IJAAR PUBLISHING®

West African Journal of Interdisciplinary Research | ISSN: 3027-1878
Volume 3, Issue 4 (2025) | www.ijaar.org

FISCAL POLICY AND CAPITAL FORMATION IN NIGERIA: AN EMPIRICAL ANALYSIS

BY

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Abstract

This study empirically investigates the relationship between fiscal policy and capital formation (CF) in Nigeria from 1990 to 2023. Utilizing time series data sourced from the Central Bank of Nigeria Statistical Bulletin, the study employed the Ordinary Least Squares (OLS) estimation technique. Capital Formation was modeled as a function of capital expenditure, recurrent expenditure, tax revenue, and oil revenue. The findings reveal that 68.7% of the variation in CF is explained by the fiscal policy variables. Specifically, capital expenditure exhibited a positive and statistically significant effect on CF. Recurrent expenditure and tax revenue showed positive but statistically insignificant effects. Conversely, oil revenue had a negative and significant impact on capital formation. The study concludes that fiscal policy is a critical determinant of capital formation in Nigeria and recommends a strategic reorientation of fiscal policy towards boosting capital expenditure and diversifying the revenue base away from oil to stimulate sustainable investment and economic growth.

Keywords: Fiscal Policy, Capital Formation (CF), Capital Expenditure, Oil Revenue, Nigeria, Ordinary Least Squares.

Ikezam, N. D., Sunday, H. & Wike, C. (2025). Fiscal Policy and Capital Formation in Nigeria: An Empirical Analysis. *West African Journal of Interdisciplinary Research. 3*(4), 20-29. DOI: https://doi.org/10.5281/zenodo.17457163

1. Introduction

The role of fiscal policy in stimulating economic growth and development has been a subject of intense debate in economic literature. Classical economists posited that fiscal variables, such as taxation and public expenditure, influence income levels but have no long-run impact on economic growth (Folster & Henrekson, 2012). In contrast, Keynesian economists assign a significant role to government fiscal policy, advocating its use to fine-tune the economy and achieve macroeconomic objectives like output growth, price stability, and full employment (Wjaosk, 2011). Fiscal policy, defined as the use of government revenue (taxation) and expenditure to influence economic activity, is a crucial tool for pulling economies out of recession and stimulating capital accumulation (Odior, 2013).

Capital formation, the pool of resources set aside for the production of further capital, is an integral component of the Gross Domestic Product (GDP) and a key driver of long-term economic growth (Lucky & Uzah, 2017). An effective fiscal policy is expected to increase the quantum of available capital stock, thereby enhancing a nation's productive capacity. However, in Nigeria, the over-reliance on oil revenue, which accounts for about 90% of government earnings, poses a significant challenge (Ojeka et al., 2016). This monolithic revenue structure makes the economy vulnerable to volatile international oil prices, constraining the government's ability to provide consistent fiscal stimulus and invest in capital projects.

While numerous studies have examined the relationship between fiscal policy and economic growth in Nigeria (e.g., Babalola & Aminu, 2011; Endurance et al., 2022; Amusa et al., 2021), there remains a relative paucity of empirical research focusing directly on its impact on capital formation. This study aims to fill this gap by providing a focused empirical analysis of how different components of fiscal policy—capital expenditure, recurrent expenditure, tax revenue, and oil revenue—affect gross fixed capital formation in Nigeria.

Specific objectives of this study are to:

1. Examine the relationship between capital expenditure and capital formation.
2. Determine the relationship between recurrent expenditure and capital formation.
3. Analyze the relationship between oil revenue and capital formation.
4. Investigate the relationship between tax revenue and capital formation.

2. Literature Review

2.1 Conceptual Framework

2.1.1 Fiscal Policy

Fiscal policy encompasses the government's use of taxation and expenditure to influence the economy. As defined by the Central Bank of Nigeria (2011), it is "the use of government expenditure and revenue collection through tax and amount of government spending to influence the economy." The primary instruments include government expenditure (both capital and recurrent) and taxation, which can affect aggregate demand, resource allocation, and income distribution (Odhiambo et al., 2013).

