

ANALYZING THE IMPACT OF FIRM SIZE ON REAL SECTOR PERFORMANCE IN NIGERIA: INSIGHTS FROM QUOTED FIRMS

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Abstract

This study takes a closer look at how firm size affects the performance of Nigeria's real sector, focusing on eight publicly listed firms on the Nigerian Stock Exchange (NSE) from 2013 to 2022. Using the panel autoregressive distributed lag (ARDL) model as the main approach and confirming results with the fully modified ordinary least squares (FMOLS) method, we found some interesting insights. The ARDL results show that sampled firms tend to perform better across agriculture, manufacturing, and services. However, the FMOLS analysis reveals a surprising twist, indicating that these firms might actually hurt overall sector performance. These findings highlight the need for better financial support, especially for small businesses. The government and financial institutions should work together to offer affordable financing options, like lower interest rates and credit guarantee schemes, to ease lending risks. Supporting SMEs through venture capital, grants, and other investment tools can also drive growth. Beyond finance, infrastructure is key. Stable electricity would cut down production costs, particularly in manufacturing, while better roads, ports, and rail networks could improve trade and logistics. Investing in digital infrastructure is equally important, helping firms leverage modern technology to boost productivity. By tackling these challenges, Nigeria can create a stronger, more competitive real sector that benefits businesses of all sizes.

Keywords: Firm Size, Real Sector, Firm Performance, Quoted Firms.

1. INTRODUCTION

The real sector is the backbone of economic growth and development, especially in emerging economies like Nigeria. It drives job creation, provides household income, and improves living standards (Gibrat, 1931). Comprising industries such as manufacturing, agriculture, and services, the real sector produces tangible goods and services that directly boost national output and employment. Understanding what influences firm performance in this sector is vital for shaping policies that support Nigeria's broader development goals. As the country works to reduce its heavy reliance on oil, strengthening the real sector is essential for achieving sustainable and inclusive growth. Its contributions to GDP, industrialization, poverty reduction, and value addition make it a key pillar of Nigeria's economy. One factor that continues to draw

attention is firm size and its impact on performance. Firm size — measured by assets, revenue, or market capitalization — plays a crucial role in determining a firm's ability to compete, innovate, and sustain growth (Bentzen & Tung, 2023). Larger firms often benefit from better access to capital, economies of scale, and stronger market influence, which can enhance performance. Meanwhile, smaller firms, despite their flexibility and innovation potential, often face resource constraints and limited market reach (Shapiro et al., 1987). Understanding this dynamic is key to developing policies that promote balanced growth across firms of all sizes.

Firm size plays a vital role in shaping the growth and performance of Nigeria's real sector (Coug et al., 2023). Whether measured by assets, revenue, or market capitalization, firm size affects a company's ability to access resources, adapt to changes, and contribute to the broader economy. Larger firms typically have better access to capital and financing, as financial institutions and investors perceive them as less risky. This advantage makes it easier for them to secure loans and attract investments, enabling them to expand operations, adopt advanced technology, and boost productivity — all of which drive real sector growth. In contrast, smaller firms often struggle with limited financing due to weaker credit histories, fewer assets, and higher perceived risk (Beck, Demirgüç-Kunt, & Maksimovic, 2005). These financial constraints can hinder their ability to grow, innovate, and compete, limiting their overall impact on the real sector. Firm size also influences economies of scale, where larger production volumes lower per-unit costs. It affects access to capital, technological advancement, market reach, employment generation, risk management, and resilience to economic shocks (Isiksal & Chimezie, 2016). These factors significantly shape economic growth and diversification. For Nigeria to achieve sustainable and inclusive growth, supporting firms of all sizes is essential. Policies that improve access to financing, foster innovation, and build resilience can help maximize the real sector's contribution to the broader economy.

Firm size is a significant factor influencing the performance of firms in Nigeria's real sector. Previous studies consistently show that larger firms tend to outperform smaller ones in critical areas such as market access, employment generation, and resilience to economic shocks (Egbuhuzor & Wokeh, 2022; Ehigator, 2017; Aza, 2018; Nevin et al., 2018; Isiksal & Chimezie, 2016; Ebumuche et al., 2023). Larger firms have the capacity to diversify operations, secure credit during economic downturns, and manage large-scale production, which makes them more resilient to external shocks. They also play a crucial role in value-added production, such as processing agricultural products and expanding into manufacturing, reducing Nigeria's reliance on imports. Additionally, larger firms often have better access to markets, which enhances their competitiveness and overall contribution to economic growth. This study investigates the impact of firm size — measured by total assets, total sales, market value of equity, and the number of employees — on the performance of the real sector in Nigeria. The focus is on three key sectors: agriculture, manufacturing, and services. Performance is assessed using sector-specific indicators, including agricultural value-added, manufacturing value-added, and services sector value-added among publicly listed firms. To guide this investigation, the study seeks to address the following research questions: a) How do total assets impact the performance of Nigeria's real sector? b) Does total sales significantly influence real sector performance? c) To what extent does market value of equity affect real sector performance? d)

What is the impact of the number of employees on real sector performance in Nigeria?

To explore how firm size affects real sector performance in Nigeria, we applied the autoregressive distributed lag (ARDL) model following Manasseh et al. (2017), focusing on key indicators such as total assets, total sales, market value of equity, and the number of employees. The study examines three crucial sectors: agriculture (measured by agricultural value-added), manufacturing (manufacturing value-added), and services (services sector value-added) among publicly listed firms. While building on previous research (Ebumuche et al., 2023), this study provides fresh insights into how firm size drives economic outcomes through reveal sector growth. First, we assessed the impact of total assets on real sector performance. When quoted firms increase their total assets, they gain more capacity to expand, innovate, and operate efficiently. This boosts financing access, resilience to economic shocks, job creation, productivity, and economic diversification, promoting sustainable growth and reducing reliance on imports. Second, we examined the effect of total sales. As a direct indicator of profitability and growth, higher sales revenue enhances market competitiveness and supports economic development through job creation and income generation. Third, we also explored how the market value of equity reflects financial health and investor confidence. Higher equity values improve access to capital and market competitiveness, enabling firms to pursue growth strategies and strengthen corporate governance. Finally, we analyzed the role of employment. Workforce size directly impacts productivity, innovation, and economic growth. In Nigeria, higher employment levels in the real sector promote poverty reduction and national development. The study is organized into five chapters: Chapter 2 explores the existing literature, Chapter 3 details the research methodology, Chapter 4 presents and discusses the findings, and Chapter 5 concludes with key insights and policy recommendations.

2. LITERATURE REVIEW

2.1. Conceptual Review

Firm size reflects how big or small a business is, typically measured by total assets, sales revenue, market value, and the number of employees. It plays a crucial role in shaping a company's ability to innovate, compete, and grow. In Nigeria, businesses are generally classified as small, medium, or large enterprises, each contributing uniquely to the economy. Larger firms often have the upper hand with better access to financing, advanced technology, skilled labor, and economies of scale. These advantages help them withstand economic downturns, sustain growth, and make a bigger impact on the economy. On the flip side, smaller firms, despite being essential for job creation and grassroots development, often struggle with limited capital, high operational costs, and regulatory hurdles, which slow their growth. Nigeria's real sector — which includes agriculture, manufacturing, and services — is the backbone of the economy. It drives GDP growth, creates jobs, and promotes economic diversification. The link between firm size and real sector performance is particularly important because larger firms tend to lead in driving industrialization and boosting productivity. For instance, Olam Nigeria has significantly improved agricultural output through large-scale mechanization and supply chain efficiency, enhancing food security. In manufacturing,

Dangote Cement leverages its scale to cut production costs and expand its market reach, boosting profitability. Similarly, MTN Nigeria has transformed the services sector by creating jobs, expanding digital access, and supporting economic growth. However, small businesses remain the heartbeat of entrepreneurship and innovation. Supporting them by improving access to financing, infrastructure, and favorable policies can unlock their full potential. Understanding how firm size affects the real sector, especially in agriculture, manufacturing, and services, is key to fostering sustainable growth and development in Nigeria.

