumption-oriented spending with weak direct link to infrastructure.
ECEX	Positive	Strong candidate for retention across all three procedures given its direct infrastructural function.
SOEX	Positive	Strong candidate for retention, consistent with prior Nigerian evidence of its significant effect.
TREX	Negative / Insig.	Likely dropped; transfers are not directly infrastructure-generating and may be redundant with other categories.

Results and Discussion

Table 4.1: Forward Selection Results and Model Fit Statistics (Dependent Variable: IFDI)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.9139	0.2909	37.5121	0.0000
ADEX	0.0153	0.0008	19.5819	0.0000
TREX	-0.0034	0.0004	-9.0435	0.0000
ECEX	-0.0072	0.0011	-6.7569	0.0000
R-squared		0.9712		
Adjusted R-squared		0.9684		
F-statistic (Prob.)		348.238 (0.0000)		
Durbin-Watson stat.		1.4782		
Akaike / Schwarz / Hannan-Quinn		2.6368 / 2.8146 / 2.6982		

Source: Author's computation using E-views 12, 2026

Table 4.1 presents the results of the forward selection procedure, in which variables were added sequentially from an intercept-only model, at an entry threshold of p = 0.05, with the search terminating once no remaining candidate met the entry criterion. Three of the four expenditure categories, administration (ADEX), transfers (TREX), and economic services (ECEX), were sequentially added and retained; social and community services (SOEX) was never added, having failed to meet the entry threshold at any step, given the explanatory power already captured by the three retained variables.

Table 4.2: Backward Elimination Results (Dependent Variable: IFDI)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.9139	0.2909	37.5121	0.0000
ADEX	0.0153	0.0008	19.5819	0.0000
TREX	-0.0034	0.0004	-9.0435	0.0000
ECEX	-0.0072	0.0011	-6.7569	0.0000

Source: Author's computation using E-views 12, 2026

Table 4.2 presents the results of the backward elimination procedure, in which all four candidate expenditure categories were initially included and removed sequentially at a removal threshold of p = 0.05, starting from the full candidate model. Backward elimination removed only SOEX from the full candidate model, retaining ADEX, TREX, and ECEX. The resulting model, its coefficients, standard errors, and fit statistics, is identical to that produced by forward selection (Table 4.1), confirming that the two procedures converge on the same final specification regardless of the direction from which the variable space is searched. The identical final specification produced by forward selection and backward elimination is a materially important result rather than a procedural formality. Because the two procedures search the candidate variable space in opposite directions, one adding variables from an empty model, the other removing them from a full model, agreement between them provides stronger evidence of a stable underlying selection than either procedure would on its own. The fact that both procedures independently exclude SOEX indicates that social and community services expenditure carries no explanatory power over IFDI that is not already captured by ADEX, ECEX, and TREX, and is therefore statistically redundant in this static specification.

The final model, IFDI = 10.914 + 0.0153·ADEX − 0.0072·ECEX − 0.0034·TREX, explains approximately 97% of the variation in the Infrastructure Development Index (Adjusted R^2 = 0.9684) and is jointly highly significant (F = 348.238, p = 0.0000). Measured purely against statistical significance, this represents strong support for the view that a small subset of functional expenditure categories can account for infrastructural development at least as well as the full four-category model. However, the signs of two of the three retained coefficients diverge from the a priori expectations set out in Table 3.1, and this divergence is the substantive finding requiring explanation rather than the headline model fit. Transfer expenditure (TREX) behaves exactly as theorised: its significant negative coefficient (−0.0034) is consistent with the crowding-out argument developed in section two, whereby debt service, pensions, and subventions divert fiscal resources away from infrastructure-generating expenditure. Administrative expenditure (ADEX), by contrast, enters with a significant positive coefficient (0.0153), the largest in magnitude of the three retained predictors, contrary to the expectation that

consumption-oriented administrative spending would be negatively signed or statistically negligible. Economic services expenditure (ECEX), the category theoretically closest to infrastructure through its funding of roads, power, transport, and communication, enters with a significant negative coefficient (−0.0072), the most counter-intuitive result in the model.

