



Econometric Analysis of Effects of Macroeconomic Variables on Small and Medium Scale Enterprises' Output in Nigeria

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Abstract

This study seeks to evaluate the effects of exchange rate, interest rate and inflation rate on small and medium scale enterprises' output in Nigeria, using annual time series data from 1991 to 2022. The data for the study was sourced from the World Development Indicator (WDI) and the Central Bank of Nigeria (CBN) statistical bulletin. The study uses ARDL technique. The results of the study show that variables have the combinations of l(0) and l(1) for both ADF and PP. Bound test indicates a long run relationship between the variables. Exchange rate has positive and insignificant effect on small and medium scale business output. The result shows that interest rate has negative and insignificant effect on the output. The result of inflation rate is positive and insignificant. Finally, the model is free from autocorrelation, hetroscadacity and it is normally distributed and stable. Based on the findings the following recommendations were made: Financial institutions should be encouraged to offer loans to SMEs at reduced interest rates, ideally in single digits. This can alleviate the financial burden on SMEs and promote investment in productivity-enhancing initiatives. The government should consider implementing policies that reduce collateral requirements for SMEs, allowing them to access funds more easily. Projects undertaken by SMEs could serve as collateral instead of traditional assets.

Keywords: SME, Interest rate, Inflation, Exchange Rate, ARDL **JEL Classification:**

1.0 Introduction

SMEs in developing economies account for 90% of enterprises globally, 40% of GDP, and more than 50% of employment, according to the World Bank (2022). SMEs make up the majority of enterprises in Nigeria, producing over 70% of jobs and contributing over 45% to the GDP. Over 80% of Nigeria's employment and 49.78% of GDP come from SMEs, according to the NBS MSME Survey (PwC, 2020).

Exchange rate fluctuations have a pronounced effect on SMEs, particularly those relying on imported raw materials and equipment. Research indicates that depreciation of the naira leads to increased costs of production, as SMEs must pay more for imported goods. This scenario often results in higher prices for locally manufactured products, which can reduce demand and ultimately lead to decreased output. Furthermore, the liberalization of the foreign exchange market in Nigeria has not necessarily benefited SMEs, as many have struggled to adapt to the volatility of exchange rates, failing to capitalize on potential export opportunities. Nigeria's currency rate has fluctuated significantly against the US dollar since



1980. Up until the early 1980s, the naira's value was fixed against the US dollar; in November 1980, it reached a record low of 0.530 NGN/USD.

Interest rate also plays a crucial role in shaping the operational landscape for SMEs. SMEs drive growth and development in any economy. Most economies, especially emerging ones, depend on them since they make up most companies, provide jobs, and boost global economic growth (World Bank, 2022). When borrowing gets more expensive, high interest rates have the potential to discourage investment and restrict access to credit. The strict lending policies of banks, which frequently do not favor SMEs owing to perceived risks, exacerbate this situation. High interest rates have been shown to have a negative correlation with the growth of SMEs because they make it more difficult for these companies to obtain the capital, they need for expansion and ongoing operations.

Over the years, Nigerian inflation has exhibited notable fluctuations. In the late 1980s and early 1990s, the nation experienced hyperinflation, with rates rising above 70%. Inflation has surged once more in recent times, hitting record highs for food prices and levels not seen since the 1990s. The demand for SME products is impacted by the high rates of inflation, which also raise input costs and reduce purchasing power, further compressing profit margins. Nigerian interest rates have changed in response to pressures from inflation and economic policies. Interest rates were relatively low in the early 1980s, but during times of economic instability, they increased significantly. The cash rate was set at 18.500% annually as of May 2023, reflecting the Central Bank's efforts to stabilize the economy and rein in inflation. Due to their restriction on access to reasonably priced credit and their tendency to discourage investment, high interest rates present serious obstacles for SMEs looking to grow and expand. From 1980 to the present, the effects of interest rates, inflation, and exchange rates on small and medium-sized businesses (SMEs) in Nigeria have changed dramatically. It is essential to comprehend these trends in order to analyze the economic environment that SMEs operate in. Nigeria's currency rate has fluctuated significantly against the US dollar since 1980. Up until the early 1980s, the naira's value was fixed against the US dollar; in November 1980, it reached a record low of 0.530 NGN/USD. After several devaluations and economic reforms, the exchange rate peaked in May 2023 at 460.702 NGN/USD. SMEs have been severely impacted by this depreciation, particularly those that depend on imported goods, as rising costs result in higher consumer prices and decreased competitiveness in local markets (Achua et al. 2020).

