# EFFECT OF FEDERAL GOVERNMENT EXPENDITURE ON SMALL AND MEDIUM ENTERPRISES DEVELOPMENT IN NIGERIA

**[1]Egor Hikarofem Ise; [2]Obodagu Tonica Owan; [3]Gwunyenga Innocent Izu; [4]Odo Kenneth Ejiofor; [5]Chilokwu Chioma Glory.**
*[1,2,3,4..].Federal Co-operative College, Oji River, Enugu State.*
*[5]Chukwuemeka Odumegwu Ojukwu University, Igbariam.*

***Abstract***
*This study appraised the effect of federal government expenditure on small and medium enterprises development in Nigeria from 1999-2022 using Ordinary Least Square (OLS) technique method.*
*The objectives of the study are to examine impact of government expenditure on small and medium enterprises development in Nigeria, to examine the effect of gross domestic product, government expenditure, unemployment rate, commercial banks credit to SMEs subsector and interest rate on small and medium enterprises output. Secondary data used were obtained from the Statistical Bulletin of Central Bank of Nigeria. OLS techniques was applied after determining stationarity of our variables using the ADF Statistic, as well as the cointegration of variables using the Johansen approach. It was discovered that the variables are stationary and have a long term relationship among the variables in the model. From the result of the OLS, gross domestic product, commercial banks credit to the SMEs and interest rate significantly contribute to SMEs development. It is also observed that gross domestic product, government expenditure and commercial banks credit to SMEs have a positive relationship with SMEs growth and development in Nigeria. On the other hand, unemployment and interest rate have a negative relationship with SMEs. The study recommends that the government should improve all the components part of the real GDP. This will help develop the SMEs subsector. The government should invest more on infrastructure that will enhance the development of SMEs. This is because critical infrastructure like electricity, roads and technology improve business performance and create employment. The government through the apex bank should ensure that adequate credit at reduced interest rate is extended to the SMEs subsector to enable businesses thrive as done in advance countries.*
***Keywords:*** *GDP, expenditure, unemployment Rate, SMEs, Interest Rate*

## Introduction

It has been acknowledged in the literature that the industrial development of any modern economy lies in the development of Small and Medium Scale Enterprises (SMEs) which make up a sub-sector of the industrial sector (Eniola & Ektebang, 2014)). Nigeria's journey to develop this sub-sector began in the early 80's when economic reforms were initiated to shift from large scale manufacturing companies to Small and Medium Scale Enterprises. These large scale manufacturing enterprises though few according to international requirements were contributing unequal large share of the nation's Gross Domestic Product (GDP). The sectors inability to effectively link other sectors of the economy became a challenge that weakened their expected impact on the national

economy. There was thus the need to move the economy to a sub-sector that had proven to be a veritable vehicle for rapid socio-economic development of the so called advanced economies of the world, and one that could provide linkages with bigger industries and other subsectors within the industrial sector in Nigeria. The obvious challenge for Nigeria's national economic development requires a holistic approach that incorporates all subsectors of the real sector for national integrated development (Onwukwe, & Ifeanacho, 2011; Nsorah, Mintah & AbuduK. 2022).

Again, extant literature posits that Small and Medium Scale Enterprises (SMEs) have proven to be the engine of growth; to deal with mass unemployment by creating new jobs, impart new skills through technological transfers, improved technical skills and technological innovativeness, nurture and build entrepreneurial capacities and managerial competence, encourage the sourcing of local raw materials and application of local content in the productive processes, encourage domestic savings and by extension capital formation for continuous investments, maintain and sustain the economy and reposition the economy for growth and development (Taiwo et al 2012; Adegbite et al, 2007). The benefits of a well-structured and well developed SMEs subsector is therefore not in doubt.

