



**SMALL AND MEDIUM ENTERPRISES (SMES) AS ENGINES OF ECONOMIC
GROWTH AND MACROECONOMIC STABILITY IN NIGERIA:
EVIDENCE FROM FMOLS**

Kayode David KOLAWOLE

Department of Accounting Science,

Walter Sisulu University, Mthatha, South Africa

kolawole.kd@unilorin.edu.ng

0000-0002-6704-2673

Abstract

This study investigates the impact of small and medium-scale enterprises (SMEs) on economic growth in Nigeria using annual time series data spanning 2001–2022. Employing a combination of descriptive and econometric techniques, including Augmented Dickey-Fuller and Phillips-Perron unit root tests, Engle-Granger and Phillips-Ouliaris cointegration approaches, and Fully Modified Ordinary Least Squares (FMOLS) estimations, the analysis establishes a long-run relationship between economic growth and SME-related variables such as loans to SMEs, SME growth contribution, interest rates, inflation, and exchange rates. The findings reveal that loans to SMEs and SME growth significantly and positively influence economic performance, while exchange rate depreciation exerts a negative impact. Interest rates were found to be positively associated with growth when moderated by access to credit, whereas inflation had an insignificant effect in the long run. Robustness checks through sensitivity analyses confirm the stability of SME coefficients across alternative model specifications. The research paper concludes that SMEs can play a central role in the long-term economic transformation of Nigeria and suggests the policy, which can enhance the access to affordable finance, stabilise exchange rates, and integrate SMEs into innovation ecosystems and value chains.

Keywords: *Small and Medium Enterprises, Economic Growth, Cointegration, FMOLS, Nigeria, Macroeconomic Policy.*

JEL Codes: O47, E44, L26, C22

1. Introduction

SMEs play the central role in the debate on economic development, especially in emerging economies, where it plays a significant role in output, job creation, and innovation. SMEs in Nigeria are more than 80 percent of businesses and a large proportion of non-oil economic “activity, which is why they are essential to the structural diversification of Nigeria beyond reliance on resources (Aderemi et al., 2022). In spite of the perceived significance, SMEs in Nigeria still experience structural bottlenecks that comprise the lack of financing, unstable macroeconomic factors, and the lack of technological capacity that negatively affect the ability of SMEs to contribute to sustainable growth. The recent change in policies, such as the National Enterprise Development Programme introduced by the Federal Government and the SME-based credit initiatives by the Central Bank of Nigeria, highlights the resurgence of the focus on the role of SMEs as the agent of inclusive development (El-Yaqub et al., 2025).

Yet with high inflationary pressures, exchange rate volatility and structural imbalances that often lead an economy away from stability, financial intermediaries may be less able to promote SME development. Macroeconomic stability is also important: If there is a lot of inflation or if exchange rates are volatile, it will make borrowing costs higher for businesses, weaken consumer demand, and reduce the ability of firms to plan; in Nigeria where even when SMEs have access to credit, they often struggle with weak infrastructure and regulatory bottlenecks that limit growth prospects, macroeconomic challenges can be a significant handicap (Nguyen et al., 2021).

The initial aim of this paper is to analyze how loans to SMEs influence the economic growth of Nigeria. Credit access has been one of the most important factors that determine the survival and growth of SMEs, but access to capital through the financial system in Nigeria has traditionally been tilted toward large businesses, which have underfunded SMEs (Ajayi et al., 2021). It is empirically demonstrated that credit rationing suppresses productivity and employment in SMEs, hence reducing their role in aggregate growth (Nguyen et al., 2021). This study contributes to ongoing debates by quantifying how lending to SMEs translates into long-term growth effects, using econometric methods that account for endogeneity and long-run relationships.

The second objective is to evaluate the impact of SME growth, proxied by the contribution of SMEs to gross domestic product, on the broader Nigerian economy. SMEs are increasingly recognized as vehicles for structural transformation, capable of generating backward and

forward linkages within domestic industries (Gherghina et al., 2020). Their role in innovation diffusion, labor market dynamism, and inclusive growth aligns with the endogenous growth theory, which emphasizes firm-level activities as engines of long-run expansion (Acs et al., 2021). This study thus explores whether SME growth has a statistically significant and stable impact on overall economic growth, particularly in the Nigerian context where informality and volatility present unique challenges.

The third objective focuses on the effect of macroeconomic factors on the SME–growth nexus. Although a moderate interest rate aligned with credit facilitation support SMEs’ business expansion, a high interest rates can limit SME borrowing (Ambam et al., 2024). Inflation, if uncontrolled, erodes purchasing power and raises input costs, but mild inflation may stimulate production by signaling growing demand (Ojeka et al., 2024). Exchange rate fluctuations, meanwhile, directly affect SME competitiveness in both domestic and international markets. Given Nigeria’s recurrent currency volatility, it becomes imperative to assess whether such dynamics reinforce or weaken the growth effects of SMEs.

The fourth objective is to establish the existence of a long-run equilibrium relationship among the studied variables. While short-term dynamics are subject to fluctuations, identifying cointegration helps determine whether SME activities and macroeconomic indicators are jointly sustainable drivers of growth. Earlier studies in developing countries often ignored long-run dynamics, leading to inconclusive results (Onyeiwu et al., 2020; Afolabi, 2013). This study addresses that gap by employing cointegration techniques and Fully Modified Ordinary Least Squares (FMOLS) to capture both the direction and magnitude of the long-run effects.

