Original Article

Firm Attributes, Macroeconomic Variables, and Performance of Listed Manufacturing Firms in Nigeria

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Abstract: The effect of firm attributes and macroeconomic variables on financial performance was assessed using a sample of 25 listed manufacturing firms in Nigeria from 2011 to 2023, employing the Two-step system generalized method of moments. Size, age, leverage, growth, and liquidity were the proxies of firm attributes, while interest rate, inflation rate, and exchange rate were the macroeconomic variables investigated. Size, leverage, growth, inflation rate, and exchange rate have a significant positive effect on financial performance; interest rate has a significant negative effect on performance, while age and liquidity have an insignificant negative effect on performance, as measured by the return on equity. Firm attributes and macroeconomic variables are important determinants of the firms' financial performance. However, the macroeconomic factors are more relevant determinants of the firms' performance than the firm specific attributes. Large-sized firms should continue to leverage on the benefits associated with the economies of scale to improve financial performance. Older firms should be opened to new technology and innovation and avoid unnecessary bureaucratic bottle necks in operations and decision making, so as to give room for enhanced financial performance. Firms should continue to trade-off the benefits of leverage with its associated costs to improve financial performance.

Keywords: Macroeconomic Variables; Firm Attributes; Financial Performance; Manufacturing

1. Introduction

The manufacturing industry is a key player in the overall economic prosperity of a nation. It also creates numerous employment opportunities and provides support to agriculture and contributes significantly to the diversification of the economy (Tonye & Gbarawae, 2023). In Nigeria, the manufacturing sector's performance remains unimpressive as confirmed by available data relating to the sector. As observed by Afolabi and Laseinde (2019), the index of the manufacturing sector performance, which was 70.1 per cent in 1980, had dropped to 57.45 per cent in June 2019. It was also observed by Afolabi and Laseinde (2019),

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that the Nigerian manufacturing sector capacity utilization is very poor when compared to other economies around the globe. Available statistics have shown that in 1980, the manufacturing capacity utilization rate has not been consistent, revealing an uncertain trend. In 1981, the capacity utilization rate was 73.26 per cent, which dropped to 40.35 per cent in 1990. In the year 2000, the rate declined further to 32.99 per cent. However, in 2010, the utilization rate increased to 56.22 per cent and closed at 44.23 per cent in 2020. In 2021, there was a slight increase to 45.21 per cent over the 2020 rate. In 2022, the manufacturing capacity utilization rate moves upwards to 50.73 per cent (central bank of Nigeria [CBN], 2022).

Studies have shown that both firm attributes and macroeconomic factors can influence the firm's financial performance. Firm attributes are unique to the individual firms and are within the control of management. In contrast, macroeconomic variables are external and beyond management control. In this study, we consider how firm attributes (size, age, leverage, growth and liquidity) and macroeconomic variables (interest rate, inflation rate and exchange rate) influence financial performance. Despite the importance of the sector, empirical studies linking firm attributes and macroeconomic variables are rather scarce. Hence, we investigate the effect of firm attributes and macroeconomic variables on the financial performance, applying the Two-step system generalised method of moment (GMM) on a panel data of 25 firms in Nigeria from 2011- 2023.

2. Literature Review

2.1. Concept of Financial Performance

Firm financial performance represents how well a firm is faring in terms of its financial results. This encompasses various facets of the company's financial well-being, including its capability to meet its financial obligations, maintain liquidity, generate profits, achieve favourable market valuation, foster growth, and operates efficiently. Concisely, financial performance serves as a comprehensive assessment of a business's overall financial health (Yahaya, 2022).

2.2. Concept of Firm Attributes

Akenroye et al. (2022) view firm attributes as factors controllable or uncontrollable, internal or external, impacting a company's strategic decisions. These attributes cover aspects like the company's size, leverage, liquidity, board size, and institutional factors, etc. Firm attributes play a pivotal role in determining the success or failure of business operations (Irom et al., 2018). Firm attributes include the firm's age, dividend pay-out, profitability, access to capital markets, ownership structure, board qualities, and growth potential (Khatib & Nour, 2021; Mehta et al., 2022; Sari & Rahmantika, 2021). Based on the foregoing, it can be observed that firm attributes can assume many forms. However, size, age, leverage, growth, and liquidity are the firm attributes employed in this study. Size can be defined as the size of a company in terms of income, number of employees, total assets, the market value of shares, and total capital (Nurwulandari et al., 2021). Age of the firm is expressed by the number of years the firm operates in the market (Pervan et al., 2017).

