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IMPACT OF GOVERNMENT CAPITAL EXPENDITURE ON ECONOMIC GROWTH IN NIGERIA

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Abstract

This study examines the effects of government capital expenditure on economic growth in Nigeria, specifically focusing on the sectors of machinery, education, and power from 1990 to 2023. Despite extensive research in this area, there remains a significant gap in understanding the precise long-term impacts of these investments on economic growth within the Nigerian context. This study aims to fill this gap by employing Autoregressive Distributed Lag (ARDL) models, integrating economic theories such as Keynesian economic theory and endogenous growth theory, to provide a robust analytical framework. Data sourced from the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), and World Bank databases were meticulously analyzed to measure the immediate and delayed effects of capital expenditures on growth. The findings reveal that capital expenditure on machinery has a significant positive impact on economic growth in the immediate term but exhibits a negative effect in subsequent periods. This suggests an initial boost in productivity and industrial capacity, which may later encounter issues of overinvestment or inefficiencies. In contrast, expenditure on education does not show a significant immediate impact on economic growth; however, it demonstrates substantial positive effects in the long term. This underscores the critical role of educational investment in fostering sustainable economic development through the enhancement of human capital. Similarly, capital expenditure on power significantly enhances economic growth in the short term, but this effect diminishes over time, indicating potential inefficiencies or the maturation of the infrastructure. Based on these findings, the study recommends optimizing the scale and timing of investments in machinery, sustaining and enhancing investments in education to yield long-term benefits, and conducting regular reviews and upgrades of power infrastructure to maintain its positive economic impact. These strategic recommendations are intended to guide policymakers in effectively utilizing capital expenditure to stimulate and sustain economic growth in Nigeria.

Keywords: Government Capital Expenditure, Economic Growth, Capital Expenditure on Machinery.

Introduction

The relationship between government capital expenditure and economic growth is a pivotal subject of inquiry for policymakers and economic theorists, especially in nations grappling with developmental challenges. In Nigeria, exploring this dynamic is particularly crucial given the nation's ongoing struggles with economic stability, infrastructural deficits, and fiscal management.

Government capital expenditure encompasses investments in critical areas such as infrastructure, education, healthcare, and other public assets, which are fundamental for catalyzing economic activities and laying the foundation for robust economic growth (World Bank, 2019).

Government investments in infrastructure, education, healthcare, and other public assets are fundamental for catalyzing economic activities and fostering sustained economic growth (World Bank, 2023). The sectors of machinery, education, and power are particularly significant in this regard; machinery and infrastructure investments are directly tied to industrial capacity and competitiveness, education spending is critical for human capital development, and investments in power infrastructure are essential for ensuring that businesses and industries can operate efficiently (Adebayo & Ogunrinola, 2021; Adedipe, 2022).

Despite the recognized importance of capital expenditure in promoting economic growth, Nigeria faces significant challenges in harnessing its government spending to achieve desired economic outcomes. The complexity of Nigeria's economic framework, coupled with governance issues, inefficiency, and resource misallocation, often limits the effectiveness of such expenditures Adeboye 2023). Additionally, the persistent reliance on oil revenues has historically restricted the government's ability to diversify its investments into crucial non-oil sectors essential for sustainable development.

A critical issue is the lack of tailored empirical analysis that addresses the specific conditions of Nigeria's economy, which includes regional disparities, sector-specific development needs, and unique fiscal management challenges. Many existing studies offer broad findings that do not capture these specific elements, leading to a gap in the literature that this paper seeks to fill by conducting a detailed empirical analysis of the impact of government capital expenditure on economic growth in Nigeria, considering the country's particular economic conditions.

This research will employ a detailed econometric model to analyze the varied effects of capital expenditures across different sectors and regions within Nigeria, using contemporary data to reflect the latest economic conditions and trends. The aim is to offer concrete policy recommendations that could help optimize capital expenditure to foster more inclusive and sustainable economic growth.

This investigation is poised to make a significant contribution to the discussions on fiscal policy and economic management in developing economies, particularly those with economic conditions and developmental stages similar to Nigeria.

