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THE REGULATORY IMPACT OF FINANCIAL RATIOS ON PROFITABILITY OF AGRICULTURAL ENTERPRISES IN EMERGING ECONOMIES: A NIGERIAN CASE STUDY

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Abstract: This study examines the effect of financial ratios on the financial performance of agricultural firms in Nigeria from 2014 to 2024, with Return on Assets (ROA) serving as the measure of profitability. The specific objective was to assess how the Liquidity Ratio (Current Ratio), Leverage Ratio (Debt to Equity Ratio), Efficiency Ratio (Asset Turnover Ratio), Profitability Ratio (Gross Profit Margin), and Operating Expense Ratio influence ROA. Using panel data from listed agricultural firms and applying panel least squares regression analysis, the study found that three of the examined financial ratios had a statistically significant effect on ROA. Liquidity Ratio ($\beta = 0.1185$, $p = 0.0000$), Efficiency Ratio ($\beta = 0.1227$, $p = 0.0000$), and Profitability Ratio ($\beta = 0.2362$, $p = 0.0000$) exhibited statistically significant positive relationships with ROA, indicating their strong influence on firm profitability. In contrast, Leverage Ratio ($\beta = 0.0149$, $p = 0.0845$) and Operating Expense Ratio ($\beta = -0.0724$, $p = 0.4810$) had statistically insignificant effects. This suggests that while some traditional financial ratios are strong predictors of financial performance, others may have limited explanatory power in the agricultural context. Descriptive statistics indicated considerable variability in the financial structures and performance of the firms, underscoring the unique challenges faced by the sector. The findings imply that external factors such as regulatory conditions, environmental volatility and infrastructural deficits may also significantly shape profitability. The study concludes that financial ratios are useful internal tools for monitoring performance but may not fully capture all the dynamics affecting profitability in agricultural enterprises. It recommends that firms adopt a more integrated approach, combining financial indicators with contextual and strategic factors to improve long-term profitability and sectoral resilience.

Keywords: Return on Assets, Liquidity Ratio, Leverage Ratio, Efficiency Ratio, Profitability Ratio, Operating Expense Ratio, Agricultural Firms, Financial Performance.

1. Introduction

Agriculture remains a cornerstone of economic development in emerging economies, particularly in Nigeria, where the sector contributes significantly to the Gross Domestic Product (GDP) and serves as a primary source of employment (World Bank, 2022). Despite its vital role, Nigerian agriculture continues to face systemic challenges, including infrastructural deficits, restricted access to credit, and volatile market conditions. These constraints have limited the sector's profitability and long-term sustainability, highlighting the urgent need for improved financial management frameworks (Ogunleye & Olagunju, 2021).

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Financial ratios are established analytical tools for evaluating the fiscal health and operational performance of firms. Derived from financial statements, these metrics, such as the Current Ratio, Debt-to-Equity Ratio, Asset Turnover, and Return on Assets (ROA) provide a multidimensional view of liquidity, leverage, efficiency, and profitability (Kariuki & Kimani, 2023). In the context of agricultural enterprises, financial ratios not only serve as performance indicators but also assist stakeholders in identifying inefficiencies and making data-driven decisions.

The regulatory environment plays a pivotal role in influencing the financial outcomes of agricultural firms. Policies related to taxation, subsidies, credit accessibility, and trade significantly affect enterprise performance. For instance, reforms aimed at reducing borrowing costs or introducing tax incentives can enhance liquidity and profitability, whereas stringent compliance mandates may impose additional financial burdens (Adegboye, Adebayo, & Akinbode, 2020). In recent years, Nigerian agricultural policies have increasingly emphasized sectoral transformation, yet empirical studies examining the interplay between regulatory frameworks and firm-level profitability particularly through the lens of financial ratios remain limited (Eze, Umeh, & Ezugwu, 2023).

This study addresses this critical gap by empirically investigating the regulatory impact on the profitability of agricultural enterprises in Nigeria. Using financial ratios derived from publicly available annual reports, with a particular focus on ROA as a measure of profitability, the research seeks to quantify the extent to which regulatory factors influence financial performance. The findings aim to inform policymakers, investors and managers in designing a more enabling regulatory environment conducive to the growth and sustainability of agricultural enterprises in emerging economies.

Statement of the Problem

In theory, agricultural enterprises in emerging economies such as Nigeria are expected to operate within regulatory frameworks that promote financial transparency, operational efficiency, and long-term profitability. Under such conditions, firms would effectively leverage financial ratios, such as Return on Assets (ROA), Current Ratio and Debt-to-Equity Ratio to evaluate performance, guide strategic decisions, and enhance financial sustainability. Regulatory policies would serve as enablers, facilitating access to finance, reducing compliance burdens, and incentivizing sound financial management.

In practice, however, the Nigerian agricultural sector deviates significantly from this ideal. Agricultural enterprises often contend with inconsistent regulatory enforcement, limited access to reliable financial data, and a lack of institutional support for financial literacy and reporting standards. Many firms either underutilize or misinterpret financial ratios, weakening their capacity for evidence-based decision-making. Moreover, regulatory frameworks sometimes impose onerous financial obligations without offering commensurate incentives for growth, thereby constraining firm-level profitability and operational resilience.