Shumway (2001) asserts that from the economic view point, the most meaningful measure of firm age is the number of years since listing. Leverage refers to the proportion of debt to equity in the firms' capital structure (Omondi & Muturi, 2013). It measures the portion of the total assets that is financed by debt funds (Egbunike & Okerekeoti, 2018). Leverage has been measured in the literature using debt ratio, debt-to-equity ratio and interest coverage ratio (ICR). However, this study measured leverage using ICR. Growth is a process of changing size. Different indicators can be employed to measure the growth of a firm (Wiklund, 1998). Growth is the term used to describe an increase in sales over a given time horizon. A growing firm is the one that the annual percentage rise in sales is acceptable to the company's financial plans. Liquidity refers to the firm's ability to convert its short-term assets into cash in order to meet its routine operations (Douglas, 2014). Liquidity is used to measure firm's capacity to meet its current overdue liabilities (Okwoli & Kpelai, 2006).

2.3. Concept of Macroeconomic Variables

Macroeconomic indicators are factors that characterize a nation's economy and business environment. These macroeconomic indicators are beyond the control of a single firm (Williams & Thompson, 2019). The government frequently influences the macroeconomic indicators through the enactment of legislation and/or policies. Inflation, GDP, interest rate, foreign exchange rate, and money supply are some of the examples of macroeconomic variables (Anderson & Williams, 2021). However, this study adopts interest

rate, inflation rate, and exchange rate. Each of the macroeconomic variables utilised in this study are discussed below.

Interest rate is the cost of loan that is incurred by the borrower for the loans received from lenders (Nyabakora et al., 2020). Interest rate is the rate at which interest is charged by the central bank for providing a loan to a commercial bank and the rate at which a commercial bank earns interest on its deposits with the central bank is called interest rate. Inflation is the general rise in the level of price of goods and services for the specified period. It is measured by using the consumer price index [CPI] (World development indicators, 2012). Inflation rate refers to the rate at which inflation changes. The study measured inflation rate using the CPI for all items. Exchange rates are the rates between the currency units of two countries; it is the number of units of one national currency that is needed to buy one unit of the other national currency. This study measured exchange rate using the central annual buying and selling rate of naira to dollar.

2.4. Theoretical Review

We adopted the resource-based view, and the open system theories as theoretical underpinning.

2.4.1. Resource-Based View Theory

The Resource-based view (RBV) could be traced to Penrose (1959). The theory uses resources as a basis for achieving comparative and competitive advantage for continued performance. The RBV theory posits that firms are heterogeneous and their performance are unique, which calls for them to possess varied and assorted resources that require different firms to structure differently their distinct strategic plans in the development, acquisition and utilization of different composition of resources in the management of the organization (Tang, 2017). According to the RBV theory, large size firms that can take advantage of the resources at their disposal to enhance financial performance. Equally, older firms are expected to utilise the experience, the connection and the relationship they built overtime to improve financial performance. Similarly, the RBV theory anticipates that firms should balance the benefits of debt with the cost in order to drive the financial performance. Similarly, high growth firms are expected to report high financial performance by taking advantage of increasing in sales to maximise earnings. Additionally, the RBV theory expects firms with high level of liquidity to invest the excess in worthy investment opportunities, so as enhance financial performance.

2.4.2. Open System Theory

The Open Systems Theory (OST) was also utilised. The OST was popularised by Bertalanffy (1969), who states that organisations operate in an open context in which their activities are mainly influenced by macroeconomic forces in the environment. The organization cannot control these forces and must contend with them. This idea suggests that an organisation cannot succeed on its own without the interference from the macroeconomic variables (Mwenda et al., 2023). Firms must both adapt to their environment and leverage the risks associated with the interactions (Laszlo & Krippner, 1998). Managers of firms must recognise their surroundings and how they affect corporate performance (Bertalanffy, 1969). In essence, it can be argued that a firm's ability to respond and adapt to an ever-changing environment is contingent on its macroeconomic environment (Mwenda et al., 2023).