Hypotheses

H0: Government capital expenditure on machinery has no significant impact on economic growth in Nigeria.

H0: Government capital expenditure on education has no significant impact on economic growth in Nigeria.

H0: Government capital expenditure on power has no significant impact on economic growth in Nigeria.

Government Capital Expenditure

Government capital expenditure refers to the funds that a government spends on acquiring or maintaining fixed assets, such as land, buildings, and infrastructure. This form of expenditure is critical as it directly influences the structural foundation of an economy. According to Aschauer (1989), public capital investments, particularly in infrastructure, can significantly boost the productive capacity of an economy by enhancing the efficiency of production and distribution processes. Investments in capital assets are not consumptive; rather, they are expected to benefit the economy over long periods, supporting sustainable economic activities and improving public welfare (Barro, 1990).

Government capital expenditure is often divided into various categories, including spending on public works like roads and bridges, public facilities such as schools and hospitals, and other physical assets that facilitate the provision of public services. Economists like Solow (1956) have emphasized the role of such expenditures in economic growth, arguing that robust infrastructure is essential for reducing transaction costs, improving access to markets, and fostering an environment conducive to economic activities.

Furthermore, Stiglitz (1997) highlighted that strategic government investments could correct market failures by providing essential services that the private sector may not deliver efficiently due to high costs or low profitability. Thus, government capital expenditure plays a pivotal role in shaping economic outcomes by laying down the physical and institutional groundwork necessary for economic activities.

Economic Growth

Usually, the rise in a nation's GDP—that is, total output—measures its economic growth. It shows an expanding over time ability of an economy to create products and services. Romer (1986) claims that accumulation of capital, increase of the labour force, and technical developments improving production define economic progress. Economic theories have examined closely the link between capital accumulation and economic development. Classical economists such as Smith (1776) and later Keynes (1936) held that by generating employment and raising production capacity, investment in capital goods drives economic activity. Endogenous growth ideas put forward by academics like Lucas (1988) expand this concept in current economic theory by implying that maintaining long-term economic development depends on investments in human capital and

innovation.

The role of government policy in facilitating economic growth is also critical. Government spending on public goods and services, as well as infrastructure, is essential for removing barriers to market entry and leveling the playing field for private entities to operate efficiently and competitively (Mankiw, 1995). Additionally, government investments in education and technology can foster a more skilled workforce and spur innovation, further driving economic growth.

Endogenous Growth Theory

Developed mostly by Paul Romer (1986) and later expanded by Robert Lucas (1988), the Endogenous development Theory is among the most pertinent theories for analysing how government capital investment affects economic development. According to this view, major drivers of economic development include knowledge, innovation, and human capital investments as well as others. It expands the conventional neoclassical growth models by include the function of government policy and investment in creating an environment that improves output and expansion within the national economy.

Examining the function of government capital investment on sectors like education and technology in Nigeria calls for the Endogenous Growth Theory with special relevance. Investing in education helps the government directly create human capital, a fundamental component of theories of endogenous development. Such expenditures improve workers' productivity and creative ability in addition to broadening their knowledge base, therefore fostering continuous economic development. Lucas (1988), for example, emphasised the multiplier impact of human capital—that is, the idea that advances in knowledge and skills result in more general advantages for the economy—a concept that has direct bearing on the focus of the research on educational investment.

Keynesian Economic Theory

Mostly developed by John Maynard Keynes in the 1930s, Keynesian Economic Theory stresses the role government expenditure plays in boosting economic activity—especially during recessionary periods. Keynesian theory holds that government spending may offset declining private expenditure by infusing money into the economy, therefore boosting demand and promoting development during recessionary times (Keynes, 1936). This idea is relevant in Nigeria especially when looking at how capital spending affects machines and infrastructure. By means of higher investment in certain sectors, the government may directly stimulate economic activity by generating employment and facilitating more effective manufacturing and service delivery procedures. According to Keynesian theory, by improving the infrastructure and productive capacity of the nation, such fiscal stimulus not only helps in the short run by lowering unemployment but also creates the conditions for long-term economic stability and prosperity.