The acceptance of this fact by governments in Nigeria has led to deliberate policies to reposition the sector. Government skill acquisition centers have been set up to encourage skill development, technological transfers and generally, entrepreneurial development. The government renewed policy was thus geared towards harnessing the abundant human resources evidently untapped to arrest the nation's dwindling fortunes and redirect her on the part of economic prosperity (Essien & Udofia, 2006).Government has also undertaken bank reforms to strengthen the abilities of money deposit banks and micro finance banks to effectively and efficiently provide credit facilities to the SMEs sector for business growth and expansion (Ebitu, Basil & Ufot, 2016; Wahab & Ijaiya, 2006; Abbasi, Wang, & Abbasi, 2017). In undertaking such reforms, government is of the belief that financial institutions can readily mobilize and deploy financial credits and facilities to the SMEs' sub-sector (Mihaiu, 2014).). The ability of financial institutions especially commercial banks, micro finance banks etc. to assemble and deploy some ranges of financial assistance to this sector will make it competitive, thus stimulating the economy (Wahab & Ijaiya, 2006; Ebiringa, 2011). It has also been argued in the literature that government intervention in the sector has further opened up the sector and repositioned it to achieve its desired potentials. Despite all these, the SMEs subsector in Nigeria is struggling and their impact to national economic recovery is yet to be felt, warranting an empirical probe into the impact of government policy on small and medium enterprises in Nigeria.

This study was informed by the fact that despite the touted benefits of SMEs to reengineer economies and the increasing support of government to the sector, SMEs in Nigeria have not impacted the economy positively enough and so have not been able to

lift the citizens out of poverty. The parlous state of the SMEs subsector means government's continuous funding and seeking of better ways of funding the sector. The government renewed policy towards the sector has led to reforms in the banking sector to allow money deposit banks to play critical roles in revamping the sector through the provision of bank credits and loans. Government has also through the Central Bank of Nigeria tried to intervene directly by providing grants, tax holidays, restructuring the economy for greater absorptive capacities and setting up of training centers to unlock the entrepreneurial skills in the SME operator (Nnanna, 2001). Government support agencies have been set up and skill acquisition programmes launched to bring to fore latest technological innovations in the sector. In the light of these initiatives by government towards the growth and sustainability of the sector for national economic benefits, the continuous failure of the sector to make appreciable input on national economy has become a source of worry not only to government but also to researchers, stakeholders and the citizens when their performance is juxtaposed with the successes recorded by SMEs in other countries.

Some researchers are of the view that most government policies are misplaced due to the fact that their implementations are not well thought out. Others are of the view that corrupt officials and lack of political will to see through the policies have aggravated their failures. Thus, the Nigerian nation suffers from the collapse of almost all sectors of the economy. This has led to series of socio-economic problems especially unemployment and biting poverty which have wiped out domestic savings. Inflation and interest rates are on the increase and inability to access bank credits and other financial instruments by SMEs operators have further compounded their financial and operational woes. Government finances according to reports are also thinning down as revenue from her monolithic business (oil) has continued to dwindle, thus leaving her with scarce resources to attend to the multifaceted problems facing the country. In the light of these, there is the need to examine the impact of government policy on small and medium enterprises in Nigeria with a view to unravelling the remote reasons behind the unimpressive showing of SMEs despite government's continued intervention.

The objectives of the study are to examine impact of government expenditure on small and medium enterprises development in Nigeria, to examine the effect of gross domestic product, government expenditure, unemployment rate, commercial banks credit to SMEs subsector and interest rate on small and medium enterprises output

***Hypotheses***

**Ho:** Gross domestic products, government expenditure, unemployment rate, commercial banks credit to SMEs subsector and interest rate have no significant effect on small and medium enterpriese output.

## Theoretical Framework – System Theory

Systems theory was first introduced in the 1940s by biologist Ludwig Von Bertalanffy. Systems theory is the trans-disciplinary study of systems, i.e. cohesive groups of interrelated, interdependent components that can be natural or human-made. Every system has causal boundaries, is influenced by its context, defined by its structure, function and role, and expressed through its relations with other systems. A system is "more than the sum of its parts" by expressing synergy or emergent behavior. Systems theory is an interdisciplinary theory about the nature of complex systems in nature, society, and science. It is a framework by which one can use to study, investigate and describe any group of objects that work in collaboration towards a common purpose/goal.