There is a dearth of thorough research that looks at the influence of these macroeconomic factors on SME output in Nigeria, despite the fact that they are important for SME performance. The majority of research has concentrated on specific elements or hasn't offered a thorough examination of the patterns and trends over time. In order to close this gap, this study examines the effects of exchange rates, inflation, and interest rates on the output of small and medium-sized enterprises (SMEs) in Nigeria between 1980 and the present, taking into account the historical trends and patterns of these macroeconomic indicators (Adeosun & Shittu, 2021). Following the introduction, the next section is literature



review, the methodology, data presentation and analysis and the last section deals with conclusion and recommendation

2.0 Literature Review

According to CBN, SME is defined as the business that has 10-49 employees with more than N5 Million but not exceeding N50 Million. Small and medium-sized enterprises (SMEs) are identified using various criteria such as the number of employees, total capital invested, plant capacity, sales turnover, and profit margin. Defining SMEs globally poses a challenge for the World Bank, as national standards vary significantly. The International Finance Corporation (IFC) and the Multilateral Investment Guarantee Agency (MIGA) use the same standard criteria to determine micro, small, or medium-sized businesses.

The National Policy on SMEs defines enterprise categorization by size, industry, organization, manpower, technology, and location. Understanding the complex relationships between these variables is critical for understanding the nature, characteristics, performance, concerns, and challenges of businesses. Size provides the most practical foundation for categorization in policy and planning. This analysis is based on the definitions of SMEs provided in the SMEDAN National Policy on SMEs, as perspectives on SME classification may differ across nations and financial institutions. It is important to note that entry into the industry is straightforward, requiring only personal finances and conviction, depending on the firm's activities.

According to Olusola et al. (2022), inflation is a situation in which the economy's demand for goods and services exceeds supply. It occurs when demand for goods and services exceeds available supply, as noted by Achua et al. (2020). This can be attributed to excessive spending by both the private and public sectors, resulting in a deficit or temporary decrease in productivity. Price increases may also result from higher production costs. If imported raw material price increases are not controlled, inflation will occur.

2.1 Theoretical Framework

2.1.1 Keynesian Theory

This study is also based on Keynesian Economic Theory from 1936. According to this theory, small businesses play an important role in a country's economic development. Keynes (1936) proposed that the government can address economic instability by enacting effective economic policies. This concept proposes that the government intervenes in the economic landscape through economic policies to promote efficient resource allocation, regulate markets, and create a favorable business environment that encourages the growth of small businesses. In a 1936 publication, Keynes proposes that small businesses thrive in an environment characterized by policies that maintain a consistent interest rate, exchange rate, and inflation rate, which could have a positive impact on their operations. Small businesses that understand their operating environment and recognize its dynamic nature will not only adapt proactively but also make informed decisions to improve their performance.



2.3 Empirical Review

Iheanachor and Ozegbe (2021) investigated the impact of persistent exchange rate fluctuations on Nigerian economic performance. The study was motivated by desire to understand why Nigerian monetary authorities' concerted efforts to pursue internal and external balances have yielded little or no positive results in recent years. The autoregressive distribution lag (ARDL) technique was used in the study to test the short- and long-run effects of exchange rate fluctuations on economic growth using annual time series data spanning 1986 to 2019.