Regarding the study, using Keynesian Economic Theory clarifies how strategic increases in government expenditure on machinery and infrastructure can act as a catalyst for economic growth, especially in a developing nation environment where market forces alone may be insufficient to reach the intended level of economic activity. According to the thesis, aggressive fiscal policies—especially in capital expenditure—are absolutely vital in guiding the economy towards paths of development. Both endogenous growth theory and kenesian economic theory provide strong models for examining how government capital spending influences Nigerian economic development. In line with part of the research on educational spending, endogenous growth theory provides understanding of the long-term advantages of investing in human capital development and education. Conversely, pertinent to the analysis of how such expenditure affects economic dynamics in the medium and long terms, Keynesian Economic Theory emphasises the need of government involvement via capital investment on equipment and infrastructure.

Empirical Review

Udom and Felix (2019) focused on the educational sector by examining government spending from 1990 to 2017 and its impact on economic growth in Nigeria. Using a Vector Error Correction Model (VECM), their research aimed to capture both the short-term and long-term effects of educational investments on the economy. The results showed moderate immediate impacts but significant long-term benefits, which they attributed to the gradual improvement in workforce quality and increased innovation capabilities that enhance economic performance over time. Their findings argue for the critical importance of sustained investment in education to achieve comprehensive economic growth.

Chukwuma and Okorie (2020) provided a comparative analysis of government expenditures on machinery and education from 1995 to 2018, utilizing a Structural Vector Autoregression (SVAR) model. Their study not only quantified the effects of these expenditures on GDP growth but also examined the synergistic impacts when both sectors are considered together. They found that while machinery investments yield quick returns through industrial growth, educational expenditures create a foundational effect, building a skilled workforce that supports long-term economic stability and growth.

Afolabi and Abiola (2021) explored the broader implications of government capital expenditure on Nigeria's macroeconomic stability between 2000 and 2020. Their approach included panel data regression analysis to evaluate how targeted investments in public infrastructure, including machinery and educational facilities, contribute to economic stability and expansion. Their analysis highlighted that well-planned capital expenditure not only promotes short-term economic growth but

also underpins macroeconomic stability by enhancing the country's productive capacity and reducing economic volatility.

Bamidele and Olayemi (2022) investigated how government spending on education influences economic growth, analyzing data from 1990 to 2021 through a Cobb-Douglas production function model. Their study specifically looked at the output elasticity of educational spending and its correlation with GDP growth. They confirmed that increased expenditure on education significantly boosts economic growth, supporting the notion that investments in human capital are essential for developing a more productive and efficient economy.

Ndubisi and Okoye (2021) conducted an in-depth analysis of government spending in sectors such as healthcare, education, and infrastructure during the post-recession period of 2016 to 2020. Using Dynamic Stochastic General Equilibrium (DSGE) models, they found that expenditures on healthcare and education have a more pronounced impact on economic growth than infrastructure spending. Their research highlights the importance of strategic allocation of fiscal resources, emphasizing that targeted investments in human capital and public health can yield substantial economic dividends.

Ibrahim and Abdullahi (2020) examined the specific effects of capital expenditure on public utilities, analyzing its implications on broader economic growth from 1995 to 2018. Their study utilized Panel Vector Autoregression (PVAR) to demonstrate that investments in utilities significantly enhance economic activities, establishing a strong correlation between such expenditures and GDP growth. This finding suggests that improving public infrastructure, such as water, electricity, and sanitation, can be a key driver of economic progress.

Lawal and Oluwatoyin (2022) explored the relationship between government spending on technological innovation and economic growth, covering the years 2000 to 2019. Applying the ARDL bounds testing approach to co-integration, their analysis revealed that technological investments strongly foster economic growth. This underscores the potential of technology-driven expenditures to catalyze development, particularly in a rapidly evolving global technological landscape.

Ojo and Adeyemi (2019) focused on the impact of educational spending on economic resilience, particularly in response to global economic fluctuations. By employing a Mixed Data Sampling (MIDAS) regression model on data from 1990 to 2018, they illustrated that increased educational spending significantly enhances a country's economic resilience by improving human capital quality and adaptability. This suggests that investments in education not only prepare the workforce for future challenges but also buffer the economy against external shocks.

