Macroeconomic Variables and Profitability of Consumer Goods Manufacturing Firms in Nigeria

Alalade, Yimka S. A.[*1].; Idowu, Paulina A.[2]; Akande, Folorunso I.[3]; Oliyide, Roseline O.[4], Adebola, Peter S.[5]

[1,2,3,4,5]Department of Finance, School of Management Sciences
Babcock University, Ilishan-Remo, Ogun State, Nigeria

CORRESPONDING AUTHOR:

Alalade, Yimka S. A.
alalades@babcock.edu.ng

Abstract

Given the essential role of the manufacturing sector in promoting economic development within emerging economies such as Nigeria, it is imperative to investigate how macroeconomic policy indicators affect this sector. This study examines the impact of key macroeconomic variables on the profitability of consumer goods manufacturing firms in Nigeria. Utilizing an ex-post facto research design, the study analyzed secondary data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and the financial reports of twelve listed consumer goods manufacturing firms over the period from 2006 to 2022. The data was subjected to analysis using a random effects panel regression model. The results reveal that inflation exerts a statistically significant positive effect on Return on Assets (ROA) ($p = 0.0211 < 0.05$) and Return on Equity (ROE) ($p = 0.0368 < 0.05$), while its effect on Return on Capital Employed (ROCE) ($p = 0.0681 > 0.05$) and Earnings per Share (EPS) ($p = 0.7175 > 0.05$) is not significant. Conversely, interest rates showed no significant impact on any of the profitability metrics. The study also found that fluctuations in the exchange rate had significant negative effects on ROA ($p = 0.0000 < 0.05$), ROE ($p = 0.0160 < 0.05$), and ROCE ($p = 0.0015 < 0.05$), with no significant effect on EPS ($p = 0.0720 > 0.05$). The findings suggest that while inflation and exchange rates significantly influence the manufacturing sector, these variables do not necessarily enhance financial returns for investors, as measured by EPS. Therefore, it is recommended to reduce lending costs to lower manufacturing expenses and enhance productivity, while the government should implement macroeconomic measures to mitigate detrimental inflationary effects.

INTRODUCTION

Maximization of profit is a key objective of firms, as profitability is imperative for the sustenance and longevity of business organizations. The ability of firms to make profit is of grave importance because profitability influences the ability of firms to continue operations and attract investors or financing from banks which is essential for the growth and continuance of a business entity. According to Odusanya et al. (2018) maximizing profitability is a key goal for any company looking to stay afloat and outperform rivals in the same field. It is critical for a firm's long-term survival and success, as well as a necessary condition for achieving other financial goals for the business entity (Gitman & Zutter, 2012).

Profitability serves as a fundamental indicator of a firm's performance, representing a crucial component of its financial reporting framework. It encapsulates the firm's proficiency in generating earnings based on its sales volume, asset utilization, and capital stock within a specified timeframe (Margaretha & Supartika, 2016). Khalifa and Shafii (2013) highlighted that the 20th century marked a period where certain nations differentiated themselves through the adoption of industrialization. They argue that once a country achieves industrialization, it overcomes the vicious economic cycle, which stands as the primary obstacle to economic development.

Reinert (2007) further emphasized the historical importance of manufacturing for national wealth, noting that prosperity is largely driven by engaging in manufacturing rather than relying on raw material exports and by active participation in international trade. It is imperative to recognize that firms operate under various economic conditions that influence their internal and external activities (Ruhomaun et al., 2019). The manufacturing sector, in particular, is sensitive to changes in macroeconomic variables such as inflation, interest rates, and exchange rates, all of which significantly impact its productivity and profitability. For example, the ability of manufacturing firms to secure capital is contingent upon factors such as the prevailing interest rate policy, while the inflation rate directly affects the supply and demand for manufactured goods. Furthermore, adverse exchange rate movements, especially in import-dependent economies like Nigeria, can impede the procurement of essential raw materials or machinery from international markets, thus hindering production. Additionally, an expansionary monetary policy typically leads to an increase in commercial loans available to the manufacturing sector, which is expected to enhance manufacturing activities, assuming all other factors remain constant.

Following the attainment of independence across African nations, the manufacturing sector initially experienced a significant expansion. However, this momentum was considerably hampered by a confluence of external economic pressures. Key among these were the persistent decline in global commodity prices, pronounced volatility in oil markets, the upward trajectory of real interest rates, the progressive depletion of public financial resources, and the inherently limited scale of domestic markets across numerous countries on the continent (Signe, 2018). These factors collectively imposed formidable constraints on the sector's long-term growth and development potential.

The Nigerian manufacturing sector has been described as the fulcrum of economic growth and development (Afolabi & Laseinde, 2019). This is because it plays an important part in employment and industrialization in the country, and is crucial to reducing dependence on foreign goods, thus promoting local production, export and reducing import. Although, with the potential to pivot the nation to industrialization, thus improving the economy, the Nigerian manufacturing sector is not living up to its potential, as data shows that the manufacturing sector contributed only 11.44% on the average to the GDP from 2017 to 2021 (Macrotrends, 2021). Based on this background, this study attempts to assess the effect of macroeconomic variables and profitability of consumer goods manufacturing firms in Nigeria.

Objective of the Study

1. To determine the effect of inflation on the profitability of consumer goods manufacturing firms in Nigeria;

2. To examine the effect of interest rate on the profitability of consumer goods manufacturing firms in Nigeria;

3. To investigate the effect of exchange rate on the profitability of consumer goods manufacturing firms in Nigeria and

4. To examine the joint effect of macroeconomic variables on the profitability of consumer goods manufacturing firms in Nigeria.