Changing one component of a system may affect other components or the whole system. It may be possible to predict these changes in patterns of behavior. For systems that learn and adapt, the growth and the degree of adaptation depend upon how well the system is engaged with its environment and other contexts influencing its organization. Some systems support other systems, maintaining the other system to prevent failure. The goals of systems theory are to model a system's dynamics, constraints, conditions, and relations; and to elucidate principles (such as purpose, measure, methods, tools) that can be discerned and applied to other systems at every level of nesting, and in a wide range of fields for achieving optimized equifinality.

Additionally, an essential assumption of systems theory is that it needs to be understood as a whole system, rather than only the mechanical portions mentioned above, as someone should reflect on how the system connects itself to its' environment.

## Relevance of the Theory

System theory says that a change in one component of a system may affect other components or the whole system. It may be possible to predict these changes in patterns of behavior. This is relevant to the work because a reduction in budgetary allocation to small and medium enterprises will automatically affect the performance of the sector whether positively or negatively.

## Methodology

### *Model Specification*

The model equation for this study is stated as follow:

*The structural form of the model is:*

$$SME = f(GDP, GEXP, UMPL, CBC, INTR) \quad \ldots \quad \ldots \quad \ldots (1)$$

*The mathematical form of the model is:*

$$SME = \beta_0 + \beta_1 GDP + \beta_2 GEXP + \beta_3 UMPL + \beta_4 CBC + \beta_5 INTR \quad \ldots \quad \ldots (2)$$

*The econometric form of the model is:*

$$SME = \beta_0 + \beta_1 GDP + \beta_2 GEXP + \beta_3 UMPL + \beta_4 CBC + \beta_5 INTR\ R + \mu_i \quad \ldots (3)$$

Where; SME = Small and Medium enterprise captured by small and medium industry output

GDP = Gross Domestic Product

GEXP = Government policy proxied by government expenditure

UMPL = Unemployment rate

CBC = Commercial Banks Credit to SMEs subsector

INTR = Interest rate

$\beta_0$ = Intercept of the model

$\beta_1 - \beta_5$ = Parameters of the regression coefficients

$\mu_i$ = Stochastic error term

***Method of Data Analysis***

The economic technique employed in the study is the ordinary least square (OLS). This is because the OLS computational procedure is fairly simple a best linear estimator among all unbiased estimation, efficient and shown to have the smallest (minimum variance) thus, it become the best linear unbiased estimator (BLUE) in the classical linear regression (CLR) model. Basic assumptions of the OLS are related to the forms of the relationship among the distribution of the random variance ($\mu_i$).

OLS is a very popular method and in fact, one of the most powerful methods of regression analysis. It is used exclusively to estimate the unknown parameters of a linear regression model. The Economic views (E-views) software will be adopted for regression analysis.

***Stationarity (unit root) test:*** The importance of this test cannot be overemphasized since the data to be used in the estimation are time-series data. In order not to run a spurious regression, it is worthwhile to carry out a stationary test to make sure that all the variables are mean reverting that is, they have constant mean, constant variance and constant covariance. In other words, that they are stationary. The Augmented Dickey-Fuller (ADF) test would be used for this analysis since it adjusts for serial correlation.

***Decision rule****:* If the ADF test statistic is greater than the MacKinnon critical value at 5% (all in absolute term), the variable is said to be stationary. Otherwise it is non stationary.

***Cointegration test:*** Econometrically speaking, two variables will be cointegrated if they have a long-term, or equilibrium relationship between them. Cointegration can be thought of as a pre-test to avoid spurious regressions situations (Granger, 1986:226). As recommended by Gujarati (2004), the ADF test statistic will be employed on the residual.

***Evaluation of Parameter Estimates***

The estimates obtained from the model shall be evaluated using three (3) criteria. The three (3) criteria include:

i. The economic a priori criteria.
ii. The statistical criteria: First Order Test.
iii. The econometric criteria: Second Order Test

***Evaluation based on economic a priori criteria***

This could be carried out to show whether each regressor in the model is comparable with the postulations of economic theory; i.e., if the sign and size of the parameters of the economic relationships follow with the expectation of the economic theory. The a priori expectations, in tandem with the manufacturing sector growth and its determinants are presented in Table 1 below, thus:

**Table 1: Economic a priori expectation**

| **Parameters** | **Variables** | | **Expected Relationships** |
|---|---|---|---|
| | **Regressand** | **Regressor** | |
| $\beta_1$ | SME | GDP | + |
| $\beta_2$ | SME | GEXP | + |
| $\beta_3$ | SME | UMPL | - |
| $\beta_4$ | SME | CBC | + |
| $\beta_5$ | SME | INTR | - |

*Source: Researchers compilation*

A positive '+' sign indicate that the relationship between the regressor and regressand is direct and move in the same direction i.e. increase or decrease together. On the other hand, a '-' shows that there is an indirect (inverse) relationship between the regressor and regressand i.e. they move in opposite or different direction.

***Evaluation based on statistical criteria: First Order Test***

This aims at the evaluation of the statistical reliability of the estimated parameters of the model. In this case, the F-statistic, standard error, t-statistic, Co-efficient of determination ($R^2$) and the Adjusted $R^2$ are used.

***The Coefficient of Determination ($R^2$)/Adjusted $R^2$***

The square of the coefficient of determination $R^2$ or the measure of goodness of fit is used to judge the explanatory power of the explanatory variables on the dependent variables. The $R^2$ denotes the percentage of variations in the dependent variable accounted for by the variations in the independent variables. Thus, the higher the $R^2$, the more the model is able to explain the changes in the dependent variable. Hence, the better the regression based on OLS technique, and this is why the $R^2$ is called the co-efficient of determination as it shows the amount of variation in the dependent variable explained by explanatory variables.

However, if $R^2$ equals one, it implies that there is 100% explanation of the variation in the dependent variable by the independent variable and this indicates a perfect fit of regression line. While where $R^2$ equals zero. It indicates that the explanatory variables could not explain any of the changes in the dependent variable. Therefore, the higher and closer the $R^2$ is to 1, the better the model fits the data. Note, the above explanation goes for the adjusted $R^2$.

***Standard Error test (S.E):***The standard error test is used to test if the regression coefficients of the explanatory variables are statistically significant, individually (different from zero). The precision or reliability of estimates (i.e., the intercepts and scopes) would also be measured by the Standard Error.

***The F-test:*** The F-statistics is used to test whether or not, there is a significant impact between the dependent and the independent variables. In the regression equation, if calculated F is greater than the table F table value, then there is a significant impact between the dependent and the independent variables in the regression equation. While if the calculated F is smaller or less than the table F, there is no significant impact between the dependent and the independent variable.

***The t-statistic:*** This is used to determine the reliability/statistical significance of each variable coefficient. Here, the absolute t-value of each coefficient is compared with a tabular t-value and if greater than a tabular t-value, such variable possessing the coefficient is accepted as statistically significant and fit to be used for inferences and possibly for forecasting.

***Evaluation based on econometric criteria: Second Order Test***

This aims at investigating whether the assumption of the econometric method employed are satisfied or not. It determines the reliability of the statistical criteria and establishes whether the estimates have the desirable properties of unbiasedness and consistency. It also tests the validity of non-autocorrelation disturbances. In the model, Durbin-Watson (DW), unit root test, co-integration test areused to test for: autocorrelation, multicolinearity and heteroskedasticity.

***Decision Rule:*** if the ADF test statistic is greater than the critical value at 5%, then the variables are cointegrated (values are checked in absolute term).

***Test for Autocorrelation:*** The Durbin-Watson (DW) test is appropriate for the test of First-order autocorrelation and it has the following criteria.

1. If d* is approximately equal to 2 (d* =2), we accept that there is no autocorrelation in the function.
2. If d*= 0, there exist perfect positive auto-correlation. In this case, if 0<d*< 2, that is, if d* is less than two but greater than zero, it denotes that there is some degree of positive autocorrelation, which is stronger the closer d* is to zero.

3. If d* is equal to 4 (d*=4), there exist a perfect negative autocorrelation, while if d* is less than four but greater than two (2<d*< 4), it means that there exist some degree of negative autocorrelation, which is stronger the higher the value of d*.

***Test for multicolinearity:*** This means the existence of an exact linear relationship among the explanatory variable of a regression model. It is use to determine whether there is a correlation among variables.