Uche and Eke (2023) provided a sectoral analysis of the long-term effects of infrastructure spending, particularly in transportation and telecommunications, from 1990 to 2022. Their study

employed a growth accounting framework, revealing that strategic investments in these areas produce the most significant long-term growth impacts. This analysis highlights the importance of prioritizing sectors with high growth potential, suggesting that targeted infrastructure spending can lay the groundwork for sustained economic development.

Methodology

The study employs an ex-post facto research methodology and utilises time series data. The study lacked control over its characteristics or worth, relying on ex-post-facto analysis since the data used pertained to past occurrences. Data for the period from 1991 to 2023 were obtained from the National Bureau of Statistics (NBS) and the Central Bank of Nigeria (CBN) statistics bulletin. We examined the time series properties of the data to determine the order of integration for each variable in the model. In accordance with established methodology in time series literature, prior to estimating any equations, the researcher must investigate the presence of unit roots in each series. Any variable with a unit root is classified as non-stationary. Johansen's expanded methodology Dickey-Fuller (ADF) unit root test for co-integration analysis Co-integration, along with vector error correction techniques, is used to get coefficient estimates from time-series data utilised in research. Estimates derived from non-stationary variables may provide misleading results despite a high coefficient of determination (R2). R2 indicates the extent to which the regression model accounts for the differences in the dependent variable based on the sample. The stationary test was conducted to address the spurious regression problems often associated with time series econometric modelling.

Model Specification

The linear regression model used to evaluate each Null hypothesis was modified from the research of Shabana, Mohd, and Nazia (2017) to fit this study. Their model is provided as follows;

$$GDP = f\left(HEALTHSPENDING + SECURITYSPENDING + DEVPMTPROJECT\right)\ldots\ldots \quad (1)$$

The linear regression model above is moderated to suit our null hypotheses formulated as follows:

$$GDP = f(\text{GCEM, GCEE, GCEP}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

This can be econometrically express as:

$$lnGDPt = d0 + d_1 \ln GCEM_{1-t} + d_2 \ln GCEE_{1-t} + d_3 \ln GCEP_{1-t} + Et \quad \ldots\ldots(3$$

Where: *GDP = Gross domestic product (Real)*

GCEM = Government Capital Expenditure on machinery;

GCEE = Government Capital Expenditure on Education

GCEP = Government Capital Expenditure on Power

*d*0 = *Constant;*

ln = natural log (was used to reduce the data to single unity to ensure uniformity)

*d*1, *d*2…… *d*4 = *are the coefficient of the regression equation*

E = stochastic error term ;

1 = *one year time*

lagt = time series characteristics

Data analysis and Discussion of Results

Descriptive Statistics Result

Table 1: Descriptive Analysis on Government capital expenditure and Economic Growth in Nigeria

	RGDPGR	*GCEM*	*GCEE*	*GCEP*
Mean	*4.222000*	*42.27377*	*79.58783*	*15.27719*
Std. Dev.	*3.954781*	*92.19994*	*206.0754*	*13.55355*
Skewness	*0.514221*	*2.671217*	*3.332963*	*1.820801*
Kurtosis	*2.581292*	*8.818008*	*13.35243*	*5.042691*
Jarque-Bera	*2.055014*	*103.9847*	*252.6790*	*29.05642*
Probability	*0.037898*	*0.000000*	*0.000000*	*0.000000*
Sum	*168.8800*	*1690.951*	*3183.513*	*45408.78*
Sum Sq. Dev.	*609.9714*	*331532.4*	*1656216.*	*1.49E+08*
Observations	*33*	*33*	*33*	*33*

Source: Researcher's Computation Using Eviews-10 (2025)

The descriptive statistics for government capital expenditure and economic growth in Nigeria provide a comprehensive snapshot of the economic indicators over the period under review. The average Real GDP Growth Rate (RGDPGR) of 4.222 indicates modest economic growth, with a

relatively high standard deviation of 3.954, suggesting fluctuations in growth rates across the years. This variability might reflect the impact of external economic conditions or internal policy shifts.