Scope for the Study

This study undertakes a rigorous examination of the influence exerted by macroeconomic variables on the profitability metrics of consumer goods manufacturing firms in Nigeria. The

macroeconomic determinants under scrutiny include the inflation rate, interest rate, and exchange rate, with their impacts evaluated through a suite of profitability indicators: Return on Assets (ROA), Return on Equity (ROE), Return on Capital Employed (ROCE), and Earnings per Share (EPS). The analysis was grounded in secondary data, drawing from the financial statements and annual reports of publicly listed firms. Data on macroeconomic variables such as interest rates, inflation, and exchange rates were obtained from the Central Bank of Nigeria's Statistical Bulletin, while profitability data are derived from the published financial disclosures of the selected firms. The temporal framework extends from 2006 to 2022, deliberately encompassing the 2007/2008 global financial crisis to capture its long-term ramifications, thereby offering a nuanced and up-to-date evaluation of the prevailing economic conditions in Nigeria.

REVIEW OF LITERATURE

This session focuses on the works of various authors and researchers on the topic under discussion. The review of related literature was done under the following sub-headings; conceptual review, theoretical framework, empirical review and appraisal of related literature.

Inflation Rate

Inflation is an economic variable that has continued to harm and hinder the growth of many nations because it reduces the purchasing power of money as the cost of products and services rises (Maimunah & Patmati, 2018). The first point of reaction to the effect of increase in inflation can be noted to be the reduction in sales volume due to the reduction in the purchasing power of money, and increase in the level of operating costs, which will result in a decline in the net asset per share and other variables. Since a rise in inflation affects profit and other performance variables like net asset, return on equity, this translates to a negative effect on the economy (Akabom-Ita, 2012). Because the increase in inflation results in a decline in currency values that is the purchasing power of money, more naira are needed to buy fewer components or materials locally and this will have an impact on businesses that use local resources for manufacturing, this can be described as the subsequent result of an increase in inflation. Companies can still function effectively at low levels of inflation, but high levels of inflation make it difficult for businesses to perform well because the cost of inputs will soar and the demand for their outputs will decline, which will lower their yearly income (Meyers, 2001).

Interest Rate

In his 1936 seminal work, Keynes conceptualized interest as the compensation for foregoing liquidity over a specified period, emphasizing its role as a reward for parting with cash reserves rather than hoarding them (Katarzyna, 2016). This interpretation focuses primarily on the interest rate aspect of lending rates. Subsequent scholars have expanded on this foundation, offering nuanced definitions that cater to the diverse needs of financial and accounting information users. Obura and Anyango (2011) described the interest rate as the price of acquiring loanable funds, a price often dictated by the dynamics of demand and supply in financial markets. Osoro and Ogeto (2021) further argued that firms pursue loanable funds as a strategic measure to optimize their capital structure, enabling managers to achieve a balanced gearing ratio that supports operational efficiency and effectiveness. This perspective underscores the importance of an optimal capital structure, characterized by a judicious mix of debt and equity. The financial costs associated with borrowed funds, whether borne by financial institutions or individuals, are known as the cost of loanable funds. These costs are generally calculated as a percentage of the principal amount borrowed. According to neoclassical economic theory, an increase in interest rates negatively impacts investment decisions, thereby suppressing overall economic activity. For firms with leveraged capital structures, the finance costs incurred on borrowed funds can have either favorable or adverse effects, significantly influencing their investment strategies and broader financial performance (Olweny & Omondi, 2011).

Exchange Rate

Exchange rates represent the value at which one currency can be exchanged for another between two countries, and fluctuations in these rates can have profound implications for a firm's cost structure, particularly concerning the pricing of manufacturing inputs. Firms typically rely on monetary authorities to implement well-designed policies that stabilize exchange rates, thereby mitigating the risk of escalating costs associated with foreign inputs such as goods, services, or equipment. The appreciation of the Naira, for instance, is a favorable development, as it reduces the number of Naira units required to acquire foreign currencies like the U.S. dollar or British pound (Kirui, Wawire, & Perez, 2008). When the domestic currency strengthens, the cost of importing foreign materials or components decreases, thereby enhancing the ability of businesses—especially those with constrained financial resources—to manage foreign exchange

risks. This risk mitigation is particularly crucial for local firms reliant on imported goods, services, materials, or machinery to maintain their operational continuity (Kuwornu, 2012).

Profitability Performance

The concept of "performance" originates from the French term signifying the act of bringing forth or actualizing objectives. Performance in a financial context entails the effective execution, achievement, and fulfillment of predetermined goals, which are then measured against the resources and time invested to achieve these outcomes (Prasad & Ahmed, 2011).

Within finance, performance is intricately linked to the efficient attainment of these objectives while minimizing financial liabilities. It functions as a critical benchmark for assessing a firm's success, particularly in terms of profitability and financial robustness, commonly evaluated through metrics such as Return on Investment (ROI), Return on Assets (ROA), Return on Capital Employed (ROCE), and Return on Equity (ROE). Financial performance, more specifically, refers to the quantification of an organization's financial health over a designated period. The financial decisions made by an organization profoundly influence its revenue generation and profitability (Ijaz & Naqvi, 2016).

In the manufacturing sector, the assessment of performance is closely tied to macroeconomic variables, such as pricing dynamics and employment levels. Inflation, in particular, exerts a significant impact on these factors, which in turn affects the financial outcomes of manufacturing enterprises. Performance is inherently multifaceted, and the optimal approach to evaluating business performance is contingent upon the nature of the entity under scrutiny and the specific objectives of the assessment (Kaguri, 2013).

As articulated by Richard et al. (2009), a comprehensive evaluation of corporate performance encompasses three primary dimensions: product market performance (e.g., sales volume and market share), financial performance (e.g., profitability metrics such as ROA, ROI, ROCE, ROE, and Earnings per Share (EPS)), and shareholder returns (e.g., total shareholder return and economic value added). Financial performance is particularly, defined by a firm's capacity to achieve its anticipated financial outcomes relative to projected targets (Mutende et al., 2017).

