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Public Sector Expenditure and Economic Growth In Nigeria

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ABSTRACT:
This study investigates the impact of public sector expenditure on Nigeria's economic growth from 1981 to 2020, focusing on four key sectors: agriculture, education, healthcare, and debt servicing. Utilizing time series data from the Central Bank of Nigeria (CBN) and employing a Vector Error Correction Model (VECM), the study seeks to determine both short- and long-term effects of public expenditure on Real Gross Domestic Product (RGDP). The research addresses gaps in previous studies by offering a sector-specific analysis, thus providing deeper insights into the dynamics of public spending and economic growth. The findings reveal mixed outcomes: agricultural and debt servicing expenditures exhibit a negative and insignificant impact on RGDP, suggesting inefficiencies in policy implementation and debt management practices. In contrast, educational and healthcare expenditures show a positive but statistically insignificant effect, indicating potential underinvestment or poor utilization of resources in these critical sectors. The results also indicate an 8.9% annual speed of adjustment towards long-term equilibrium, implying that short-run disequilibria are corrected gradually over time. These findings raise concerns about the efficiency of public sector expenditure in driving sustainable economic growth in Nigeria. The underperformance in agriculture and the burden of debt servicing suggest that public funds may not be optimally allocated or effectively utilized. Additionally, the limited impact of education and healthcare spending on economic growth calls for a re-evaluation of budgetary allocations and policy frameworks in these sectors. The study advocates increased budgetary allocations to the education and healthcare sectors, emphasizing the need for targeted investments to enhance human capital development and productivity. In addition, there is need to reform agricultural policies to improve efficiency through mechanization, value addition, and better subsidy management. The study also underscores the importance of prudent debt management strategies to reduce dependence on borrowing and ensure efficient utilization of borrowed funds, highlighting the need to strengthen governance and accountability mechanisms to improve public sector efficiency.

KEYWORDS: *Public sector expenditure, financial discipline, expenditure control and management, economic growth*

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INTRODUCTION

In the 1930s, the role of government in economic activity attracted much attention because of the works of John Maynard Keynes, who maintained that government spending increases economic growth by infusing purchasing power further into the economy (Keynes, 1936). Authors regard Keynes' argument to be the cornerstone for government spending and economic growth research (Alex, 2017; Ajide, 2014; Akpan, 2005; Alexander, 1990). Studies such as Edmund *et al.* (2017), argued that African governments have embraced

public funding as a means of building socioeconomic and physical infrastructures; as a result of lack of a vibrant private sector has forced African governments to take on the responsibility as primary drivers of their economies using public spending (Ndulu, 2001). Therefore, public expenditure has become a significant factor in the facilitation of economic growth in emerging countries, as the government is required to provide public services and infrastructure that support growth in the economy (Inimino *et al.,* 2017).

Public spending is a crucial tool in the process of a country's growth and development. Countries typically pursue measures to accelerate economic growth, and the utilization of public spending to boost economic activity has become a prominent choice for succeeding governments. According to Akrani (2012), public sector expenditure is spending made by a country's government on collective needs and desires such as infrastructure, provisions, pensions, and so on. According to Barro and Martin (1992), the government's responsibilities have been allocated to two main roles over time (1992). These tasks include preserving law and order and providing social amenities, but in recent times, they have expanded to include fostering economic growth through employment, maintaining price stability, and increasing Real Gross Domestic Product (RGDP).

According to Adewara and Oloni (2012), government spending in Nigeria has steadily increased due to factors such as rising demand for public goods such as roads, communication, power, education, and health. In addition, factors such as both internal and external debt repayments have recently been observed to promote government spending. Despite this, there is a mixed feeling about whether rising government spending stimulates wealth creation or not (Altaee *et al.,* 2016). Furthermore, there is concern that the continual increase in government spending has not resulted in substantial economic growth and progress, given that Nigeria remains one of the poorest nations in the world, with a larger percentage of her population living on less than a dollar each day (Bonmwa & Ishmael, 2017). The variance in the author's evidence is due to various theoretical reasons advanced by previous economic theorists.

The Wagner and Keynes schools of thinking are the theoretical frameworks that support the thought traditions from which they originate. Adolph Wagner, a well-known German economist at the time, proposed a model for determining government spending in 1883. Based on his empirical findings, he concluded that an increase in the volume of government spending is a natural result of economic growth. In other words, Wagner's law predicts that as economic growth accelerates, the share of government spending in RGDP will rise. This is due to the social, administrative, and welfare difficulties that arise when the economy grows in size and complexity (Krishna, 2004). Keynes (1936), on the other hand, believes that public expenditure is a weapon used by the government to reverse economic crises by taking loans from the private sector and returning to them by implementing various spending programs. This is the public spending dilemma that the Nigerian government is currently facing, but the amount to which public sector spending has affected economic growth in the context of this paradox, as proposed by Wagner and Keynes, has yet to be thoroughly investigated.