The empirical findings revealed that the exchange rate, net direct foreign direct investments, and inflation rate all had a significant negative impact on Nigeria's economic growth in the long term. In conclusion, this study established that excessive exchange rate fluctuations are detrimental to Nigeria's economic growth. Based on the empirical findings, this study suggests that Nigeria diversify its agricultural exports and increase agro-investment. The state should exert influence over the foreign exchange system by enacting credible reforms that mitigate the negative effects of an unstable foreign exchange system on Nigeria's economy.Ashogbon et al. (2022) used annual time series data from 2000 to 2019 to assess the impact of interest rates on the growth of SMEs in Nigeria. Data for the study were obtained from the World Development Indicator (WDI) and the Central Bank of Nigeria (CBN) statistical bulletin. The dependent variable was Small and medium-sized enterprises GDP (SMEG), while the independent variables were commercial bank total credit to the private sector, commercial bank loans to SMEs, percentage of commercial bank loans to SMEs, Monetary Policy Rate (MPR), inflation, exchange rate, reserve requirement, and commercial bank lending rates to SMEs.Descriptive and inferential statistics were used, and the Autoregressive Distribution Lag (ARDL) was used to test the long-term relationship of the variables. The results show that LRCM has a negative effect on SMEGDP, with a 1% increase resulting in a 1.6% decrease in SMEGDP. In contrast, a 1% increase in RR causes a 0.005% increase in SMEGDP. The study recommends that MPR and INFR be reduced in order to reduce LRCM, which will improve SMEs' financial capacity and, as a result, increase SMEs' contribution to national GDP.

Onakoya et al. (2024) investigated the impact of inflation on Small and Medium-Sized Enterprises (SMEs) growth in Nigeria. The study's objectives are to investigate how inflation rates, interest rates, and exchange rates have influenced SMEs' growth in Nigeria. Secondary data spanning 2001 to 2022 were obtained from the Central Bank of Nigeria (CBN) and the Federal Office of Statistics (FOS). To test the stationarity of the variables, unit root tests were applied to the time series data. The analysis was performed using cointegration, Ordinary Least Squares (OLS), and the Error Correction Model (ECM). Many diagnostic tests were run on the study's residuals. The interest rate has a positive and statistically significant effect on Nigerian SMEs' funding. In contrast, inflation has a negative impact on Nigerian SME funding. The exchange rate had no effect on SMEs' funding, according to the study. The study recommended that Nigeria's monetary authorities implement policies to reduce inflation and prioritize SMEs' growth by establishing dedicated channels through



various financial institutions to provide low-interest loans. This will boost their growth and help to lower inflation.

Atayi et al. (2020) investigated how variations in exchange rates affect Nigerian SMEs. Using annual time series data from 2000 to 2019, they looked at how interest rates affect Nigerian SMEs. The dependent variable was SMEG GDP. Independent factors included the MPR, inflation, currency exchange rates, reserve requirements, and commercial bank lending rates to SMEs. Commercial banks' total private sector credit, SMEs' loans, SMEs' share of loans, the MPR, and the MPR were all included.

The data was analyzed using descriptive and inferential statistics. Long-term variable relationships were investigated using the autoregressive distribution lag (ARDL) model. The results showed that LRCM reduces SMEGDP. Specifically, LRCM increases by 1% while reducing SMEGDP by 1.6%. SMEGDP rises by 0.005% with a 1% increase in RR. The study suggested that lowering MPR and INFR would reduce LRCM. This reduction in LRCM would boost SMEs' financial capabilities, thereby increasing their GDP contribution.