2.1.2 Capital Formation

GFCF refers to the net increase in the physical assets of a nation. It represents investments in fixed assets such as machinery, buildings, and infrastructure, which are essential for expanding production capacity and fostering future economic growth (Bakare, 2011). It is a critical indicator of a country's investment health and long-term growth prospects.

2.2 Theoretical Framework

This study is anchored on theKeynesian Aggregate Demand Theory. Keynes (1936) argued that during economic downturns, the market mechanism is insufficient for a swift recovery. He advocated for activist fiscal policies, particularly increased public spending, to stimulate aggregate demand, output, and employment. This theory posits that government expenditure, especially on capital projects, has a multiplier effect on the economy, thereby enhancing capital formation. The study also considers the counter-arguments from the Neoclassical school, which emphasizes potential crowding-out effects where government borrowing to finance deficits may raise interest rates and deter private investment.

2.3 Empirical Review

Empirical evidence on the fiscal policy-capital formation nexus is mixed.Ogbole (2021) found that fiscal policy's effectiveness in stimulating private investment in Nigeria differed between regulated and deregulated periods. Basil (2014) emphasized the need to fine-tune macroeconomic indicators to enhance the efficacy of fiscal policy in boosting capital formation. Peter and Julius (2023) found that total government revenue and expenditure positively impacted gross capital formation in Nigeria, while government borrowing and budget deficits had negative effects. Akujiobi et al. (2018) revealed a significant relationship between public expenditure and capital formation in Nigeria. Conversely, Lucky and Uzah (2016), while testing Jhingan's propositions, found that several financial variables had insignificant effects on capital formation in Nigeria, highlighting the complexity of the relationship.

3. Methodology

This outlines the research design, data sources, model specification, and analytical techniques employed to investigate the relationship between fiscal policy and capital formation in Nigeria.

3.1 Research Design and data Framework

Component	Description
Research Design	Ex-post facto and descriptive research design. This design is appropriate for analyzing historical data to establish causal relationships between variables without direct manipulation.
Data Type	Time-series data.
Data Source	Central Bank of Nigeria (CBN) Statistical Bulletin.
Period of Study	1990-2023 (33 years)
Estimation Technique	Ordinary Least Square (OLS) Regression.

This study employs an ex-post facto research design, utilizing historical time-series data to establish relationships between the variables.

3.2 Data Sources

Annual time-series data for the period 1990 to 2023 were sourced from the Central Bank of Nigeria(CBN) Statistical Bulletin.

Variable	Symbol	Measurement	
Dependent variable			
Capital Formation	**CF**	**Monetary value of CF (in Billions of Naira)**	**Expected Sign**
Independent variables			
Capital Expenditure	CEXP	Government capital expenditure (in Billions of Naira)	Positive (+)
Recurrent Expenditure	REEXP	Government recurrent expenditure (in Billions of Naira)	Positive (+)
Tax Revenue	TAXR	Government Tax revenue from non-petroleum sources (in Billions of Naira)	Positive (+)
Oil Revenue	OILR	Government revenue from the oil sector (in Billions of Naira)	Negative (-)

3.3 Model Specification

The functional relationship for the study is specified as follows:

Component	**Description**
Functional Form	CF = f(CEXP, REEXP, TAXR, OILR)
Econometric Model	$CF = \beta_0 + \beta_1 CEXP + \beta_2 REEXP + \beta_3 TAXR + \beta_4 OILR + \mu$
Where:	β_0 is the intercept; $\beta_1 - \beta_4$ are the coefficients of the independent variables; μ is the stochastic error term.

CF = f (CEXP, REEXP, TAXR, OILR)

The econometric form of the model is:
$GFCF = \beta_0 + \beta_1 CEXP + \beta_2 REEXP + \beta_3 TAXR + \beta_4 OILR + \mu$

Where:

· GFCF = Gross Fixed Capital Formation
· CEXP = Capital Expenditure
· REEXP = Recurrent Expenditure
· TAXR = Tax Revenue
· OILR = Oil Revenue
· β_0 = Intercept
· β_1 - β_4 = Coefficients of the independent variables
· μ = Error term