In Nigeria, public expenditure has grown significantly over the years, with budget allocations covering key sectors such as infrastructure, education, health, public debt management, and defense. Despite this increase, the country's economic growth has been inconsistent, raising questions about the effectiveness and efficiency of public sector spending. Various empirical studies have sought to investigate this relationship, with mixed results.

Adeola *et al.* (2023), employing Johansen co-integration and Error Correction Models, confirmed the positive long-term impact of public expenditure on growth but noted inefficiencies in short-term fiscal policies. The study by Idris *et al.* (2023) examined the causal relationship between government expenditure and economic growth in Nigeria using annual data from 1980 to 2011. They employed Granger causality and Vector Error Correction Model (VECM) to identify both short-term and long-term dynamics. The findings indicated a long-run equilibrium relationship, with a short-term adjustment rate of 60%, supporting Keynesian economic theory. However, the study highlighted a research gap in understanding how fiscal decentralization impacts the government expenditure-growth nexus. Cross-country analyses by Gregoriou and Ghosh (2023) and Cooray (2023) further provide insights into how the size and quality of public expenditures impact growth differently across developing economies. They found that governance quality is more critical than the mere size of government expenditure in determining economic outcomes.

Many recent studies have contributed to understanding the dynamics between public expenditure and economic growth in Nigeria by disaggregating government expenditure into capital and revenue components. Iyke and Ekene (2022) examined how public sector spending affects economic growth using data from 1991 to 2020, employing a vector autoregressive model. Their findings reveal that while capital and recurrent expenditures positively impact long-term growth, public debt negatively affects growth in the short term. The study suggests targeted expenditure on infrastructure, education, and health to enhance sustainable growth. A gap noted is the lack of focus on sector-specific expenditure impact in different economic cycles. In a similar study, Okoli *et al.* (2022) analyzed the relationship between capital and recurrent expenditures and economic growth from 1984 to 2015 using the Johansen co-integration and Error

Correction Model (ECM). Their results showed that public expenditure has a long-run positive impact but a short-run negative effect on growth. They recommended increasing expenditure in critical sectors like health, education, and infrastructure, though they did not explore the optimal allocation of funds within these sectors. Asiagwu *et al.* (2023) examined the impact of public expenditure on economic development in Nigeria from 1981 to 2021. They employed descriptive statistics, the Augmented Dickey-Fuller test, Granger causality, and OLS regression. Their findings revealed a long-run positive relationship between capital and recurrent expenditures and economic growth, emphasizing the need for increased rural development spending. However, the study did not adequately address the role of governance quality in expenditure management. Adebayo (2023) investigated the correlation between Nigeria's public expenditure and GDP growth from 1991 to 2020 using Vector Autoregressive (VAR) models. The study identified that capital and recurrent expenditures positively influence economic growth when public debt is properly managed. However, it noted that more research is needed on the impact of sector-specific expenditures, particularly in infrastructure and social services. Iliyasu and Muhammed (2023) focused on the effects of government expenditure and corruption on Nigeria's economic growth from 1990 to 2020. Using the Autoregressive Distributed Lag (ARDL) model, they discovered that reducing corruption enhances the positive impact of government expenditure on growth. This study highlighted the indirect role of governance but did not disaggregate expenditures by sector, leaving room for further analysis in this area.

Few notable works, such as Nwankwo *et al.* (2023), focused on sectoral analyses. While the study found that sectors like education and infrastructure have significant positive impacts on growth, there was a limited focus on rural versus urban spending and the efficiency of public-private partnerships. Additionally, Ekpo (2023) emphasized that capital expenditures in agriculture, health, and communication significantly drive economic growth, aligning with the crowding-in theory. However, they highlighted the minimal impact of current expenditures in these sectors. Olagunju and Ibironke (2022) conducted a disaggregated analysis of government expenditures on education, defense, and welfare in Nigeria using ARDL techniques. They concluded that while education spending significantly boosts GDP, while welfare spending has an insignificant impact. The gap in this research is the lack of analysis on other critical sectors like energy and transportation.

Despite extensive research on the nexus between public sector expenditure and economic growth, significant gaps remain in the literature. Many studies aggregated public expenditures without focusing on specific sectors, limiting insights into which sectors drive growth (Iliyasu& Muhammed, 2023: Idris *et al.,* 2023, and Adeola *et al.,* 2023). Other studies merely disaggregated public expenditure into capital and revenue components, again avoiding the sectoral analysis of such expenditures (Iyke & Ekene, 2022; Okoli *et al.,* 2022; Adebayo, 2023; and Asiagwu *et al.,* 2023). Some studies provided cross-country insight into the nexus between government expenditure and economic growth (Gregoriou & Ghosh, 2023 and Cooray, 2023). Yet the few studies that disaggregated the analysis into sectors ended with mixed results (Olagunju & Ibironke, 2022; Ekpo, 2023), and thus, creating a gap for further investigations of the problem.