Adamu (2024) examines the impact of credit, interest rates, and inflation on Small and Medium Enterprise Productivity in Nigeria, using annual time series data from 1986 to 2023. Data for the study were obtained from the World Development Indicator (WDI) and the Central Bank of Nigeria (CBN) statistical bulletin. The dependent variable was gross domestic product (GDP), and the independent variables were commercial bank total credit to the private sector (CPS), small and medium enterprises' contribution to GDP (SMEC), inflation rate (INFL), and interest rate (INT). Descriptive, inferential statistics, and the Error Correction Model (ECM) were used to assess the variables' long-term relationship. The regression results show that credit to the private sector and small and medium-sized enterprises contribute positively and significantly to GDP growth. The results also revealed that inflation and interest rates have a negative and insignificant effect on GDP. The study recommends that the government make more efforts to control inflation in order to give investors more confidence, as well as implement measures (low interest rates) that broaden the borrowing base to improve SMEs' financial capacity, resulting in an increase in SMEs' contribution to the nation's GDP.

3.0 Methodology

3.1 Research Design and Estimation Techniques

This study used an ex post facto research design. The study used annual secondary data from 1991 to 2022 from the CBN statistics bulletin and the World Development Indicators (WDI). The study used econometric methods to test the research hypotheses. A unit root test was used to determine whether the variables were stationary, and ARDL bound tests, ARDL, and post estimation tests were used to investigate the relationship between the dependent variable Small and Medium Scale Business Output (proxied by Wholesale and Retail trade) and the independent variables Exchange Rate, Interest Rate, and Inflation Rate over time. The results are then processed using EViews 10.0.



3.2 Source of Data

The investigation was conducted in Nigeria. The data analysed was sourced from the Central Bank of Nigeria (CBN) and the World Development Indicators (WDI), and it was of secondary nature.

Variable	Description and measurement	Sources
SMEP	Small and medium scale business productivity measured by wholesale and retail total trade	CBN
EXR	Exchange Rate	WDI
INR	Interest Rate	CBN
IFR	Inflation Rate	WDI

Table 1. Description of variables and their measurement

Source: Author's Computation

3.3 Model Specification

The model specify in this study was The study adopted the model developed by Adeniran et al. (2014) and Small and Medium Scale Business Output (proxed by Wholesale and Retail trade). In addition to Naira/Dollar exchange rate, other independent variables employed are, inflation rate, and interest rate.

The functional form of the model is specified as follows:

Where

$$\begin{split} SMEP &= Small \text{ and Medium Scale Business productivity} \\ EXR &= Exchange Rate \\ INR &= Interest Rate \\ IFR &= Interest Rate \\ \beta 0, \beta 1, \beta 2 \text{ and } \beta 4 \text{ are the respective coefficients associated with the dependent variable} \\ Presentation of Data and Discussion of Results \end{split}$$

Table 2. Descriptive Statistics

SMEP	EXR	INR	IFR



Mean	8707.934	149.2813	24.52969	16.92278
Median	5596.900	130.5350	23.10000	10.30663
Maximum	26607.54	397.0800	36.09000	75.40165
Minimum	80.84000	9.910000	18.36000	0.686099
Std. Dev.	8871.856	112.9014	4.429155	15.64308
Skewness	0.650060	0.759920	0.608832	2.076549
Kurtosis	1.890316	2.723827	2.615049	7.554867
Jarque-Bera	3.895612	3.181584	2.174524	50.66006
Prob.	0.142587	0.203764	0.337138	0.000000
Sum	278653.9	4777.000	784.9500	541.5291
Sum Sq. Dev.	2.44E+09	395148.4	608.1399	7585.888
Observations	32	32	32	32

Source: Author Computation Eview 10 Softwire 2024

Table 2 above suggest that the mean medium, minimum and maximum value of small and medium scale business output in Nigeria proxed by wholesale and retail trading in billions are 8707.934, 5596.900, 26607.54 and 80.84000 respectively, also mean, medium, minimum and maximum value of exchange rate 149.2813, 130.5350, 397.0800, and 9.910000 respectively, it is also reported on table mean medium, minimum and maximum value interest rate are 24.52969, 23.10000, 36.09000 and 18.36000; that mean medium, minimum and maximum value of inflation rate are 16.92278, 10.30663, 75.40165, and 0.686099. However, all the variables are positively skewed given their positive skewed valued. The Jarque-Bera value of all the distributions are normally distributed since their probability value is greater than five per cent level of significance except for inflation rate.

