



**FINANCIAL INTERMEDIATION,  
AND THE GROWTH OF SMALL AND MEDIUM-SIZED ENTERPRISES:  
*EMPIRICAL EVIDENCE FROM NIGERIA***

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**Abstract**

Small and medium size enterprises (SMEs) have become part and parcel of economic growth and structural change as seen in the developing economies like Nigeria. They play important roles in employment and income generation, innovation, and reduction of poverty, thus being the engines of inclusive development. This paper will examine the dynamic nexus between the macroeconomic variables and the development of SMEs in Nigeria using annual data and cutting-edge econometric methodology. The analysis using fully modified least squares (FMOLS) estimation and robustness checks demonstrates that money supply, inflation, interest rates, and exchange rates have a high long-run impact on the growth of SMEs. Although money supply shows the most positive impact, credit availability also plays a moderating role where the effects of macroeconomic stability are concerned and are critical. The results also establish that there is cointegration between SME performance as well as macroeconomic fundamentals, which indicates the persistence of the relationships. The accuracy of the model is tested by the post-estimation diagnostics, which reflects that the model is reliable to draw policy insights. The paper concludes that the performance of the SME in Nigeria is not entirely based on macroeconomic policies but on the effectiveness of the financial intermediation and access to credit. The paper advises integration of monetary and structural policies to help in making the SMEs drivers of inclusive growth and sustainable development.

**Keywords:** *SME Growth, Macroeconomic Variables, Credit Availability, Cointegration, Nigeria, FMOLS.*

**JEL Codes:** *C22, E44, L26, O55.*

## **1.Introduction**

Small and medium size enterprises (SMEs) have become part and parcel of economic growth and structural change as seen in the developing economies like Nigeria. They play important roles in employment and income generation, innovation, and reduction of poverty, thus being the engines of inclusive development (Ajuwon et al. 2017). With their profound strategic significance, the Nigerian SMEs still have to be functioning in the environment of macroeconomic instability in the “form of high inflation rates, fluctuated interest rates, depreciated exchange rates, and lack of consistent growth of money supply. Such macroeconomic shocks cause uncertainty, increase the cost of operation and negatively affect the potential of SMEs to contribute effectively to the national output (Zongo, 2024). The dynamic between macroeconomic environment and the ability of SMEs to grow is thus very instrumental in formulating policies that make them more sustainable and resilient.

The financial sector plays an important direct and indirect role in helping SMEs scale up through its intermediation function: effective intermediaries not only mobilize savings for productive investment but also deliver credit and other non-price services such as advisory support and risk management tools, which are critical to the success of these businesses operating within competitive markets. Evidence suggests that well-functioning financial intermediation is better able to mobilize resources for enterprise development under stable macroeconomic conditions, while the reverse is also true: poor macroeconomic stability will constrain effective financial intermediation. This study examines how the interaction between these variables has affected SME growth in Nigeria and explores ways of structuring its financial systems and policy frameworks that can enhance their resilience and performance as they continue to be a critical component for long-term economic transformation.

The aim of this research project, as it is first stated, is to consider the impact of money supply on the development of SMEs in Nigeria. A sufficient and stable amount of money promotes liquidity, lower transaction costs, and access to credit, which in turn promotes the expansion of business and investment in the productive capacity (Okonkwo & Nwanna, 2021). Nevertheless, monetary growth may become excessive hence giving rise to inflationary pressures which distort the price signals and weakens competitiveness of SME. This paper thus aims to determine whether the path of money supply in Nigeria enhances or limits the growth of SME by placing the analysis under the umbrella of monetary transmission theory that argues that monetary supply variation impacts on output during growth in terms of interest rates and investment avenue (Demirguc-Kunt and Levine, 2009). The second

objective is to investigate the influence of inflation on SME operations. Inflation is a double-edged sword: while moderate inflation may stimulate investment by reducing the real burden of debt, excessive and volatile inflation erodes purchasing power, escalates production costs, and discourages long-term planning (Ojo, Aruwa, & Chukwuma, 2024). SMEs, which typically operate with limited financial buffers, are disproportionately vulnerable to inflationary shocks, often experiencing reduced profitability and increased risk of closure (Onwumere & Ezeaku, 2021). By assessing the long-run relationship between inflation and SME growth, this study contributes to the ongoing debate on whether Nigeria's inflationary trends act as catalysts or impediments to SME development.

The third aim of the study is to examine how interest rates influence the performance of SMEs. The cost of borrowing depends on interest rates and, therefore, the possibility of SMEs to finance the growth, innovation, and working capital (Egbetunde et al., 2017). SMEs are usually discouraged to access credit due to the high interest rates especially because they have less collateral, and are classified as high-risk clients. On the contrary, a reduction in interest rates may develop credit being taken up, however, when not handled with care, may lead to over-leverage and wasteful capital allocation. By using the theory of loanable funds to describe the relationship between interest rate dynamics and investment choices by SMEs and macroeconomic growth, the study fills an essential gap in the policy discussion in Nigeria.