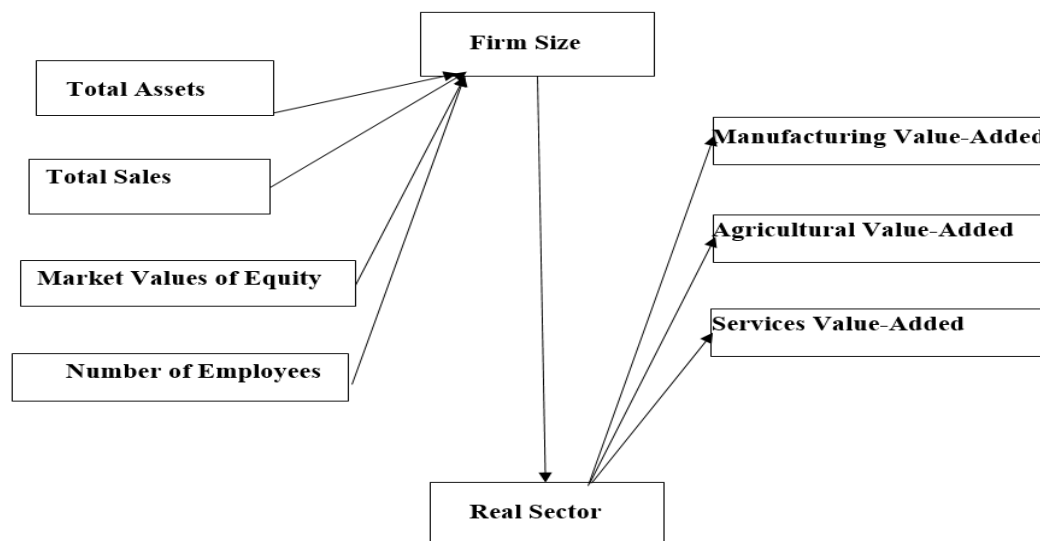


Figure 1: The Conceptual Framework

Source: Authors' Concept

2.2. Theoretical Review

Several theoretical frameworks offer valuable insights into how firm size shapes real sector performance in Nigeria, with practical examples from quoted firms. First, Gibrat's Law of Proportionate Effect (Gibrat, 1931) suggests that firm growth is random and independent of initial size, implying that small and large firms have equal chances of growth. However, in Nigeria's real sector, this theory faces challenges. For instance, larger firms like Dangote Cement and Nestlé Nigeria consistently outperform smaller firms due to their market dominance and resilience to economic shocks. This suggests that growth is not entirely random but influenced by firm size. Second, the Resource-Based View (RBV) (Penrose, 1959) emphasizes that a firm's size determines its capacity to access and leverage resources, which directly impacts performance. In Nigeria, larger firms such as MTN Nigeria and Flour Mills of Nigeria have better access to financing, advanced technology, and skilled labor. This advantage allows them to innovate, expand operations, and sustain growth even during economic downturns. Smaller firms often struggle due to limited resources, highlighting the relevance of RBV in explaining real sector dynamics. Third, Marshall's Economies of Scale Theory (Marshall, 1890) argues that as firms grow, they achieve cost advantages through larger

production volumes. In Nigeria, companies like BUA Group leverage economies of scale to reduce production costs, negotiate better deals with suppliers, and enhance profitability. This has boosted manufacturing and agricultural value-added, reducing the country's reliance on imports. Together, these theories provide a comprehensive framework for understanding how firm size influences real sector performance in Nigeria, offering practical insights for policies aimed at driving sustainable economic growth.

2.3. Empirical Review

Ebomuche et al. (2023) examined Nigeria's real sector performance as a foundation for economic restructuring, emphasizing the uneven growth across sectors during the country's shift from agriculture to industry and services. Using sector-specific time series data from 1981 to 2018, the study applied the Autoregressive Distributed Lag (ARDL) bounds testing approach to analyze key variables, including real GDP growth, sectoral output rates (agriculture, manufacturing, industry, and services), trade openness, and real interest rates. Findings revealed that real sector growth significantly drives economic growth in both the short and long term. For example, the steady expansion of Dangote Group's manufacturing operations has contributed to Nigeria's industrial growth, while the rise of MTN Nigeria has boosted the services sector. The study concluded that a sector-specific policy framework is essential for sustainable economic transformation, highlighting the real sector's critical role in driving diversification and resilience. Similarly, Egbuhuzor and Wokeh (2022) explored how firm size affects the financial performance of listed deposit money banks in Nigeria. Analyzing data from 13 banks listed on the Nigerian Stock Exchange (NSE) through multiple regression analysis, they measured firm size using total assets and total revenue. Interestingly, the study found no significant relationship between firm size and financial performance, indicating that bigger banks do not necessarily perform better financially. For instance, despite its large asset base, Union Bank of Nigeria has sometimes underperformed compared to smaller, more agile banks like Wema Bank, suggesting that size alone does not guarantee profitability. These findings challenge the assumption that larger financial institutions inherently deliver superior financial outcomes.

Cuong et al. (2021) explored how firm size influences the performance of private enterprises in Vietnam, providing insights that are highly relevant to Nigeria. Analyzing data from 2009 to 2018 with an ordinary least squares (OLS) regression model, the study found that total assets had the strongest impact on firm performance, followed by total labor and the growth rate. This mirrors the Nigerian experience, where larger firms like Dangote Cement and MTN Nigeria excel due to better access to capital, advanced technology, and operational efficiency. However, the study also highlighted that the decline of medium and large enterprises undermines competitiveness and business expansion—a challenge Nigeria continues to face with its struggling small and medium enterprises (SMEs) sector, which often battles limited financing and poor infrastructure. In a similar vein, Meiryani et al. (2020) examined the relationship between capital structure and firm performance in Indonesia's manufacturing sector, offering parallels to Nigeria's financial landscape. Using panel data analysis on 55 listed companies, they found no significant relationship between firm size and financial performance, measured

by return on assets (ROA) and market-to-book value. This reflects the situation in Nigeria's banking sector, where bigger institutions like Union Bank sometimes underperform compared to smaller, more dynamic players such as Wema Bank. These findings challenge the assumption that bigger always means better, underscoring the importance of efficient capital management and strategic leadership in achieving financial success. In both cases, the message is clear — firm size matters, but it is not the sole driver of performance.