3.4 Data Analysis and Diagnostic Tests

Test/Statistic	Purpose	Decision Rule
Coefficient of Determination (R^2)	Measures the proportion of the variance in the dependent variable explained by the independent variables.	A higher value (closer to 1) indicates a better model fit.
Adjusted R-squared	Adjusts the R^2 for the number of explanatory variables in the model.	A more reliable measure of model fit for multiple regression.
T-Test	Tests the individual statistical significance of each regression coefficient	If þ-value < 0.05, the variable is considered statistically significant. $H_0 : \beta = 0$; $H_1 : \beta \neq 0$.
F-Test	Tests the overall significance of the regression model	If þ - value < 0.05, the model is statistically significant. $H_0 : \beta_1 = \beta_2 = \ldots = \beta_k = 0$; H_1 : Not all coefficients are zero
Durbin-Watson (DW) Statistic	Test for the presence of autocorrelation in the residuals	A value around 2.0 suggests no autocorrelation. A value toward 0 indicates positive autocorrelation, and toward 4 indicates negative autocorrelation.

The study used the Ordinary Least Squares(OLS) multiple regression technique. Diagnostic tests included the Coefficient of Determination (R^2), T-test, F-test, and the Durbin-Watson statistic for autocorrelation.

4. Results and Discussion

4.1 Descriptive Statistics of Variables (1990-2023)

The OLS regression results are presented in Table 1.

Variable	Mean	Median	Maximum	Minimum	Standard Deviation
CF	8.45	8.46	11.33	5.57	1.65
CEXP	60.45	56.45	99.73	27.65	18.50
REEXP	18.76	19.35	29.70	9.10	5.25
TAXR	36.75	36.08	67.93	8.04	14.20
OILR	29.67	26.06	65.77	5.85	17.89

NOTE: Values are represented are viz.
CF, CEXP, REEXP, TAXR, OILR are in Billions of Naira.

Table 1: OLS Regression Results

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Probability**
CF	5.374665	3.493997	1.538257	0.1397
CEXP	0.560209	0.178113	3.145248	0.0051
REEXP	0.087349	0.130243	0.670660	0.5101
TAXR	0.419039	0.290209	1.443919	0.1642
OILR	-0.613329	0.351761	-1.743598	0.0466
R-squared	0.791567			
Adjusted R-squared	0.687351			
F-statistic	7.595430			
Prob(F-statistic)	0.000067			
Durbin-Watson Statistics	2.050697			

The model shows a good fit, with the independent variables explaining 68.7% (Adjusted R^2 = 0.687) of the systematic variations in GFCF. The F-statistic of 7.595 (p = 0.000067) confirms that the model is statistically significant overall.

4.2 Discussion of Findings

· Capital Expenditure (CEXP): The coefficient of 0.560 (p = 0.0051) indicates a positive and statistically significant relationship with GFCF. This aligns with theoretical expectations and empirical evidence (e.g., Peter & Julius, 2023), confirming that government spending on productive assets like infrastructure directly stimulates capital formation.

· Recurrent Expenditure (REEXP): With a coefficient of 0.087 (p = 0.5101), recurrent expenditure has a positive but statistically insignificant effect on GFCF. This suggests that while spending on salaries, overheads, and administration is necessary, it does not directly translate into a significant increase in the capital stock within the studied period.

· Tax Revenue (TAXR): The positive coefficient of 0.419 (p = 0.1642) implies that tax revenue has an insignificant positive effect on GFCF. This could be because increased tax revenue, in theory, provides the government with more resources for investment, but its impact may be diluted if not efficiently channeled into capital projects or if it crowds out private investment.

· Oil Revenue (OILR): The coefficient of -0.613 (p = 0.0466) reveals a negative and significant relationship with GFCF. This critical finding supports the "resource curse" narrative in Nigeria. Heavy reliance on oil revenue often leads to volatility in government spending, Dutch disease, and a neglect of other productive sectors, ultimately hampering sustained capital accumulation (Obi, 2018).