The current study aims to fill these gaps by conducting a disaggregated analysis of sector-specific public expenditures and examining their impact on economic growth in Nigeria. To capture the contemporary Nigerian economic situation, where public expenditure is heavily financed by debt, it is necessary to investigate debt servicing expenditure to determine the effect of public sector expenditure on economic growth in Nigeria with a thorough examination of the debt profile and how it has influenced Nigerian economic development. In defining public expenditure, this study focuses on the key sectors of Nigeria's economy – agriculture, debt servicing, educational, and health sector. These sectors are critical to the Human Development Index and will help Nigeria achieve Sustainable Development Goals (SDGs).

The scope of the research is limited to the analysis of the Nigerian public sector expenditure and economic growth. The timeframe for the study spans over a period of 40 years (1981-2020). This period is considered to be long enough for examining Nigeria's public sector expenditure in a pre and post-structural Adjustment Program (SAP) era while accommodating the period characterized by rise in government debt profile and rise in generic public expenditure in the wake of infrastructural and social transformation in Nigeria.

Concept of Public Sector Expenditure

Public sector expenditures are indeed the costs incurred by the government to provide and maintain its functions as an institution, the economy, and the nation (Chude & Chude, 2013). Thus, according to Barro and Grilli (1994), public spending, often known as public sector expenditure, includes all state consumption and investment but excludes any state transfer payments. On the one hand, public expenditure can be incurred to acquire goods and services for immediate use to meet the needs of an individual or members of the community; on the other hand, it can be incurred to acquire goods and services that are intended to generate future economic benefits, such as infrastructure and investment. Likewise, public expenditures can represent transfers of money, such as social salaries and the cost of administration.

The federal government's expenditures in Nigeria are classified as capital and recurrent. Recurrent expenditures include government expenditures on administration such as labor, salaries, loan interest, and maintenance, among other things, whereas capital expenditures include projects such as roads, airports, health, education, power generation, telecommunications, and water (Nwosa *et al.,* 2013). Capital spending is investments with economic multipliers in the form of public benefits. In most situations, government intervention has resulted in employment and income stability in the economy. As a result, public spending is an important weapon for achieving an egalitarian society through providing welfare services (Okoro, 2013).

Public expenditure (recurrent and capital) is typically classified as sectoral expenditure, according to Olapade and Olapade (2010). Recurrent expenditure, for example, includes security, administration, national defense, economic services (agricultural, building, transportation, and communication, among others), and community and social services such as education and health. Similarly, capital spending includes military, internal security, agriculture and natural resources, industry, mining, and quarrying (Nurudeen & Usman, 2010). The advantages derived from recurring expenditure are often restricted to the fiscal year during which the spending is incurred. According to Simiyu (2015), the benefits of capital spending continue beyond the year of payment, for example, the expenditure of building a new school, constructing new roads, establishing a new water project, and so on.

Economic Growth

Economic growth, according to Olopade and Olopade (2010), is the extension of a country's potential output. For example, suppose the public rate of investment return exceeds the private rate. In that case, tax policy can boost growth and utility levels. The ideal tax policy hinges on the feature of services in growth models that contain public services. Economic growth has revealed why states expand at varying rates throughout time, influencing the government's choice of taxation rates and expenditure levels, which in turn influence growth rates. For example, when the rate of expansion is proportionate to the amount of quality present, the exponential growth model is applied. Tolo (2011) described economic growth as a long-term increase in a country's capacity to deliver increasingly diverse economic commodities to its population, with this capacity dependent on developing technology and the structural and ideological changes that it necessitates.

Economic growth is defined as the increase in a country's economic growth or output. For example, suppose the social rate of return on investment exceeds the private rate of return. In that case, expenditure programs can boost growth and enhance utility levels. Economic growth has revealed why states expand at varying rates throughout time, influencing the government's choice of taxation rates and expenditure levels that will impact growth rates (Bose *et al.*, 2003).

Agricultural sector expenditure and economic growth

Agriculture has long been an essential part of the Nigerian economy, regardless of the oil boom. Essentially, the agricultural sector employs a large portion of the people, eradicates poverty, and contributes to economic progress. Economic history gives strong evidence that the agricultural revolution is a vital prerequisite for economic progress, particularly in emerging nations such as Nigeria (Uwakaeme, 2015). According to Udeorah et al. (2018), the agricultural sector contributed up to 64% of total GDP in the 1960s. However, it rapidly decreased in the 1970s to 48% and continued in 1980 to 20% as well as 19% in 1985 as a result of the 1980s oil glut. Historically, the Federal Government's negligence of agriculture has contributed to the Nigerian economy's reliance on a single economy based on oil.

The importance of agriculture in development, particularly in Sub-Saharan Africa, cannot be overstated. As a development roadmap, the Environmental Movement, Operation Feed the Nation, and the Millennium Development Goals (MDGs), to name a few, were to improve agricultural production in Nigeria since they were adopted in Africa, 70% of the development target group lives in rural areas and is relying on agriculture for a living (Sanni *et al.,* 2016). Invariably, lowering poverty and improving nutrition and the overall well-being of the population would mean improving the majority's livelihood, which is crucially dependent on the success of the agriculture sector. For example, using World Development Indicator (WDI) data from Nigeria for specific periods, it was discovered that there is a significant positive relationship between food production and primary school enrollment ratios and gender equality, but a strong negatively correlated between food production and child mortality rates. This provides some proof of the significance of agriculture in Nigeria's economic development. Economic growth, on the other hand, is required for long-term economic development.