Adeyemi et al. (2022) looked into how firm size affects performance in Nigeria's Fast-Moving Consumer Goods (FMCG) sector, focusing on data from 2008 to 2019. Their findings, based on multiple regression analysis, showed that bigger firms tend to perform better financially, with return on shareholders' funds serving as the key performance measure. Companies like Nestlé Nigeria and Unilever Nigeria stood out, leveraging their size for better market reach, stronger brand loyalty, and economies of scale. This reflects a common trend in Nigeria's FMCG industry, where larger firms often outshine smaller ones due to their resource advantage. Similarly, Rahman and Liu (2021) explored the link between firm size and profitability in China's stock market, analyzing data from 2008 to 2018. Using a fixed effects model, they found that larger firms were generally more profitable — a pattern that aligns with global market trends. Nigeria offers similar examples, with giants like Dangote Cement and MTN Nigeria consistently reporting higher profits, thanks to their financial muscle and market dominance. In Indonesia, Widhiaslutis (2021) studied real estate companies using structural equation modeling, finding a strong positive relationship between firm size and profitability, despite some concerns over raw data usage. This pattern is also evident in Nigeria's real estate sector, where bigger firms like UPDC Plc benefit from better financing options and economies of scale, allowing them to outperform smaller competitors. However, Jurnal (2020) provided a different perspective by examining Indonesian manufacturing firms listed on the Indonesia Stock Exchange (BEI) from 2016 to 2018. Their analysis, done using Eviews software, found a non-significant negative link between firm size and financial performance. This suggests that larger firms didn't necessarily perform better than smaller ones. A similar scenario exists in Nigeria's banking sector, where bigger banks like Union Bank have occasionally underperformed compared to smaller, more agile banks like Wema Bank, showing that size alone doesn't guarantee profitability. This highlights the importance of strategy and efficiency over sheer scale.

Yu (2016) looked into how firm size affects growth in mobile phone companies across mainland China, Hong Kong, and Taiwan, testing the idea behind Gibrat's law—which suggests that firm growth happens randomly, regardless of size. The findings mostly backed this theory, but not for all cases. In some sub-groups, companies driven by innovation and technology saw growth patterns that broke the rule. This is similar to Nigeria's tech scene, where startups like Flutterwave and Paystack have expanded rapidly despite their smaller sizes, proving that innovation often outweighs sheer size when it comes to growth. Villari et al. (2021) studied the service industry in India, finding that firm size, age, and growth were closely linked. Knowledge-intensive service firms grew differently from other sectors, thanks to their reliance on expertise and technology. Nigeria's fintech sector reflects this trend. Companies like Paga and Kuda Bank have outpaced many older, more traditional firms by leveraging digital

efficiency and innovative business models. In Turkey, Aydogan and Donduran (2019) found strong evidence against Gibrat's law, showing that smaller firms grew faster than larger ones because the economic environment was more favorable to smaller businesses. A similar situation plays out in Nigeria's SME sector, where smaller firms thrive in flexible markets despite facing resource constraints. For example, small agro-processing businesses have experienced significant growth under supportive policies like the Anchor Borrowers' Programme, demonstrating how government intervention and favorable conditions can help smaller firms outperform larger competitors.

Masira (2018) examined how company size affects total debt in Chinese firms, finding a positive relationship that wasn't statistically significant in the fixed effects model. However, the study revealed a negative and highly significant link between company size and long-term debt, indicating that larger firms are less reliant on long-term borrowing. This wasn't due to information asymmetry, as China's well-capitalized equity market provides ample transparency. Instead, larger firms leverage their strong market reputation and easier access to capital markets, favoring equity financing for its capital gains appeal. A similar trend is evident in Nigeria, where giants like Dangote Cement and MTN Nigeria often prioritize equity over long-term debt, thanks to high investor confidence and market liquidity. This observation aligns with Manasseh et al. (2025), who explored how financial technology and innovation influence bank performance in ECOWAS from 1997 to 2022 using the ARDL model. The findings show that fintech and innovation significantly boost bank performance, emphasizing the importance of investing in financial technology within regulated banking systems to enhance profitability. Similarly, Manasseh et al. (2024) investigated how technological innovation affects bank performance in 40 emerging markets from 2000 to 2021. Using ARDL and GMM models, the study confirmed a long-term positive relationship between innovation and bank performance, underlining how technological progress drives financial success in emerging economies. In East Africa, Omenyo & Muturi (2019) analyzed how firm size influences the financial performance of manufacturing firms listed on the Nairobi Securities Exchange (NSE). They identified Carbacid Investments as having the largest firm size, reflected in its strong financial performance with the highest mean return. Interestingly, firm size wasn't significantly linked to the number of employees, suggesting that financial strength matters more than workforce size. This mirrors Nigeria's manufacturing sector, where companies like Nestlé Nigeria thrive financially despite having a relatively smaller workforce. These findings echo Manasseh et al. (2024, 2025), where innovation and financial technology, rather than sheer size or employee count, emerge as key drivers of long-term financial performance.

3. RESEARCH METHODOLOGY

3.1. Data, Definition and Sources

To achieve the purpose of this study, we focused on examining how firm size affects the performance of Nigeria's real sector from 2013 to 2023. After a thorough review of theoretical and empirical literature, we selected key variables to capture firm size, including total assets (TA), total sales (TS), market value of equity (MVE), and number of employees (NOE). Real

sector performance was measured using manufacturing value-added (MVA), agricultural value-added (AVD), and services value-added (SVA). Additionally, we controlled for inflation rate (INFR) and exchange rate (EXR) to account for macroeconomic influences. The data for this study was sourced from the World Bank Development Indicators (WDI) and the annual financial reports of the selected firms. To provide clarity on each variable, we presented detailed definitions in Table 1 below, offering a better understanding of how these factors interplay in shaping real sector performance.

Table 1: Definition of the Variables

Acronyms	Definition	Source
AVD	Agriculture, forestry, and fishing, value added (% of GDP)	World Bank's World Development Indicators (WDI)
MVA	Manufacturing, value added (% of GDP)	World Bank's World Development Indicators (WDI)
SVA	Services, value added (% of GDP)	World Bank's World Development Indicators (WDI)
TA	Total Assets	Financial Fact Sheets of the Selected Firms
TS	Total Sale	Financial Fact Sheets of the Selected Firms
MVE	Market Value of Equity	Financial Fact Sheets of the Selected Firms
NOE	Number of Employment	Financial Fact Sheets of the Selected Firms
INFR	Inflation, consumer prices (annual %)	World Bank's World Development Indicators (WDI)
EXR	Official exchange rate (LCU per US\$, period average)	World Bank's World Development Indicators (WDI)

Source: Authors' Concept

3.2. Method of Analysis

Baseline Model – Panel ARDL (p, ..., q)

In this study, we employed the panel autoregressive distributed lag (ARDL) approach as our baseline model to examine how firm size influences the performance of the real sector in Nigeria, following Manasseh et al. (2017). The ARDL model offers several advantages over other estimation techniques commonly used in econometric research. While methods like the Engle and Granger (1987) residual-based test, the Johansen (1991) maximum likelihood approach, and the Johansen and Juselius (1990) cointegration test have been widely applied, they come with certain limitations. These shortcomings have led researchers to adopt the panel-based ARDL model, which provides greater flexibility and robustness. One key advantage of the ARDL model is its ability to handle variables that are integrated at different orders — whether I(0) or I(1) — as highlighted by Pesaran et al. (2001). Additionally, it can generate an error correction model (ECM) through linear transformation (Banerjee et al., 1993), allowing for a clear distinction between short-run and long-run dynamics. According to Ghatak and Siddiki (2001), the ARDL model is particularly effective even with small or finite sample sizes, making it ideal for this investigation. Moreover, Pesaran et al. (2001) emphasize that the ARDL model is well-suited for addressing issues of serial correlation and endogeneity, especially when the appropriate lag structure is applied. Its ability to estimate both long-run and short-run relationships accurately makes it a superior choice for this study. The empirical ARDL model used in this investigation is presented below.

$$\Delta \ln PRS_{it} = \phi_0 + \sum_{i=1}^n \phi_1 \Delta \ln PRS_{it-1} + \sum_{i=1}^n \phi_2 \Delta \ln MFS_{it} + \sum_{i=1}^n \phi_3 \Delta \ln INFR_{it} + \sum_{i=1}^n \phi_4 \Delta \ln EXR_{it} + \partial_1 \ln PRS_{it} + \partial_2 \ln MFS_{it} + \partial_3 \ln INFR_{it} + \partial_4 \ln EXR_{it} + \varepsilon_{it} \quad (1)$$