The evaluation of financial performance typically employs quantitative metrics such as Return on Equity (ROE), Return on Assets (ROA), Return on Capital Employed (ROCE), Return on Sales (ROS), and operating margin (Gilchris, 2013). These metrics serve as indicators of how

efficiently a firm deploys resources derived from its core operations to generate income (Pandey, 2001; Van Horne, 2005). The financial performance of a firm is of paramount importance not only to its direct stakeholders, including customers, investors, and shareholders, but also to the broader economic landscape in which it operates.

Theoretical Framework

The study was underpinned by the theory of inflation which was first propounded by William D. Nordhaus in 1976, and various opinions have emanated from economists in respect of inflation theory due to the different views of two schools of thought, namely, "monetarists and structuralists". According to Nordhaus, in his paper titled "Inflation Theory and Policy", he stated that the short run behavior of aggregate prices is one of the most significant and controversial of macroeconomic variables in the sense that Keynes suggested that in a capitalist economy in recession, there would be little price response to change in aggregate demand while monetarists argue that change in aggregate demand lead rapidly to price changes (Jahan, et al., 2014).

The first hypothesis was premised on theoretical foundations that underscore the detrimental effects of unclear economic policies, particularly concerning firm performance in an inflationary environment. Drawing on insights from two key schools of thought, the hypothesis critically examines how the lack of coherent economic policy exacerbates the impact of inflation on firm-level outcomes. Inflation, by its nature, elevates the consumer price index as the additional costs incurred by producers are systematically transferred down the supply chain—from wholesalers to retailers and ultimately to consumers, who bear the brunt of these increases (Frisch, 2010). In the context of Nigeria's economic dynamics, inflationary episodes are recurrent phenomena characterized by heightened consumer expenditure and dramatic price escalations, often doubling or surpassing previous price levels. These inflationary surges precipitate a significant devaluation in the purchasing power of the currency as the costs of both consumable and non-consumable goods and services rise sharply. The resultant effect on firm profitability is profound, as inflation amplifies input costs, thereby eroding the financial performance of firms (Meyers, 2001).

Empirical Review of Related Studies

Kanwal and Nadeem (2013) examined the impact of macroeconomic variables on the profitability of publicly listed commercial banks in Pakistan from 2001 to 2011. Employing Pearson Correlation and Pooled Ordinary Least Squares (POLS) regression analyses, the study assessed the effects of three principal external variables—inflation rate, real GDP, and real interest rate—on profitability indicators such as Return on Assets (ROA), Return on Equity (ROE), and the Equity Multiplier (EM). Their findings indicated a strong positive correlation between the real interest rate and all three profitability metrics. In contrast, real GDP showed a positive yet statistically insignificant effect on ROA, and an insignificant negative impact on both ROE and EM. Conversely, inflation rate displayed a consistently negative relationship with all profitability measures.

Osamwonyi and Michael (2014) investigated the influence of macroeconomic variables on the profitability of Nigerian banks over the period from 1990 to 2013, utilizing Pooled Ordinary Least Squares (POLS) regression analysis. The study focused on GDP, interest rate, and inflation rate, with profitability measured through Return on Equity (ROE). Results revealed a positive relationship between GDP and ROE, while interest rate exerted a significant negative effect. Inflation rate, however, proved statistically insignificant across all significance levels. Specifically, a unit increase in GDP was associated with a 2.063-unit increase in ROE, whereas a unit rise in inflation rate resulted in a 0.237-unit decrease in ROE, though this effect was not significant. Furthermore, a unit increase in the interest rate led to a 0.095-unit reduction in ROE.

Boateng (2019) explored the effects of exchange rate fluctuations on the financial performance of manufacturing firms from 2014 to 2018 through panel data analysis. The study identified a significant positive relationship between GDP and manufacturing performance. However, fluctuations in exchange rate and interest rate were found to negatively impact financial performance. Ownership structure and firm performance exhibited a positive but statistically insignificant effect, while inflation and firm size had a negative yet insignificant impact on financial performance.

Ojeyinka (2019) analyzed the effect of exchange rate volatility on the performance of Nigeria's manufacturing sector from 1981 to 2016, employing the Auto Regressive Distributed Lags (ARDL) approach and bounds testing for co-integration. The study revealed a long-term relationship among manufacturing sector value added and key macroeconomic variables, including

exchange rate, exchange rate volatility, interest rate, inflation, imports, and gross capital formation. Notably, exchange rate volatility was found to have a significant positive effect on manufacturing performance in both the short and long term. Conversely, the exchange rate itself had a positive but statistically insignificant effect on output in the long term and a negative and significant impact in the short term. Additionally, imports negatively influenced manufacturing sector performance in both time frames.

Orbunde et al. (2020) examined the impact of interest rate on the financial performance of listed manufacturing firms in Nigeria from 2009 to 2018. Correlation research design was adopted and cross-sectional and time series data was extracted from the reports of the firms, while the panel multiple regression was used to analyze the data in order to establish the relationship between the variables using E-views 10. The findings showed that Interest rates had a significant impact on ROA but no significant impact on ROE of listed manufacturing firms in Nigeria.

Ozigbo (2020) explored the effects of interest rate fluctuations on the performance of the manufacturing sector in Nigeria, covering the period from 1980 to 2019. Utilizing the co-integration approach with an error correction mechanism, the study revealed that elevated interest rates have adversely impacted the sector's performance. The findings from the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) and Autoregressive Conditional Heteroskedasticity (ARCH) models further confirmed that interest rate dynamics significantly affect manufacturing performance. The study also identified a long-term relationship among the analyzed variables, leading to recommendations for substantial reductions in interest rates and the cautious adoption of a liberalized interest rate regime.