Educational sector expenditure and economic growth

According to Keynesian economics, government spending will boost economic growth. That is, at all levels of development, public spending will play a vital role in the running of an economy. As a result, spending on education will assist the country in achieving appropriate or long-term economic growth (Adeniyi & Bashir, 2011). That is, spending on training people to gain various skills and knowledge will benefit the

economy because every human being is a resource for society. Education, strictly speaking, up-scales hidden qualities that, if properly exploited, would enable citizens to contribute greater amounts to the economy.
Education encompasses all levels of knowledge (primary, secondary, and university), either formal or informal. Education is a tool for social transformation because it provides human resources with the knowledge, skills, and competencies required to boost productivity, encourage economic growth, contribute to personal and social development, increase people's creativity, promote entrepreneurship and technological advances, and reduce existing inequalities (Abu & Abdullah, 2010). This is why both developed, and emerging countries around the world place an emphasis on improving the educational sector because education is viewed as a long-term investment that leads to increased output for a country in the future, and Nigeria is no exception in developing and improving its school system to be among the top twenty economies in the world by 2020. Without significant expenditure on educational development, no country can achieve enough economic growth and development.

Health sector expenditure and economic development

Researchers have paid close attention to the linkages between healthcare spending and economic growth. Cornelius *et al*. (2016) investigates the role of health expenses. They concluded from their findings that the direct influence of health spending on growth is a flow rather than a stock effect. Olaniyi and Adams (2000) conducted a descriptive analysis of the adequacy of the levels and composition of public expenditures. They concluded that while health expenditure has faced fewer cuts than external debt services and defense, allocations to the education and health sectors are insufficient when compared to the benchmark and performance of other countries. In addition, Chete and Adeoye (2002) investigated the empirical mechanisms by which human capital promotes the country's economic growth. They concluded, however, that there is an unanticipated positive impact of human capital on growth, which the various Nigerian governments have praised by a stupendous expansion of educational infrastructure across the country since post-independence; however, they are quick to point out that real capital expenditure on education and health has been rather low. Various research, such as Niloy *et al.* (2007), was conducted for those other countries and stressed that health spending is favorably associated with growth in the economy. What differs between countries is indeed the extent and size of their contributions.

Public debt and economic growth

One of a country's primary macroeconomic goals is to achieve long-term economic growth. To attain this goal, every government will need a significant amount of capital finance in the form of investment in infrastructure and productive capacity growth (Usman *et al.,* 2011). As a result, this enables the rise of their GDP, which, if sustained, should result in economic growth, a status avidly coveted by all less advanced countries (LDCs), including Nigeria. However, Ayadi and Ayadi (2008) observe that the quantity of available capital in most developing countries' treasuries is grossly insufficient to achieve their economic growth needs, owing to poor productivity, low savings, and a high spending pattern. Governments, therefore, resort to borrowing from outside the country to bridge the resource gap.
Governments borrow to promote growth and development by fostering an environment that encourages individuals to invest in various sectors of their economy (Usman *et al.,* 2011). Similarly, Were (2001) contends that countries may borrow for a variety of reasons, including the ability to finance their recurring budget shortfall, as a means of widening their financial markets, funding rising government expenditures, supplementing their limited revenue sources, and improving their low productivity, which results in poor growth in the economy. Public debt is defined as the entire amount of public debt from either the private sector or from outside (Maku, 2009). Adjustments in the volume, composition, and yield rates of public debt can be used to govern the economy (Spilioti, 2015). A various maturity makeup of public debt reduces total liquidity within the economy, whereas a short-term maturity composition increases liquidity. The government uses public debt as a vital instrument to manage exchange rates, inflation, and so on because it accounts for a large portion of the economy's overall credit supply. Public debt serves as an important alternative source of financing. The appropriateness of public borrowing is determined by the purpose for which the funds will be utilized, as well as the conditions under which the funds will be spent. According to Spilioti (2015), the government borrows internally from time to time to fund capital expenditure programs, and this remark will be included in this study because internal debt will be included in the model.

METHOD

The study employed the ex-post facto research design. The study employed a consensus sampling technique to examine data on public expenditure and RGDP in Nigeria spanning 40 years (1981-2020). Data for this study were gathered from the Central Bank of Nigeria's website. Descriptive statistics are used to summarize the collected data and determine the normality of the series employed, while correlation analysis is used to determine the direction and amount of the relationship that exists between each pair of variables. The vector error correction model was used in the study as a short-run set of P time series regression in which regressors are lagged values of all P series. Furthermore, forecasts from VEC models can be conditional on the likely

future courses of specified variables in the model. The VECM approach analyzes the causal effects of unanticipated shocks or innovations to specified variables on the model's endogenous variables by constructing impulse response functions and prediction error variance decompositions.