***Decision Rule:*** From the rule of Thumb, if correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity.

***Test for heteroscedasticity:*** The essence of this test is to see whether the error variance of each observation is constant or not. Non-constant variance can cause the estimated model to yield a biased result. White's General Heteroscedasticity test would be adopted for this purpose.

***Decision Rule***: We reject $H_0$ if $F_{cal} > F_{tab}$ at 5% critical value. Or alternatively, we reject $H_0$ if $n.R^2 > x^2$ tab at 5% critical value.

## Empirical Results and Analyses

### *Stationary Unit Root Test*

The Augmented Dickey-Fuller (ADF) test for unit roots was conducted for all the time series employed for the study. The ADF results in Table 4.1 show that all the variables are non-stationary in levels, that is, *I*(0). However, they are all stationary at their first differences, that is, they are *I*(1). Since the ADF absolute value of each of these variables is greater than the 5% critical value, they are all stationary at their first differences. The result of the regression (stationary unit root test) is presented in table 2 below.

**Table 2: Summary of ADF test**

| Variables | ADF Statistics | Lagged difference | 5% Critical Value | Order of Integration |
|---|---|---|---|---|
| SME | -4.834036 | 1 | -2.960411 | Statistically stationary at *I*(1) |
| GDP | -5.489200 | 1 | -2.960411 | Statistically stationary at *I*(1) |
| GEXP | -5.396728 | 1 | -2.960411 | Statistically stationary at *I*(1) |
| UMPL | -6.404135 | 1 | -2.960411 | Statistically stationary at *I*(1) |
| CBC | -4.626230 | 1 | -2.960411 | Statistically stationary at *I*(1) |
| INTR | -9.992178 | 1 | -2.960411 | Statistically stationary at *I*(1) |

*Source: Researchers computation*

These results from table 2 show that at 5% critical value, small and medium enterprises development (SME), gross domestic product (GDP), government expenditure (GEXP), unemployment rate (UMPL), Commercial Banks credit (CBC) and interest rate (INTR) are not stationary at level form (i.e. they are not integrated at order zero; *I*(0)). The variables are only stationary at first difference. That is, they are integrated at order one;

*I*(1). This result is expected, since most macro-economic time-series data are known to exhibit non-stationary at level form.

Since our variables are non-stationary (i.e. at level form), we go further to carry out the cointegration test. The essence is to show that although all the variables are non-stationary, the variables have a long term relationship or equilibrium between them. That is, the variables are cointegrated and will not produce a spurious regression.

***Summary Johansen Cointegration Test***

Cointegration means that there is a correlationship among the variables. Cointegration test is done on the residual of the model. Since the unit root test shows that all the variables are stationary at first difference *1*(1), we therefore test for cointegration among these variables. The result is presented in the tables 3 below for Trace and Maximum Eigenvalue cointegration rank test respectively.

**Table 3: Summary of Johansen Co-integration Test**

Unrestricted Cointegration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.908385 | 163.0760 | 95.75366 | 0.0000 |
| At most 1 * | 0.676509 | 88.98110 | 69.81889 | 0.0007 |
| At most 2 * | 0.617768 | 53.99496 | 47.85613 | 0.0119 |
| At most 3 | 0.454930 | 24.18141 | 29.79707 | 0.1929 |
| At most 4 | 0.143556 | 5.369352 | 15.49471 | 0.7684 |
| At most 5 | 0.018073 | 0.565382 | 3.841466 | 0.4521 |

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.908385 | 74.09490 | 40.07757 | 0.0000 |
| At most 1 * | 0.676509 | 34.98614 | 33.87687 | 0.0367 |
| At most 2 * | 0.617768 | 29.81356 | 27.58434 | 0.0254 |
| At most 3 | 0.454930 | 18.81205 | 21.13162 | 0.1024 |
| At most 4 | 0.143556 | 4.803970 | 14.26460 | 0.7664 |
| At most 5 | 0.018073 | 0.565382 | 3.841466 | 0.4521 |

*Source: Researchers computation*

Table 3 indicates that trace have only 3 cointegrating variables in the model while Maximum Eigenvalue indicated only 3 cointegrating variables. Both the trace statistics and Eigen value statistics reveal that there is a long run relationship between the variables. That is, the linear combination of these variables cancels out the stochastic trend in the series. This will prevent the generation of spurious regression results. Hence, the implication of this result is a long run relationship between Small and Medium enterprise captured by small and medium industry output and other macroeconomic variables used in the model.