Ezenwa et al. (2021) investigated the impact of exchange rate volatility on the return on assets (ROA) of consumer goods manufacturing firms listed in Nigeria from 2010 to 2019. Employing a panel regression model, the researchers assessed the influence of exchange rate volatility, firm size, and leverage on ROA. The study found that exchange rate volatility, firm size, and leverage all had negative and statistically significant effects on ROA. The authors noted the persistent rise in exchange rates in Nigeria, which has significantly devalued the local currency, particularly in recent years.

Lawal et al. (2022) analyzed the influence of macroeconomic, socio-economic, and political variables on the Nigerian manufacturing sector using the autoregressive Distributed Lag (ARDL) approach with data from 1986 to 2019. The study found that while both the Solow growth

theory and the endogenous growth model were applicable in the short run, only the endogenous growth model remained valid in the long run. The authors emphasized that for sustainable economic growth driven by a robust manufacturing sector, there must be a coherent alignment between macroeconomic variables and socio-political factors.

MATERIALS AND METHODS

The study adopted an ex-post facto research design deploying random effects panel regression. This research design was adopted because this study is non experimental, and the study also tries to determine the preexisting effect of the independent variables on the dependent variables being studied.

Source of Data

The data was sourced from the Central bank of Nigeria (CBN) statistical bulletin and the published financial records of the listed consumer goods manufacturing firms from twenty-one (21) listed consumer goods manufacturing firms in Nigeria. This study used secondary data spanning from 2006 to 2022. The gap of seventeen (17) years was chosen to capture the effect of the global financial crisis of 2007/2008 on the profitability of consumer goods manufacturing firms, as well as to view the effect of the current trend and recent economic activities and fluctuations on these firms. The study's sample size was 12 consumer goods manufacturing firms obtained using purposive sampling.

Methods of Data Analysis

A systematic numbering was used on each variable to avoid overlaps. The data was entered into E-views10 software and both descriptive and inferential statistics were conducted on the data. The multiple linear regression model was also tested where it emerged that the independent variable had significant effect on the dependent variable. The Levin, Lin, and Chu panel unit root test was carried out to test the stationarity of the data. Based on similar reviewed works and articles, data like these are known to be stationary, thus the decision to use either the pooled, random, or fixed effects was determined by the Hausman test.

Model Specification

The functional relationship between macroeconomic variables and profitability of firms can be portrayed as follows:

PF = F(INF, IR, EXR)   (1)

Where PF= Profitability Performance using ROA, ROE, ROCE and EPS. Hence, models of profitability performance with regards to the nature of the data for this study are:

$$ROA_{it} = \beta_0 + \beta_1 INF_t + \beta_2 IR_t + \beta_3 EXR_t + \varepsilon_{it} \quad \dots\dots\dots\dots\dots\dots\dots\dots \text{ (2)}$$
$$ROE_{it} = \beta_0 + B_1 INF_t + \beta_2 IR_T + \beta_3 EXR_t + \varepsilon_{it} \quad \dots\dots\dots\dots\dots\dots\dots.. \text{ (3)}$$
$$ROCE_{it} = \beta_0 + B_1 INF_t + \beta_2 IR_T + \beta_3 EXR_t + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots.. \text{ (4)}$$
$$EPS_{it} = \beta_0 + \beta_1 INF_t + \beta_2 IR_t + \beta_3 EXR_t + \varepsilon_{it} \dots\dots\dots..\dots\dots\dots\dots\dots \text{(5)}$$

Profitability performance was measured by the ROE, ROA, EPS and ROCE.

Where: ROA = Return on Asset, ROE = Return on Equity, ROCE = Return on Capital Employed, EPS = Earnings per Share, β_0 = Constant Term, that is the value of the dependent variables when the independent variable X is zero, β_1, β_2, and β_3 = Beta coefficients which predict the slope of the regression equation, INFL= Inflation Rate, INTR= Interest Rate, EXCR= Exchange Rate and ε = Error term which covers the unforeseen contingencies and other factors that affect the model but are not captured in the model.

RESULTS AND DISCUSSION OF FINDINGS

To evaluate the influence of macroeconomic variables on the profitability of consumer goods manufacturing firms, this study rigorously analyzed the effects of the inflation rate, interest rate, and exchange rate on the financial performance metrics of these firms in Nigeria.

Descriptive Statistics

To determine whether the dataset is appropriate for the analysis of the models, descriptive analysis helps to explain the natural characteristics and properties of the data. The results are shown in the table below:

Table 4.1 – Summary Statistics of Variables

	ROA	ROE	ROCE	EPS	INFL	INTR	EXCR
Mean	6.657	25.489	12.740	3.895	12.059	16.288	224.996
Median	5.220	14.945	11.655	1.042	12.146	16.792	156.452
Maximum	28.570	2898.45	44.180	61.770	18.765	18.991	423.510
Minimum	-39.010	-2087.70	-118.950	-5.743	5.417	11.483	116.905
Std. Dev.	9.353	290.64	15.886	9.928	3.476	1.637	100.802
Skewness	-0.381	3.639	-2.736	3.989	0.114	-1.439	0.662
Kurtosis	5.263	67.713	25.012	19.817	2.369	5.328	1.964
Jarque-Bera	48.460	36046.3	4373.01	2945.22	3.821	116.44	24.006
Probability	0.000	0.000	0.000	0.000	0.148	0.000	0.000

Source: Author's Compilation with E-Views 10

The skewness of each variable is described to evaluate the symmetry or absence of symmetry in the spread of a dataset when analysing the descriptive attributes of the variables, with symmetry being the target. The decision rule states that symmetry exists and the data distribution is normal if the skewness is zero in value. The above result indicates that there is a lack of symmetry all across the dataset, which results in the finding that the dataset of the variables is not normally distributed.