3.4 Correlation Matrix.

Table 3. Correlation Matrix.

	LSMEP	EXR	INR	IFR
LSMEP	1			
EXR	0.8776080868177438	1		
INR	0.03377200581062683	0.3007784556975868	1	
IFR	-0.6125443776942335	-0.5035498320881526	0.07003579370774842	1

Source: Author Computation Eview 10 Softwire 2024

Table above presents a correlation matrix, which summarizes the strength and direction of linear relationships between five variables: The diagonal elements (1.000000) represent the



perfect positive correlation of each variable with itself. LSMEP exhibits a strong positive correlation with, inflation rate and exchange rate with the exception of interest rate at coefficient value of 0.877608086, 0.612544377 and 0.033772005 respectively.

3.4 Unit Root Test

Table 4 Augmented Dicker Fuller (ADF) Unit Root Test

Variables	ADF statistics	Critical value	Probability	Order
LSMEP	-4.816992	-3.612199	0.0040	I(1)
EXR	-4.074340	-3.670170	0.0037	I(0)
INR	-7.177633	-2.963972	0.0000	I(1)
IFR	-3.956433	-2.971853	0.0053	I(1)

Source: Author Computation Eview 10 Softwire 2024

Table 5 Phillips-Perron test statistic

Variables	ADF statistics	Critical value	Probability	Order
LSMEP	-3.587527	-3.140466	0.0075	I(1)
EXR	-3.999908	-2.963972	0.0044	I(0)
INR	-7.177633	-2.963972	0.0000	I(1)
IFR	-9.828699	-3.568379	0.0000	I(1)

Source: Author Computation Eview 10 Softwire 2024

In order to examine the integrating level of variables, standard test such as Dickey and Fuller (1979) and Phillips-Perron Test. Table 3 and 4 shows the result ADF and PP test statistics Show that, LSMEP, EXR, INR and IFR rate have I(1) and this mean they are stationary at a first difference. It is only that exchange rate is stationary at a level I(0). The result reported that they are significant at 5 per cent level of significance.

3.5 ARDL Bound Test

F-Bounds Test	N	s: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	39.50743	10%	2.37	3.2
Κ	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Table 6 Cointegration Test

Source: Author Computation Eview 10 Softwire 2024



The ARDL Bounds Test is used to determine if there is a long-run cointegrating relationship among the variables. The null hypothesis is that there is no cointegration. The calculated F-statistic of 39.50743 is greater than the upper bound critical value of 3.2. When the F-statistic exceeds the upper bound critical value, it provides evidence to reject the null hypothesis of no cointegration at the chosen significance level (e.g. 5%)

Long Run ARDL Result						
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
EXR	0.005041	0.006141	0.820863	0.4214		
INR	-0.058183	0.096226	-0.604650	0.5522		
IFR	0.130992	0.207129	0.632417	0.5343		
С	6.350102	4.716779	1.346279	0.1933		
EC = LSMEP - (0.0050*EXR - 0.0582*INR + 0.1310*IFR + 6.3501)						

Table l Long Run ARDL Result

Source: Author Computation Eview 10 Softwire 2024

Coefficient Interpretation: The coefficient of 0.005041 indicates that for every one-unit increase in the exchange rate (which generally means a depreciation of the local currency), the output of small and medium enterprises (SMEs) are expected to increase by approximately 0.5041%. This suggests a positive relationship between exchange rate fluctuations and SME output in the long run. Statistical Significance: The probability value (p-value) of 0.04214 is below the conventional threshold of 0.05, indicating that the relationship between exchange rate and SME output is statistically significant. This means that there is a less than 5% chance that the observed relationship is due to random variation, thus lending credibility to the finding that exchange rate changes have a meaningful impact on SME performance. A positive coefficient in this context could imply that SMEs in Nigeria may benefit from a depreciating naira, potentially due to increased competitiveness in export markets or lower relative costs for domestic production when priced in foreign currencies. However, this also raises concerns about the cost of imports, which could negatively affect SMEs reliant on imported materials.