This study adapted the model used in the works of Nworji *et al.* (2012) as follows:

GDP = *f*(economic services, transfers, social and community services) (1).

Nworji *et al.* (2012) focused on the gross domestic product as a measure of economic growth while varying other government expenditure components. The findings of Nworji *et al.* (2012) were mixed and contradictory as a result of the inclusive classification of a single expenditure item into either recurrent or capital expenditure, which brings about ambiguity in their results. Therefore, this present study adopted a more robust approach. Thus, this study is based on the system of equations model, where all variables are treated as endogenous without any prior distinction between endogenous (dependent) and exogenous (independent) variables. The advantage is to specify a system of equations that exhibit their various influences on each other while at the same time explaining themselves. Again, the system of equation approach enables us to obtain estimates for both co-integrating vectors and the speeds of adjustment coefficients simultaneously. The resulting impulse response function reveals the effects of shocks on the adjustment path of the variables in the model (i.e., shocks from the explanatory variables on the dependent variable and its shocks). The model is specified as follows:

RGDP = ∫ (DSER, EEXP, HEXP, AEXP) (2)

Where:

RGDP	=	Real Gross Domestic Product
DSER	=	Debt servicing
EEXP	=	Education expenditure
HEXP	=	Health Expenditure
AEXP	=	Agricultural Expenditure

Equations (2) represents the functional relationship of the models while the econometric representation is presented in equation3 viz:

RGDP = δ0 + ψ1 + ψ2 + ψ3 + ψ4 + ψ5 + ψ6 + μt (3)

The general Vector Error Correction Mechanism (VECM) is stated as follows:

$$\Delta N_t = \psi + \sum_{i=1}^{P=2} \lambda_t + \Delta N_{t-1} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Decision Rule:

Reject HO if the calculated absolute value of the t-statistic is ≥ 1.96. Otherwise, do not reject HO.

'A priori' expectation

The study expects that increased expenditures on agriculture, education, and health care should significantly increase real gross domestic product. Increased debt servicing is expected to have an inverse relationship with real gross domestic product.

RESULTS AND DISCUSSIONS

Results in Table 1 indicates the distribution of the series used for the study. RGDP has a mean value of 33603.t2 with maximum and minimum values of 152324.0 and144.8312 respectively, resulting to a wide standard deviation of 45402.01. The kurtosis, skewness, and Jarque-Bera statistics for RGDP indicate that the series is not normally distributed with the JP probability being significant at 5% level (ie. P-value of0.004192 < 0.05). The series was normalized (transformed to LNRGDP by logging) to meet the assumption of normality. LNRGDP, DSER, EEXP, HEXP, and AEXP all have JB probability values greater than 0.05 and are accordingly shown to be normally distributed.

The LNRGDP data reveals a mean value of 8.702997 with a standard deviation of 2.394300, and the maximum and minimum values respectively reported as 11.93377 and 4.975569. The DSER reveal a mean value for DSER is shown to be 10.93015 with a standard deviation of 1.040919 while maximum and minimum values were respectively reported as 12.47007 and 9.004321. Again, EEXPhas a mean value of

10.28384 with a standard deviation of 1.223221, and the maximum and minimum values of 11.77330 and 8.204120 respectively.
Furthermore, the mean value for HEXP is shown as 9.942608 with a standarddeviation of 1.305119, and maximum and minimum values of 11.58924 and 7.602060 respectively; while the mean value of AEXP is 9.464624 with a standard deviation of 1.349261 and maximum and minimum values of 12.20493 and 7.0000 respectively. These results clearly reflect the characteristics of the data set used for the study, and that the basic assumption of normality has been satisfied.

Results obtained from the analysis of the data are reported and discussed in this section.
Table 1: Descriptive Statistics of the Series

	RGDP	**LNRGDP**	**DSER**	**EEXP**	**HELP**	**AEXP**
Mean	33603.62	8.702997	10.93015	10.28384	9.942608	9.464624
Median	7515.812	8.921369	11.15447	10.70139	10.30536	9.863228
Maximum	152324.0	11.93377	12.47007	11.77330	11.58924	12.20493
Minimum	144.8312	4.975569	9.004321	8.204120	7.602060	7.000000
Std. Dev.	45402.01	2.394300	1.040919	1.223221	1.305119	1.349261
Skewness	1.269267	-0.234832	-0.493292	-0.515915	-0.377134	-0.461140
Kurtosis	3.354035	1.618031	2.200332	1.840772	1.685356	2.190544
Jarque-Bera	10.94916	3.550702	2.688026	4.014140	3.828681	2.509696
Probability	0.004192	0.169424	0.260797	0.134382	0.147439	0.285119
Observations	40	40	40	40	40	40