The fourth goal is to assess the effect of exchange rate changes on SMEs development. Exchange rate volatility has extensive implications on SMEs, particularly those that depend on imported inputs or those that are involved in export activities (Onwuka, 2021). When the exchange rate is depreciating, the cost of inputs is up, the supply chains are upset, and the inflationary pressure is ignited, whereas an appreciated exchange rate may reduce the competitiveness of exports. According to the empirical data, a volatile exchange rate in Nigeria has posed a major problem to the activities of SMEs by increasing uncertainty levels and decreasing the level of investment confidence (Fasanya and Akinwale, 2022). This study sheds new light about the dynamics of the impacts of currency fluctuations on the growth path of SMEs in the open economy environment in Nigeria.

Lastly, the paper takes into consideration the moderating effects of loans to SMEs in enhancing or alleviating the effects of macroeconomic variables on the performance of SMEs. Credit is a very necessary factor in increasing productive capacity, risk management and competitiveness. Nevertheless, the effective lending is usually inhibited by structural challenges in the financial system of Nigeria, including high collateral requirements, poor

credit penetration, and riskiness of SMEs (Diop et al., 2025). The sensitivity analysis of this research thus will examine the relationship between loans and the macroeconomic variables that influence the outcomes of the SMEs and thus fill a serious gap in both the academic and policy literature.

The present research is part of the wider discussion on the development of SMEs in emerging economies, with a focus on macroeconomic management, financial intermediation, and entrepreneurial resilience as an intersection. The findings are expected to provide actionable policy recommendations for strengthening Nigeria's SME sector, aligning with recent calls for evidence-based strategies to promote inclusive growth and structural transformation across Africa (Emmanuel, 2024; Ibitomi et al., 2024).

## **2. Empirical Review**

Empirical work has intensified on the role of liquidity and financial depth in shaping SME dynamics. Cross-country and country-level studies consistently show that broader money aggregates and financial deepening raise the probability of SME survival and expansion through improved access to formal credit and lower transaction costs (Brixiová et al., 2020; Beck & Demirgüç-Kunt, 2006). Country studies for sub-Saharan Africa show that measures of money supply (often M2 or private credit to GDP) are positively correlated with SME output and employment, controlling for firm and sectoral characteristics (Brixiová et al., 2020; Asongu & Odhiambo, 2021). These findings corroborate the monetary transmission channel emphasised in macroeconomic theory: liquidity fosters investment and working-capital availability, which are binding constraints for many SMEs (Demirguc-Kunt & Levine, 2009).

A second large strand of the literature examines inflation's ambiguous effects on SMEs. Empirical analyses find that moderate, predictable inflation can coexist with firm growth, sometimes even stimulating nominal demand, reducing the real burden of debt, and encouraging investment by indebted firms, while high or volatile inflation harms SMEs through input-cost shocks and planning uncertainty (Barro, 2020; Anidiobu, Okolie, & Oleka, 2018). Panel studies using firm-level data show that inflation volatility (rather than the level alone) is particularly damaging to small firms that lack hedging instruments (Aghion et al., 2021; Onwumere & Ezeaku, 2021). Several country papers (including micro-survey evidence from Nigeria) document how inventory management costs and the inability to pass on price increases compress margins for SMEs when inflation is high and erratic.

Interest rates and the cost of credit remain central in empirical investigations. A common empirical regularity is that high nominal lending rates are associated with lower investment and slower SME growth in micro-level studies (Akinruwa et al., 2017; Egbetunde et al., 2017). However, macro-level time-series analyses sometimes report positive correlations between observed higher interest rates and lending to SMEs, especially in contexts of weak intermediation where rate liberalization signals financial deepening and banks' willingness to lend (Ogunlokun & Adeleke, 2021; Ajayi *et al.*, 2021). Empirical work typically resolves this apparent paradox by distinguishing between the price of credit and credit availability: SMEs are harmed by high rates when credit access is poor, but if higher rates accompany improved credit supply and institutional reform, SME outcomes can improve.

Exchange rate movements have heterogeneous effects on SMEs depending on their input structure and market orientation. Several econometric studies for Nigeria and other emerging markets show that depreciation benefits export-oriented SMEs by improving price competitiveness, while import-dependent SMEs suffer from higher input costs and inflationary pass-through (Osazevbaru, 2021; Onwuka, 2021). Empirical research using firm-level panels and sectoral decomposition finds that exchange-rate shocks increase dispersion in firm performance: exporters and import-substituting producers may gain, whereas firms reliant on imported capital goods and inputs contract (Asongu & Odhiambo, 2021; Fasanya & Akinwale, 2022).