The table also includes the kurtosis values of each of the variables. Kurtosis is a measure of the cumulative weight of a dataset's tails in relation to the rest of its distribution. That is, it helps determine how much probability is in the tails of a distribution. The kurtosis value of a normal distribution is equivalent to 3, and the decision rule therefore stipulates that if the kurtosis of a variable is higher than 3, the dataset has much more heavier tails than that of the normal distribution, but if the value of kurtosis is less than 3, the dataset has fewer tails than the normal distribution. According to the table, the distributions of ROA, ROE, ROCE, EPS, and INTR all have heavier tails than that of the normal distribution, whereas the residuals of INFL and EXCR have lighter tails. As a result, the findings support the notion that the variables do not exhibit a normal distribution.

The Jarque Bera normality test is used to determine whether the variables follow the normal distribution or not to further validate the dataset's skewness and kurtosis. If the p-value of the Jarque Bera statistic is greater than 0.05, the null hypothesis of normal distribution (i.e., skewness = 0) is accepted; otherwise, it is rejected. According to the table result, only the INFL distribution follows the normal distribution based on the probability value of its Jarque Bera

statistic. However, with panel datasets, the above result is unavoidable. As a result, this result does not call into question the veracity of the work's findings, but rather demonstrates the dataset's orientation.

Table 4.2 – Correlation Table for the Variables

Description	INFL	INTR	EXCR
INFL	1	-0.2324	0.7367
INTR	-0.2324	1	-0.5104
EXCR	0.7367	-0.51046	1

Source: Author's Compilation with E-Views 10

The Table 4.2 demonstrates that the research models lack multicollinearity problem due to the fact that none of the correlation coefficients among two or more variables are greater than 0.8. As a result, the research models are reliable.

Stationarity Test

The Levin, Lin, and Chu unit root test is used in the study to determine the stationarity or otherwise of the dataset. The decision rule stipulates that if the probability value of the Levin, Lin, and Chu unit statistic is less than 5%, the null hypothesis of no stationarity is rejected. The Levin, Lin, and Chu unit root test result is shown in the table below:

Table 4.3 – Results of Levin, Lin, and Chu Unit Root Test

	Level		1st Difference		2nd Difference		Order of Integration
	LLC t-Statistics	Prob.**	LLC t-Statistics	Prob.**	LLC t-Statistics	Prob.**	
ROA	-0.86878	0.1925	-5.42055	0.0000	-	-	I(1)
ROE	-150.553	0.0000	-	-	-	-	I(0)
ROCE	0.03725	0.5149	-0.50842	0.3056	-3.79345	0.0001	I(2)
EPS	-1.78113	0.0374	-	-	-	-	I(0)
INFL	-4.86526	0.0000	-	-	-	-	I(0)
INTR	-3.45851	0.0003	-	-	-	-	I(0)
EXCR	4.32973	1.0000	-10.3432	0.0000			I(1)

(Header spanning title: Levin, Lin & Chu Unit Root Test)

Source: Author's Compilation with E-Views 10

The Table 4.3 above shows that ROE, EPS, INFL and INTR are each stationary at level as shown by the p-value of their respective Levin, Lin, and Chu t* statistics which are each less than 0.05. On the other hand, the p-value of the respective Levin, Lin, and Chu t* statistics for ROA and EXCR are each greater than 0.05 at level but become stationary at first difference. On the other hand, the distribution of ROCE is stationary only when differenced by two. In summary, since the variables employed in the model have datasets that are stationary, it rules out the possibility of yielding spurious regression coefficients.

Hausman Test

H_0: the random effects model is ideal H_1: the fixed effects model is ideal

Decision Rule: If the p-value of the Hausman Chi-Square statistic is less than 5%, reject the null hypothesis.

Table 4.4 – Hausman Test Result

Description	Model One	Model Two	Model Three	Model Four
Chi-Square	0.000000	0.000000	0.000000	0.000000
P-value	1.0000	1.0000	1.0000	1.0000

Source: Author's Compilation with E-Views 10

As shown in the Hausman test results in the table above, the p-value of the Chi-Square statistic for each of the four models are each greater than 0.05. This demonstrates that the value is not statistically significant, allowing the random effects model to be used in regression. So, based on the results of the Hausman test, the random effect model is selected.

Effect of Macroeconomic Variables on ROA

The result of the estimated model one is shown below:

Table 4.5 – Regression Result showing the effect of Macroeconomic Variables on ROA

Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
(Constant)	5.461791	6.420518	0.850678	0.3960
INFL	0.478418	0.205868	2.323904	0.0211**
INTR	0.188766	0.343699	0.549218	0.5835
EXCR	-0.033992	0.008029	-4.233757	0.0000**
R^2	0.138163			
Adj. R^2	0.125235			
F-stat	10.68748			
Prob. (F-stat)	0.000002			

Source: Author's Compilation with E-Views 10

** $p < 0.05$, **DV**: Return on Asset (ROA)

The estimated random effects panel regression model result is given as:

$$ROA = 5.461791 + 0.478418*INFL + 0.188766*INTR - 0.033992*EXCR$$

The estimated random effects panel regression model result as shown above describes the

empirical effects of inflation rate, interest rate, and exchange effect on the return on asset of the selected consumer good manufacturing firms. As seen in the estimated model results, inflation rate (INFL) and interest rate both exhibited positive effects on ROA, while the effect of exchange rate (EXCR) on ROA is negative. Specifically, a 1% positive change in each of INFL, INTR, and EXCR would influence 47.8%, 18.8%, and -3.3% changes respectively on the ROA of the firms. However, the p-values of the t-statistics of the coefficients of the independent variables show that the effects of INFL and EXCR on ROA are both significant given that the respective p-values are less than 5%, while the effect of INTR on ROA is not significant since its t-statistics p-value is greater than 0.05.