Where: PRS connotes performance of real sector measured with – agricultural value-added (AVD), manufacturing value-added (MVA) and services value-added (SVA) which also represent the dependent variable, MFS is the measures of firm size which include – total assets (TA), total sale (TS), market value of equity (MVE) and number of employees (NOE); while the control variables are inflation rate (INFR) and exchange rate (EXR). Furthermore, ϕ_0 is the constant, ∂_1 to ∂_4 represents the coefficients of the long-run impacts, ϕ_1 to ϕ_4 , is the coefficients of the short-run dynamics, Δ , is the first difference operator, and \ln is the natural logarithm, while ε_{it} is the white noise error term. However, if the F-statistic lies above the upper-bound critical value for a given significance level, the conclusion is that there is a non-spurious long-run level relationship with the dependent variable. If the F-statistic lies below the lower bound critical value, the conclusion is that there is no long-run level relationship with the dependent variable. If it lies between the lower and the upper limits, the result is inconclusive. The general form of the null and alternative hypotheses for the F-statistic test is as follows:

$$\begin{aligned} H_0: & \partial_1 = \partial_2 = \partial_3 = \partial_4 = 0 \\ H_1: & \partial_1 \neq \partial_2 \neq \partial_3 \neq \partial_4 \neq 0 \end{aligned} \quad (2)$$

If the cointegration between variables is identified, then one can undertake further analysis of the long-run and short-run (error correction) relationship between the variables. The error correction representation of the series can be specified as follows:

$$\Delta \ln PRS_{it} = \phi_0 + \sum_{i=1}^n \phi_1 \Delta \ln PRS_{it-1} + \sum_{i=1}^n \phi_2 \Delta \ln MFS_{it} + \sum_{i=1}^n \phi_3 \Delta \ln INFR_{it} + \sum_{i=1}^n \phi_4 \Delta \ln EXR_{it} + \Phi ECT + \varepsilon_{it} \quad (3)$$

Where ϑ the speed of adjustment parameter and ECT is the error correction term (the residuals obtained from equation 1). The coefficient of the lagged error correction term Φ is expected to be negative and statistically significant to further confirm the existence of a cointegrating relationship between the variables.

Robustness Check – FMOLS

To ensure the robustness of our results from the ARDL model, we conducted additional analysis using the panel fully modified ordinary least squares (FMOLS) method, following Manasseh et al. (2024). This approach builds on the works of McCoskey and Kao (1998), Chiang (2000), Phillips & Moon (1999), and Pedroni (2000). The FMOLS model effectively addresses cross-sectional dependency, country-specific heterogeneity, and other econometric issues that often arise in panel data analysis. One of the key advantages of the FMOLS technique is its ability to produce optimal estimates of cointegration parameters, even with a small sample size. It resolves challenges such as endogeneity, serial correlation, omitted variable bias, and measurement errors, while allowing for heterogeneity in long-run parameters. It also accounts for the long-run correlation between the cointegrating equation and the innovations of the stochastic regressors. The FMOLS estimator is asymptotically unbiased and offers a fully

efficient mixture of normal asymptotics, enabling the use of standard Wald tests with asymptotic Chi-square statistical inference. Additionally, it leverages long-run covariance matrices of the residuals, which can be derived directly from difference regressions. The FMOLS model is specified as follows:

$$\beta^{*NT} - \beta^{FMOLS} = [\sum_{i=1}^N L_{22t}^{-1} \sum_{t=1}^T (x_{it} - x_{it})^2] \sum_{t=1}^N L_{11t}^{-1} L_{22t}^{-1} [(\sum_{t=1}^T (x_{it} - x_t) \mu_{it}^* - T_{\gamma 1}^{\wedge})]$$

(4)

4. EMPIRICAL RESULTS, ANALYSIS AND DISCUSSIONS

This study explores how firm size impacts the performance of listed firms in Nigeria's real sector. Specifically, it investigates how total assets (TA), total sales (TS), market value of equity (MVE), and number of employees (NOE) influence manufacturing value-added (MVA), agricultural value-added (AVD), and services value-added (SVA). To ensure data reliability, the analysis focused on eight quoted firms on the Nigerian Stock Exchange (NSE), with data drawn from their annual financial reports and financial fact sheets. The study covers a span of eight years, from 2013 to 2023. In this chapter, we present a detailed analysis of the regression results obtained from the secondary data, offering insights into the relationship between firm size variables and real sector performance.

4.1. Descriptive Statistics

The first step of this study was to examine the general and specific behavior of the variables before conducting the main analysis, using descriptive statistics. The sample included eight firms, with a total of 80 observations, covering a 10-year period from 2013 to 2023. Descriptive statistics provided a basic summary of the data, offering insights into key metrics such as mean, median, minimum, maximum, standard deviation, skewness, and kurtosis. The results, presented in Table 2, show that the Jarque-Bera statistics have probability values below 0.05, indicating that the series is normally distributed. Additionally, the mean, median, standard deviation, skewness, and kurtosis values were relatively close to one another, suggesting minimal drift. This consistency confirms that the variables are well-suited for analyzing the relationship between firm size and real sector performance in Nigeria.

Table 2: Descriptive Statistics Results

Variable	TA	TS	MVE	NOE	AVD	MVA	SVA	INFR	EXR
Mean	-0.538	0.587	1.230	0.900	2.719	101.7	-0.673	-0.618	-0.748
Median	-0.750	0.105	0.448	0.896	0.597	83.18	-0.680	-0.694	-0.783
Maximum	1.990	11.36	6.335	5.066	7.432	4.841	1.196	1.420	1.160
Minimum	-2.445	-0.698	-11.65	-1.588	-6.226	0.102	-2.547	-1.916	-2.450
Std. Dev.	0.900	5.668	4.993	0.720	22.92	81.37	0.678	0.630	0.644
Skewness	1.096	1.254	5.948	0.245	30.76	1.960	0.074	0.617	0.330
Kurtosis	3.761	4.458	57.82	7.162	989.4	6.885	3.287	2.957	3.028
Jarque-Bera	247.8	69.36	1447	808.0	4493	1401.	4.823	70.34	20.15
Probability	0.000	0.000	0.000	0.000	0.000	0.000	0.089	0.000	0.000
Observations	80	80	80	80	80	80	80	80	80

Source: Authors' Concept

4.2. Correlation Test

The next step in this study was to explore the relationship between firm size and real sector performance in Nigeria using the Spearman's correlation test. This test measures the strength and direction of the linear relationship between each pair of variables in the model, with correlation values ranging from -1 to +1.

A higher absolute value indicates a stronger relationship, while a lower value suggests a weaker connection (Gujarati, 2003). According to Cohen's (1988) rule of thumb, correlations are categorized as strong (± 0.5), moderate (± 0.3), and weak (± 0.1).

The results, presented in Table 4, reveal that total assets (TA) have a strong negative correlation with real sector performance in Nigeria, while total sales (TS) show a positive relationship.

The market value of equity (MVE) exhibits a weak correlation, whereas the number of employees (NOE) and inflation rate (INFR) demonstrate moderate positive correlations. In contrast, the exchange rate (EXR) reflects a moderate negative correlation with real sector performance.