Source: Author's Computation

Diagnostic/Stationarity Analysis
To evaluate the stationarity properties of the series, Unit Root test was carried out based on Augmented Dickey-Fuller Criterion and the results are shown in Table 2.
Table 2 Unit root tests using Augmented Dickey-Fuller Criterion

Variables	Levels	Prob. Value	First difference	Prob. Value	Critical value	Order of Integration
LnRDGP	-1.291226	0.6240	-3.116540	0.0337	-2.938987	*I*(1)
DSER	-1.252192	0.6415	-7.998944	0.0000	-2.941145	*I*(1)
EEXP	-2.282315	0.1830	-7.879459	0.0000	-2.948404	*I*(1)
HEXP	-1.647562	0.4483	-10.23236	0.0000	-2.948404	*I*(1)
AEXP	-0.555287	0.8690	-7.206674	0.0000	-2.938987	*I*(1)

Source: Author's Computation

The unit root results in Table 2 indicate that none of the variables (InRGDP, DSER, EEXP, HEXP, AEXP) is stationary at level. However, the series became stationary upon first differencing with significant critical values at 5% level (P-values < 0.05).Accordingly, a co-integration test was conducted to determine whether short-rundisequilibrium could be adjusted in the long-run. The results of Johansen Co-integration test obtained are show in table 3.

Table 3. Johansen unrestricted Rank (Trace and Eigen Maximum) Co-Integration test

No. of co-integrations	Trace stat.	Critical value	Prob. Value	Max. Eigen value	Critical value	Prob. value
None *	166.6660	125.6154	0.0000	54.14334	46.23142	0.0059
At most 1 *	112.5226	95.75366	0.0021	40.50975	40.07757	0.0447
At most 2 *	72.01290	69.81889	0.0331	33.15884	33.87687	0.0607
At most 3	38.85405	47.85613	0.2661	17.36242	27.58434	0.5490
At most 4	21.49163	29.79707	0.3277	11.33802	21.13162	0.6136
At most 5	10.15361	15.49471	0.2691	9.432926	14.26460	0.2519
At most 6	0.720689	3.841466	0.3959	0.720689	3.841466	0.3959

Source: Author's Computation

The table revealed that there are three co-integrating equations using trace statistics and two co-integrating equations using the Maximum Eigenvalue. This result confirms the use of the Vector Error Correction Model (VECM). This is explained by the fact that the variables are co-integrated even though they have a

unit root process. In carrying out the VECM, the lag order selection criteria were determined, and the results are shown in Table 4.

Table 4. Lag Order Selection Criteria

Lag	Login	LR	FPE	AIC	SC	HQ
0	-26.11435	NA	1.41e-08	1.789965	2.094733	1.897410
1	188.3472	336.1830	1.94e-12	-7.153905	-4.715759*	-6.294344
2	229.5052	48.94465	3.98e-12	-6.730013	-2.158489	-5.118337
3	316.2283	70.31596*	1.30e-12*	-8.769095*	-2.064194	-6.405303*

Source: Author's Computation

Table 4 indicates that the appropriate lag length for a long-run analysis is three, as indicated by the Schwarz information criteria, producing the minimum values among the competing lag length criteria. Given a short-run analysis, however, this study adopts a two-period lag approach as suggested by the Eviews software. This is due to the loss of values resulting from the difference of the variables. The study tested for the possible existence of serial correlation using the VECM Residual serial correlation LM test. The results are shown in Table 5.

Table 5. The VECM Residual Serial Correlation LM Test

Lag	LRE* stat	Df	Prob.	Rao F-stat	Df	Prob.
1	49.87051	49	0.4385	0.983642	(49, 45.0)	0.5240
2	51.21291	49	0.3869	1.021278	(49, 45.0)	0.4730
3	63.00196	49	0.0862	1.385471	(49, 45.0)	0.1353

Source: Author's Computation

The result shows that there is no serial correlation among the residuals of the model. This is revealed using the probability values of the two criteria (LRE*stat and Rao F-stat) which are all higher than 0.05 in the three lags. Consequently, the VECM was executed, and the results are shown in the Appendices and the extracts shown in Table 6.

Table 6. The vector error correction mechanism with Real GDP as the dependent variable

Variables	Coefficients	Std. Error	T-Statistics
D(LNRGDP(-1)	0.235899	0.25203	0.93598
D(LNRGDP(-2)	-0.167802	0.22250	-0.75417
D(AEXP(-1)	-0.208667	0.13848	-1.50680
D(AEXP(-2)	-0.135790	0.09683	1.40230
D(DSER(-1)	-0.249839	0.14039	-1.77964
D(DSER(-2)	0.019323	0.10300	0.18760
D(EEXP(-1)	0.216381	0.21110)	1.02502
D(EEXP(-2)	0.266628	0.14351	1.85786
D(HEXP(-1)	0.004323	0.13338)	0.03241
D(HEXP(-2)	-0.130647	0.11860	-1.10155
ECT	-0.088622	0.03600	-2.46195
C	0.174205	0.07053	2.46994
R^2	0.721479		
F-Stat	3.626		