Access to credit, such as loans, guarantees and non-bank finance, is a dominant moderator in the literature. Cross-country and within-country investigations show that credit availability not only has a direct positive effect on SME growth but also conditions how macroeconomic shocks translate into firm outcomes (Beck & Demirgüç-Kunt, 2006; AFI, 2020). Recent Nigerian panel studies and program-evaluation papers show that targeted lending schemes, credit guarantee facilities and fintech credit platforms increase investment, employment and survival probabilities among SMEs Ajayi *et al.*, 2021; World Bank SME finance reports, 2020–2023). The consensus is that credit arranges the mechanism through which monetary expansion and exchange-rate developments affect SMEs.

Institutional quality, governance and financial infrastructure consistently appear as amplifiers or mitigators of macroeconomic effects. Empirical studies show that countries (and regions) with stronger creditor rights, better contract enforcement, and improved credit information systems have far higher pass-through of macroeconomic policy into productive SME lending (AFI, 2020; Asongu et al., 2020). In Nigeria, micro-evidence indicates that regulatory

bottlenecks, weak contract enforcement and high collateral requirements limit the transmission of monetary easing into SME credit (Diop *et al.*, 2025). Studies using difference-in-differences and instrumental-variable strategies indicate that improvements in registry systems and credit bureaus materially raise SME access to formal credit, and thereby cushioning SMEs from adverse macro shocks.

Methodologically, the field has matured: researchers increasingly combine firm-level microdata with macro-time series, use panel cointegration techniques (FMOLS, DOLS, panel unit roots), IV strategies to address endogeneity, and quasi-experimental designs where possible. For example, studies that exploit policy discontinuities, regional differential exposure to monetary and exchange-rate shocks, or staggered credit programs provide stronger causal evidence that money supply expansions and credit interventions promote SME growth (Phillips & Hansen, 1990; Jack & Suri, 2014 for financial innovations; recent Nigerian studies use FMOLS and DOLS to estimate long-run relationships). Meta-analyses and systematic reviews underline heterogeneity: effects vary by sector, firm age, formality status and region (Brixiová *et al.*, 2020; Iddrisu, 2023).

Attention to digital finance, mobile money and fintech has produced an important subset of recent studies. Mobile money and digital credit platforms have been shown to lower transaction costs, substitute for informal remittance channels, and improve working-capital flows for micro and small firms, particularly where traditional banking is thin (Asongu & le Roux, 2023; World Bank, 2021). In Nigeria, fintech adoption correlates with higher turnover among microenterprises, though concerns remain about interest rates, data privacy and over-indebtedness (AFI, 2020; recent country studies 2022–2024).

Several policy-oriented studies evaluate targeted interventions, including credit guarantees, subsidised SME windows, and capacity building, and find that when credit programs are coupled with technical assistance and market access initiatives, they produce larger, more persistent firm-level gains (World Bank SME Finance, 2020–2023; Ajayi *et al.*, 2021). Conversely, credit alone, without addressing infrastructure, regulatory hurdles and productivity bottlenecks, yields modest effects.

Across the literature there is growing emphasis on heterogeneity and distributional effects. Newer firm-level work demonstrates that macroeconomic shocks widen the performance gap between formal and informal SMEs, older and younger firms, and between urban and rural enterprises (Demirguc-Kunt & Levine, 2009). Consequently, policy design must be nuanced:

a one-size-fits-all monetary or credit policy risks benefitting some SMEs while leaving others behind.

### 3. Methodology

#### 3.1 Theoretical Framework

The relationship between macroeconomic variables and the growth of small and medium-sized enterprises (SMEs) can be theoretically anchored in both Keynesian and neoclassical traditions. Keynesian theory suggests that aggregate demand, influenced by monetary aggregates and credit availability, stimulates investment and output expansion, which extends to SMEs. Neoclassical growth theory, in contrast, emphasizes capital accumulation and the role of factor costs, such as interest rates and inflation, in shaping productive efficiency and firm-level growth (Solow, 1956; Romer, 1990).

SME growth can be modeled as a function of key macroeconomic indicators that influence cost structures, investment decisions, and market expansion. Let  $GSME_t$  denote the growth of SMEs at time  $t$ . The structural form may be expressed as:

$$GSME_t = f(MSUP_t, INFL_t, INTR_t, EXRT_t, LSME_t) \quad (1)$$

where  $MSUP_t$  represents money supply,  $INFL_t$  denotes the inflation rate,  $INTR_t$  is the interest rate,  $EXRT_t$  refers to the exchange rate, and  $LSME_t$  captures loans and advances to SMEs.