Table 3: Spearman's Correlation Results

	AVD	MVA	SVA	TA	TS	MVE	NOE	INFR	EXR
AVD	1								
MVA	0.516	1							
SVA	0.739	-0.017	1						
TA	-0.812	0.152	-0.013	1					
TS	0.907	0.043	0.763	-0.039	1				
MVE	0.214	-0.037	-0.006	-0.239	0.182	1			
NOE	0.503	-0.040	-0.011	-0.085	0.104	0.516	1		
INFR	0.527	-0.043	0.056	-0.193	0.129	0.739	0.469	1	
EXR	-0.427	0.125	-0.049	-0.211	-0.189	-0.112	-0.196	-0.018	1

Source: Authors' Concept.

4.3. Unit Root Test

To ensure the reliability of the time series data, we conducted a unit root test to check for stationarity and determine the order of integration. This was done using four tests: Levin, Lin, and Chu (LLC) test (2002), Im, Pesaran, and Shin (IPS) test (2003), Fisher-ADF, and Fisher-PP tests.

The LLC test treats panel data as homogeneous across cross-sections and runs a pooled test, while the IPS test allows for serial correlation in the error terms and accounts for cross-sectional heterogeneity.

Combining these tests, along with Fisher-ADF and Fisher-PP, provided a comprehensive assessment. The null hypothesis assumes the presence of a unit root, while the alternative suggests no unit root. According to the decision rule, we reject the null if the p-value is less than 0.05.

As shown in Table 4, the results indicated no unit root, as the p-values for each variable were below the threshold. Some variables were stationary at level, while others became stationary at first difference, with none integrated at second difference or higher.

Table 4: Unit Root Tests Results

Variable	LLC	IPS	Fisher-ADF	Fisher-PP	Integration Order
AVD	-6.995*** (0.000)	8.296*** (0.000)	240.9*** (0.000)	237.8*** (0.000)	Level
MVA	-15.75*** (0.000)	-4.748*** (0.000)	489.2*** (0.000)	481.2*** (0.000)	Level
SVA	-4.943*** (0.000)	5.747*** (0.000)	226.1*** (0.000)	216.5*** (0.000)	Level
TA	-5.402*** (0.000)	-7.463*** (0.000)	197.2*** (0.000)	189.9*** (0.000)	Level
TS	-8.636*** (0.000)	-8.893*** (0.000)	262.8*** (0.000)	253.4*** (0.000)	First Difference
MVE	-19.85*** (0.000)	-21.58*** (0.000)	521.9*** (0.000)	546.2*** (0.000)	Level
NOE	-22.47*** (0.000)	-18.73*** (0.000)	643.3*** (0.000)	600.1*** (0.000)	Level
INFR	-18.60*** (0.000)	-10.90*** (0.000)	530.9*** (0.000)	517.9*** (0.000)	Level
EXR	-26.72*** (0.000)	-36.03*** (0.000)	859.5*** (0.000)	884.3*** (0.000)	First Difference

Source: Authors' Concept. *** represents 1% level of significance. (.); represents probability values.

4.4. Cointegration Test

To examine whether a long-term relationship exists between firm size and the performance of the real sector in Nigeria, we first conducted a cointegration analysis. We employed the Pedroni (2004) cointegration test as our primary method and validated the results using the Kao (1999) cointegration test for robustness.

Pedroni's framework includes seven cointegration tests, categorized into within-dimension and between-dimension statistics. These tests allow for heterogeneity in both short-run dynamics and long-run slopes and intercepts, making them suitable for panel data analysis.

The null hypothesis assumes no cointegration, while the alternative suggests the presence of cointegration, with a decision rule to reject the null if the p-value is less than 0.05. Our findings showed that most of the Pedroni test statistics had p-values below 0.05, indicating significant cointegration.

The Kao (1999) test further confirmed this result. Thus, we concluded that a long-term relationship exists between firm size and real sector performance in Nigeria.

Table 5: Pedroni Cointegration Results

Test	Pedroni Cointegration Test		
	Agricultural Sector (Dep. Var.: AVD)	Manufacturing Sector (Dep. Var.: MVA)	Services Sector (Dep. Var.: SVA)
(Within-Dimension)			
Panel v-Statistic	-6.152*** (0.000)	-9.547** (0.014)	3.587*** (0.000)
Panel rho-Statistic	-0.425 (0.335)	0.057 (0.365)	7.254*** (0.000)
Panel PP-Statistic	-16.78*** (0.000)	0.745 (0.227)	-1.759 (0.960)
Panel ADF-Statistic	-1.808 (0.035)	7.119*** (0.000)	2.348*** (0.006)
(Between-Dimension)			
Group rho-Statistic	1.742*** (0.959)	9.719*** (0.000)	6.697*** (0.000)
Group PP-Statistic	-28.13*** (0.000)	-9.533*** (0.000)	-1.782** (0.037)
Group ADF-Statistic	-2.970*** (0.001)	5.261*** (0.000)	1.907 (0.971)
Kao (1999) Cointegration Test (Robustness Check)			
ADF-Statistics	7.266*** (0.000)	4.236*** (0.000)	4.889*** (0.000)

Source: Authors' Concept. *** & ** represents 1% and 5% level of significance. (.); represents probability values.

4.5. ARDL Estimations – Baseline Model

To explore the relationship between firm size and the performance of Nigeria's real sector, we utilized the Autoregressive Distributed Lag (ARDL) model, which effectively captures both long-run and short-run impacts. Our primary focus was on firm size in the agricultural, manufacturing, and services sectors due to their significant contributions to Nigeria's economic growth. To maintain clarity, we stratified the analysis by sector. Before running the ARDL model, we performed key econometric tests to ensure that the models were normally distributed, serially uncorrelated, homoscedastic, and correctly specified (see Table 6). The Hausman test results indicated that a random effects model was suitable for the agricultural sector, while fixed effects models were better suited for the manufacturing and services sectors. For the agricultural sector, where agricultural value-added (AVD) served as the dependent variable, findings showed that past values of AVD significantly influenced current values. Total assets (TA) had a positive and significant impact of 0.085, indicating that a unit increase in TA would boost real sector performance by 0.085. Similarly, total sales (TS) showed a positive and significant impact of 9.672, reflecting its substantial contribution to real sector growth. Conversely, the market value of equity (MVE) had a significant negative impact of -2.997, suggesting a detrimental effect. Meanwhile, the number of employees (NOE) had a positive but insignificant impact of 1.178. We also controlled for key macroeconomic variables. Inflation rate (INFR) exhibited a negative and significant impact on real sector performance,

indicating that rising inflation hurts the sector. In contrast, the exchange rate (EXR) showed a positive but insignificant impact, suggesting minimal influence on real sector performance.

Our analysis of Nigeria's manufacturing sector as indicated in Table 6 offers valuable insights into how firm size influences real sector performance. Using manufacturing value-added (MVA) as the dependent variable, the results reveal that past performance significantly impacts current outcomes. In simple terms, if a firm performed well in the past, it's likely to maintain that momentum. This persistence is evident in industries like cement production, where companies such as Dangote Cement have continuously expanded due to consistent past growth. One of the standout findings is the positive and significant impact of total assets (TA) on sector performance. Firms with larger assets can invest more in advanced technology and infrastructure, which improves efficiency and output. For example, Nigerian Breweries and Nestlé Nigeria leverage their substantial assets to boost production and expand market reach. Interestingly, total sales (TS) showed a significant negative impact on performance. This indicates that higher sales volumes don't automatically translate to profitability — often due to rising production costs or inefficiencies. A clear example is Nigeria's struggling textile industry, where high sales have been offset by high operating expenses, reducing overall performance. The market value of equity (MVE) also had a positive influence on performance, although less pronounced. A higher market value reflects investor confidence, allowing firms to secure financing for growth. For instance, BUA Group has leveraged its market value to fund infrastructure development and scale operations.