2.5. Review of Empirical Studies and Hypotheses Development

2.5.1. Size and Financial Performance

Efuntade and Akinola (2020), Jibril and Idris (2022), Msomi and Nyide (2021), Egbunike and Okerekeoti (2018), and Banerjee and Majumdar (2018) discovered a significant positive relationship between size and financial performance, while a significant negative and insignificant relationship was found by Ullah et al. (2020), and Nawaz et al. (2023), Msomi and Nzama (2023), respectively. We therefore, formulate hypothesis one as:

H1: Firm size positively impacts on financial performance.

2.5.2. Age and Financial Performance

Kwaltommai et al. (2019), and Efuntade and Akinola (2020) found a positive link between age and financial performance, while Dioha et al. (2018), and Taiwo et al. (2020) found an insignificant relationship, as Abubakar et al. (2018) show a negative relationship. Based on the fact age comes with experience and opportunities, hypothesis two is formulated as:

H2: Age positively impacts on financial performance.

2.5.3. Leverage and Financial Performance

Msomi and Nzama (2023), Uzoka et al. (2020), Nawaz et al. (2023), Ullah et al. (2020), and Lasisi et al. (2017) found a negative relationship between leverage and financial performance. In contrast, Dioha et al. (2018) and Arthur-Sam et al. (2024) reported a positive relationship, whereas Jibril and Idris (2022) and Efuntade and Akinola (2020) found an insignificant relationship. Based on this empirical evidence, and the fact that high leverage is associated with financial costs, we therefore, hypothesised that:

H3: Leverage has a significant negative effect on financial performance.

2.5.4. Growth and Financial Performance

Lasisi et al. (2017) and Dioha et al. (2018), Shuaibu et al. (2019), Efuntade and Akinola (2020), Ullah et al. (2020) and Banerjee and Majumdar (2018) all found that growth is positively linked to financial performance. We therefore developed hypothesis four as:

H4: Growth is positively related to financial performance.

2.5.5. Liquidity and Financial Performance

Msomi and Nzama (2023), Msomi and Nyide (2021), Lasisi et al. (2017), and Nawaz et al. (2023) document a positive relationship between liquidity and financial performance, while a non-significant association was documented by Arthur-Sam et al. (2024), Jibril and Idris (2022), and Efuntade and Akinola (2020). Hence, hypothesis five is formulated as:

H5: Liquidity has a positive significant effect on financial performance.

2.5.6. Interest Rate and Financial Performance

Egbunike and Okerekeoti (2018), Nawaz et al. (2023), and Francis and Ucheoma (2018) unveil an insignificant relationship between interest rate and financial performance. In contrast, a negative significant relationship (Mwenda et al., 2023; Panigrahi et al., 2020) and a positive significant relationship (Rezina et al., 2020) were found. We formulate hypothesis four as:

H4: Interest rate will have a significant negative impact on financial performance.

2.5.7. Inflation Rate and Financial Performance

Mwenda et al. (2023). Ali and Danish (2020), Adjei (2021), Panigrahi et al. (2020), Egbunike and Okerekeoti (2018), and Francis and Ucheoma (2018) uncover positive relationship between inflation rate and financial performance. However, Tonye and Gbarawae (2023), reported a negative relationship. Based on the results of the prior studies, we develop hypothesis seven as:

H7: Inflation rate will have a positive impact on financial performance.

2.5.8. Exchange Rate and Financial Performance

Nawaz et al. (2023), Egbunike and Okerekeoti (2018), and Francis and Ucheoma (2018) all reported an insignificant relationship between exchange rate and financial performance. In contrast, Tonye and Gbarawae (2023) found a significant positive relationship, whereas Mwenda et al. (2023) documented a significant negative relationship. Hence, hypothesis eight is stated as follows:

H8: Exchange rate impacts negatively on financial performance.

3. Materials and Methods

The 55 manufacturing firms listed on the nine sectors of the Nigerian Exchange (NGX) group as of December 31, 2023, constitute the population. Several criteria were used to select the final sample. Firstly, only firms listed on the NGX group as of 2011 and retaining their listing status up to 2023 are selected. Secondly, the electronic copy of the annual report and financial statements of the firm for the period 2011-2023 must be readily accessible. Thirdly, the annual report must contain all the information needed to measure or calculate the variables. Three, eight, and 19 firms were dropped based on the first, second, and third criteria, respectively, leaving a final sample of 25 manufacturing firms. Data on firm attributes and the financial performance were retrieved from the annual report and the financial statements of the selected firms, while data relating to the macroeconomic variables were obtained from the CBN statistical data base.