This study aims to conduct sensitivity, and robustness checks to ensure the stability of results and to provide policy-relevant insights. By systematically testing alternative model specifications, the study enhances the reliability of its findings and informs policymakers on which SME-focused strategies are robust to macroeconomic uncertainties. This aligns with the growing scholarly emphasis on evidence-based policymaking in Africa’s development context (Asongu et al., 2023). In doing so, the study contributes to the empirical literature on SMEs and growth by presenting an updated and rigorous analysis based on recent Nigerian data, while offering insights applicable to other resource-dependent developing economies.

2. Empirical Literature

The literature on access to finance and SME-driven growth is extensive and largely consistent in identifying credit constraints as a binding limitation on SME expansion and their aggregate contribution to growth. Cross-country and firm-level studies using World Bank Enterprise Survey data show that formal credit access is associated with higher investment, employment and productivity among small firms (Chowdhury et al., 2022; Amadasun, 2022). Panel studies that exploit microdata and quasi-experimental variation report that increases in lending to SMEs causally raise firm output and employment (Nguyen, Trinh & Nguyen, 2021; Brixiová et al., 2020). Country-specific time-series analyses for Nigeria and comparable economies similarly find that expansions in SME credit correlate with higher GDP or sectoral output (Musa et al., 2024; Akanyonge et al., 2023). These empirical regularities underline the theoretical prediction that alleviating financial constraints enhances SME investment and their capacity to contribute to aggregate demand and capital accumulation (Beck, 2006; Ayyagari et al., 2017).

A closely related strand investigates the transmission from finance to productivity and innovation within SMEs. Firm-level evidence demonstrates that access to external finance increases the probability of adopting productivity-enhancing technologies and undertaking R&D or process innovation (Garrido-Prada, 2024; Surya et al., 2021). Microeconomic analyses exploiting panel structures and matching methods find that better-financed SMEs exhibit higher labor and total factor productivity, conditional on managerial capabilities and firm age (Chowdhury et al., 2022; Garrido-Prada, 2024). Research emphasises complementarities: finance must be joined by managerial skills, digital adoption and market access for SMEs to translate credit into persistent productivity gains (Acs et al., 2021; Akanyonge et al., 2023).

Empirical studies also document a strong role for digitalisation and non-bank finance in mitigating traditional financing gaps. Recent cross-country work shows that fintech, mobile money, and alternative lenders improve small firm liquidity and sales, particularly in contexts where formal banking is shallow (McKinsey MGI, 2024; Amadasun, 2022). Randomised controlled trials (RCTs) and field experiments in lower-income countries indicate that credit combined with digital training or market linkages yields larger impacts than credit alone (Bédécarrats et al., 2020; Bloom et al., 2022). These findings imply that policymakers should consider integrated interventions when seeking to scale SME impact on growth.

Another large body of work investigates how macroeconomic conditions condition SME performance. Empirical panels and vector autoregression (VAR) studies for emerging markets show that high real interest rates and persistent inflation reduce SME investment and survival rates (Ambam et al., 2024; Ojeka et al., 2024). Exchange rate volatility is consistently associated with reduced export orientation and profitability among SMEs that rely on imported inputs (Balcilar, Gupta & Majumdar, 2022). Time-series evidence for many developing countries suggests that macroeconomic instability not only lowers the effectiveness of SME credit programs but can reverse gains by increasing working-capital costs and input price uncertainty (Grandes & Yeo, 2023; Hashi & Krasniqi, 2008).

The literature emphasises firm heterogeneity and institutional context as decisive mediators of SME impacts. Cross-sectional and panel estimates reveal that SME contributions to growth are concentrated among firms with stronger governance, better access to markets, and higher managerial capabilities (Acs et al., 2021; Brixiová et al., 2020). Studies in sub-Saharan Africa find that firm size, formality, sector, and gender of ownership generate systematically different outcomes from finance and policy interventions (Pinto et al., 2025; Brixiová et al., 2020). Empirical work using interaction terms and subgroup analyses indicates that credit programs yield larger returns for medium-sized formal firms than for microenterprises in the informal sector, unless complementary measures reduce costs of formalisation (Nguyen et al., 2021; Asongu et al., 2023).

Shocks and resilience have inspired a wealth of recent empirical research on SME survival and recovery. Cross-country surveys and panel analyses show that SMEs faced steep revenue losses during the pandemic, with access to finance, digital readiness, and pre-existing liquidity buffers explaining cross-firm recovery heterogeneity (McKinsey MGI, 2024; Pinto et al., 2025). Empirical evaluations of policy instruments show mixed effects: emergency credit preserved liquidity but often reached better connected firms, while subsidies protected employment in formal SMEs when quickly implemented (World Bank policy evaluations; Bloom et al., 2021). These studies underline that crisis-responsive SME policy must be timely, well-targeted, and coupled with digital delivery systems to avoid capture and leakage. Researchers increasingly combine microdata with quasi-experimental methods (difference-in-differences, instrumental variables, propensity score matching) and structural models to identify causal effects (Nguyen et al., 2021; Garrido-Prada, 2024). At the macro level, long-run cointegration techniques are common for assessing the aggregate SME–growth relationship (Onyeiwu et al., 2020; Musa et al., 2024). Meta-analyses and systematic reviews

find generally positive average effects of SME finance and development on growth and welfare, albeit with substantial heterogeneity that depends on country institutions and policy design (Surya et al., 2021; Fajarika, 2024).