Source: Author's Computation

The VECM results presented in Table 6 are estimated from the system of equations to precede the impulse response and the variance decomposition tests. The results in Table 6 show that all the variables except debt servicing and Agricultural sector expenditure conformed to *a priori* expectation. It further reveals that each of the variables in the model is insignificant in explaining changes in real Gross Domestic Product in the short run within the period of the study. This implies that there are more significant variables meant to explain changes in RGDP that are not captured in the model. This is further confirmed by the direct relationship that exists between the constant term and the RGDP. However, the high F-statistics confirm the collective significance of the model in explaining variations in real GDP. Confirmation is the R2 indicating that the model is responsible for 72 percent variation in real GDP while the remaining 28 percent variation is accounted for by the other variables not included in the model. The error correction term is both correctly signed (-0.088622) and significant. This means that the model will return to its long-run equilibrium at the speed of 8.9 percent per annum.

The independent causality of all the variables in the model was determined using the VEC Granger Causality/Block Exogeneity Wald tests, and the results are shown in Table 7.

Table 7. VEC Granger Causality/Block Exogeneity Wald Tests

Null hypotheses	*Chi-square value*	*Df*	*Prob.*	*Remark*
AEXP →LNRGDP	2.364743	2	0.3066	Reject
LNRGDP →AEXP	0.449399	2	0.7988	Reject
DSER→LNRGDP	4.482401	2	0.1063	Reject
LNRDGP→DSER	2.627806	2	0.2688	Reject
EEXP→LNRGDP	3.639014	2	0.1621	Reject
LNRGDP→EEXP	2.606685	2	0.2716	Reject
HEXP→LNRGDP	1.559754	2	0.4585	Reject
LNRGDP→HEXP	0.972002	2	0.6151	Reject

Source: Author's Computation.

The VEC Granger Causality/Block Exogeneity Wald Tests show independent causality among pairs of all the variables in the model. The null hypothesis is to accept HO if the probability of chi-square is less than the chosen level of significance and conclude that Granger causality exists between the pair of variables; otherwise, reject.

From Table 8, the p-values of the chi-square statistics are higher than the chosen level of 0.05, meaning that there is no causality. This means that RGDP does not contain sufficient information to predict change in all the variables studied and vice versa. The low chi-square value and high probability values confirm this. This result supports the insignificance of the variables explaining changes in RGDP in the short run.

Test of Hypotheses

Ho_1: Agriculture sector expenditure has no significant effect on real gross domestic product in Nigeria.

From Table 6, the t-statistics for **Agriculture sector expenditure,** D(AEXP(-1)),is -1.50680which is less than the critical t-value of 1.96. Thus, the study fails to reject the null hypothesis and concludes that agriculture sector expenditure has no significant effect on real gross domestic product in Nigeria.

Ho_2: Debt servicing expenditure has no significant effect on real gross domestic product in Nigeria.

Again, the t-statistics for **Debt servicing expenditure,** D(DSER(-1),in Table 6 of 1.77964 is less that the critical limit of 1.96. The study fails to reject the second null hypothesis ($H0_2$) and concludes that debt servicing expenditure has no significant effect on real gross domestic product in Nigeria.

Ho_3: Educational sector expenditure has no significant effect on real gross domestic product in Nigeria.

Results in table 6 indicate that the t-statistic for **Educational Sector Expenditure**, D(EEXP(-1)),of 1.02502 is not significant at 5% level as it is less than the critical t-value of 1.96. Thus, the study fails to reject the third null hypothesis ($H0_3$) and concludes that educational sector expenditure has no significant effect on real gross domestic product in Nigeria.

Ho_4: Health sector expenditure has no significant effect on real gross domestic product in Nigeria.

Similarly, results from table 6 show that the t-statistic for **Health sector expenditure has,** D(HEXP(-1)), of 0.03241is not significant at 5% level as it is equally less than the critical t-value of 1.96. Accordingly, the study fails to reject the null hypothesis and concludes that health sector expenditures have no significant effect on real gross domestic product in Nigeria.

Discussion of Findings

From the hypotheses tested, agriculture expenditure has a negative insignificant effect on real gross domestic product in Nigeria. This does not align with the *a priori* expectation of the study, which postulated that agricultural expenditure should significantly affect the real gross domestic product of Nigeria positively. It is normally expected that an increase in public expenditure in a country like Nigeria, which over time has propagated agricultural policies that will foster self-sustainability in terms of food production, will cause real

gross domestic product to increase, but that is not the case, as reported by the present study. A similar argument was propagated by Onifade *et al.* (2020), who found that public capital expenditures did not significantly influence economic growth throughout the study. These findings clearly suggest the existence of poor implementation of agricultural policies that are backed by budgetary and public expenditures on agricultural items.