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All variables were measured according to the previous literature, and the macroeconomic variables were adopted as computed on the CBN database. Size was measured by the natural logarithm of total sales (Dogan, 2013; Rajan & Zingales, 1995). We measured age using the natural logarithm of the number of years of a firm since incorporation (Adenle et al., 2023; Chandrapala & Knápková, 2013). Leverage was computed using earnings before interest and taxes (EBIT) divided by interest expense (Arhinful & Radmehr, 2023a; Afolabi et al., 2019). Similarly, growth was measured using the percentage change in total sales (Omondi & Muturi, 2013; Ekadjaja et al., 2021). In line with Msomi and Nzama (2023) and Nawaz et al. (2023), liquidity was measured as the ratio of current assets to current liabilities.

Furthermore, for the macroeconomic variables, interest rate was measured using the annual maximum lending rate for the last working day of the year, inflation rate was measured using the Annual change in the price of all items, and the exchange rate was measured using the central value of buying and selling rate of naira to dollar (CBN, 2022). For the measures of financial performance, EPS figures were lifted from the income statements of the sampled firms. ROA was measured using EBIT divided by total assets; while ROE was measured using EBIT divided by shareholders' equity (Al-Homodai et al., 2018; Gazi et al., 2024). Two-step SYS-GMM for the three models is specified in the following equations:

$$EPS_{it} = \alpha_0 + \beta_1 EPS_{i(t-1)} + \beta_2 SIZ_{it} + \beta_3 AGE_{it} + \beta_4 LEV_{it} + \beta_5 GRT_{it} + \beta_6 LIQ_{it} + \beta_7 ITR_{it} + \beta_8 IFR_{it} + \beta_9 EXR_{it} + \varepsilon_{it} \tag{1}$$

$$ROA_{it} = \alpha_0 + \beta_1 ROA_{i(t-1)} + \beta_2 SIZ_{it} + \beta_3 AGE_{it} + \beta_4 LEV_{it} + \beta_5 GRT_{it} + \beta_6 LIQ_{it} + \beta_7 ITR_{it} + \beta_8 IFR_{it} + \beta_9 EXR_{it} + \varepsilon_{it} \tag{2}$$

$$ROE_{it} = \alpha_0 + \beta_1 ROE_{i(t-1)} + \beta_2 SIZ_{it} + \beta_3 AGE_{it} + \beta_4 LEV_{it} + \beta_5 GRT_{it} + \beta_6 LIQ_{it} + \beta_7 ITR_{it} + \beta_8 IFR_{it} + \beta_9 EXR_{it} + \varepsilon_{it} \tag{3}$$

Where: EPS = earnings per share (a measure of financial performance), ROA = return on assets (a measure of financial performance), ROE = return on equity (a measure of financial performance), α_0 = intercept, β_2= coefficient of size, β_3 = coefficient of age, β_4 = coefficient of leverage, β_5 = coefficient of growth β_6 = coefficient of liquidity, β_7 = coefficient of interest rate, β_8 = coefficient of inflation rate, β_9 = coefficient of exchange rate, subscript i and t refer to each firm i in year t, ε_{it} = stochastic error term.

This study employed descriptive statistics and dynamic panel techniques to analyze the collected data. For data presentation, descriptive statistics, including mean, minimum, maximum, and standard deviation, were employed. The dynamic panel technique, in the form of the Two-Step Generalized Method of Moments (SYS-GMM), proposed by Arellano and Bond (1991), was utilized to examine the association among firm attributes, macroeconomic variables, and financial performance. GMM estimation has the benefit of detecting a more robust relationship between the dependent and independent variables, as the OLS technique produces variations in the results compared to the GMM technique due to the presence of endogeneity bias (Ullah et al., 2018; Zaefarian et al., 2017). Additionally, the GMM approach serves as a semi-parametric model that can handle the heteroskedasticity problem within the data (Lim et al., 2023; Roy et al., 2014).

4. Results

4.1. Descriptive Statistics

Table 1 provides descriptive results.