The negative coefficient of -0.058183 indicates that for every one percentage point increase in the interest rate, the output of small and medium enterprises (SMEs) is expected to decrease by approximately 5.8183%. This suggests a significant inverse relationship between interest rates and SME output, meaning that higher interest rates are likely to hinder the performance of these businesses. The probability value (p-value) of 0.05522 is slightly above the conventional significance level of 0.05. This indicates that while the relationship is close to being statistically significant, it does not meet the strict threshold. Therefore, one might conclude that there is a trend suggesting that higher interest rates negatively affect SME output, but the evidence is not robust enough to assert this with high confidence.



The positive coefficient of 0.130992 suggests that for every one percentage point increase in the inflation rate, the output of small and medium enterprises (SMEs) is expected to increase by approximately 13.0992%. This indicates a positive relationship between inflation and SME output, which may seem counterintuitive given that inflation typically raises costs and could reduce purchasing power. The probability value (p-value) of 0.5343 is significantly above the conventional threshold of 0.05. This indicates that the relationship between inflation and SME output is not statistically significant. In other words, there is a high probability that the observed positive relationship is due to random chance rather than a true effect.

Findings regarding the impact of exchange rate, interest rate, and inflation rate on small and medium scale business output (SMEP) in Nigeria can be analyzed through the lens of macroeconomic theory. Each result reflects underlying economic principles that govern the behavior of SMEs in response to these macroeconomic variables. The positive coefficient of 0.005041 suggests that a depreciation of the naira (increase in exchange rate) leads to an increase in SME output. This aligns with the Theory of Comparative Advantage, which posits that a weaker currency can enhance the competitiveness of domestic goods in international markets, making exports cheaper and potentially boosting sales for SMEs engaged in export activities. In practical terms, a depreciated currency may allow SMEs to benefit from increased export demand, as their products become more competitively priced abroad. However, it is essential to consider the potential adverse effects on import costs, which could raise production costs for SMEs reliant on imported materials.

The negative coefficient of -0.058183 indicates that higher interest rates decrease SME output, which is consistent with the Cost of Capital Theory. This theory suggests that as interest rates rise, the cost of borrowing increases, discouraging investment and expansion among SMEs. Although the p-value (0.05522) is marginally significant, it suggests a trend where higher interest rates can limit access to financing for SMEs, ultimately reducing their capacity to invest in growth. This reflects the broader economic environment where monetary policy aimed at controlling inflation can inadvertently stifle economic activity among smaller businesses that are more sensitive to borrowing costs. This finding is in line with the work of Ashogbon, Onyenebo and Orefuwa (2022) who found that interest rate have a negative effect on SMEGDP but Onakoya, Oladejo and Kolawole (2024) found that interest rate positively and statistically significantly affects Nigerian SMEs' funding. Adamu (2024) results further revealed that interest rate have a negative positive and insignificant effect on gross domestic product.

The positive coefficient of 0.130992 implies that rising inflation could correlate with increased SME output. This finding is somewhat counterintuitive and may be explained by the Adaptive Expectations Theory, which posits that businesses may adjust their pricing strategies in response to inflation, potentially passing on costs to consumers and maintaining revenue levels. However, the high p-value (0.5343) indicates that this relationship lacks statistical significance, suggesting that the observed effect could be due to random variation rather than a true economic relationship. In practice, while some SMEs may benefit from the



ability to raise prices in an inflationary environment, the overall negative effects of inflation—such as reduced consumer purchasing power and increased costs of inputs—may outweigh these benefits. This highlights the complexity of inflation's impact on SME performance, necessitating further investigation into specific sectors and contexts. Onakoya, Oladejo and Kolawole (2024) in contrast, inflation has a negative impact on Nigerian SMEs' funding. Adamu (2024) results further revealed that inflation rate positive and insignificant effect on gross domestic product.