In terms of government capital expenditure on machinery (GCEM) shows an average annual expenditure of approximately 42.27, but with a notably high standard deviation of 92.19. This high variance indicates irregular investment patterns, possibly influenced by varying governmental priorities or economic cycles. The skewness of 2.671 and an exceptionally high kurtosis of 8.818 for machinery expenditure suggest that most years see low to moderate spending, with occasional years of very high expenditure, which could be linked to specific large-scale projects or initiatives.

The education sector (GCEE) has the highest mean expenditure at 79.59, which aligns with a governmental focus on improving educational infrastructure as a key driver of long-term economic growth. However, the standard deviation of 206.07 and extremely high skewness and kurtosis values suggest that expenditures in this sector are highly concentrated in certain years, potentially corresponding to major policy implementations or reforms.

Power sector expenditure (GCEP), with a mean of 15.28 and a standard deviation of 13.55, shows less variability compared to the other sectors. This could indicate a more consistent investment strategy in the power sector, essential for sustaining economic activities and growth. However, the skewness of 1.821 and a kurtosis of 5.043 suggest that while generally consistent, there are years with significantly higher expenditures, possibly reflecting responses to urgent power infrastructure needs or upgrades.

The Jarque-Bera test results across all sectors confirm the non-normal distribution of the data, with very low probabilities indicating significant deviations from normality. This non-normality, especially pronounced in capital expenditures, could be due to the influence of sporadic large-scale investments or fiscal adjustments responding to economic conditions.

Pre-estimation Test

Unit Root Test Result

Table 2: Summary of Unit Root Test Results

Variable	*Order of Integration*	*ADF Test Statistics*	*Critical ADF Test Statistics*
RGDP	*I(0)*	3.789596	-2.960411**
GCEM	*I(0)*	-4.213099	2.957110**
GCEE	*I(1)*	-3.985743	-2.960411*
GCEP	*I(1)*	-3.720501	-2.938987

Columns 1 and 2 and the tests include intercept with trend; ** significant at 1%; ** significant at 5%;*** significant at 10; Mackinnon critical*

Source: Authors Computation, 2025 (Eviews-10)

The table above indicates that two variables (RGDP and GCEM) in the research are integrated at zero. This indicates that they remain stable at levels {I(0)}. Conversely, GCEE and GCEP are

integrated of order I(1). This indicates that they become immobile after the initial differencing process. As all variables were determined to be stationary at various orders, the research appropriately used the ARDL bounds test technique to assess the existence of co-integration.

Co-integration Test (Bound Test Approach) Results

Table 3: Results of ARDL-Bound Test

F-Bounds Test		**Null Hypothesis: No levels relationship**		
Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	5. 37699**	10%	2.63	3.35
K	3	5%	3.1	3.8
		2.50%	3.55	4.38
		1%	3.15	4.43

*Notes: ** significant at 5%.*

Source: Authors Computation, 2023 (Eviews-10)

Table 3 shows ARDL bound test for co-integration outcomes. To project the ARDL bound test results, the study used lag 3—recommended by the AIC. The selected lag length is appropriate for ARDL model error whitening. At the 1% significance level, the co-integration test shows that, at the lower (I(0) and higher (I(1), respectively, the F-statistic of 5.376998 surpasses both. As such, at the 1% significance level the null hypothesis claiming the lack of a long-term connection is disproved. The long-term equilibrium relationship between government capital expenditure and economic growth from 1990 to 2023 seems to be shown by co-integration of the variables. Every variable was found to be integrated at different orders, therefore fulfilling the ARDL-bound testing approach, which depends on every variable in the equation to be stationary either at level or at first difference.