***Regression Results***

The result of the regression test is presented in table 4below.

**Table 4: Summary of regression results**

Dependent Variable: SME
Included observations: 4

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 23.03838 | 0.623185 | 36.96876 | 0.0000 |
| GDP | 1.42E-05 | 2.16E-06 | 6.575930 | 0.0000 |
| GEXP | 2.81E-07 | 2.58E-07 | 1.090821 | 0.2850 |
| UMPL | -1.701385 | 0.043563 | -0.231782 | 0.9749 |
| CBC | 5.38E-07 | 2.30E-07 | 2.335443 | 0.0272 |
| INTR | -3.096451 | 0.032486 | -2.968984 | 0.0062 |
| R-squared | 0.909937 | F-statistic | | 54.55809 |
| Adjusted R-squared | 0.893259 | Prob(F-statistic) | | 0.000000 |
| S.E. of regression | 0.775086 | Durbin-Watson stat | | 1.408038 |

Source: Researchers computation

***Evaluation of the Estimated Model***

To analyze the regression results as presented in table 4.3 (see also appendix 4), we employ economic a prior criteria, statistical criteria and econometric criteria.

***Evaluation based on economic a priori criteria***

This subsection is concerned with evaluating the regression results based on a priori (i.e., theoretical) expectations. The sign and magnitude of each variable coefficient is evaluated against theoretical expectations.

From table 4, it is observed that the regression line have a positive intercept as presented by the constant (c) = 23.04. This means that if all the variables are held constant (zero), SME will be valued at 23.04. Thus, the a-priori expectation is that the intercept could be positive or negative, so it conforms to the theoretical expectation.

From table 4, it is observed that gross domestic product, government expenditure and commercial bank credits to small and medium enterprises have a positive relationship

with small and medium enterprises development. This means that when gross domestic product, government expenditure and commercial bank credits to small and medium enterprises increases, there will be increase and improvement in small and medium enterprises development. On the other hand, unemployment and interest rate have a negative relationship with small and medium enterprises development. From the regression analysis, it is observed that all the variables conform to the a priori expectation of the study. Thus, table 5 summarises the a priori test of this study.

**Table 5: Summary of economic a priori test**

| Parameters | Variables | | Expected Relationships | Observed Relationships | Conclusion |
|---|---|---|---|---|---|
| | **Regressand** | **Regressor** | | | |
| $\beta_0$ | SME | Intercept | +/- | + | Conform |
| $\beta_1$ | SME | GDP | + | + | Conform |
| $\beta_2$ | SME | GEXP | + | - | Conform |
| $\beta_3$ | SME | UMPL | - | + | Conform |
| $\beta_4$ | SME | CBC | + | + | Conform |
| $\beta_5$ | SME | INTR | - | - | Conform |

*Source: Researchers compilation*

***Evaluation based on statistical criteria***

This subsection applies the $R^2$, adjusted $R^2$, the S.E, the t–test and the f–test to determine the statistical reliability of the estimated parameters. These tests are performed as follows:

From our regression result, the **coefficient of determination ($R^2$)** is given as 0.909937, which shows that the explanatory power of the variables is very high and/or strong. This implies that 90.99% of the variations in the growth of the GDP, GEXP, UMPL, CBC and INTR are being accounted for or explained by the variations in SME. While other determinants of small and medium enterprises development as proxied by small and medium industry output not captured in the model explain just 9.01% of the variation in the growth of SME in Nigeria.

The **adjusted $R^2$** supports the claim of the $R^2$ with a value of 0.893259 indicating that 89.33% of the total variation in the dependent variable (small and medium enterprise development as proxied by small and medium industry output is explained by the independent variables (the regressors)). Thus, this supports the statement that the explanatory power of the variables is very high and strong.