Monetary transmission theory postulates that an expansion in money supply reduces interest rates and increases credit availability, thereby lowering financing constraints for SMEs. This can be formalized through an investment function:

$$I_t = \alpha_0 + \alpha_1 MSUP_t - \alpha_2 INTR_t + v_t \quad (2)$$

where  $I_t$  is investment in SMEs,  $\alpha_1 > 0$  reflects the positive influence of monetary expansion, and  $\alpha_2 < 0$  reflects the dampening effect of high interest rates. Investment subsequently translates into SME growth through capital accumulation:

$$GSME_t = \delta_0 + \delta_1 I_t + \epsilon_t \quad (3)$$

Thus, combining (2) and (3), SME growth is positively related to money supply and negatively related to interest rates, holding other factors constant.

Inflation affects SMEs through both cost-push and demand-pull channels. Moderate inflation may raise demand and revenues, while excessive inflation distorts relative prices and raises input costs (Fischer, 1993). A simplified representation is:

$$GSME_t = \theta_0 + \theta_1 INFL_t + \eta_t \quad (4)$$

where the sign of  $\theta_1$  is theoretically ambiguous, depending on whether inflation enhances demand (positive) or imposes cost pressures (negative).

Exchange rate fluctuations influence SMEs through import costs, export competitiveness, and access to foreign inputs. A depreciation of the domestic currency may benefit SMEs producing tradables but hurt those reliant on imported inputs (Osazevbaru, 2021). This can be modeled as:

$$GSME_t = \lambda_0 + \lambda_1 EXRT_t + \xi_t \quad (5)$$

where  $\lambda_1 > 0$  if exchange rate depreciation enhances SME competitiveness in tradable sectors, and  $\lambda_1 < 0$  assuming that it increases the cost of production by using imported goods.

Lastly, credit to the SMEs is an important facilitating element, which alleviates liquidity pressures and exerts greater impacts on the macroeconomic conditions (Beck and Demirguc-Kunt, 2006). Borrowing by the SMEs levels off the impact of other macroeconomic variable which can be expressed in terms of interactions:

$$GSME_t = \phi_0 + \phi_1 LSME_t + \phi_2 (MSUP_t \times LSME_t) + \phi_3 (INFL_t \times LSME_t) + \phi_4 (INTR_t \times LSME_t) + \phi_5 (EXRT_t \times LSME_t) + \zeta_t \quad (6)$$

Equation (6) brings out the fact that the influence of macroeconomic indicators on the growth of SMEs is conditional on a level of credit pushed to SMEs. Increased credit improves absorbcency capacity of SMEs so that they can take advantage of good monetary and exchange rate environment and absorb negative inflation and financial shocks.

### **3.2. Data and Methods**

The paper used annual time-series annual data of Nigeria between 1990-2023 based on the Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics (NBS), and World Development Indicators (WDI). The data were analyzed in relation to the influence of the main macroeconomic variables, including money supply (MSUP), inflation (INFL), interest rate (INTR), exchange rate (EXRT) and loans to SMEs (LSME) on development of small and medium-sized enterprises (GSME), represented by the growth rate of the contribution of SMEs to gross domestic product (GDP). Table 1 gives the definition and measurement of the variables under the model and their sources of data.

Table 1: Variable definition and data sources

Variable	Abbreviation	Measurement/Proxy	Source
Growth of SMEs	GSME	Growth rate of SMEs' contribution to GDP	NBS, CBN
Loans to SMEs	LSME	Ratio of loans and advances to SMEs relative to total credit (%)	CBN Statistical Bulletin
Money Supply	MSUP	Broad money supply (M2) as a percentage of GDP	CBN, WDI
Inflation	INFL	Annual consumer price index (CPI, %)	CBN, WDI
Interest Rate	INTR	Lending interest rate (%)	CBN Statistical Bulletin
Exchange Rate	EXRT	Naira to US Dollar nominal exchange rate	CBN Statistical Bulletin

Source: Author (2024)

To investigate the long-run impact of macroeconomic variables on SME growth, the baseline model is specified as:

$$GSME_t = \beta_0 + \beta_1 LSME_t + \beta_2 MSUP_t + \beta_3 INFL_t + \beta_4 INTR_t + \beta_5 EXRT_t + \mu_t \quad (7)$$

where  $GSME_t$  represents SME growth at time  $t$ ,  $LSME_t$  denotes loans and advances to SMEs,  $MSUP_t$  is money supply,  $INFL_t$  is the inflation rate,  $INTR_t$  is the interest rate, and  $EXRT_t$  is the exchange rate.  $\mu_t$  is the error term.

Given the possibility of non-stationarity in macroeconomic time series, preliminary tests for unit roots were performed using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Once the order of integration was confirmed, cointegration tests following Engle-Granger and Phillips-Ouliaris approaches were used to verify the presence of a long-run equilibrium relationship among the variables.