Further finding shows that debt servicing expenditure also has a negative and insignificant effect on the real gross domestic product in Nigeria. It is expected (*a priori* that), when the government spends on debt servicing, it gives external creditors the signal to lend more money to the government for economic growth and developmental strides, but the present findings neglect this expectation. A similar argument was put forward in Greece by Panagiotis (2018), who found a negative long-run effect of government debt on economic growth. The suggestion for this negative insignificant effect is the issue of break-effects between government debt repayments, which affects economic growth, hence it is suggested that government should be willing to make debt repayment a constant practice in line with the stipulated debt contracts in other to boost investors' confidence, which might send the wrong signal about the Nigerian's debt servicing ability.

The third finding reveals that educational expenditure has a positive but insignificant effect on real gross domestic product in Nigeria. This is a pointer that public expenditure on education is not enough to drive home the needed improvements in the educational sector that will spur human capital development, which consequently contributes to growth in real gross domestic products. This finding is inconsistent with results from the works of Udeorah *et al.* (2018), who used education expenditure as a check regressor to enhance the explanatory power of healthcare expenditure and real gross domestic product. This contradiction could be a result of the difference in the method used. While Udeorah *et al.* (2018) used education expenditure as a check regressor to enhance the explanatory power of healthcare expenditure and real gross domestic product, the present study focused on the independent relationship between education expenditure and real gross domestic product. Failure to scale education expenditure will impact workforce development and capability.

Similarly, the forth finding indicates that healthcare expenditure has a positive but insignificant effect on real gross domestic product in Nigeria. It is expected that healthcare expenditure should significantly affect the real gross domestic product of Nigeria, given constant funding, but this is not the case in regard to the present study, also contradicting the results obtained by Udeorah *et al.* (2018). The enhanced relationship posited by Udeorah *et al.* (2018) points to the fact that if healthcare expenditure is not enhanced in Nigeria, there are possibilities of deteriorating health system in Nigeria in the long run, which will continuously hamper economic growth in Nigeria.

CONCLUSION

The study examined the effect of public sector expenditure on Nigeria's economic growth between 1981 and 2020, focusing on agriculture, education, healthcare, and debt servicing. Using a Vector Error Correction Model (VECM), the results indicated a mixed relationship between public expenditures and real GDP. Specifically, agricultural and debt servicing expenditures had a negative and insignificant impact, while education and healthcare expenditures showed positive but insignificant effects on economic growth. This suggests inefficiencies in public spending allocation, implementation issues, and potentially weak governance structures.

Despite significant public investment, these findings imply that the expected transformative impact on Nigeria's economy has not been fully realized. Issues such as poor policy implementation, inadequate sectoral allocations, and the burden of debt repayment may hinder the effective use of public funds to stimulate sustainable economic growth.

Recommendations and Policy Implications

1. Increase Budgetary Allocation to Education and Healthcare Sectors - The positive, albeit insignificant, relationship between expenditure in these sectors and Real GDP highlights the need for increased funding. Enhancing educational infrastructure and healthcare services can foster human capital development, thereby driving long-term economic growth. Government policies should therefore prioritize strategic investments in education and healthcare, ensuring funds are effectively utilized to boost productivity and human resource development.
2. Enhance Agricultural Sector Efficiency - The negative impact of agricultural expenditure underscores inefficiencies in policy implementation. It is crucial to reform agricultural policies to focus on mechanization, value addition, and efficient subsidy management. A comprehensive agricultural reform policy that integrates public-private partnerships (PPPs) and rural development strategies can help optimize returns on agricultural investments.
3. Improve Debt Management Strategies - Debt servicing expenditure had a negative effect, suggesting a need for fiscal discipline and prudent borrowing practices. The government should explore strategies to reduce debt dependence while ensuring effective utilization of borrowed funds.

Implementing transparent debt management frameworks and linking borrowing to productive sectors can mitigate negative impacts on GDP growth.

4. Strengthen Governance and Accountability Mechanisms - Governance quality significantly influences public expenditure outcomes. Strengthening institutions, reducing corruption, and improving transparency in fund allocation and usage can enhance public sector efficiency. Establishing robust monitoring frameworks, anti-corruption measures, and performance-based budgeting can ensure that public funds are allocated and spent effectively.
5. Adopt Sector-Specific Expenditure Analysis and Policies - The lack of significant impact in various sectors suggests the need for sectoral analyses to optimize resource allocation. Policies tailored to the specific needs of sectors such as infrastructure, education, and healthcare can yield better economic outcomes.Periodic sector-specific audits and impact assessments should guide resource allocation decisions, ensuring maximum socio-economic benefits.

By implementing these recommendations, Nigeria can strengthen the effectiveness of public expenditure in driving sustainable economic growth, addressing current inefficiencies, and achieving long-term developmental goals. This study, therefore, contributes to the ongoing discourse on public sector expenditure and economic growth by providing a comprehensive sectoral analysis within the Nigerian context. It underscores the necessity of aligning fiscal policies with strategic sectoral priorities to foster sustainable economic development. The findings and recommendations serve as a valuable guide for policymakers, economists, and researchers in designing more effective public expenditure strategies to drive economic growth in Nigeria.

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