The **standard errors** as presented in table 4.3 show that all the explanatory variables were all low. The low values of the standard errors in the result show that some level of confidence can be placed on the estimates (*see* table 4.3 and appendix 4).

The **F-statistic:** The F-test is applied to check the overall significance of the model. The F-statistic is instrumental in verifying the overall significance of an estimated model. The F-statistic of our estimated model is 54.55809 and the probability of the F-statistic is 0.0000. Since the probability of the F-statistic is less than 0.05, we conclude that the explanatory variables have significant impacts on small and medium enterprise development via small and medium industry output growth in Nigeria.

Alternatively, F-statistic can be calculated as:
$V_1$ / $V_2$ Degree of freedom (d.f)
$V_1$ = n-k, $V_2$ = k-1:
Where; n (number of observation); k (number of parameters)

Where k-1 = 6-1= 5
Thus, df = 33-6 = 27
Therefore, $F_{0.05(5,27)} = 2.21$ (From the F table) … F-table
F-statistic = 54.55809 (From regression result) … F-calculated

Since the F-calculated > F-table, we reject $H_0$ and accept $H_1$ that the model has goodness of fit and is statistically different from zero. In other words, there is significant impact between the dependent and independent variables in the model.

***T-statistic:*** Here, we compare the estimated or calculated t-statistic with the tabulated t-statistic at $t_{\alpha/2} = t_{0.05} = t_{0.025}$ (two-tailed test).

Degree of freedom (d.f) = n-k = 33-6 = 27
So, we have:

$T_{0.025(27)} = 2.052$ ... Tabulated t-statistic

Here, we are interested in determining the statistical reliability and significance of the individual parameters used in our model. We shall do this by comparing the absolute t-value of each coefficient with the critical t-value of 2.052 and if the absolute t-value is greater than 2.052, such variable possessing the coefficient is accepted as statistically significant and fit to be used for statistical inference and possibly for forecasting. This exercise is shown in the table below:

**Table 6: Summary of t-test**

| **Variable** | **t-tabulated ($t_{\alpha/2}$)** | **t-calculated ($t_{cal}$)** | **Conclusion** |
|---|---|---|---|
| Constant | ±2.052 | 36.96876 | Statistically Significance |
| GDP | ±2.052 | 6.575930 | Statistically Significance |
| GEXP | ±2.052 | 1.090821 | Statistically Insignificance |
| UMPL | ±2.052 | -0.231782 | Statistically Insignificance |
| CBC | ±2.052 | 2.335443 | Statistically Significance |
| INTR | ±2.052 | -2.968984 | Statistically Significance |

Source: Researchers computation

From table 6, the ***t-test*** result is shown and the individual hypothesis consider below;
For GDP, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that GDP have a significant impact on SME.
For GEXP, $t_{\alpha/2} > t_{cal}$, therefore we accept the null hypothesis and reject the alternative hypothesis. Thus, GEXP do not have significant impact on SME.
For UMPL, $t_{\alpha/2} > t_{cal}$, therefore we accept the null hypothesis and reject the alternative hypothesis. Thus, UMPL do not have significant impact on SME.
For CBC, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that CBC do has a significant effect on SME.
For INTR, $t_{\alpha/2} < t_{cal}$, therefore we reject the null hypothesis and accept the alternative hypothesis. This means that INTR have a significant impact on SME.

***Evaluation based on econometric criteria***

In this subsection, the following econometric tests are used to evaluate the result obtained from our model: autocorrelation, multicolinearity and heteroscedasticity.

**Test for Autocorrelation**

Using Durbin-Watson (DW) statistics which we obtain from our regression result in table 4, it is observed that DW statistic is 1.408038 or 1.41%, which indicate the absence of autocorrelation in the series so that the model is reliable for predications.

***Test for Multicolinearity***

This means the existence of an exact linear relationship among the explanatory variable of a regression model. This means the existence of an exact linear relationship among the explanatory variable of a regression model. This will be used to check if collinearity exists among the explanatory variables. The basis for this test is the correlation matrix obtained using the series. The result is presented in table 7.