Table 7: ECM Regression

ECM Regression						
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
D(EXR)	8.59E-05	0.000308	0.278983	0.7831		
D(INR)	-0.009129	0.003792	-2.407527	0.0258		
D(IFR)	0.012558	0.003596	3.492288	0.0023		
CointEq(-1)*	-0.021863	0.001420	-15.39625	0.0000		

Source: Author Computation EViews 10 Softwire 2024

The result of ARDL bound test indicated a long run relationship among the variable and Error correction terms measures the speed of adjustment. Based on the ECM value the speed of adjustment is slow which means it will take longer time before it restored to the equilibrium

3.6 Post Diagnostic Test

Table 8 Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.459220	Prob. F(2,18)	0.6390
Obs*R-squared	1.310778	Prob. Chi-Square(2)	0.5192

Source: Author Computation Eview 10 Softwire 2024

The Breusch-Godfrey Serial Correlation LM Test results suggest that there is no significant serial correlation in the residuals of the regression model. The F-statistic of 0.459220 and the p-value of 0.6390 indicate that the residuals are likely independent, which is a desirable property for the validity of regression results. This implies that the model's assumptions regarding the residuals are met, enhancing the reliability of the regression analysis.

Table 9: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.860998	Prob. F(6,20)	0.5397
Obs*R-squared	5.542466	Prob. Chi-Square(6)	0.4763
Scaled explained SS	5.564067	Prob. Chi-Square(6)	0.4737

Source: Author Computation Eview 10 Softwire 2024



The Breusch-Pagan-Godfrey test results suggest that there is no significant heteroskedasticity in the residuals of the regression model. The F-statistic of 0.860998 and the p-value of 0.5397 indicate that the residuals are likely homoskedastic, meaning that the variance of the residuals is constant across all levels of the independent variables. This is a desirable property for regression analysis, as it supports the validity of the model's assumptions and enhances the reliability of the estimated coefficients.



Further the stability of the ARDL model's is assessed using the CUSUM and CUSUMSQ test

4.0 Conclusion and Recommendation

The analysis utilized the Autoregressive Distributed Lag (ARDL) technique, revealing a long-run relationship among the examined variables. The results indicated that the exchange



rate has a positive but insignificant relationship with SME productivity, suggesting that fluctuations in exchange rates do not significantly affect the output of small and medium enterprises in Nigeria. Similarly, the interest rate exhibited a negative and insignificant relationship with SME productivity, indicating that changes in interest rates do not substantially impact the performance of these businesses.

Furthermore, the model was validated for robustness, demonstrating no autocorrelation, heteroscedasticity, and confirming that the residuals are normally distributed and stable. These findings suggest that while the macroeconomic variables of exchange rate, interest rate, and inflation rate are relevant to the economic environment of SMEs, their direct influence on productivity remains limited. This underscores the need for policymakers to consider additional factors that may drive productivity in the SME sector beyond these macroeconomic indicators.

Based on the findings of the study regarding the impact of exchange rate, interest rate, and inflation rate on the productivity of small and medium scale businesses (SMEs) in Nigeria, several operational recommendations can be made to enhance the performance and sustainability of these businesses in the current economic environment. Financial institutions should be encouraged to offer loans to SMEs at reduced interest rates, ideally in single digits. This can alleviate the financial burden on SMEs and promote investment in productivity-enhancing initiatives. The government should consider implementing policies that reduce collateral requirements for SMEs, allowing them to access funds more easily. Projects undertaken by SMEs could serve as collateral instead of traditional assets.

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