On the other hand, the number of employees (NOE) had a significant negative impact on performance. This suggests that overstaffing or inefficient labor use might be dragging down productivity. Some Nigerian manufacturing firms, particularly in the food and beverage industry, face challenges balancing workforce size with automation, which affects profit margins. Macroeconomic factors also played a crucial role. The inflation rate (INFR) had a negative and significant impact, reflecting how rising costs reduce purchasing power and increase expenses. Nigeria's 2016 economic recession is a prime example of how inflationary pressures hurt the manufacturing sector. Conversely, the exchange rate (EXR) had a positive but insignificant impact. Despite Nigeria's volatile exchange rates increasing the cost of imported raw materials, many firms have adapted by adjusting prices or sourcing locally. In summary, these findings highlight the complex relationship between firm size, market dynamics, and macroeconomic conditions in Nigeria's manufacturing sector. Addressing inflation and improving labor efficiency could significantly enhance the sector's contribution to the economy.

Our analysis of Nigeria's services sector provides valuable insights into how it affects real sector performance. Using services value-added (SVA) as a benchmark, we found that past performance significantly shapes current outcomes. In simple terms, when the services sector grows in one period, it tends to carry that momentum forward. This is evident in Nigeria's booming telecommunications industry, where giants like MTN Nigeria and Airtel Africa have built on previous successes to maintain market dominance. By continuously investing in network infrastructure and innovative services, these companies show how sustained growth

can create a ripple effect over time. However, not all the findings were as expected. For instance, total assets (TA) had a negative impact of -0.035 on real sector performance. This suggests that simply having more assets doesn't necessarily improve productivity or profitability. In Nigeria's banking industry, institutions like First Bank and Union Bank have expanded their physical presence over the years, but the high costs of maintaining branches and staffing have sometimes outweighed the benefits. Bigger isn't always better if the added costs cut into profits.

Surprisingly, other key indicators — total sales (TS), market value of equity (MVE), and number of employees (NOE) — also showed significant negative impacts. This points to deeper inefficiencies where more sales, higher market valuations, or a larger workforce don't automatically translate into better performance. For example, in Nigeria's hospitality industry, hotels in Lagos and Abuja often report high sales during peak tourism seasons, but profits can be eroded by high overhead costs, including staff wages and maintenance. Similarly, in the banking sector, some banks with high market valuations struggle to improve customer satisfaction or operational efficiency. It shows that having a higher market value doesn't necessarily mean the business is performing better on the ground. The negative impact of number of employees (NOE) also raises concerns about labor productivity. Overstaffing or poor labor utilization is a common issue in Nigerian service firms. For instance, ABC Transport has, at times, struggled to balance labor costs with operational efficiency. High wage bills without corresponding output can hurt profits, highlighting the need for better workforce management. On the macroeconomic side, the inflation rate (INFR) had a positive but insignificant impact. This suggests that moderate inflation may not harm service sector growth immediately. During the period of 2017–2018, for example, Nigeria's retail and e-commerce industries, including Jumia, continued to thrive despite modest inflation, thanks to steady consumer demand. However, when inflation spirals — as it did during the 2016 recession — purchasing power drops, and businesses face rising costs, leading to slower growth.

The exchange rate (EXR) showed a positive and significant impact, meaning a stable or favorable exchange rate boosts real sector performance. This is especially true in Nigeria's growing fintech industry, where companies like Flutterwave and Paystack have benefited from stable exchange rates to attract foreign investments and facilitate cross-border transactions. A stable exchange rate builds investor confidence and makes it easier for businesses to expand. In conclusion, while the services sector remains a crucial part of Nigeria's economy, these findings highlight several challenges — including poor asset utilization, inefficiencies in sales performance, and labor productivity issues. Addressing these problems through smarter asset management, cost control, and better workforce optimization could significantly enhance the sector's contribution to economic growth. For Nigeria to fully unlock the potential of its services sector, policymakers and business leaders need to focus on improving labor efficiency, controlling inflation, and maintaining a stable exchange rate environment.

In the short run (see Table 6), Nigeria's key economic sectors — agriculture, manufacturing, and services — show varying speeds of adjustment when bouncing back from disruptions. The Error Correction Model (ECM) results reveal that these sectors correct short-term imbalances

at different rates. The agricultural sector leads with a rapid correction speed of 76%, while the manufacturing and services sectors adjust more slowly at 13% and 15%, respectively. This indicates that agriculture is much quicker to return to equilibrium compared to the other two sectors. Agriculture's fast recovery isn't surprising, given its seasonal nature and strong policy support. Programs like the Anchor Borrowers' Program (ABP) by the Central Bank of Nigeria (CBN) provide timely access to credit and farming inputs, helping farmers rebound from short-term shocks. For example, during the 2018 floods that affected rice production in Kebbi and Benue states, many farmers were able to recover quickly due to this intervention. Similarly, cassava farmers in Ogun State have shown resilience after supply chain disruptions, thanks to ongoing mechanization and irrigation efforts.

The manufacturing sector, however, adjusts much more slowly, reflecting deep-rooted structural issues. High production costs, unreliable power supply, and dependency on imported raw materials make it difficult for manufacturers to bounce back quickly. Companies like Dangote Cement and players in the textile industry have faced prolonged output gaps during economic downturns. During the 2016 recession, for instance, many manufacturers struggled due to foreign exchange shortages and rising inflation, leading to reduced production and layoffs. These challenges highlight the sector's vulnerability to macroeconomic shocks. The services sector isn't much better. With a correction speed of just 15%, it also struggles to recover from short-term disruptions. High operational costs, labor market inefficiencies, and sensitivity to economic conditions slow down its adjustment. Take Nigeria's hospitality industry, for example. After the COVID-19 pandemic, many hotels in Lagos and Abuja struggled with low occupancy rates and high fixed costs, causing a sluggish recovery. Similarly, despite their dominance, telecom giants like MTN Nigeria and Airtel Africa faced delays in adjusting to market disruptions, exposing inefficiencies within the sector.

Table 6: Estimated ARDL Results

Variable	Long-Run Relationships			Short-Run Relationships		
	Agricultural Sector	Manufacturing Sector	Services Sector	Agricultural Sector	Manufacturing Sector	Services Sector
	Dep. Var.: (AVD)	Dep. Var.: (MVA)	Dep. Var.: (SVA)	Dep. Var.: (AVD)	Dep. Var.: (MVA)	Dep. Var.: (SVA)
Lag of Dep. Var.	10.43** (0.016)	0.487*** (0.000)	6.345*** (0.004)	-226.8*** (0.000)	-2.113*** (0.000)	0.315*** (0.000)
TA	0.085*** (0.000)	0.868*** (0.000)	-0.035*** (0.000)	-0.304*** (0.000)	-313.3 (0.233)	0.121*** (0.000)
TS	9.672** (0.019)	-1.326** (0.032)	-7.592*** (0.003)	-1521*. (0.065)	-0.019 (0.897)	25.89 (0.773)
MVE	-2.997*** (0.000)	0.158** (0.019)	-0.323*** (0.000)	-0.067 (0.821)	-23.33*** (0.000)	4.996 (0.875)
NOE	1.178 (0.553)	-0.155*** (0.002)	-2.935** (0.019)	-31.87 (0.740)	24.12 (0.897)	0.088 (0.535)
INFR	-0.024** (0.011)	-0.424 (0.549)	0.054 (0.685)	74.93*** (0.000)	11.91 (0.445)	-0.065*** (0.000)
EXR	7.808 (0.747)	0.655 (0.589)	6.637*** (0.000)	-0.092 (0.998)	-26.03*** (0.000)	1.865 (0.257)

No of Obs.	80	80	80			
ECM (-1)				-0.763*** (0.000)	-0.131*** (0.000)	-0.158*** (0.000)
Hausman	15.91 (0.068)	30.14 (0.002)	47.47 (0.000)			
Normality	479.7 (0.279)	3189. (0.407)	5152 (0.394)			
Serial Correlation	1.322 (0.882)	0.238 (0.787)	0.608 (0.544)			
Ramsey	-0.018 (0.000)	-0.483 (0.033)	-0.571 (0.000)			
Heteroscedasticity	0.732 (0.679)	1.193 (0.183)	0.923 (0.616)			

Source: Authors' Concept. ***, ** & * represents 1%, 5% & 10% level of significance. (.); represents probability values.