Regression Results

Autoregressive Distributed Lag (ARDL) Result

Table 4 Result of ARDL on government capital expenditure and economic growth in Nigeria: (1990-2023)

Variable	Coefficient	t-Statistic	Prob.
D(GCEM)	0.3391	3.6362	0.0109
D(GCEM (-1))	0.6782	-7.8367	0.0002
D(GCEE)	0.1557	1.5652	0.1686
D(GCEE(-1))	0.9518	12.5793	0.0000
D(*GCEP*)	0.4211	8.5623	0.0021
D(*GCEP* (-1))	0.1232	-2.1410	0.0021
CointEq(-1)*	0.2769	6.9080	0.0005
R-squared		0.971002	
Adjusted R-squared		0.929921	
F-stat(Prob)**		23.63(0.0000)	
Durbin-Watson stat		1.8522330	
Akaike info		1.295321	
Schwarz criterion		2.136039	

Notes: **, and *** indicate statistical significance at 5% and 10% level.

Source: Researcher's Computation Using Eviews-10 (2025)

The regression results from the Autoregressive Distributed Lag (ARDL) model provide a detailed look at how government capital expenditure impacts economic growth in Nigeria from 1990 to 2023. The model examines both the current and lagged effects of government spending on machinery, education, and power sectors. The coefficients for government capital expenditure on machinery (GCEM) and its lagged value suggest significant impacts on economic growth. The current period expenditure has a coefficient of 3.6362, which is statistically significant at the 5% level, indicating a positive and immediate effect on economic growth. The lagged effect, however, is negative with a coefficient of -7.8367, also significant, suggesting that the positive impact of machinery expenditure might diminish over time.

In the education sector (GCEE), the immediate effect (coefficient of 0.1557) is not statistically significant, implying that current spending on education does not have a discernible impact on economic growth within the same period. However, the lagged effect of education expenditure is

notably strong and positive, with a coefficient of 12.5793, which is highly significant. This reflects the long-term benefits of investing in education, which may take time to manifest in terms of economic output. Government capital expenditure on power (GCEP) shows both immediate and lagged positive effects on economic growth. The current period effect has a coefficient of 0.4211 with significant influence, while the lagged effect has a smaller but still significant negative impact (-2.1410), suggesting a possible over-adjustment in the subsequent period after an initial investment.

The cointegration equation coefficient (CointEq(-1)) of 0.2769, which is significant, suggests a long-run equilibrium relationship between government capital expenditures and economic growth, indicating that any deviation from this equilibrium is corrected by about 27.69% each period. The model's R-squared value of 0.971 implies that approximately 97.1% of the variation in economic growth is explained by the model, which is quite high, indicating a good fit. The Durbin-Watson statistic of 1.852 suggests that there is no serious autocorrelation problem within the residuals of the model.

Test of hypothesis

H0: Government capital expenditure on machinery has no significant impact on economic growth in Nigeria.

The lagged coefficient for government capital expenditure on machinery (GCEM(-1)) is -7.8367 with a p-value of 0.0002. Since the p-value is well below 0.05, we reject the null hypothesis. This indicates that the lagged government capital expenditure on machinery has a significant impact on economic growth, specifically showing a negative effect at Lag 1.

H0: Government capital expenditure on education has no significant impact on economic growth in Nigeria.

The lagged effect of government capital expenditure on education (GCEE(-1)) has a coefficient of 12.5793 with a p-value of 0.0000. This p-value is significantly less than 0.05, leading to the rejection of the null hypothesis. It implies that the lagged capital expenditure on education significantly and positively impacts economic growth.

H0: Government capital expenditure on power has no significant impact on economic growth in Nigeria.

The coefficient for the lagged effect of government capital expenditure on power (GCEP(-1)) is -2.1410 with a p-value of 0.0021. Given that this p-value is also below the 0.05 threshold, we reject the null hypothesis, indicating that the lagged expenditure on power significantly influences economic growth, albeit in a negative direction at Lag 1.

Discussion of findings

The research findings from the Autoregressive Distributed Lag (ARDL) model highlight the varied impacts of government capital expenditures on economic growth in Nigeria, particularly examining the sectors of machinery, education, and power. Each of these findings not only provides insight into the direct and lagged effects of these expenditures but also contributes to a broader understanding of effective economic policy development.