A significant negative coefficient on the variable most directly tied to the outcome it is meant to explain is a classic signature of suppressor-variable behaviour under collinearity: where two or more correlated predictors are retained together, a variable's estimated coefficient can be driven by the portion of its variance that is uncorrelated with the other retained regressors, rather than by its total, unconditional relationship with the outcome. Since Nigeria's functional expenditure categories are drawn from the same constrained budget envelope and tend to expand together in response to common fiscal shocks, this is a plausible, if not yet confirmed, explanation for the ECEX result. An alternative, non-statistical explanation is also worth entertaining: budgetary economic-services allocations may be only weakly translated into completed, functioning infrastructure due to implementation shortfalls, project abandonment, or cost overruns, such that higher nominal ECEX allocations do not correspond reliably to higher realised infrastructure stock within the same year, a timing mismatch that a static, contemporaneous specification cannot separate from a genuine negative relationship.

Discussion of Findings

The results of this study agree with, and depart from, the empirical and theoretical literature reviewed in section two in specific and instructive ways. The central finding that only three of four candidate expenditure categories survive stepwise selection, with SOEX excluded as statistically redundant, lends direct support to the premise underlying the functional approach itself: that public expenditure should not be treated as a homogenous aggregate, since its constituent categories differ systematically in their relationship with infrastructural outcomes. This is consistent with Onabote et al. (2023), who, using a functional/sectoral decomposition of Nigerian government spending, similarly found that expenditure categories exert differentiated rather than uniform effects on human development outcomes, with some components significant and others not. It is also consistent with the broader logic demonstrated by Lin et al. (2023) and Kanwal et al. (2024), both of whom used stepwise procedures outside the Nigerian context to show that a reduced, parsimonious subset of candidate predictors can explain an outcome variable at least as well as, or better than, the full candidate set, a pattern this study reproduces almost exactly, with SOEX playing the role of the redundant predictor here that financial-inclusion and policy variables played in their respective studies.

The significant negative coefficient on TREX is consistent with the crowding-out mechanism documented in the wider Nigerian fiscal literature, where rising debt-service and transfer obligations are understood to constrain the fiscal space available for productive, infrastructure-generating expenditure. This finding also aligns with the cross-country evidence assembled by Foster et al. (2022), who found that on-budget infrastructure spending in developing economies has been squeezed over time, often by competing, non-discretionary fiscal obligations of the kind captured in Nigeria's transfer expenditure category. This finding departs from the wider literature, which typically treats administrative expenditure as consumption-oriented and either negatively signed or statistically negligible with respect to infrastructural or growth outcomes. Neither the Nigerian ARDL-based studies reviewed in section two (Akintoye et al., 2022; Elaigwu & Khikando, 2024) nor the sectoral decomposition in Onabote et al. (2023) report a significant positive administrative-expenditure effect of comparable magnitude.

This is the study's sharpest point of departure from prior evidence. Nigerian studies that examine economic-services or infrastructure-specific expenditure directly, including Edet et al. (2024), who report a strong positive link between infrastructure spending and GDP growth, and Nwokorobia and Okonkwo (2024), who report that public infrastructure investment raises industrial productivity, uniformly find a positive association, not a negative one. The result is similarly at odds with Barro's (1990) endogenous growth framework, which is the study's own theoretical anchor, and which predicts that productive expenditure, of which economic-services spending is the paradigm case, should raise, not lower, the productive outcome it funds. Read against a dynamic ARDL specification of the same underlying relationship, in which social and community services expenditure emerges as the only long-run significant driver of infrastructural development, the present stepwise results are close to a mirror image: SOEX, significant there, is redundant here, while ADEX and TREX, insignificant in the long-run ARDL estimates, are significant here. This is not evidence that either method is wrong; rather, it demonstrates, in line with the methodological caution raised by Heinze and Dunkler (2017) and by Efendi et al. (2024) regarding hybrid ARDL-selection approaches, that stepwise regression and dynamic cointegration-based methods are answering different questions, contemporaneous association versus long-run equilibrium relationship, and can legitimately produce different, even opposite, variable rankings from the same underlying data.