Interestingly, further evidence in Table 6 show that the past still plays a significant role in shaping the present. Our analysis shows that the previous values of Agricultural Value-Added (AVA), Manufacturing Value-Added (MVA), and Services Value-Added (SVA) significantly influence current performance. This persistence suggests that consistent growth in the past tends to sustain future performance. In agriculture, investments in mechanization and irrigation in Kano and Kaduna have continued to pay off, with higher yields season after season. In manufacturing, companies like Nestlé Nigeria have demonstrated how reinvesting profits into expansion and innovation helps maintain steady growth. Macroeconomic factors also matter — and not always in the ways you'd expect. Total assets (TA) positively impacted real sector performance, showing that capital accumulation is crucial for growth. For instance, firms like BUA Group have leveraged their substantial asset base to expand production, fueling the manufacturing sector. But having large assets isn't always a guarantee of success. Some financial institutions, despite holding significant assets, struggle with inefficiencies and high operating costs, limiting their overall performance.

The market value of equity (MVE) was another key factor. Higher market valuations often boost investor confidence, making it easier for firms to access capital. Nigeria's booming fintech sector, with players like Flutterwave and Paystack, is a perfect example. These firms have used their strong market valuations to attract foreign investments, scale operations, and boost economic output. Inflation and exchange rates also played crucial roles. Inflation tends to strain sectors by raising production costs and weakening consumer purchasing power. During Nigeria's 2016 recession and more recently in 2023, high inflation made it difficult for both producers and consumers to cope, slowing down economic growth. On the other hand, a stable exchange rate (EXR) proved beneficial, especially for sectors that rely on imports. When the exchange rate was relatively stable in 2021, manufacturers and service providers were able to plan better and control costs, improving short-term performance. These findings echo the conclusions of previous studies by Egbuhuzor & Wokeh (2022), Ehigator (2017), Aza (2018), Nevin et al. (2018), Isiksal & Chimezie (2016), and Ebumuche et al. (2023). They consistently highlight how asset management, market valuation, and macroeconomic stability are key drivers of real sector growth. Addressing inefficiencies, improving labor productivity, and

maintaining macroeconomic stability should be top priorities for policymakers and business leaders looking to unlock the full potential of Nigeria's economy.

4.6. Robustness Check – FMOLS

To get a clearer picture of how firm size affects the performance of Nigeria's real sector, we took our analysis a step further by re-estimating the models using the Fully Modified Ordinary Least Squares (FMOLS) method. This provided a more robust check against the initial findings from the ARDL model, particularly addressing issues like endogeneity and cross-sectional dependence, which ARDL doesn't fully account for. To make the analysis easier to follow, we broke it down by sector — agriculture, manufacturing, and services — using Agricultural Value-Added (AVD), Manufacturing Value-Added (MVA), and Services Value-Added (SVA) as the dependent variables for each sector. These three sectors weren't chosen by accident; they're considered the backbone of Nigeria's economy, playing a crucial role in driving growth across other industries. Agriculture, for example, supports food security and raw materials, manufacturing boosts industrial output, and services power trade and employment. Understanding how firm size impacts these key sectors gives valuable insights into what really fuels economic growth in Nigeria.

The results in Table 7 reveal how past performance continues to shape current outcomes across Nigeria's key economic sectors — agriculture, manufacturing, and services. The findings show that previous values of Agricultural Value-Added (AVD), Manufacturing Value-Added (MVA), and Services Value-Added (SVA) significantly contribute to their current growth, indicating a strong persistence effect where historical performance leaves a lasting impact on future outcomes. This reflects how sectors in Nigeria build on past successes or struggles to shape ongoing performance. Total assets (TA) had a negative but insignificant effect on the agricultural sector, suggesting that simply acquiring more assets doesn't necessarily improve performance. This is evident in Nigeria's small-scale farming sector, where government initiatives such as the Anchor Borrowers' Program (ABP) have increased access to tractors and irrigation systems without a corresponding rise in output, mainly due to poor maintenance and low mechanization efficiency. In contrast, TA showed a significant positive effect in manufacturing and services. Firms like Dangote Cement and BUA Group have successfully leveraged their large asset bases to scale production and expand market presence. Similarly, telecom giants such as MTN Nigeria and Airtel Africa have invested heavily in infrastructure, driving network coverage and boosting consistent growth in the services sector.

Total sales (TS) produced significant negative effects on real sector performance in agriculture and manufacturing, indicating that higher sales volumes do not always translate to profitability. In agriculture, increased crop sales during harvest seasons are often undermined by post-harvest losses and poor storage facilities, especially in Benue and Kano, Nigeria's food production hubs. The manufacturing sector faces similar issues. For instance, Nigeria's textile industry once experienced high sales volumes but struggled with declining profit margins due to high production costs, poor infrastructure, and competition from cheaper imports. However, TS had a positive and significant impact in the services sector. Companies like Jumia Nigeria and ride-hailing services such as Bolt and Uber have shown how higher sales directly enhance

revenue, benefiting from scalable digital platforms that keep operating costs low. The market value of equity (MVE) showed significant negative effects on real sector performance in agriculture and manufacturing, suggesting that high market valuations don't always reflect underlying sector productivity. Agricultural firms such as Okomu Oil Palm Plc have sometimes recorded high market capitalizations while struggling with output volatility due to climate risks. Similarly, in manufacturing, firms in Nigeria's brewing industry have seen inflated market values even as rising production costs and intense competition from imports suppress profitability. On the other hand, MVE had a significant positive effect in the services sector. Nigeria's booming fintech industry, with players like Flutterwave and Paystack, has leveraged high market valuations to attract investment and scale operations, contributing to robust sector growth.

Macroeconomic variables such as inflation (INFR) and exchange rates (EXR) followed consistent patterns across sectors. Inflation had a significant positive impact in all three sectors, suggesting that moderate inflation can stimulate production and spending by encouraging investment. However, during periods of hyperinflation — notably in 2016 and 2023, when Nigeria faced double-digit inflation — rising costs eroded profit margins, particularly in agriculture and manufacturing, where production expenses are sensitive to price fluctuations. Exchange rates had a positive and significant effect across all sectors, reflecting how exchange rate stability supports business planning and competitiveness. During periods of exchange rate stability, such as parts of 2021, manufacturers benefited from reduced import costs, while fintech firms in the services sector leveraged favorable rates to facilitate cross-border transactions. The number of employees (NOE) significantly boosted performance in the agricultural and manufacturing sectors, reflecting the labor-intensive nature of these industries. Government initiatives like the N-Power Agro Scheme have improved labor availability in agriculture, supporting higher crop yields. Similarly, manufacturing giants like Nestlé Nigeria have benefited from expanding their workforce to enhance production capacity. However, in the services sector, NOE had a negative and significant effect, suggesting that merely increasing staff numbers without proportional productivity gains can weigh down performance. This trend is observable in Nigeria's hospitality industry, where high staffing costs during off-peak seasons often hurt profitability.