Furthermore, the weighted statistics from the estimated model shows how robust the model is. Specifically, the table above shows that the adjusted R^2 value of 0.1252 depicts that about 12.5% of the variations recorded in the return on asset (ROA) of the consumer goods manufacturing firms are influenced by changes in the macroeconomic variables put together, hence, the model has a fairly good fit and indicates that the independent variables have good explanatory power over the return on asset of the sampled firms. In addition, the F-statistic value shows the joint significance of the variables in the model and indicates that the model is significant since its p-value is less than 5% (i.e., $p = 0.000 < 0.05$).

The results indicate that the inflation rate in the country has positively impacted on the fortunes of the manufacturing firms in significantly good proportions. This is plausible in that through inflation, profits of the firms increase because producers can sell at increased prices, while great investment returns are recorded as a result of rewards for both investors and business owners to invest in productive activities. On the other hand, the negative effect of the exchange rate variable on ROA implies that the fluctuating and unfavorable exchange rate regimes or policies in the country has a debilitating effect on the investments made by these firms by altering the price of raw materials purchased from another country as well as in altering the appeal of their product offerings to international buyers which could put them at risk of improved prices or loss in sales revenue due to low demand.

Effect of Macroeconomic Variables on ROE

The result of the estimated research model two is shown below:

Table 4.6 – Regression Result showing the Effect of Macroeconomic Variables on ROE

Variables	*Coefficient*	*Std. Error*	*t-ratio*	*p-value*
(Constant)	371.3638	264.9091	1.401854	0.1625
INFL	18.60527	8.852315	2.101740	0.0368
INTR	-23.42375	14.77902	-1.584932	0.1146
EXCR	-0.838724	0.345234	-2.429438	0.0160
R^2	0.030849			
Adj. R^2	0.016311			
F-stat	2.922033			
Prob. (F-stat)	0.028647			

Source: Author's Compilation with E-Views 10

** $p<0.05$, **DV**: Return on Asset (ROE)

The estimated random effects panel regression model result is given as:

$$ROE = 371.3638 + 18.60527*INFL - 23.42375*INTR - 0.838724*EXCR$$

The above-shown estimated random effects panel regression model result describes the empirical effects of inflation, interest rate, and exchange effect on the return on equity of the selected consumer goods manufacturing firms. According to the estimated random effects panel model results, interest rate (INTR) and exchange rate (EXCR) both have negative effects on ROE, whereas inflation rate (INFL) has a positive effect on ROE. A 1% increase in INFL would cause ROE to rise by about 186%, while a 1% increase in each of INTR and EXCR would cause ROE to fall by 234% and 83.8%, respectively. However, the p-values of the t-statistics of the coefficients of the macroeconomic variables show that the effects of INFL and EXCR on ROE are both significant given that the respective p-values are less than 5%, whereas the effect of INTR on ROE is not significant because its t-statistics p-value is greater than 0.05.

Furthermore, the estimated model's weighted statistics demonstrate the model's robustness. The table above shows that the adjusted R^2 value of 0.030849 shows that only 3% of the variations recorded in the return on equity (ROE) of the consumer goods manufacturing firms

are influenced by changes in the macroeconomic variables combined, indicating that the model has a poor fit and that the independent variables do not have strong explanatory power over the return on equity of the sampled firms. Furthermore, the F-statistic value demonstrates the joint significance of the variables in the model and indicates that the model is significant because the p-value is less than 5% (i.e., p = 0.000 0.05).

The results indicate that inflation rate in the country has positively impacted on the return on equity of the manufacturing firms in massive proportions. This is against the backdrop that high inflation has historically been associated with lower equity returns. Similarly, the negative impact of exchange rate on return on equity implies that the firms have not fared well in the face of harsh exchange rate polices by the government even though that economic theory posits that in the long run, an upsurge in the positive real exchange rate will result in a rise in real stock prices.

Effect of Macroeconomic Variables on ROCE

The result of the estimated research model three is shown below:

Table 4.7 – Regression Result showing the Effect of Macroeconomic Variables on ROCE

Variables	Coefficient	Std. Error	t-ratio	p-value
(Constant)	8.639997	11.81568	0.731231	0.4655
INFL	0.704348	0.384037	1.834064	0.0681
INTR	0.396136	0.641153	0.617849	0.5374
EXCR	-0.048207	0.014977	-3.218680	0.0015
R^2	0.089170			
Adj. R^2	0.075508			
F-stat	6.526649			
Prob. (F-stat)	0.000311			

Source: Author's Compilation with E Views 10

** $p<0.05$, **DV**: Return on Capital Employed (ROCE)

The estimated random effects panel regression model result is given as:

$$ROCE = 8.639997 + 0.704348*INFL + 0.396136*INTR - 0.048207*EXCR$$

The estimated random effects panel regression model result as shown above describes the empirical effects of inflation rate, interest rate, and exchange effect on the return on capital employed of the selected consumer good manufacturing firms. As seen in the estimated model results, inflation rate (INFL) and interest rate both exhibit positive effects on ROCE, while the effect of exchange rate (EXCR) on ROCE is negative. Specifically, a 1% positive change in each of INFL, INTR, and EXCR would influence about 70%, 39.6%, and -4.8% changes respectively on the ROCE of the firms. However, the p-values of the t-statistics of the coefficients of the independent variables show that the effects of INFL, INTR, and EXCR on ROCE are all not significant since their respective t-statistics p-values are greater than 0.05.

Furthermore, the weighted statistics from the estimated model shows how robust the model is. Specifically, the table above shows that the adjusted R^2 value of 0.0891 depicts that only about 8.9% of the variations recorded in the return on capital employed (ROCE) of the consumer goods manufacturing firms are influenced by changes in the macroeconomic variables put together, hence, the model has a fairly good fit and indicates that the independent variables are fairly good explanatory variables of the return on capital employed of the sampled firms. In addition, the F-statistic value shows the joint significance of the variables in the model and indicates that the model is significant since its p-value is less than 5% (i.e., $p = 0.000 < 0.05$). The results indicate that the macroeconomic variables do not exhibit significant effects on the return on capital employed of the sampled consumer goods manufacturing firms.