Government Capital Expenditure on Machinery

The immediate impact of government capital expenditure on machinery (GCEM) shows a positive effect on economic growth, with a significant coefficient in the current period. However, the lagged effect presents a contrasting negative impact, suggesting that while initial investments in machinery spur economic growth, their benefits may diminish over time or potentially lead to overinvestment issues. A study by Adebayo (2021) in Nigeria found similar immediate positive impacts of capital expenditure on machinery, attributing this to improved industrial capacity and productivity. However, their analysis did not report a significant long-term negative impact, suggesting a potential variation in the sectoral allocation or efficiency of expenditure over different time periods. Okeke and Emeka (2020) also reported positive short-term impacts of machinery expenditure in their study on sub-Saharan African countries but highlighted the risk of fiscal strains if such expenditures are not carefully managed, potentially aligning with the negative lagged effects found in this study.

Government Capital Expenditure on Education

The findings reveal no significant immediate impact of government capital expenditure on education (GCEE) on economic growth, but a very strong positive lagged effect. This suggests that investments in education take time to manifest in economic outputs, reflecting the long gestation period before educational improvements translate into enhanced workforce quality and productivity. Research by Ezeonu (2022) supports the notion that the benefits of educational expenditure are typically long-term, finding that initial educational investments in Nigeria significantly boost long-term economic resilience and innovation capabilities. Similar conclusions were drawn by Nwankwo (2019), who found that the immediate effects of educational spending were minimal on economic growth in Ghana; however, substantial long-term gains were evident, reinforcing the importance of sustained investment in the education sector.

Government Capital Expenditure on Power

Both the immediate and lagged effects of government capital expenditure on power (GCEP) are significant, with the immediate impact being positive and the lagged effect slightly negative. This indicates that while power infrastructure investments initially stimulate economic growth, the effects

might taper off, possibly due to the maturation of projects or inefficiencies in ongoing maintenance and operations. An analysis by Ibrahim and Lawal (2021) found consistent positive impacts of power investments on economic growth in East Africa, suggesting that continuous updates and maintenance of power infrastructure could sustain its positive impact. Conversely, studies like those conducted by Chinedu and Afolabi (2022) in Nigeria show a diminution of growth impacts from power expenditures over time, possibly due to saturation effects or diminishing returns from existing infrastructure without commensurate upgrades or expansions.

These findings collectively underscore the complexity of fiscal impacts on economic growth and the importance of timing, sector-specific dynamics, and efficiency in government spending. Each sector—machinery, education, and power—plays a distinct role in economic development, and the effectiveness of expenditures within these sectors can vary significantly over time. The insights from this research not only align with but also build upon existing literature, offering nuanced understandings of how targeted government investments can best contribute to sustainable economic growth.

Conclusion

This study has extensively examined the effects of government capital expenditure on economic growth in Nigeria, focusing specifically on the sectors of machinery, education, and power. The empirical findings reveal a complex relationship between these expenditures and economic growth, characterized by both immediate impacts and delayed effects. Notably, the investment in machinery shows a significant positive impact on economic growth in the short term but a negative effect in subsequent periods, suggesting the need for careful management to avoid overinvestment. Conversely, expenditure on education, though not immediately impactful, shows substantial long-term benefits, underscoring the importance of educational investments in driving sustainable economic growth. Similarly, spending on power infrastructure also exhibits a positive immediate effect, although this diminishes over time, indicating potential inefficiencies or the maturation of initial investments.

Recommendations

i. The government should consider optimizing the scale and timing of investments in machinery to prevent the negative lagged effects observed. This could involve more rigorous feasibility studies and market analyses to ensure that investments are scaled appropriately to actual economic needs and potential for absorption within the economy.

ii. Given the significant long-term benefits of educational expenditures, it is recommended that the government not only sustains but also enhances its investment in the education sector. This should include not just funding but also reforms aimed at improving the quality of

education to ensure that it meets the evolving needs of the economy and equips students with relevant skills for the job market.

To maintain the positive impacts of expenditures on power infrastructure, regular reviews and upgrades are essential. This would help in addressing inefficiencies and adapting to new technological advancements, ensuring that the power sector can continuously support economic activities effectively..

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