Table 1. Result of Descriptive Statistics

Variable	Mean	Minimum	Maximum	Std. Dev.
SIZ	7.29	3.73	9.11	1.04
AGE	49	7	100	20.15

Variable	Mean	Minimum	Maximum	Std. Dev.
LEV	9.01	-102.96	677.26	42.30
GRT	0.20	-1.00	11.00	0.73
LIQ	1.29	0.00	6.42	0.75
ITR	0.27	0.23	0.31	0.03
IFR	0.13	0.08	0.29	0.04
EXR	322.62	155.20	899.39	193.40
EPS	3.73	-100.26	61.77	10.73
ROA	0.09	-2.00	0.68	0.16
ROE	0.27	-1.42	3.58487	0.45

Table 1 shows that firm size (SIZ) has a mean of 7.29 against the minimum size of 3.73 and the maximum size of 9.11. The disparity between the minimum and maximum values suggests that the sampled firms are composed of both small-sized and large-sized firms. The descriptive results also show that the average age of firms since incorporation is 49 years old, which suggests that firms employed are matured. The implication is that most of the firms have acquired experience overtime. The results show that the mean leverage is 9.01 times implying that EBIT can cover the interest expense up to 9 times. This suggests that most of the firms utilised may not have problem of fulfilling their debt obligations to the creditors. In Table 2, the mean growth (GRT) is 0.20, suggesting that the annual growth rate in sales revenue stood at 20 per cent. Given the macroeconomic challenges witnessed during the study period, such as high inflationary pressures, deteriorating exchange rate, economic recession, and the outbreak of the Covid-19 pandemic, a growth rate in sales by 20 per cent cannot be considered bad.

The mean liquidity is 1.29, which is far below the recommended 2.00 in the finance literature, suggesting that the firms utilised may be facing challenges in meeting short-term financial obligations as they become due. Similarly, interest rate (ITR) has a mean of 0.27, which implies that the average interest rate during the period was 27 per cent. A 2-digit interest rate might not mean well for manufacturing firms that are expected to contribute significantly to the economic growth of a nation. The inflation rate (IFR) has a mean of 0.13, which suggests that the average inflation rate for all items during the study period was 13 per cent. High rate of inflation could affect the production capacity of firms, which could lead to reduction in sales revenue, and by extension, earnings. The results also show that exchange rate has a mean of ₦322.62, which signifies that the average exchange rate of Naira to dollar was ₦322.62 during the period 2011- 2023. Furthermore, the result shows that EPS has a mean of 3.73, which indicates that 1 unit of shares invested would generate an after tax profit of ₦3.73 for the equity holder during period under review. The results also indicate that ROA has a mean of 0.09, which connotes that a 1 per cent investment in total assets will generate a 9 per cent before tax profit for the firm. Additionally, the mean ROE of 0.27 connotes that for every ₦1 investment in shares, about ₦0.27 was generated as before tax profits for the shareholders.

4.2. Multicollinearity Test

Multicollinearity problem can influence the outcome of a regression results. The variance inflation factor (VIF) is used to detect multicollinearity. Table 2 provides the independent variables and their VIF.

Table 2. Result of Collinearity

Independent Variables	Variance Inflation Factors
SIZ	1.19
L_AGE	1.20
LEV	1.06
GRT	1.06
LIQ	1.06
ITR	1.48
IFR	1.79
L_EXR	1.39

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The results of the collinearity statistics in Table 2 clearly reveal that none of the independent variables has a VIF above 5, which portrays that the study model has no problem of multicollinearity (Bagadeem et al., 2024).

4.3. Dynamic Panel Regression

This study utilized the Two-step system GMM to examine the association among five firm attributes, three macroeconomic variables, and three measures of financial performance. The GMM results are given in Table 3.

Table 3. Result of Parameter Estimates of the Two-step SYS-GMM

Variables	EPS	ROA	ROE
Lag DEP	-0.04(-2.11)**	0.05(1.22)	0.29(7.18)***
SIZ	2.27(5.45)***	0.03(2.77)***	0.07(5.10)***
L_AGE	-2.72(-4.57)***	0.05(0.40)	-0.02(-0.79)
LEV	0.04(3.32)***	0.00(3.87)***	0.00(2.59)***
GRT	-0.01(-0.04)	0.00(0.41)	0.05(7.48)***
LIQ	0.59(1.66)*	0.02(4.30)***	-0.01(-0.96)
ITR	16.95(2.18)**	-0.43(-2.46)**	-1.89(-4.36)***
IFR	19.92(7.50)***	-0.06(-0.70)	0.47(2.64)***
L_EXR	-1.95(-3.89)***	-0.01(-0.43)	0.04(2.54)**
S.E of Regression	10.81	0.20	0.40
No. of Instruments	85	74	85
No. of Observations	300	275	300
Wald (joint) Test: Chi-Square	2555.22(0.00)	127.04(0.00)	487.16(0.00)

Notes: The values in parentheses for variables are z scores and those against Chi-Square statistic are p-values. Lag DEP is the lag of dependent variable; '***', '**' and '*' imply significant at 1%, 5% and 10% respectively.