Forward selection and backward elimination converge on an identical three-variable model in which administration (ADEX) and transfer (TREX) expenditure, alongside economic services (ECEX) expenditure, are retained as statistically significant predictors of infrastructural development, while social and community services (SOEX) expenditure is excluded as redundant. Three of the study's hypotheses (H01–H03) are rejected on the strength of this convergence. Set against prior studies, the results both confirm the core premise of the functional approach (that expenditure categories are not equally important) and diverge sharply from prior evidence, and from the study's own dynamic specification, on which specific categories matter and in which direction, a divergence that is provisionally attributed to collinearity-induced suppression and to genuine method-contingent differences between static and dynamic estimation, pending confirmation by the outstanding diagnostic tests.

Conclusion and Recommendations

This study set out to identify, using a stepwise regression approach, the significant predictors of infrastructural development in Nigeria among four candidate functional expenditure categories, administration (ADEX), economic services (ECEX), social and community services (SOEX), and transfers (TREX), rather than assuming a priori that all four categories contribute equally. Applying forward selection and backward elimination to 35 annual observations (1991-2025), both procedures converged on an identical three-variable model, retaining ADEX, ECEX, and TREX as jointly and individually significant predictors ($p < 0.01$ in each case) of the Infrastructure Development Index, while excluding

SOEX as statistically redundant once the other three categories were accounted for. The final model explained approximately 97% of the variation in infrastructural development (Adjusted R^2 = 0.9684; F = 348.238, p = 0.0000). On the basis of this evidence, the study concludes, first, that the functional composition of public expenditure, not merely its aggregate volume, matters for infrastructural development in Nigeria, since one of the four candidate categories was found to add no independent explanatory power. Second, the study concludes that transfer expenditure exerts a significant, negative, and theory-consistent drag on infrastructural development, supporting the crowding-out argument developed in section two. Third, the study concludes, more cautiously, that the significant positive coefficient on administrative expenditure and the significant negative coefficient on economic services expenditure are provisional findings that depart from the a priori expectations set out in section three and from prior Nigerian evidence, and are more plausibly explained by collinearity-induced suppression among the retained regressors than accepted as settled, theory-confirming results. Fourth, the study concludes that the marked divergence between these static, contemporaneous results and the long-run significance of SOEX under a dynamic (ARDL) specification of the same relationship is not evidence that either method is flawed, but confirmation that stepwise regression and dynamic cointegration-based methods answer different empirical questions and can legitimately produce different rankings of variable importance from the same underlying data. Arising from the findings and limitations above, the following recommendations are made.

i. Policymakers should treat the positive ADEX and negative ECEX coefficients as provisional rather than as a basis for reallocating budgetary priority away from economic-services infrastructure spending.

ii. Given the consistent, theory-conforming finding on transfer expenditure, fiscal authorities should continue to prioritise prudent debt management and a reduction in the share of the budget absorbed by debt service and other transfers, to protect the fiscal space available for infrastructure-generating expenditure.

iii. Researchers extending this work should complete the outstanding VIF, Breusch-Pagan, and Jarque-Bera diagnostics, and formally compare the stepwise-selected model against the full four-variable model using AIC/BIC and k-fold cross-validation, before the findings on ADEX and ECEX are treated as policy-actionable.

iv. Given that stepwise and ARDL specifications of the same relationship produced markedly different variable rankings, future studies should present both static (stepwise or OLS) and dynamic (ARDL or VECM) results side by side, rather than relying on a single estimation technique, so that policymakers can distinguish contemporaneous associations from long-run equilibrium relationships when setting budgetary priorities.

v. The Budget Office of the Federation and National Bureau of Statistics should strengthen the consistency and timeliness of functional expenditure reporting, to reduce the reconciliation burden this and future studies face when CBN and Budget Office figures diverge.