Regression Result showing the Effect of Macroeconomic Variables on EPS

The result of the estimated research model four is shown below:

Table 4.8 – Regression Result showing the Effect of Macroeconomic Variables on EPS

Variables	Coefficient	Std. Error	t-ratio	p-value
(Constant)	-0.771235	5.646331	-0.136590	0.8915
INFL	-0.061456	0.169615	-0.362327	0.7175
INTR	0.166707	0.283174	0.588708	0.5567
EXCR	0.011965	0.006615	1.808819	0.0720
R^2	0.028842			
Adj. R^2	0.014274			
F-stat	1.979877			
Prob. (F-stat)	0.118227			

Source: Author's Compilation with E Views 10

** p<0.05, **DV**: Earnings per Share (EPS)

The estimated random effects panel regression model result is given as:

$$EPS = -0.771235 - 0.061456*INFL + 0.166707*INTR + 0.011965*EXCR$$

The above-shown estimated random effects panel regression model result describes the empirical effects of inflation, interest rate, and exchange effect on the earnings per share of the selected consumer goods manufacturing firms. According to the estimated random effects panel model results, interest rate (INTR) and exchange rate (EXCR) both have positive effects on EPS, whereas inflation rate (INFL) has a negative effect on EPS. A 1% increase in INFL would cause EPS to decline by about 6%, while a 1% increase in each of INTR and EXCR would cause EPS to rise by 16.6% and 1.2%, respectively. However, the p-values of the t-statistics of all the coefficients of the macroeconomic variables show that the effects of INFL, INTR, and EXCR on EPS are not significant because their respective t-statistics p-values are greater than 0.05.

Furthermore, the estimated model's weighted statistics demonstrate the model's robustness. The table above shows that the adjusted R^2 value of 0. 014274 indicates that only 1.4% of the discrepancies in the earnings per share (EPS) of the consumer goods manufacturing firms are influenced by changes in the macroeconomic variables combined, indicating that the model has a poor fit and that the independent variables do not have strong explanatory power over the earnings per share of the sampled firms. Furthermore, the F-statistic value demonstrates the joint significance of the variables in the model and indicates that the model is not significant because the p-value is greater than 5% (i.e., p = 0.000 0.05). The results indicate that the macroeconomic variables do not exhibit significant effects on the earnings per shares of the sampled consumer goods manufacturing firms.

Post Estimation and Diagnostics Tests

The study also employed several diagnostic tests to ascertain the reliability of the models used in terms of the behavior of the residuals. Specifically, the study tests for the normality and serial correlation of the residuals.

Test for Normality of the Residuals

This test was carried out using the histogram normality test to check if there was a normal distribution among the residuals of the models. The null hypothesis of normality would be accepted if the probability value is higher than the 0.05 critical value which means that the sample data are not significantly different than a normal population. From the normality tests for the four models, and based on the decision rule, since the probability values of the Chi-Square statistic for the distribution of each of the models are less than 0.05, the null hypothesis (H_0) of normal distribution of the residuals of the models is rejected. This outcome is expected given the nature of the panel data.

Test for Autocorrelation

The Pesaran CD test of independence was utilized in this research to ascertain if there is an interaction among cross-sectional units, which is referred to as cross-sectional dependence. The null hypothesis states that residuals between entities are uncorrelated. This test is essential because panel data can exhibit widespread cross-sectional dependence, in which all units in the same cross-section are strongly associated (Tugcu, 2018). This is typically explained as a consequence of certain unobserved common characteristics that are shared by all units and affect each of them differently. Pesaran CD test of independence for all four of the models is shown in the table below:

Table 3 – Pesaran CD Test for Cross-Sectional Dependence

	Model One	**Model Two**	**Model Three**	**Model Four**
Breusch-Pagan LM	134.9793 (p = 0.0000)	364.2667 (p = 0.0000)	142.2965 (p=0.0000)	421.3158 (p = 0.0000)
Pesaran scaled LM	6.003879 (p=0.0000)	25.96078 (p=0.0000)	6.640756 (p=0.0000)	30.92627 (p=0.0000)
Pesaran CD	2.063257 (p=0.0391)	9.191002 (p=0.0000)	1.863519 (p=0.0624)	11.18452 (p=0.0000)

Source: Researcher's Computation using Gretel 2019 Software

According to the findings from Table 3, the p-values of the Pesaran CD Statistic for models 1, 2, and 4 are each less than 0.05, indicating that it is significant. It suggests the presence of cross-sectional dependence, which confirms the existence of serial correlation in all three models. The existence of serial correlation is due to the type of data, which includes an array of firms with varying degrees of complexity and characteristics. Despite the existence of serial correlation, the estimated coefficients and regression statistical inferences on the results of these models are still unbiased as well as consistent.

On the other hand, the p-value of the Pesaran CD Statistic for model 3 is greater than 0.05, indicating that it is not significant. It therefore suggests the absence of cross-sectional dependence, which confirms the absence of serial correlation in model 3. Furthermore, the Breusch-Pagan Lagrange Multiplier test is employed to assess if the random effects applied in panel data models are significant. From the table above, the p-values of the Breusch-Pagan LM statistic for all four models is 0.0000. As such, the null hypothesis is rejected since the p-values are each less than 0.05. This leads to the conclusion that the random effects models are significant, and is appropriate.