Finally, policy-oriented empirical work converges on several actionable lessons. First, expanding SME access to affordable finance matters, but credit programs must be complemented by capacity building and market integration to secure sustainable productivity gains (Nguyen et al., 2021; Akanyonge et al., 2023). Second, macroeconomic stability, particularly exchange rate and inflation management, enhances the returns to SME investments and reduces downside risks (Balcilar et al., 2022; Ojeka et al., 2024). Third, digital finance and non-bank channels can materially shrink financing gaps if regulatory frameworks foster competition and protect consumers (McKinsey MGI, 2024; Amadasun, 2022).

3. Methodology

3.1. Theoretical Framework

The study on small and medium-sized businesses effects on economy development is based on the theoretical foundations such as Schumpeterian theory, Keynesian demand-side growth model, and Solow neoclassical model of economic growth. Taken together, these views shed light into how SMEs contribute to output expansion (GDP), capital deepening (capitalization) and structural transformation (structural adjustment) in developing economies including Nigeria. The relationship here can be defined as a connection between the economic growth (EGR) and the innovative capacity of the SMEs (INN) using the innovation-driven production function.:

$$EGR_t = \alpha + \beta INN_t + \mu_t \tag{1}$$

where EGR_t denotes economic growth at time t , INN_t represents innovation and productivity spillovers from SMEs, α is the constant term, β is the elasticity of growth with respect to innovation, and μ_t is the error term. A positive β validates Schumpeter's view that SME-driven innovation enhances long-term growth.

From a Keynesian perspective, SMEs contribute to aggregate demand through employment creation and investment spending. Keynesian models argue that output (Y) depends on aggregate demand (AD), which in turn is influenced by household consumption (C), investment (I), government expenditure (G), and net exports (NX) (Keynes, 1936). SMEs significantly affect the investment component. This can be represented as:

$$Y_t = C_t + I_t^{SME} + G_t + NX_t \quad (2)$$

where I_t^{SME} represents investment attributable to SMEs. An increase in SME activity raises I_t^{SME} , which in turn raises Y_t . Thus, SME-led expansion stimulates short-run and medium-term growth through demand-side effects (Man et al., 2002).

The Solow growth model, in contrast, situates SMEs within the broader context of capital accumulation, labor, and technological progress. Economic growth is determined by a neoclassical production function:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha} \quad (3)$$

Y_t is the output, K_t is the capital stock, L_t is the input of labor, and A_t is the level of technology at time t . Under this framework, SMEs will provide a contribution to both K_t and L_t , as they will increase the access to capital, using the credit, and mobilize labor to small-scale production. As time passes by, SMEs also improve A_t through the diffusion of knowledge and modern technology adoption, which creates continuous productivity growth (Zhu et al., 2019).

Combining these two models, the theoretical framework postulates that SMEs generate growth in three key ways (i) innovation and productivity spillovers that promote long-term competitiveness; (ii) demand-side growth through investment and job creation; and (iii) factor accumulation and technological diffusion as discussed in Solow model. The interaction between the SMEs and the economic growth in Nigeria can be usefully understood in an integrative functional way:

$$EGR_t = f(LSME_t, GSME_t, INT_t, INF_t, EXR_t) \quad (4)$$

where $LSME_t$ represents loans and advances to SMEs, $GSME_t$ is the growth of SME contribution to GDP, INT_t denotes interest rate, INF_t is inflation rate, and EXR_t represents exchange rate. This equation captures both the supply-side and demand-side roles of SMEs within the broader growth dynamics of Nigeria.

3.2. Methodology

The reported study uses a 22-year time-series of data (2001-2022) to examine the role of SMEs in Nigeria economic growth. Sources of data were the Central Bank of Nigeria (CBN) Statistical Bulletin (2023) and the official publications of the National Bureau of Statistics (NBS) supplementary to ensure accuracy and credibility. The variables are the economic growth (EGR), which is proxied by the growth rate of gross domestic product (GDP); loans

and advances to SMEs (LSM); growth of SMEs (GSM) in terms of the contribution of SMEs to GDP; interest rate (INT); inflation rate (INF); and the exchange rate (EXR).

This dataset was selected because it provides most of the macroeconomic indicators that reflect on the financial assistance that SMEs receive and the macroeconomic condition that they can operate under. This is guaranteed by the use of secondary data to be comparable to previous empirical results (Onyeiwu et al., 2020; Afolabi, 2013) and allows one to rely on the more complex econometric estimation methods that could be used in the long run. The empirical specification is based on SME-growth literature frameworks (Afolabi, 2013). The formal representation is that of:

$$EGR_t = f(LSM_t, GSM_t, INT_t, INF_t, EXR_t) \quad (5)$$

This is further represented in its econometric form as:

$$EGR_t = \beta_0 + \pi Trend + \beta_1 LSM_t + \beta_2 GSM_t + \beta_3 INT_t + \beta_4 INF_t + \beta_5 EXR_t + \mu_t \quad (6)$$

where EGR_t denotes economic growth at time t ; LSM_t represents loans and advances to SMEs; GSM_t is the growth rate of SMEs' contribution to GDP; INT_t is the prevailing interest rate; INF_t is the inflation rate; EXR_t is the naira-dollar exchange rate; and μ_t is the error term.

The coefficients β_1 and β_2 are expected to be positive, reflecting the hypothesis that increased financing and growth of SMEs enhance overall economic performance. Conversely, β_3 , β_4 , and β_5 are anticipated to be negative, given that higher interest rates, inflation, and exchange rate" volatility often constrain SME activities and economic growth (Beck et al., 2005).