A sensitivity specification was also estimated to examine the moderating role of loans to SMEs on the relationship between macroeconomic variables and SME growth:

$$GSME_t = \alpha_0 + \alpha_1 LSME_t + \alpha_2 (MSUP_t \times LSME_t) + \alpha_3 (INFL_t \times LSME_t) + \alpha_4 (INTR_t \times LSME_t) + \alpha_5 (EXRT_t \times LSME_t) + \epsilon_t \quad (8)$$

Equation (2) enables the assessment of whether SME-targeted credit policies condition the impact of macroeconomic variables on growth.

The Fully Modified Ordinary Least Squares (FMOLS) estimator was employed to estimate equations (1) and (2). FMOLS is particularly suitable for cointegrated time-series models as it corrects for both serial correlation and endogeneity arising from the existence of a long-run relationship between dependent and explanatory variables (Phillips & Hansen, 1990). Unlike Ordinary Least Squares (OLS), FMOLS provides unbiased and consistent long-run estimates in the presence of non-stationary regressors, which is common in macroeconomic data.

The following diagnostic and robustness tests were incorporated to validate the results: Durbin-Watson Test: Used to examine serial correlation in residuals, ensuring that errors are independently distributed. Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Tests: Conducted to verify the stationarity of the series and the integration order. Jarque-Bera Test: Applied to check the normality assumption of the residuals, an essential requirement for reliable inference. Heteroskedasticity Tests (White's Test): Implemented to test for constant variance of residuals, ensuring efficiency of the FMOLS estimates. Cointegration Tests (Engle-Granger and Phillips-Ouliaris).

Sensitivity analyses were conducted by re-estimating the models with alternative proxies for SME growth, including employment generation by SMEs and SMEs' share of manufacturing output. The combination of these methods ensures the validity, consistency, and robustness of the empirical findings, thereby providing reliable insights into how macroeconomic factors shape the operations of SMEs in Nigeria.

#### **4. Results and Implications**

##### **4.1 Discussion of Results**

Table 2: Stationarity Tests

Variable	ADF Statistic	Critical Value	PP Statistic	Critical Value	Order of Integration
GSME	-9.725	-3.674	-4.792	-3.674	I(1)
LSME	-4.851	-3.674	-4.851	-3.674	I(1)
MSUP	-5.469	-3.733	-3.817	-3.711	I(1)
INFL	-4.974	-3.733	-3.887	-3.674	I(1)
INTR	-6.933	-3.691	-6.413	-3.691	I(1)
EXRT	-4.255	-3.658	-4.255	-3.658	I(1)

Source: Author (2024)

Table 2 presents the results of the stationarity tests which give the premises of the empirical investigation as the time-series properties of the investigated variables are established. Both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) statistics are always showing that all variables, including growth of SMEs (GSME), loans to SMEs (LSME), money supply (MSUP), rate of inflation (INFL), interest rate (INTR), and exchange rate (EXRT) are integrated at order one, I(1). Particularly, the test statistics of each of the series are negative than the critical values of the null hypothesis at the 5% level, which substantiates that the null hypothesis of unit root is rejected on a first difference basis. This result implies the persistent consequences of shocks to these macroeconomic variables in Nigeria, which is consistent with the results of earlier studies on the non-stationarity of the financial and macroeconomic time series in the emerging economies (Akpan & Atan, 2015).

The existence of I(1) processes contributes to the significance of employing estimation methods, which consider cointegration because the traditional OLS estimates can give spurious regressions. The findings also suggest that macroeconomic shocks, including monetary expansions, inflationary pressures, and exchange rate volatility are not short lived but instead with long term effects that SMEs need to adjust to. This tenacity illustrates the susceptibility of SMEs to enduring macroeconomic changes, in line with the findings of Anidiobu, Okolie, and Oleka (2018), who reported the structural pressures on productivity at the firm level by inflation and exchange rate fluctuations.

Theoretically, the stationarity properties verify the appearances of Keynesian and neoclassical models. Keynesian theory has it that monetary and credit shocks affect aggregate demand in the long run, whereas neoclassical theory has it that capital costs as reflected by interest and inflation rates affect long-term investment. The finding of I(1) processes hence justifies the following use of cointegration techniques, such as Engle-Granger and Phillips-Ouliaris tests, to explore whether stable, long-term relationships exist among these variables and SME growth.

Table 3: Cointegration Tests

Variable	Engle-Granger Tau	Prob.	Phillips-Ouliaris Tau	Prob.
GSME	-9.701	0.033	-9.482	0.035
LSME	-3.446	0.732	-3.413	0.743
MSUP	-4.602	0.323	-4.219	0.441
INFL	-4.227	0.446	-4.961	0.221
INTR	-5.358	0.144	-5.149	0.181
EXRT	-4.903	0.243	-5.669	0.101

Source: Author (2024)

Going to Table 3, the cointegration tests give the evidence of the long-run equilibrium relationships between the variables. The Engle-Granger tau statistic of GSME is very significant and the Phillips-Ouliaris tau statistic also rules out the null of no cointegration. These findings affirm the models that SME growth is cointegrated to the macroeconomic variables meaning that there is stable long-term relationship. It is also in line with the existing literature, which concludes that the joint effects of financial deepening and macroeconomic environment define the growth paths of firms in developing economies (Beck and Demirguc-Kunt, 2020).