4.3 Hypotheses Testing

Table 4.3 Summary of Hypotheses Testing

Hypothesis	**Decision**	**Interpretation**
H-01-: no significant relationship between capital expenditure Capital formation	Rejected	A unit increase in Capital Expenditure leads to a significant 0.56-unit increase in CF. It is a potent tool for capital formation
H-02-: No significant relationship between recurrent expenditure and capital formation.	Not Rejected	Recurrent expenditure has a positive but statistically insignificant effect (p=0.5101) on CF. It does not directly contribute to capital stock expansion
H-03-: No significant relationship between tax revenue and capital formation.	Not Rejected	Tax revenue has a positive but statistically insignificant effect (p=0.1642) on CF. its impact is not direct or is diluted by other factors.
H-02-: No significant relationship between oil revenue and capital formation.	Rejected	Aunit increase in oil revenue leads to a significant 0.61-unit decrease in CF. Over-reliance on oil revenue is detrimental to capital formation.

Based on the p-values:
· H~O1~ (Capital Expenditure): Rejected. A significant positive relationship exists.
· H~O2~ (Recurrent Expenditure): Not rejected. No significant relationship exists.
· H~O3~ (Tax Revenue): Not rejected. No significant relationship exists.
· H~O4~ (Oil Revenue): Rejected. A significant negative relationship exists.

4.4 Discussion of Key Findings

Finding	Implication
The model is significant (F-stat. p-value = 0.00067) and explains 68.7% (Adj. R^2) of variations in CF	Fiscal policy variables are major determinants of capital formation in Nigeria. The model has a strong explanatory power.
Capital Expenditure has a positive and significant effect (β = 0.560, p=0.0051).	Government spending on infrastructure and productive assets is a direct and powerful driver of capital accumulation. This aligns with Keynesian theory, where public investment stimulates economic capacity.
Recurrent Expenditure has a positive but significant effect (β = 0.087, p=0.5101).	Spending on salaries, overheads and administration, while necessary for government operations, does not directly lead to a significant increase in the nation's capital stock. It may even crowd out resources for more productive capital spending if too large.
Tax Revenue has a positive but significant effect (β = 0.419, p=0.1642)	While increase tax revenue provides fiscal space, its impact on CF is not automatic. This could be due to inefficiencies in revenue utilization, misallocation of funds, or the potential for high taxes to disincentivize private investment.
Oil Revenue has a negative and significant effect (β = 0.613, p=0.0466).	This is a critical finding that underscores the "resources curse" phenomenon in Nigeria. Reliance on oil revenue leads to volatility, rent-seeking behavior, and a neglect of other sectors, ultimately hampering sustainable capital formation. It can appreciate the domestic currency, making non-oil sectors less competitive and reducing investment incentives.

5. Conclusion and Recommendations

5.1 Conclusion

This study establishes that fiscal policy is a significant determinant of gross fixed capital formation in Nigeria. The composition of fiscal policy matters greatly. Capital expenditure is a potent tool for driving investment, while over-dependence on oil revenue is detrimental to capital formation. The positive but insignificant effects of recurrent expenditure and tax revenue suggest inefficiencies in their deployment and structure.

5.2 Policy Recommendations

Based on the findings, the study proposes the following recommendations:
1. Prioritize and Increase Capital Expenditure: The government should consciously increase the share of capital expenditure in the annual budget and ensure the efficient execution of

capital projects, particularly in critical infrastructure like power and transportation, to directly boost the nation's capital stock.

2. Diversify the Revenue Base: There is an urgent need to reduce dependence on oil revenue by aggressively diversifying the economy. Efforts should be intensified to strengthen the non-oil sector, particularly agriculture, manufacturing, and services, to create a more stable and sustainable revenue base for funding capital projects.

3. Rationalize Recurrent Expenditure: While necessary, the government should streamline recurrent expenditure by improving efficiency and reducing wasteful spending. Savings from a more efficient recurrent budget should be reallocated to the capital budget to enhance its impact on growth.

4. Improve Tax System Efficiency: The government should broaden the tax base and improve the efficiency of tax collection rather than increasing tax rates. The generated revenue should be transparently and accountably linked to the financing of productive capital investments.

5. Strengthen Fiscal Governance: Implementing existing frameworks like the Fiscal Responsibility Act and ensuring transparency in public financial management are crucial to curbing leakages and ensuring that public funds are effectively channeled towards growth-enhancing capital formation.

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