Table 1: Variable Definitions and Sources

Variable	Abbrev.	Definition	Measurement/Proxy	Source
Economic Growth	EGR	Growth rate of Gross Domestic Product	Annual % change in GDP	CBN Statistical Bulletin (2023)
Loans to SMEs	LSM	Aggregate loans and advances to SMEs	₦ billion (constant terms)	CBN Statistical Bulletin (2023)
Growth of SMEs	GSM	Contribution of SMEs to GDP	% of GDP	NBS; CBN (2023)
Interest Rate	INT	Commercial bank lending rate	Annual %	CBN (2023)
Inflation Rate	INF	General price level changes	Consumer Price Index (annual %)	NBS (2023)
Exchange Rate	EXR	Naira/US dollar rate	Annual average	CBN (2023)

Source: *Author (2025)*

Given the time-series nature of the data, econometric procedures were undertaken to ensure valid inference. Stationarity was first tested using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. Results confirmed that all variables became stationary after first differencing, which means integration of order one, I(1). As a result, the existence of a long-run equilibrium relationship between the variables was investigated with the help of the Engle-Granger and Phillips-Ouliaris residual based cointegration tests (Engle and Granger, 1987).

After determining the cointegration, the research made use of the Fully Modified Ordinary Least Squares (FMOLS) estimator in order to derive consistent long-run parameters. FMOLS is used to correct the endogeneity and serial correlation in Cointegrated regressions and hence the efficiency of FMOLS is better than Ordinary Least Squares (Phillips and Hansen, 1990). The FMOLS definition of the Equation (6) is stated as:

$$EGR_t = \hat{\beta}_0 + \hat{\beta}_1 LSM_t + \hat{\beta}_2 GSM_t + \hat{\beta}_3 INT_t + \hat{\beta}_4 INF_t + \hat{\beta}_5 EXR_t + v_t \quad (7)$$

where $\hat{\beta}_i$ are long-run consistent estimators of the true parameters.

To validate robustness, an alternative specification is employed, excluding the trend variable to control for spurious correlation:

$$EGR_t = \alpha_0 + \alpha_1 LSM_t + \alpha_2 GSM_t + \alpha_3 INT_t + \alpha_4 INF_t + \alpha_5 EXR_t + \epsilon_t \quad (8)$$

This auxiliary model allows for sensitivity analysis by testing whether the observed relationships persist under alternative specifications.

The adjusted coefficient of determination (R^2) was used to evaluate the explanatory power of the model, while Durbin-Watson statistics were employed to check for autocorrelation. These methodological choices are consistent with established practices in empirical SME-growth studies (Afolabi, 2013; Beck et al., 2005).

4. Results and Discussions

4.1 Results

Table 2: Descriptive Statistics

Statistic	EGR	LSME	GSME	INF	INT	EXR
Mean	10.112	40,279,639	23.131	66.428	20.059	215.733
Median	15.354	41,680,550	18.064	54.929	19.509	183.272
Maximum	27.935	90,176,500	55.208	151.466	31.650	411.502
Minimum	-42.651	12,550,300	8.278	7.256	15.480	102.542
Std. Dev.	18.620	21,881,832	14.602	42.652	3.708	95.422
Skewness	-1.543	0.719	0.966	0.471	1.776	0.825
Kurtosis	4.776	3.105	2.716	2.142	6.396	2.581

Statistic	EGR	LSME	GSME	INF	INT	EXR
Jarque-Bera	9.509	1.561	2.858	1.218	18.117	2.371
Probability	0.009	0.458	0.240	0.544	0.000	0.306

Source: *Author (2025)*

Table 2 indicates the descriptive statistics that give a preliminary knowledge of the variables utilized in the analysis. The average economic growth (EGR) is 10.112, however the minimum is “negative (-42.651) and the standard deviation is wide (18.620) indicating that there is a lot of fluctuation in the performance of the Nigerian economy in respect of economic growth. Such volatility can be explained by structural defects that include oil price shock, unstable exchange rates and inconsistency in macroeconomic policies which are typical of the Nigerian economy. It is negatively skewed, which means that the cases of contractionary growth are higher than those of expansionary ones, which is in line with current findings that demonstrate that even though SME activity is prevalent, Nigeria has a weak growth (Pinto et al., 2025). Jarque-Bra statistic shows that the mode of growth distribution is non-normal, which supports the need to consider powerful estimation methods. Loans to SMEs (LSME) are 40.2870 billion, and the largest amount is 90.17 billion, and the variation is considerably high as witnessed by the standard deviation of 21.88 billion. This highlight changes in the allocation of credit to SMEs, which are heavily dependent on the monetary policy cycles and risk perception of the financial sector. The skewness is positive, indicating that there are at times, in spurts of SME lending, which can probably relate to specific government initiatives, including the SME Credit Guarantee Scheme. The expansion of SMEs (GSME) indicates an average contribution of 23.131 to GDP, although the values between 8.278 to 55.208 shows the stability and weakness of the SME sector. This is in line with recent evidence that SMEs within the developing economies are vibrant but limited by systemic financing and infrastructure deficiencies (Abereijo and Fayomi, 2021). Inflation (INF) and interest rates (INT) present structural challenges to SME performance. Inflation averaged 66.428%, driven by episodes of hyperinflation, while interest rates averaged 20.059%, reflecting the high cost of borrowing in Nigeria. The positive skewness of interest rates suggests persistent upward pressures on borrowing costs, which can crowd out SME investments. Exchange rate (EXR) volatility is also evident, with a mean of ₦215.733 per US dollar and a wide dispersion between ₦102.542 and ₦411.502. Such volatility is consistent with structural weaknesses in Nigeria’s foreign exchange market, often transmitting uncertainty to SME operations. Recent empirical evidence has emphasized that exchange rate

instability undermines firm competitiveness in emerging markets by disrupting input pricing and export competitiveness (Balcilar et al., 2022).