The R-squared values across all models indicate that a substantial portion of the variation in sector performance was explained by the selected explanatory variables. This underscores the robustness of the model and highlights the importance of firm-level factors such as total assets, sales, and market value of equity, alongside macroeconomic variables like inflation and exchange rates, in driving sectoral performance. These findings are consistent with previous research by scholars such as Egbuhuzor & Wokeh (2022), Ehigator (2017), Aza (2018), Nevin et al. (2018), Isiksal & Chimezie (2016), and Ebumuche et al. (2023), who have similarly emphasized the role of asset utilization, market valuation, and macroeconomic stability in sustaining real sector growth. Overall, while firm-level and macroeconomic factors significantly influence Nigeria's key sectors, the nature and direction of these effects vary. Addressing structural inefficiencies in agriculture and manufacturing, optimizing workforce productivity in services, and maintaining exchange rate stability are crucial for sustaining

economic growth. Policymakers and business leaders must prioritize sector-specific strategies that enhance performance while mitigating sectoral vulnerabilities.

Table 7: FMOLS Results

Variable	FMOLS		
	Agricultural Sector	Manufacturing Sector	Services Sector
	Dep. Var.: (AVD)	Dep. Var.: (MVA)	Dep. Var.: (SVA)
Lag of Dep. Var.	-9.249*** (0.000)	-6.211*** (0.000)	-0.522** (0.017)
TA	-0.109 (0.912)	1.396*** (0.000)	0.119*** (0.000)
TS	-1.165* (0.101)	-0.342*** (0.000)	0.153** (0.022)
MVE	-2.105*** (0.000)	-0.876*** (0.000)	0.780** (0.024)
NOE	5.285*** (0.000)	0.271*** (0.000)	-0.550** (0.039)
INFR	-0.150 (0.889)	-0.672* (0.085)	-1.398*** (0.000)
EXR	-0.540*** (0.000)	-0.824*** (0.000)	0.579*** (0.000)
No of Obs.	80	78	69
R-squared	0.987	0.568	0.745

Source: Authors' Concept. ***, ** & * represents 1%, 5% & 10% level of significance. (.); represents probability values.

4.7. Discussion of Findings

This study looks at how firm size shapes the performance of Nigeria's real sector from 2013 to 2022, focusing on agriculture, manufacturing, and services — the backbone of the country's economy. It asks a simple but important question: does bigger always mean better? Using the panel ARDL model as the main tool and the FMOLS model for robustness checks, it explores how total assets, total sales, market value of equity, and the number of employees impact sectoral output. Inflation and exchange rates were also considered to reflect the broader economic context. The findings show that larger firms generally outperform smaller ones, contributing more to output and value-added. However, the FMOLS results offer a cautionary note — expanding too much without maintaining efficiency can hurt productivity.

The evidence revealed an interesting finding. All four measures of firm size significantly influence performance. Total assets, for example, have a positive impact on output, aligning with Adeyemi et al. (2022), who found that larger asset bases helped FMCG companies in Nigeria boost profitability. Sales volume is another key factor. According to Egbuhuzor and Wokeh (2022), firms with higher sales volumes perform better, especially in Nigeria's banking sector. The market value of equity, reflecting investor confidence, also shows a strong link to sectoral performance. Manasseh et al. (2024) confirmed this in emerging markets, where technological innovation enhanced firm valuation and overall success. Workforce size matters too. Omenyo & Muturi (2019) found that more employees improved production capacity and

profitability in Nairobi's manufacturing sector. Looking closer at each sector reveals unique dynamics. In agriculture, larger agribusiness firms tend to outperform smaller ones, thanks to economies of scale. Ebomuche et al. (2023) found that mechanization and better access to capital significantly boost productivity. However, scaling too fast without efficiency can lead to resource misallocation. Manufacturing shows similar trends. Bigger firms benefit from capital intensity and wider market reach. Manasseh et al. (2025) emphasized how adopting financial technology improves efficiency and scalability. But once again, overexpansion without the right support can hurt performance. The services sector offers a mixed picture. While larger firms perform better according to the ARDL results, the FMOLS findings suggest that overexpansion can lead to inefficiencies. Aza (2018) noted that oversized firms in Nigeria's service industry suffer from bureaucratic hurdles, high operational costs, and poor responsiveness to market changes.

These findings carry important policy implications. Policymakers need to strike a balance, helping firms scale efficiently without running into the pitfalls of diseconomies of scale. Supporting medium-sized firms as they grow — with better access to finance, technology, and market infrastructure — is key. Each sector also needs tailored policies. In agriculture, encouraging consolidation with a focus on technology and mechanization can maximize output. For manufacturing, policies that promote innovation and capital investment can enhance scalability, as Manasseh et al. (2024) highlighted. In the services sector, improving operational efficiency through digital transformation can help avoid the downsides of overexpansion. One of the biggest takeaways is the role of financial technology. Manasseh et al. (2025) showed how fintech streamlines transactions and cuts costs, making firms more efficient. Embracing fintech could help Nigerian firms optimize size and performance. But growth needs to be sustainable. The FMOLS results show that overexpansion can lead to inefficiencies and wasted resources. Policymakers should promote sustainable growth by encouraging firms to scale at a manageable pace. In the end, this study confirms that firm size plays a crucial role in Nigeria's real sector performance. Larger firms usually have the upper hand due to economies of scale, but expanding too much can hurt productivity. To achieve sustainable growth, Nigeria needs sector-specific policies that encourage optimal scaling, fintech adoption, and balanced expansion. These strategies could sustain economic growth and boost Nigeria's competitiveness in global markets.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study delves into how firm size shapes the performance of Nigeria's real sector, drawing on data from publicly listed companies between 2010 and 2023. It reveals that larger firms generally outperform smaller ones due to better access to financial resources, advanced technology, and skilled labor, which translates into higher efficiency, profitability, and market dominance. In contrast, smaller firms often grapple with limited financing, higher operating costs, and weaker market penetration, which stifles their growth. The study also highlights how larger firms are better positioned to invest in research and development, giving them a competitive edge both locally and globally. However, firm size isn't the only factor at play — institutional and regulatory frameworks significantly influence performance. A stable,

transparent regulatory environment that promotes investment and innovation is essential for firms of all sizes to thrive.

To achieve sustainable growth, a balanced approach that supports both large firms and small and medium-sized enterprises (SMEs) is crucial. Small firms need better access to finance, with affordable credit options, credit guarantee schemes to reduce lending risks, and greater financial inclusion through venture capital funds and grants. Infrastructure development is another critical area; stable electricity, better transport networks, and improved digital infrastructure can reduce production costs and boost productivity. Simplifying regulatory processes by reducing bureaucratic delays, tackling corruption, and strengthening contract enforcement can also create a fairer and more predictable business environment. Encouraging innovation through tax incentives, technology parks, and training programs can further enhance productivity, particularly in sectors like manufacturing and agriculture. Supporting SMEs with mentorship programs, business incubation centers, and lower tax burdens can help them scale operations and reinvest in growth. Ultimately, while firm size plays a significant role in performance, addressing the unique challenges of both large firms and SMEs is key to driving sustainable economic growth. By fostering innovation, competitiveness, and balanced growth across all firm sizes, Nigeria's real sector can make a stronger contribution to the country's economic development.

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