Discussion of Findings

The analysis revealed that the inflation rate exerts a positive influence on Return on Assets (ROA), Return on Equity (ROE), and Return on Capital Employed (ROCE), while negatively affecting Earnings per Share (EPS), though this negative impact was not statistically significant. This indicates that, despite inflation enhancing profitability indicators such as ROA, ROE, and ROCE, it does not have a substantial effect on shareholder returns as measured by EPS. This outcome led to the rejection of the first null hypothesis, thereby confirming that inflation significantly affects the profitability of consumer goods manufacturing firms in Nigeria. These findings corroborate the results of Owoputi et al. (2014), who, through a random effects model, demonstrated the significant impact of inflation on both ROA and ROE in Nigerian banks from 1998 to 2012.

Conversely, these results are inconsistent with the findings of Kanwal and Nadeem (2013), who, using Pooled Ordinary Least Squares Regression (POLS) for public limited commercial banks in Pakistan over 2001–2011, identified a negative association between inflation and all profitability measures. Similarly, Ubesie and Ezeagu (2014) found an insignificant negative relationship between inflation and ROE within Nigerian conglomerates, and Osamwonyi and

Michael (2014) reported that inflation lacked statistical significance in their study of Nigerian banks spanning 1990 to 2013. Regarding interest rates, the study found no significant effect on the profitability of consumer goods manufacturing firms in Nigeria, leading to the acceptance of the second null hypothesis. This suggests that interest rates do not substantially influence profitability. This finding aligns with Egbunike and Okerekeoti (2018), who, through multiple linear regression, found no significant impact of interest rates on ROA.

Similarly, Mohamad (2020) reported that interest rates had a positive but statistically insignificant effect on the financial performance of firms in the consumer goods sector, as determined by an ex post facto research design. However, these results contrast with those of Osamwonyi and Michael (2014), who identified a significant negative effect of interest rates on ROE, and Kanwal and Nadeem (2013), who observed a robust positive relationship between real interest rates and ROA, ROE, and Equity Multiplier (EM) in Pakistani commercial banks. Additionally, the work of Owoputi et al. (2014) showed that interest rates were significant for ROA and Net Interest Margin (NIM) in Nigerian banks.

The analysis revealed a statistically significant negative impact of the exchange rate on Return on Assets (ROA), with a 1% increase in the exchange rate leading to a 3.39% reduction in ROA. Additionally, the exchange rate exhibited a substantial negative effect on Return on Equity (ROE), where a 1% rise in the exchange rate resulted in an 83.8% decrease in ROE. Similarly, the exchange rate had a significant adverse effect on Return on Capital Employed (ROCE), causing a 4.8% decrease in ROCE for every 1% increase in the exchange rate. In contrast, the effect of the exchange rate on Earnings per Share (EPS) was positive but statistically insignificant, at 1.1%. These results are consistent with Njau's (2013) study, which employed multiple linear regression to analyze the effect of macroeconomic variables on the financial performance of private equity firms in Kenya between 2005 and 2012. Njau observed a modest negative relationship between exchange rate fluctuations and financial performance.

Similarly, Ubesie and Ezeagu (2014) identified a weak negative association between exchange rates and financial performance indicators within Nigerian conglomerates, which supports the present findings. Furthermore, Bayar and Ceylan (2017) corroborate these results by demonstrating that exchange rate volatility negatively impacts both ROA and Return on Operating Profit (ROAF). Conversely, Nzuve's (2016) study, which assessed the impact of macroeconomic

variables on deposit-taking microfinance institutions in Kenya, found a positive relationship between exchange rates and financial performance, presenting a contrast to the current findings.

Egbunike and Okerekeoti (2018) also reported no significant effect of exchange rates on ROA, and Hasan et al. (2018) found no statistically significant influence of exchange rates on the performance of non-life insurance companies in Bangladesh, further diverging from the current results. Additionally, the current findings contradict Simiyu and Ngile (2015) who identified a positive effect of exchange rates on the profitability of commercial banks listed on the Nairobi Securities Exchange. Njau (2013) highlighted the significant positive effects of inflation and bank lending rates on private equity firms' performance, which contrasts with the present study. Similarly, Kiganda (2014) found that macroeconomic factors, including exchange rates, had an insignificant effect on the profitability of Equity Bank, reinforcing the notion that the impact of macroeconomic variables on financial performance may vary across different contexts.

Conclusion and Recommendations

This study concludes that exchange and inflation rates are significant influences on the manufacturing sector in terms of the volume of their profits, and that although these macroeconomic variables impact the profits of the firms, it does not necessarily translate into higher financial rewards for investors in terms of their earnings per share. The cost of lending in the real economy should be lowered in a bid to lower manufacturing expenses, increase productivity, and earnings, while the government could also implement necessary macroeconomic measures to mitigate harmful inflationary pressures in the economy. Furthermore, inflation and exchange rates should be recognized as key factors that influence the profits and performance of consumer goods manufacturing firms in Nigeria. Additionally, to minimize the unforeseen risks of high rates of interest, these consumer goods manufacturing firms must also practice effective risk management.

Furthermore, consumer goods manufacturing firms and other manufacturing firms should engage in appropriate corporate social responsibility endeavors to help boost sales turnover in the face of adverse monetary policies that may cause finished goods prices to rise. Finally, in order to achieve higher performance in production by manufacturing firms, the government must consistently prioritize policies that promote economic expansion and trade. To accomplish this,

interest rate hikes should be kept to a minimum; significant increases in interest rates should as a matter of fact be limited to situations in which tighter monetary regulation is truly ideal.

Conflicts of Interest

The authors have disclosed no conflicts of interest.

Author's Affiliation

Alalade, Yimka S. A.[*1].; Idowu, Paulina A.[2]; Akande, Folorunso I.[3]; Oliyide, Roseline O.[4], Adebola, Peter S.[5]

[1,2,3,4,5]Department of Finance, School of Management Sciences
Babcock University, Ilishan-Remo, Ogun State, Nigeria

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