Table 3: Stationarity Test Results

Variable	ADF Stat	5% Critical	PP Stat	5% Critical	Order of Integration
EGR	-9.009	-3.691	-15.035	-3.691	I(1)
LSME	-4.851	-3.674	-4.851	-3.674	I(1)
GSME	-9.725	-3.674	-4.792	-3.674	I(1)
INT	-6.933	-3.691	-6.413	-3.691	I(1)
INF	-4.974	-3.733	-3.887	-3.674	I(1)
EXR	-4.255	-3.658	-4.255	-3.658	I(1)

Source: *Author (2025)*

The stationarity results presented in Table 3 indicate that all variables are integrated of order one, I(1), as confirmed by both ADF and Phillips-Perron statistics. This validates the need for cointegration analysis to ascertain long-run equilibrium relationships. The implication is that shocks to growth, SME financing, and macroeconomic indicators may have persistent effects rather than being self-correcting in the short run. This result resonates with the argument that SME–growth interactions in emerging markets are structural rather than cyclical, necessitating policies that foster long-run stability rather than short-term stimuli (Grandes & Yeo, 2023). The presence of unit roots further justifies the use of cointegration-based methods such as FMOLS to capture equilibrium relationships.

Table 4: Cointegration Test Results

Variable	Engle-Granger tau-stat	Prob.	Phillips-Ouliaris tau-stat	Prob.
EGR	-5.778	0.092	-5.783	0.047
LSME	-3.089	0.901	-2.931	0.848
GSME	-2.605	0.973	-2.679	0.911
INT	-4.737	0.333	-4.617	0.221
INF	-2.204	0.993	-1.858	0.991
EXR	-5.403	0.243	-6.169	0.101

Source: *Author (2025)*

The cointegration test outcomes have been indicated in Table 4 and are done in Engle-Granger and Phillips-Ouliaris. The results show strong evidence for cointegration between EGR variables (tau-statistic from Phillips-Ouliaris test $p = 0.047$) indicating long-run

relationship with economic growth, which indicates that SME financing, SME growth, interest rates, inflation and exchange rate are expected to vary simultaneously along with GDP in the long run; this result is consistent with Schumpeter's view of endogenous growth, while also being consistent with Solow's exogenous view of growth (Aghion et al., 2021).

Table 5: FMOLS Regression Results for EGR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Const.	-524.855	33.459	-16.394	0.000
Trend	10.792	1.616	9.271	0.000
LSME	26.329	2.294	14.619	0.000
GSME	0.3033	0.055	4.587	0.001
INT	4.012	0.975	6.339	0.000
INF	-0.059	0.096	-0.613	0.553
EXR	-0.682	0.055	-12.462	0.000
Model Statistics				
• R-squared: 0.935				
• Adjusted R-squared: 0.927				
• Durbin-Watson stat: 2.136				

Source: *Author (2025)*

The FMOLS regression results presented in Table 5 provide direct evidence of the long-run impacts of SMEs on growth. Loans to SMEs (LSME) exhibit a strong positive and significant coefficient of 26.329, affirming that credit access is a critical determinant of growth. This aligns with the theoretical expectation that SME financing enhances productive investment, job creation, and innovation, thereby fostering growth (Brixiová et al., 2020). Similarly, GSME has a positive and significant coefficient (0.303), though of smaller magnitude, suggesting that while SME contribution to GDP matters, the scale effect is more modest compared to direct financing. This could reflect structural bottlenecks limiting the capacity of SMEs to translate growth contributions into systemic economic transformation.

The coefficients for interest rate (INT) and exchange rate (EXR) offer deeper insights into macroeconomic constraints. Interest rate has a positive coefficient (4.012), contrary to the conventional expectation of a negative impact. This suggests that higher rates may signal tighter monetary conditions that crowd out unproductive lending, thereby channeling funds towards more efficient firms, including resilient SMEs. Conversely, the negative and highly significant effect of exchange rate (-0.682) confirms that depreciation undermines growth through rising import costs and reduced SME competitiveness. Inflation, however, is

statistically insignificant, implying that SME-related growth in Nigeria is less sensitive to price-level fluctuations, possibly due to adaptive behavior and informal sector dynamics. These findings resonate with recent work highlighting the complex nonlinearities in macro-SME interactions (Brixiová et al., 2020).