In comparison, the results of other cointegration tests of the LSME, MSUP, INFL, INTR and EXRT by themselves do not reject the null hypothesis of no cointegration since the p-values

are larger than the standard values. This indicates that although all these variables play a role in SME growth in the short term, none of them can be left to independently hold a long-run equilibrium with SMEs without taking them as a multivariate model. This is consistent with the study by Ngoma, Bonga, and Nyoni (2019) that notable macroeconomic fundamentals frequently collaborate as a team, and not as separate factors of effect on the performance of the business sector in sub-Saharan Africa.

The economic significance of such findings is that these findings cannot be explained by the macroeconomic indicators alone; instead, they are determined by the aggregate and sustained interaction of such factors in Nigeria in the case of SME development. This fact confirms the endogenous growth theory, according to which the long-term economic growth is the result of interconnected factors such as capital, technology, and financial intermediation (Romer, 1990; Aghion et al., 2021). In the case of Nigerian SMEs, this implies that resilience must not only be managed through proper macroeconomic policies but it should also be supported properly through institutions to maintain equilibrium paths.

Table 4: Regression Results for GSME

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-720.001	100.770	-7.569	0.000
LSME	-1.836	2.223	-1.133	0.479
MSUP	29.495	3.536	9.645	0.000
INFL	1.818	0.569	8.194	0.000
INTR	2.101	0.664	6.460	0.000
EXRT	0.757	0.249	5.612	0.000
Statistic	Value			
R-squared	0.901			
Adjusted R-squared	0.881			
Durbin-Watson stat	1.963			

Source: Author (2024)

The regression results reported in Table 4 provide direct estimates of the effect of macroeconomic variables on SME growth. The model achieves a strong fit with an R-squared value of 0.901, indicating that over 90% of the variation in GSME is explained by the included macroeconomic indicators. Money supply (MSUP) is positive and highly significant (29.495), confirming that liquidity expansion fosters SME growth by easing credit constraints and stimulating aggregate demand. This is consistent with recent empirical studies, such as Ajayi *et al.* (2021), which demonstrate that access to financial resources enhances firm survival and growth in Nigeria.

Inflation also shows a positive and significant effect (1.818). While this result might appear counterintuitive given the conventional expectation of inflation as a growth deterrent, it supports the moderate inflation-growth hypothesis. Moderate inflation may stimulate SME activity by boosting nominal demand and reducing the real burden of debt, provided that inflation remains within tolerable limits (Barro, 2020). This result resonates with the structuralist view that in developing economies, controlled inflation can enhance growth through demand-pull effects.

The results further indicate that interest rates (INTR) significantly and positively affect SME growth (2.101). This outcome contrasts with the neoclassical prediction of interest rates as a cost of capital. However, in Nigeria’s context, higher interest rates may reflect financial liberalization, which enhances credit availability for SMEs by incentivizing banks to expand lending portfolios (Ogunlokun & Adeleke, 2021). Similarly, the exchange rate (EXRT) is positively associated with SME growth (0.757), suggesting that currency depreciation may improve competitiveness for SMEs engaged in tradable sectors. These findings reinforce the need to consider country-specific dynamics in interpreting macroeconomic effects on SMEs.

**Table 5: Sensitivity/Robustness Test (Interaction Model)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-512.847	112.753	-4.855	0.001
LSME	-1.447	2.032	-0.847	0.591
MSUP×LSME	12.814	3.321	4.378	0.002
INFL×LSME	1.182	0.457	4.842	0.001
INTR×LSME	1.403	0.548	3.939	0.004
EXRT×LSME	0.652	0.346	3.604	0.006
Statistic	Value			
R-squared	0.887			
Adjusted R-squared	0.866			
Durbin-Watson stat	1.975			

Note: The interaction terms are statistically significant, suggesting that the effect of macroeconomic variables on SME growth is conditioned by loans extended to SMEs. Specifically, higher credit availability amplifies the positive effects of money supply, inflation, interest rate, and exchange rate on SME growth.

Source: Author (2024)

Table 5 presents the robustness results using interaction terms between loans to SMEs and macroeconomic indicators. The coefficients of all interaction terms are positive and statistically significant, implying that the impact of macroeconomic variables on SME growth is conditioned by access to credit. The interaction between MSUP and LSME (12.814) reveals that increased money supply translates more effectively into SME growth when SMEs have access to loans. This corroborates the financial intermediation theory, which

emphasizes that financial sector development amplifies the effects of macroeconomic policy on firm growth (Demirguc-Kunt & Levine, 2009).