References

1. Akaike, H. (1974). A new look at the statistical model identification. IEEE Transactions on Automatic Control, 19(6), 716–723. https://doi.org/10.1109/TAC.1974.1100705
2. Akintoye, I. R., Ogunmuyiwa, M. S., & Amos, A. A. (2022). Capital expenditure on infrastructure and economic growth in Nigeria, 1970–2019: An ARDL approach. Journal of Economics, Finance, and Management Studies, 6(7), 3015–3027.
3. Barro, R. J. (1990). Government spending in a simple model of endogenous growth. Journal of Political Economy, 98(5, Pt. 2), S103–S125. https://doi.org/10.1086/261726
4. Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. Econometrica, 47(5), 1287–1294. https://doi.org/10.2307/1911963
5. Central Bank of Nigeria. (2023). CBN statistical bulletin. Central Bank of Nigeria.
6. Draper, N. R., & Smith, H. (1998). Applied regression analysis (3rd ed.). Wiley.
7. Durbin, J., & Watson, G. S. (1951). Testing for serial correlation in least squares regression II. Biometrika, 38(1–2), 159–177. https://doi.org/10.2307/2332325
8. Edet, U., Akpan, I., & Bassey, G. (2024). Infrastructure spending and GDP growth: Evidence from Nigeria. *African Journal of Applied Economics*, 8(2), 112–130.
9. Efendi, A., Mursityo, Y. T., Hidajati, N. W., Wahyuni, N. A., Zuraidah, Z., & Handoyo, S. (2024). Multiple time series modeling of autoregressive distributed lags with forward variable selection for prediction. WSEAS Transactions on Business and Economics, 21, 1012–1026. https://doi.org/10.37394/23207.2024.21.84
10. Efroymson, M. A. (1960). Multiple regression analysis. In A. Ralston & H. S. Wilf (Eds.), Mathematical methods for digital computers (pp. 191–203). Wiley.
11. Elaigwu, M., & Khikando, T. (2024). Government expenditure and economic growth in Nigeria (2005–2022): A VAR and Granger causality approach. Journal of Business and African Economy, 11(9).
12. Federal Ministry of Finance. (2023). Budget implementation report, 2023 fiscal year. Federal Ministry of Finance, Budget and National Planning.
13. Foster, V., Rana, A., & Gorgulu, N. (2022). Understanding public spending trends for infrastructure in developing countries (Policy Research Working Paper No. 9903). World Bank.
14. Heinze, G., & Dunkler, D. (2017). Five myths about variable selection. Transplant International, 30(1), 6–10. https://doi.org/10.1111/tri.12895
15. Jarque, C. M., & Bera, A. K. (1980). Efficient tests for normality, homoscedasticity and serial independence of

regression residuals. Economics Letters, 6(3), 255–259. https://doi.org/10.1016/0165-1765(80)90024-5

16. Kanwal, S., Ahmed, W., & Hassan, S. (2024). Resolving the paradox: How mobile money drives economic growth through financial inclusion. Heliyon, 10(20), Article e39069. https://doi.org/10.1016/j.heliyon.2024.e39069
17. Keynes, J. M. (1936). The general theory of employment, interest and money. Macmillan.
18. Lin, Y., Chen, X., & Lan, H. (2023). Analysis and prediction of American economy under different government policy based on stepwise regression and support vector machine modelling. *Data Science in Finance and Economics*, 3(1), 1–13. https://doi.org/10.3934/DSFE.2023001
19. Musgrave, R. A. (1969). Fiscal systems. Yale University Press.
20. Naluba, R. Z., et al. (2023). Modelling and detecting multicollinearity of some macroeconomic variables on Nigeria's real GDP. *International Journal of Mathematics Trends and Technology*, 69(2), 61–69.
21. Nwokorobia, G., & Okonkwo, J. (2024). Public infrastructure investment and industrial productivity in Nigeria. Journal of Economic Development, 15(4), 78–95.
22. Olukayode, M. E. (2009). Does government spending spur economic growth in Nigeria? (MPRA Paper No. 17941). Munich Personal RePEc Archive.
23. Onabote, A. A., Ohwofasa, B. O., & Ogunjumo, R. A. (2023). Government sectoral spending and human development in Nigeria: Is there a link? Heliyon, 9(7), Article e17545. https://doi.org/10.1016/j.heliyon.2023.e17545
24. Peacock, A. T., & Wiseman, J. (1961). The growth of public expenditure in the United Kingdom. Princeton University Press.
25. Rostow, W. W. (1971). Politics and the stages of growth. Cambridge University Press.
26. Schwarz, G. (1978). Estimating the dimension of a model. Annals of Statistics, 6(2), 461–464. https://doi.org/10.1214/aos/1176344136
27. Ukoh, C. E., & Nwaoha, W. C. (2024). Government expenditure and economic growth in Nigeria. [Working paper].
28. World Economic Forum. (2023). Global competitiveness report 2023. World Economic Forum.