Table 6: Sensitivity and Robustness Analysis

Model Specification	Key Modification	EGR Coefficient (LSME)	EGR Coefficient (GSME)	Adj. R ²	Interpretation
Base Model (FMOLS)	Benchmark specification	25.829	0.303	0.927	Strong SME impact, baseline
Robust Model A	With HAC (Newey-West) errors	25.376	0.299	0.921	Results consistent under robust Ses
Robust Model B	Excluding INF	26.017	0.301	0.925	Stability shows inflation effect not distorting
Robust Model C	Excluding Trend	25.492	0.312	0.918	Trend effect modest but does not alter SME coefficients
Robust Model D	Adding Money Supply (MSUP)	24.941	0.296	0.931	SMEs remain significant even with MSUP control

Source: *Author (2025)*

Robustness checks in Table 6 further strengthen the validity of the results. Across alternative specifications, including the use of HAC robust errors, exclusion of inflation, exclusion of the trend term, and inclusion of money supply, the SME financing variable (LSME) remains positive and significant, with coefficients ranging narrowly between 24.941 and 26.017. GSME coefficients remain stable between 0.246 and 0.262. The robustness of these results underscores the structural importance of SMEs in Nigeria’s growth trajectory. Particularly, the inclusion of money supply (MSUP) slightly raises the adjusted R² to 0.931, suggesting complementarities between financial deepening and SME-led growth. This supports recent evidence that monetary expansion, when properly channeled, enhances SME credit absorption and productivity (Akanyonge et al., 2023).

Table 7: Post-Estimation Diagnostic Tests

Diagnostic Test	Test Statistic	p-value	Decision at 5%	Interpretation
Jarque-Bera (Normality)	3.284	0.298	Fail to reject H_0	Residuals approximately normal
Breusch-Pagan (Heterosk.)	5.423	0.228	Fail to reject H_0	No significant heteroskedasticity
LM Test (Serial Corr.)	2.827	0.304	Fail to reject H_0	No serial correlation in residuals
Ramsey RESET (Spec. Err.)	2.518	0.218	Fail to reject H_0	Model is well specified
CUSUM Stability	Within bounds		Stable	Parameters stable over time

Source: *Author (2025)*

The post-estimation diagnostics reported in Table 7 indicate that the regression model is statistically reliable. The Jarque-Bera test fails to reject normality, while the Breusch-Pagan test confirms the absence of heteroskedasticity. The LM test indicates no serial correlation, and the Ramsey RESET test suggests no evidence of model misspecification. Additionally, the CUSUM stability test confirms parameter stability over time, implying that the SME–growth nexus in Nigeria is robust to structural shocks. These diagnostic outcomes validate the credibility of the FMOLS estimates and underscore the reliability of the study’s empirical conclusions. Robust diagnostics are particularly important in volatile macroeconomic environments like Nigeria, where structural breaks and policy shifts are frequent (Udoh & Ogbuabor, 2021).

Overall, the results from Tables 2 to 7 reveal a consistent narrative: SMEs are a significant driver of Nigeria’s long-run growth, primarily through credit access and sectoral expansion. However, macroeconomic instability, particularly exchange rate volatility, constrains this potential. The theoretical framework is thus corroborated, SMEs stimulate growth via Schumpeterian innovation channels, Keynesian demand-side multipliers, and Solovian capital-labor accumulation, but the extent of impact is shaped by Nigeria’s macro-financial environment.

4.2. Policy Implications

The findings of this study provide important policy directions for promoting inclusive and sustainable economic growth through the development of SMEs. The positive effect on economic growth from large-scale SMEs (Growth-oriented SME) confirmed in FMOLS results suggests that governments should focus industrial and financial policies to promote SME development. Table 4 shows the cointegration test outcomes by Engle-Granger and Phillips-Ouliaris, where EGR as well as other variables are not individually strongly cointegrated but the combined system is showing a positive long-run relationship between economic growth and SMEs financing, growth, interest rates, inflation, exchange rate. This finding supports the Schumpeterian view of endogenous technological change that entrepreneurial activity (SME) along with accumulation of capital (GDP), which Solow identified as joint determinants of growth (Aghion et al., 2021).

Inflation, while statistically insignificant in this model, nonetheless presents an indirect policy concern. High inflation erodes real purchasing power and increases the cost of borrowing, both of which constrain SME expansion. Even though inflation did not distort the empirical results under robustness checks, policymakers should not ignore its potential distributive effects on SMEs, especially micro and growth-oriented enterprises with narrow profit margins. Anchoring inflation expectations through credible monetary policy frameworks would therefore be an essential complement to SME-targeted interventions (Ojeka et al., 2024).

The robustness checks further confirm that SME contributions to growth are resilient under alternative specifications. This has clear policy implications: SME promotion strategies should be pursued as long-term growth strategies rather than as short-term employment buffers. Integrating SMEs into industrial clusters, global value chains, and digital platforms could amplify their contributions to productivity growth and structural transformation (Gherghina et al., 2020). Such approaches are consistent with the innovation-driven growth paradigm, in which SMEs act as conduits for technological diffusion and entrepreneurial dynamism.

Lastly, the diagnostic tests that illustrate the stability of the model and even the lack of errors related to misspecification strengthen the validity of the results obtained to be used in policy. Since the SME-growth nexus has been subjected to rigorous empirical research, the policy-makers ought to make the SME development an institutionalized part of national economic policy. This may include integrating SME policies in the sustainable development models,

targeting job-rich industries including agribusiness, renewable energy and digital services. In such a way, governments have a chance to support inclusive growth and increase economic resilience to global shocks (Asongu et al., 2023).

5. Conclusion

In this paper we attempt to explore this mutual dependence between SMEs and economic growth considering large-scale or fast-growing firms as well, which would be more relevant for incorporating important measures like interest rates, inflation, and exchange rates. These results provide strong evidence that the SME is a major source of long-run economic growth with positive coefficients showing relatively high consistency across model specifications, as well as through robustness tests (Acs et al., 2021), thereby supporting the theoretical claim from endogenous growth theory which states that entrepreneurial activity at firm level drives sustainable growth. This also suggests evidence that SMEs have sticky impacts on growth in all alternative specifications used here to transform the economy.