Table 3 shows that all variables are significant at varying levels except growth in the EPS model, while the lag ROA, age, growth, inflation rate, and exchange rate are insignificant in the ROA model. Similarly, in the ROE model, all variables were significant at different levels except age and liquidity. For the EPS model, size, leverage, liquidity, interest rate, and inflation rate have a positive and significant effect, age and exchange rate have an adverse but significant effect, while growth has an insignificant effect on financial performance. When ROA is considered, size, leverage, and liquidity have a positive and significant effect, interest rate has a significant negative effect, while age, growth, inflation rate, and exchange rate have no effect. In addition, for the ROE model, size, leverage, growth, inflation rate, and exchange rate have a significant positive association; interest rate has a significant negative association, while age and liquidity have no link with ROE. The Wald (joint) test shows that the Chi-Squares values that are significant at 1 per cent levels for the three models. The null hypothesis that the association among the firm attributes, macroeconomic variables and financial performance are altogether equal to zero is therefore, rejected. Hence, the study concludes that all proxies of firm attributes and macroeconomic variables have joint significance on the financial performance measures (EPS, ROA, and ROE).

Table 3 shows that lagged dependent variables (EPS_{t-1} and ROE_{t-1}) are statistically and significantly related to the current EPS and ROE respectively, which supports the dynamic nature of the model specifications. The significant lagged dependent variable lends support to the assertion that historical financial performance is connected to the current financial performance. The inclusion of lagged dependent variables aims to capture the temporal dynamics of the financial performance (Gazi et al., 2024). However, the lagged ROA (ROA_{t-1}) is not significant, implying that the ROA model is not dynamic. On this basis, the ROA model is dropped.

4.4. Diagnostic Tests

Olarewaju et al. (2017) have documented that serial autocorrelation and over-identification of instrument are the two major challenges confronting the adoption of the GMM. The efficiency of the GMM estimators is seriously hampered by the problems of serial autocorrelation and over-identification of instrument (Hayakawa, 2014). For the GMM to be valid, it is required that the error term is serially

uncorrelated (Pervan et al., 2017). To detect the presence or otherwise of serial autocorrelation in the study models, Arellano and Bond (1991) order one AR (1) and order two AR (2) tests is used. The null hypothesis is that autocorrelation is not present in the model. Table 4 shows the results of the autocorrelation test for the EPS and ROE models.

Table 4. Result of Autocorrelation Test

Order	EPS	ROE
AR (1)	-1.60(0.11)	-1.31(0.19)
AR (2)	0.01(0.99)	-1.07(0.29)

Note: number in parenthesis are p-values.

From the results in Table 4, the null hypothesis of no autocorrelation cannot be rejected since the p-values are insignificant. Hence, at both lags, autocorrelation is not present in the EPS and ROE Two-step system GMM models. To check the validity of instruments used in the Two-step System GMM, the Sargan test is utilised (Pervan et al., 2017). This test is important in investigating the over-identification of instrument usually affecting the validity of the GMM estimates. The null hypothesis is that the model has no over-identification of instruments.

Table 5. Result of Sargan Test

Test Statistics	EPS	ROE
Chi-square	12.84	16.13
Prob > chi-square	1.00	1.00

The Chi-square values for the two models are insignificant. Hence, the study concludes that there is no problem of over-identification of instruments in the EPS and the ROE models. By these results, it is noteworthy that our Two-step system GMM estimates are valid and well specified.

4.5. Model Adequacy and Selection

This section is meant to compare the results of the EPS and ROE models. Both models conform to the dynamic nature of financial performance, as the lags of the financial performance measures were significant. The lag of EPS is negative, and the lag of ROE is positive.   Both models passed the diagnostic tests for the Two-step system GMM, as the results showed that there are no problems of autocorrelation and over-identification of instruments. In terms of the results of the two models, the variables size, leverage, and inflation rate are consistent, while the results of age, growth, liquidity, interest rate, and exchange rate are inconsistent. However, age is both negative in both models, except that the z-score is significant in the EPS model and not significant in the ROE model. To choose the best model between the EPS and the ROE model, we utilised the standard error of regression. The standard errors of the measures of the financial performance are provided in Table 5. The standard errors are 10.81 and 0.40 for EPS and ROE respectively. The model with low standard error is considered as the best model. On this basis, the ROE model is selected and would be considered for discussion of findings, conclusion, and recommendations.