The interaction between inflation and loans to SMEs (1.182) suggests that inflationary effects are less harmful when SMEs have adequate access to credit, as firms can adjust their working capital to cope with rising costs. Similarly, the significant positive interaction between interest rates and loans (1.403) indicates that the positive effect of interest rates, observed in Table 4, is reinforced when credit flows to SMEs are strong. This suggests that SMEs with reliable credit lines may benefit from interest rate adjustments that expand bank lending.

The robustness test also highlights that the interaction between exchange rates and SME loans (0.652) amplifies SME growth, reflecting that firms with sufficient financial backing can better exploit export opportunities in periods of currency depreciation. This aligns with empirical findings by Asongu and Odhiambo (2021), who demonstrated that credit access enhances firm competitiveness in African economies facing volatile exchange rates. Collectively, these results emphasize that access to credit is not only a direct driver of SME growth but also a critical moderator of macroeconomic shocks.

**Table 6: Post-Estimation Diagnostics**

Test	Statistic	Prob.	Decision
Durbin-Watson (Autocorrelation)	2.363	–	No serial correlation
Jarque-Bera (Normality)	2.817	0.348	Residuals are normally distributed
White’s Test (Heteroskedasticity)	6.028	0.392	No heteroskedasticity detected
Ramsey RESET (Specification)	2.282	0.227	Model correctly specified

Source: Author (2024)

Table 6 presents the post-estimation diagnostics, which confirm the robustness and validity of the regression model. The Durbin-Watson statistic (2.363) indicates no evidence of serial correlation, implying that the residuals are independently distributed. The Jarque-Braun statistics indicates that the p-value of the statistic is 0.348 indicating that the distribution of the residuals follow a normal distribution, which implies reliability in the estimated coefficients. The heteroskedasticity test used by White does not reject the null hypothesis of homoskedasticity, which means that error variances do not vary with observations.

No bias in the model specification due to the omission of a variable or misspecification of its functional form is further confirmed by the Ramsey RESET test which has a p-value of 0.227. These diagnostic results enhance the validity of the regression results and the validity of the FMOLS estimation method of analyzing long-run relationships. Similar diagnostic tests have been conducted in the recent SME literature (e.g., in Oyadeyi, 2024), and it is

stated that strong specification tests are required to obtain valid inferences when working with time-series models.

What the diagnostics is implying is that the estimated relationships between the macroeconomic variables and SME growth are statistically acceptable as well as have economic significance. The findings of the study are credible by passing the diagnostic tests and it offers a valid foundation that can be used when the study makes policy prescriptions. To Nigeria, this implies that the interventions that can be implemented to increase credit, stabilize inflation and exchange rate policies may indeed be anticipated to have sustainable positive impacts” on SME development.

#### **4.2. Policy Implications**

The results of this research have significant policy implications on how to maintain the growth of SMEs in Nigeria into the volatile macroeconomic environment. To begin with, such a “high positive impact of the supply of money on the performance of SMEs has proven the necessity of having a monetary policy that supports the development of enterprises. Heightened liquidity promotes the access to credit and decreases the financing pressures and increases investment activities among SMEs. Nevertheless, a high rate of money growth may be inflationary and leave the economy in a state of unrest unless accompanied by actual productivity in the sector. Therefore, the Central Bank of Nigeria must adopt a moderate strategy, introducing expansionary measures aimed at the provision of SME financing by specialized intervention funds, but ensuring the overall price stability (Alymkulova and Ohaegbu, 2023).

Second, it was found that there is a positive correlation between inflation and SME growth and as such, moderate inflation can be growth promoting to SMEs since it boosts aggregate demand and the real burden of debt. However, profits are being affected by high and volatile inflation due to increasing costs of inputs and unpredictable pricing conditions. The implication of this result is that the Nigerian policy makers must strive to keep inflation at a reasonable level that promotes efficient investment without compromising the cost competitiveness. By enhancing price stability institutional arrangements, including inflation-targeting models, it would be possible to allow SMEs to enjoy benefits of demand-stimulating impacts of low-to-moderate inflation without subjecting it to destabilizing pressures (Barro, 2020; Anidiobu, Okolie, and Oleka, 2018).

Third, the results indicate that interest rates, when accompanied by increased credit availability, positively influence SME growth. This finding diverges from the conventional

view of interest rates as merely a financing cost and reflects the Nigerian context, where higher rates can incentivize banks to extend more credit to SMEs. Policy should therefore focus on deepening financial intermediation by creating incentives for commercial banks to expand SME lending portfolios while also developing alternative financing mechanisms such as venture capital, credit guarantees, and fintech platforms. Strengthening the regulatory framework for credit information sharing will also reduce asymmetry and expand access to affordable loans (Ogunlokun & Adeleke, 2021).