The study further found that an appropriate form of interest rates could complement SME-led growth by enhancing access to credit markets, meaning that financial sector policies should be designed for a conducive environment where these small firms can thrive and align with developmental banking initiatives (Nguyen et al., 2021). The negative effect between depreciation exchange rate on the one hand and growth on the other reflects how vulnerable SMEs are from foreign shocks or macroeconomic instability; hence, exchange rates management is an important policy instrument to support competitiveness of these small firms and maintain economic momentum. While inflation did not appear significant in the primary regression, its potential for distorting cost structures as well as weakening purchasing power justifies closer scrutiny when it comes to other stabilization policies (Ojeka et al., 2024).

In policy terms, this evidence suggests that efforts at SME development need not be a short-term strategy for job creation but must become part of an overall long-run growth agenda that entails multifaceted solutions involving financial inclusion programs, infrastructural support and technological modernization. The combination of digital platform investments with innovation ecosystems and value chain integration may further enhance the potential to boost productivity growth as well as structural change (Gherghina et al., 2020). Furthermore, integrating SME promotion in sustainable development policies allows for addressing goals related to inclusiveness, resilience and industrial diversification (Asongu et al. 2023).

On the basis of these findings, the research suggests a number of measures. To begin with, policymakers need to increase accessibility to low-cost finance by SMEs by providing credit guarantees, special subsidies, and SME banking departments. Second, the exchange rate stabilization policies such as hedging facilities and macroprudential management must be enhanced in order to cushion the SMEs against international market volatility. Third, policies of the SMEs must be intertwined in the industrial clusters and global value chains to increase competitiveness and diffusion of technology. Lastly, the governments are to focus on making institutional changes that will promote better business climate, less informality, and innovation” as these institutional facilitators will drastically increase the productivity and survival of SMEs (Hashi and Krasniqi, 2008).

References

- Acs, Z. J., Estrin, S., Mickiewicz, T., & Szerb, L. (2018). Entrepreneurship, institutional economics, and economic growth: An ecosystem perspective. *Small Business Economics*, *51*(2), 501–514. <https://doi.org/10.1007/s11187-018-0013-9>
- Aderemi, T. A., Opele, A., Okoh, J., & Al-Faryan, M. A. S. (2022). An econometric analysis of small- and medium-scale enterprises and employment creation in Nigeria. *Managerial and Decision Economics*, *44*(3), 1624–1633. <https://doi.org/10.1002/mde.3770>
- Afolabi, M. O. (2013). Growth effect of small and medium enterprises (SMEs) financing in Nigeria. *Journal of African Macroeconomic Review*, 3(1), 193–205.
- Aghion, P., Antonin, C., & Bunel, S. (2019). *The power of creative destruction: Economic upheaval and the wealth of nations*. Harvard University Press.
- Ajayi, O. I., Ajuwon, O., & Ikhide, S. (2021). Access to finance and performance of services sector MSMEs in Nigeria. *Oradea Journal of Business and Economics*, *6*(2), 8–20. <https://doi.org/10.47535/1991ojbe125>
- Akanyonge, J., Obeng-Amponsah, W., & Owusu, E. L. (2023). Financial development and SMEs in African countries. In *Routledge Handbook of African Economic Development* (pp. 245–260). Routledge. <https://doi.org/10.4324/9781003215042-18>
- Amadasun, D. O. (2022). Influence of access to finance on the competitive growth of SMEs: Evidence from Lesotho. *Innovation and Entrepreneurship*, 11, Article 44. <https://doi.org/10.1186/s13731-022-00244-1>
- Ambam, A. P., Herbert, [Initials], Atadiose, S., Babarinde, G. F., & [Fifth Author]. (2024). *Exchange rate and growth of African economies: A study of selected Sub-Saharan African countries, 1999-2021*. Zenodo. <https://doi.org/10.5281/zenodo.10373636>
- Asongu, S. A., & Nting, R. T. (2022). The role of finance in inclusive human development in Africa revisited. *Journal of Economic and Administrative Sciences*, *38*(2), 345–370. <https://doi.org/10.1108/JEAS-07-2020-0138>
- Ayyagari, M., Demirguc-Kunt, A., & Maksimovic, V. (2010). *Are innovating firms victims or perpetrators? Tax evasion, bribe payments, and the role of external finance in*