**Table 7: Summary of Multicollinearity test (correlation matrix).**

| **Variables** | **Correlation Coefficients** | **Conclusion** |
|---|---|---|
| GDP and GEXP | 0.754268 | No multicollinearity |
| GDP and UMPL | 0.779254 | No multicollinearity |
| GDP and CBC | 0.708923 | No multicollinearity |
| GDP and INTR | 0.487781 | No multicollinearity |
| GEXP and UMPL | 0.754466 | No multicollinearity |
| GEXP and CBC | 0.750712 | No multicollinearity |
| GEXP and INTR | 0.387130 | No multicollinearity |
| UMPL and CBC | 0.712877 | No multicollinearity |
| UMPL and INTR | 0.290740 | No multicollinearity |
| CBC and INTR | 0.323172 | No multicollinearity |

Source: Researchers computation

***Decision Rule:*** From the rule of Thumb, if correlation coefficient is greater than 0.8, we conclude that there is multicolinearity but if the coefficient is less than 0.8 there is no multicolinearity. We therefore, conclude that the explanatory variables are not perfectly linearly correlated.

***Test for Heteroscedasticity***

This test is conducted using the white's general heteroscedascity test.

Hypothesis testing: $H_0$: $\beta_0 = \beta_1 = \beta_2 = \beta_3 = 0$ (homoscedastic)

$H_1$: $\beta_0 = \beta_1 = \beta_2 = \beta_3 \neq 0$ (heteroscedastic)

We observe that the probability of F- statistic of the white test is 0.0015. Since the probability of F- test is less than the 0.05 significance level, we accept the null hypothesis that there is heteroscedasticity in the residuals. This goes to say that the residuals of our estimated model do have a constant variance (homoscedastic). This finding has some adverse implications. Amongst these is the bias that heteroscedasticity may create in the standard errors and t-values, hence leading to erroneous inferential decisions. To circumvent this, we employed the Newey-West method. This crucial technique produces Heteroscedasticity and Autocorrelation Consistent (HAC) standard errors. Therefore, notwithstanding the presence of heteroscedasticity in the residuals of our estimated model, our inferences remain untainted, since the Newey-West method has neutralized the consequences of heteroscedasticity on the standard errors.

**Conclusion and Recommendations**

The study appraised the effect of government expenditure on small and medium enterprises development in Nigeria from 1999 -2022 using Ordinary least Square (OLS) technique method. All data used are secondary data obtained from the Statistical Bulletin of Central Bank of Nigeria. In executing the study, the OLS techniques was applied after determining stationarity of our variables using the ADF Statistic, as well as the cointegration of variables using the Johansen approach and was discovered that the variables are stationary and have a long term relationship among the variables in the model. From the result of the OLS, it is observed that gross domestic product, government expenditure and commercial banks credit to SMEs have a positive relationship with SMEs growth and development in Nigeria. On the other hand, unemployment and interest rate have a negative relationship with SMEs. This means that when SMEs is increasing, unemployment will be reducing. Following the findings, it can be infer that commercial bank loans to small and medium scale industries in Nigeria have come to a point where it will stimulate investment in small and medium scale industries of economic growth. This may be due to the use of collaterals and other requirement by commercial banks for small scale investors to borrow.

A small and medium scale industry has significantly contributed to the real gross domestic product (GDP) of Nigeria, within the period under study. This has supported the idea that if given adequate support, small scale industries will enhance economic development faster than any other sector of the economy. We also observe that most of the investors in small and medium scale industries rely on borrowing commercial banks and little of their personal savings. Finally, the study shows that there is a long run relationship exists among the variables. Both $R^2$ and adjusted $R^2$ show that the explanatory power of the variables is very high or strong. The standard errors show that all the explanatory variables were all low. The low values of the standard errors in the result show that some level of confidence can be placed on the estimates. The study

recommends that the government should improve all the components part of the real GDP. This will help develop the SMEs subsector. The government should invest more on infrastructure that will enhance the development of SMEs. This is because critical infrastructure like electricity, roads and technology improve business performance and create employment. The government through the apex bank should ensure that adequate credit at reduced interest rate is extended to the SMEs subsector to enable businesses thrive like it is done in the advance countries.

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