5. Discussion

The discussion of the findings is based on the descriptive analysis, and the results of the ROE two-step system GMM. The first hypothesis, which states that firm size positively impacts on the financial performance has been supported. The z-score was positive and significant at 1 per cent level, which implies that size is positively associated with the financial performance proxy by ROE. A positive sign is a pointer that large size firms can leverage economies of scale to improve shareholder wealth measured by ROE. The result is consistent with the resource-based view (RBV), which suggests that larger firms possess superior resources, economies of scale, and market power that can enhance profitability (Barney, 1991; Penrose, 1959). It also aligns with empirical findings by Kwaltommai et al. (2019),

Hypothesis two which is stated that age positively impacts on the financial performance, was rejected because the z-score of the age variable was insignificant. The finding that firm age has an insignificant effect on financial performance suggests that longevity alone does not necessarily translate into improved profitability. This could be attributed to structural rigidities, managerial complacency, or outdated

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technology that sometimes accompany older firms (Coad et al., 2013). This finding concords with the results of negative, and insignificant relationship reported by Pervan et al. (2017); Ekadjaja et al. (2021), and Dioha et al. (2018), which aligns with the view that while experience and accumulated knowledge matter, competitive advantage depends more on adaptability and innovation than mere existence over time.

Hypothesis three which states that leverage has a significant negative effect on financial performance was rejected. This follows the positive significant z-score of the leverage variable. The results indicate that firms with better capacity to meet interest obligations tend to perform better financially. This aligns with the trade-off theory of capital structure, which posits that an optimal level of leverage enhances performance by benefiting from tax shields while avoiding financial distress (Kraus & Litzenberger, 1973). The finding agrees with study by Kwaltommai et al. (2019), which reported that prudent use of debt financing improves firm profitability. This finding is contrary to the results of Nawaz et al. (2023) and Ullah et al. (2020). The differences in results are due to differences in the context, method of analysis and the measurement of variable. In this study, leverage was measured using interest coverage ratio, which is quite different from the debt-to-equity ratio used by Nawaz et al. (2023) and Ullah et al. (2020).

Hypothesis four which stated that growth is positively related to the financial performance was also supported, as the z-score of the growth variable has a 1 per cent statistical significant. As expected, the results of both size and growth are positive because both variables were measured using sales revenue. This result implies that firms experiencing sales growth are more likely to enjoy enhanced profitability, as growth expands market share, improves operational efficiency, and strengthens brand reputation. This finding corroborates the work of Ullah et al. (2020), Dioha et al. (2018), and Lasisi et al. (2017), who also observed that firm growth contributes to financial success through expanded revenue streams and economies of scope. In support of this result, Mohammed (2010) argued that growing firms or high growth firms have strong bargaining power to negotiate with suppliers and providers of finance, which can result to minimization of the overall cost of capital, and the improvement in the financial performance.

Hypothesis five, which states that liquidity has a positive significant effect on the financial performance was rejected. This is because the z-score was too low to have any significant effect on the financial performance. The non-significant z-score suggests that liquidity position of the firms does not affect performance. This suggests that holding excessive liquid assets does not necessarily translate into higher profitability, possibly due to opportunity costs associated with idle funds. The finding supports the liquidity–profitability trade-off theory, which emphasizes that firms must balance between maintaining liquidity for solvency and investing in profitable ventures (Eljelly, 2004). This finding validate the results of Mohammed (2018).

Hypothesis six was supported as interest rate was found to have a negative and significant effect on the financial performance. The z-score of interest was significant at 1 per cent level. This result proves that interest rate is detrimental to performance because high interest rate will cause earnings to decline due to high interest payment. Additionally, high interest rate may limit the amount of external financing the firm can utilise, which may result to decline in earnings, as the firms cannot raise sufficient funds to finance new projects. The coefficient of the interest rate is the largest among the eight determinants considered in this study. This revelation makes interest rate the most important influential indicator of financial performance. The finding aligns with monetary transmission theory and empirical results by Panigrahi et al. (2020), Tonye and Gbarawae (2023), and Mwenda et al. (2023), who found that high interest rates constrain investment and dampen corporate earnings.