- developing countries* (SSRN Scholarly Paper No. 2023210). Social Science Research Network. <https://doi.org/10.2139/ssrn.2023210>
- Ayyagari, M., Demirgüç-Kunt, A., & Maksimovic, V. (2017). Small vs. young firms across the world: Contribution to employment, job creation, and growth. World Bank Policy Research.
- Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. *Journal of Banking & Finance*, *30*(11), 2931–2943. <https://doi.org/10.1016/j.jbankfin.2006.05.009>
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2005). SMEs, growth, and poverty: Cross-country evidence. *Journal of Economic Growth*, 10(3), 199–229. <https://doi.org/10.1007/s10887-005-3533-5>
- Bédécarrats, F., Guérin, I., & Roubaud, F. (2020). Microfinance RCTs in development: Miracle or mirage? In *Randomized Controlled Trials in the Field of Development: A Critical Perspective* (pp. 214–240). Oxford University Press. <https://doi.org/10.1093/oso/9780198865360.003.0009>
- Brixiova Schwidrowski, Z., Ncube, M., & Bicaba, Z. (2015). Skills and youth entrepreneurship in Africa: Analysis with evidence from Swaziland. *World Development*, *67*, 11–26. <https://doi.org/10.1016/j.worlddev.2014.09.027>
- Brixiová, Z., Kangoye, T., & Yogo, T. U. (2020). *Access to finance among small and medium-sized enterprises and job creation in Africa* (IZA Discussion Paper No. 13708). IZA Institute of Labor Economics. <https://docs.iza.org/dp13708.pdf>
- Central Bank of Nigeria (CBN). (2023). Statistical Bulletin. Abuja: Central Bank of Nigeria. <https://nigeriareposit.nln.gov.ng/items/41684efd-0864-4436-b91a-ff59f16d6212/full>
- Chowdhury, M. A. S., et al. (2022). Assessing the empirical linkage among access to finance, firm quality, and firm performance: Evidence from Bangladesh. *Frontiers in Psychology*. <https://doi.org/10.3389/fpsyg.2022.865733>
- El-Yaqub, A. B., Ismail, Y., & Usman, G. (2025). Impact of financing small and medium enterprises on sustainable development in Nigeria. *International Journal of Management and Sustainability*, *2*(5), 9–18. <https://doi.org/10.5281/zenodo.15589587>
- Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica*, 55(2), 251–276. <https://doi.org/10.2307/1913236>
- Garrido-Prada, P., Romero-Jordán, D., & Delgado-Rodríguez, M. J. (2024). Exploring SMEs' innovation investment strategy to increase innovation output in economic crises. *Journal of Engineering and Technology Management*, *72*, 101816. <https://doi.org/10.1016/j.jengtecman.2024.101816>
- Gherghina, Ş. C., Botezatu, M. A., Hosszu, A., & Simionescu, L. N. (2020). Small and medium-sized enterprises (SMEs): The engine of economic growth through investments and innovation. *Sustainability*, *12*(1), 347. <https://doi.org/10.3390/su12010347>
- Grandes, M., & Yeo, D. (2023). Financial development and integration, exchange rate regimes, and economic growth: New evidence from African economies. *Económica*, *69*, e029. <https://doi.org/10.24215/18521649e029>

- Hashi, I., & Krasniqi, B. A. (2008). Entrepreneurship and SME growth: Evidence from advanced and laggard transition economies. *International Journal of Entrepreneurial Behavior & Research*, *17*(5), 456–487. <https://doi.org/10.1108/13552551111158817>
- Keynes, J. M. (1936). *The general theory of employment, interest and money*. Macmillan.
- Man, T. W. Y., Lau, T., & Chan, K. F. (2002). The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. *Journal of Business Venturing*, *17*(2), 123–142. [https://doi.org/10.1016/S0883-9026\(00\)00058-6](https://doi.org/10.1016/S0883-9026(00)00058-6)
- McKinsey Global Institute (2024). A microscope on small businesses: Spotting opportunities to boost productivity. <https://link.springer.com/book/10.1007/978-3-319-70344-2>
- Musa, I., Ahmad, B. E., & Magaji, S. (2024). Empirical analysis of the impact of banking sector credit on small and medium enterprises. *International Journal of Humanities, Social Sciences and Management*, *4*(2), 1-15.
- National Bureau of Statistics (NBS). (2023). Annual Abstract of Statistics. Abuja: NBS. <https://www.nigerianstat.gov.ng/elibrary/read/1241501>
- Nguyen Ba, T. (2023). Exchange rate uncertainty and economic fluctuations in emerging economies. *Ho Chi Minh City Open University Journal of Science - Economics and Business Administration*, *14*(2).
- Nguyen, T. V., Trinh, H., & Nguyen, H. (2021). Access to finance and SME performance: Evidence from Vietnam. *Journal of Small Business Management*, 59(3), 470–495. <https://doi.org/10.1080/00472778.2020.1844494>
- Ojeka, O. J., Egbetunde, T., Okoduwa, G. O., Ojeyode, A. O., Jimoh, M., & Ogunbowale, G. O. (2024). Moderating effect of institutional quality on the influence of debt on investment in sub-Saharan Africa. *Future Business Journal*, *10*(1), 76. <https://doi.org/10.1186/s43093-024-00376-8>
- Onyeiwu, C., Muoneke, O. B., & Nkoyo, U. (2020). Financing of small and medium scale enterprises and its growth impact in Nigeria. *The Journal of Entrepreneurial Finance*, *22*(2), 1–19. <https://doi.org/10.57229/2373-1761.1385>.
- Phillips, P. C. B., & Hansen, B. E. (1990). Statistical inference in instrumental variables regression with I(1) processes. *Review of Economic Studies*, 57(1), 99–125. <https://doi.org/10.2307/2297545>
- Pinto, H., Odoi, E., Nogueira, C., & Viana, L. F. C. (2025). Pathways to progress: Unveiling structural change in Africa through economic transformation, technology, talent, and tourism. *Economies*, *13*(1), 21. <https://doi.org/10.3390/economies13010021>
- Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H., & Idris, M. (2021). Economic growth, increasing productivity of SMEs, and open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 20. <https://doi.org/10.3390/joitmc7010020>.
- World Bank (2015–2024). Enterprise Surveys and policy evaluations. <https://www.worldbank.org>
- Zhu, Y., Wittmann, X., & Peng, M. W. (2011). Institution-based barriers to innovation in SMEs in China. *Asia Pacific Journal of Management*, *29*(4), 1131–1142. <https://doi.org/10.1007/s10490-011-9263-7>