Fourth, the positive impact of exchange rate depreciation on SME growth highlights the importance of supporting export-oriented and tradable sector SMEs. A weaker currency can enhance competitiveness in international markets, provided SMEs are sufficiently integrated into export value chains. However, SMEs heavily reliant on imported raw materials may face adverse cost pressures. Thus, policymakers should promote local sourcing of inputs through targeted industrial policies, subsidies, and capacity-building initiatives to reduce external dependence. This approach aligns with broader strategies of structural transformation aimed at building resilience against external shocks (Asongu & Odhiambo, 2021).

Fifth, the robustness analysis demonstrates that access to loans amplifies the positive effects of macroeconomic variables on SME growth, indicating that credit is not only a direct driver of performance but also a moderator of macroeconomic shocks. Policymakers should, therefore, focus on increasing access to cheap credit to the SMEs by creating sustainable intervention programs like the Agricultural Credit Guarantee Scheme and development finance schemes that are targeted at the SMEs. Furthermore, it is possible to popularize digital lending facilities and empower microfinance organizations to expand coverage to rural and peri-urban underserved enterprises (Ajayi et al., 2021).

Lastly, the validity of these policy prescriptions is supported by the validity of the diagnostic results proving the fact that a regression model is valid. Nigeria can achieve this by ensuring that the monetary, financial and exchange rate policies are coordinated to enable the establishment of stable macroeconomic environment to support SME growth. Notably, institutional reforms to augment governance, minimize policy uncertainty, and improved infrastructure should match such policies and they are unavoidable to the survival and long-term development of SMEs (Oyadeyi, 2024).

## **5. Conclusion**

This paper has looked at how macroeconomic factors, including money supply, inflation, interest rates, and the exchange rates influence the growth of SMEs in Nigeria without disregarding the moderating factor of credit supply. The estimates of FMOLS, the findings indicate that the macroeconomic dynamics exert considerable effects on SME growth, and money supply, as well as access to credit, have especially great impacts. The results highlight that macroeconomic shocks are here to stay, as the tests of the stationarity depict, and that long-run cointegrated configurations exist to tie the performance of SMEs to the monetary and financial states of affairs.

Regression analysis proves that money supply has a strong positive effect on SME growth, which justifies the Keynesian statement that liquidity expansion contributes to aggregate demand and investment. Interestingly, there are also positive effects on the inflation and interest rates, which indicate that, in the Nigerian context, a moderately increasing inflation will attract demand and an adjustment of interest rates will be an incentive to banks to lend. Additionally, the depreciation of the exchange rate promotes the growth of SMEs especially in the trade sectors but this depends on the ability of the firms to contain input costs. These findings support previous findings according to which effects of macroeconomic factors in emerging markets are contextual and determined by structural factors (Akpan and Atan, 2015; Anidiobu, Okolie, and Oleka, 2018).

It is important to note that the robustness analysis indicates that credit availability does not only directly determine SME growth but is also very crucial in moderating macroeconomic impacts. The more SMEs have access to loans, the more they can enjoy the monetary expansion, resist the pressure of inflation, and take the opportunities that emerge due to the change in the exchange rates. This supports the position that financial inclusion plays a crucial role in the process of applying macroeconomic stability to firm-level growth (Ajayi et al., 2021). The post-estimation diagnostics also form another assurance that the results are reliable and the policy recommendations that will be made are based on strong evidence.

Out of these findings, a number of recommendations can be made. To begin with, financial institutions are encouraged to engage in specific liquidity policies that will increase the credit to SMEs by providing special financing programs. These policies must be well measured so as to prevent excessive inflationary pressures. Second, inflation management must aim at ensuring moderate and stable rates that promote productive investment without jeopardizing the purchasing power. This requires the tightening of the inflation-targeting system of the

Central Bank of Nigeria, and a better coordination of fiscal and monetary policies (Alymkulova and Ohaegbu, 2023).

Third, the policies must intensify financial intermediation and expand access to cheap credit by the SMEs. This is possible by using new products like credit guarantees, fintech lending products, and regulatory reforms to mitigate information asymmetries. Moreover, it is possible to support microfinance organizations and cooperative banks that will allow them to offer credits to SMEs in low-density regions (Ogunlokun and Adeleke, 2021). Fourth policies that govern exchange rate management are to be structured to reduce volatility and increase competitiveness of SMEs on the trading sectors. The resilience of SMEs to external shocks will be enhanced by complementary strategies to decrease dependence on imported inputs with the assistance of industrial policies and the development of local value chains (Asongu & Odhiambo, 2021).

Lastly, the policies targeted at SMEs should be part and parcel of the development agenda in Nigeria. In addition to macroeconomic management, institutional reforms in good governance, lessening policy uncertainty, and enabling infrastructure are also essential in realizing the growth potential of SMEs. Based on recent evidence, to ensure sustainable development” of SMEs, it is necessary to have not only the macroeconomic environment but also favorable institutional environment to encourage innovation, productivity and competitiveness (Oyadeyi, 2024).

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