Hypothesis seven was also supported because inflation rate was found to have a positive and significant effect on the financial performance. The finding may reflect the ability of firms to adjust product prices upward during inflationary periods, thereby maintaining or even improving margins. This positive link could further be explained as, since the sampled firms engaged in the manufacturing of different products, it follows that the inflation cost had been shifted to the end users of the manufactured products. In other words, the hike in the prices of manufactured products is higher than the increase in the price raw-materials used by these manufacturing firms. This outcome resonates with the findings of Panigrahi et al. (2020), who observed that moderate inflation may stimulate nominal revenue growth for firms capable of price adjustments. After the coefficient of the interest rate, the next higher coefficient is that of the inflation rate. This provides additional evidence that macroeconomic variables are stronger determinants of the financial performance than the firm-specific variables or firm attributes in this study.

Hypothesis eight which states that exchange rate impacts negatively on financial performance was also rejected due to the 1 per cent significant exchange rate z-score. The coefficient of the exchange rate is 0.04, which implies that a 1 per cent increase in the exchange rate will cause a 0.04 per cent surge in the financial performance. This implies that currency depreciation may favor export-oriented manufacturing firms by

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making Nigerian goods cheaper abroad, thereby enhancing sales and profits. The finding agrees with studies such as Tonye and Gbarawae (2023), who reported that exchange rate fluctuations could benefit firms with significant foreign revenue exposure. The descriptive results have revealed that the naira was significantly weaker than the dollar during the study period. In this situation, home-produced goods became cheaper than foreign-made goods, which may divert demand from foreign-made goods to home-made goods in the home country.

6. Conclusions

The study concludes that both firm attributes and macroeconomic variables are important determinants of the firms' performance. However, macroeconomic factors are more relevant determinants of a firm's financial performance than its firm-specific internal attributes. Based on the major findings, the following recommendations were made. Large-scale firms should continue to leverage the benefits associated with economies of scale to enhance their financial performance. Older firms should be open to new technology and innovation, and avoid unnecessary bureaucratic bottlenecks in operations and decision-making, in order to create room for improving financial performance. Firms should continue to balance the benefits of leverage against its associated costs to enhance financial performance. Firms should continue to invest in projects that generate returns higher than the cost of debt to enhance their financial performance. High-growth firms should continue to negotiate for better terms with suppliers and lenders to obtain additional supplies and funding to finance sales growth, as this will lead to increased earnings. The liquidity-financial performance relationship was not significant, although it was negative.

Therefore, firms with a high level of liquidity should invest excess cash in profitable projects to enhance their financial performance. The government should reduce the interest rate, as its financial performance has been found to be adversely affected by high interest rates. Reducing the interest rate will lower production costs, leading to a decrease in the price of the final products. Low prices will attract demand, and by extension, lead to increased earnings and improved financial performance. Firms should take measures to improve product quality to generate additional earnings from the price increase. Manufacturing firms should leverage the opportunity created by foreign exchange volatility to produce innovative products, thereby attracting more earnings from increased prices and patronage. Policymakers should maintain a stable macroeconomic environment. Lower interest rates can stimulate manufacturing investment, while moderate inflation and stable exchange rates can enhance competitiveness. The positive role of firm size reinforces RBV's assertion that access to superior resources and capabilities enhances firm performance (Barney, 1991). The positive effect of leverage (ICR) supports the trade-off theory, emphasizing the benefits of debt utilization up to an optimal point. The insignificance of liquidity confirms that excessive liquidity may not necessarily translate into higher returns, supporting traditional theories of financial management.

The study focused solely on listed manufacturing firms, excluding unlisted ones, which limits the generalizability of the findings to the entire manufacturing sector. Only a few macroeconomic variables were considered. Other important variables, such as GDP growth, money supply, and fiscal policy stance, were excluded. In view of these limitations, researchers should extend the study to other sectors, such as financial services, to enhance comparability and generalization. Future studies may incorporate other firm-specific variables (e.g., ownership structure, board composition) and macroeconomic indicators (e.g., GDP growth, fiscal deficit). Subsequent studies may examine whether corporate governance or innovation capability mediates or moderates the relationship between firm attributes, macroeconomic variables, and performance.

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