This misalignment between regulatory structures and financial performance management has created a significant knowledge gap. The empirical relationship between regulatory interventions, financial ratio analysis, and firm profitability particularly as measured by ROA remains inadequately explored in existing literature. Without a robust understanding of these dynamics, policymakers risk designing interventions that are either ineffective or counterproductive.

If unaddressed, these challenges could continue to erode profitability across the sector, diminish investor confidence, and stifle the contribution of agricultural enterprises to national economic development. The absence of data-driven insights into the regulatory-financial performance nexus also limits the ability of stakeholders to implement reforms that foster financial resilience, sectoral sustainability, and food security in Nigeria.

Objectives of the Study

The main purpose of this study is to examine the regulatory impact of financial ratios on profitability of agricultural enterprises in emerging economies: a Nigerian case study. The specific objectives are to:

1. examine the effect of the Current Ratio on Return on Assets of agricultural enterprises in Nigeria.

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2. assess the effect of Debt to Equity Ratio on Return on Assets of agricultural enterprises in Nigeria.
3. examine the effect of the Asset Turnover Ratio on Return on Assets of agricultural enterprises in Nigeria.
4. evaluate the effect of Gross Profit Margin on Return on Assets of agricultural enterprises in Nigeria.
5. determine the effect of Operating Expense Ratio on Return on Assets of agricultural enterprises in Nigeria.

Research Questions

The study provided answers to the following research questions.

6. What is the effect of the Current Ratio on Return on Assets of agricultural enterprises in Nigeria?
7. To what extent does Debt to Equity Ratio affect Return on Assets of agricultural enterprises in Nigeria?
8. What is the effect of Asset Turnover Ratio on Return on Assets of agricultural enterprises in Nigeria?
9. To what extent does Gross Profit Margin affect Return on Assets of agricultural enterprises in Nigeria?
10. What is the effect of Operating Expense Ratio on Return on Assets of agricultural enterprises in Nigeria?

Statement of Hypotheses

The following hypotheses in null form (H_0) guided this study

11. Current Ratio has no significant effect on Return on Assets of agricultural enterprises in Nigeria.
12. Debt to Equity Ratio has no significant effect on Return on Assets of agricultural enterprises in Nigeria.
13. Asset Turnover Ratio has no significant effect on Return on Assets of agricultural enterprises in Nigeria.
14. Gross Profit Margin has no significant effect on Return on Assets of agricultural enterprises in Nigeria.
15. Operating Expense Ratio has no significant effect on Return on Assets of agricultural enterprises in Nigeria.

Scope of the Study

This study examines the regulatory impact of financial ratios on the profitability of agricultural enterprises in Nigeria. The analysis is based on a panel of five publicly listed agricultural firms Presco Plc, Okomu Oil Palm Company Plc, Nigerian Breweries Plc, Unilever Nigeria Plc and Dangote Sugar Refinery Plc over the period 2014 to 2024. Geographically, the study is confined to Nigeria, representing an emerging economy with a dynamic yet under-researched agricultural sector. The temporal scope captures an eleven-year period marked by significant regulatory and economic developments.

The independent variables comprise key financial ratios: Current Ratio, Debt-to-Equity Ratio, Asset Turnover Ratio, Gross Profit Margin, and Operating Expense Ratio. Profitability is measured using Return on Assets (ROA) as the dependent variable. The study is limited to secondary data obtained from audited financial statements and does not include qualitative assessments or unlisted enterprises.

2. Literature Review

Conceptual Review

Financial Ratios

Financial ratios are quantitative tools used to evaluate various aspects of a firm's financial health and operational efficiency by analyzing relationships between key financial statement items. These ratios offer stakeholders, such as investors, creditors, and management, critical insights into profitability, liquidity, solvency, and operational performance (Johnson & Meyer, 2019). By standardizing financial data, ratios facilitate comparison across periods and firms regardless of size, enabling a clearer assessment of financial conditions.

These ratios are broadly classified into categories such as liquidity ratios, which measure the firm's ability to meet short-term obligations; profitability ratios, which indicate the company's ability to generate earnings relative to sales, assets, or equity; and leverage ratios, which assess the extent of financial risk borne by the company through debt (Singh & Sharma, 2020). Each ratio provides a distinct perspective but collectively helps build a comprehensive financial profile.

The practical utility of financial ratios extends beyond mere calculation; they are crucial in financial forecasting and strategic decision-making. For example, trend analysis of ratios over multiple accounting periods can signal potential financial distress or growth opportunities (Almeida, Costa, & Freitas, 2021). Additionally, ratios like the current ratio or debt-to-equity ratio are widely used by credit rating agencies to determine creditworthiness,

impacting borrowing costs and investment attractiveness (Ramirez & Lopez, 2018).

Financial ratios support benchmarking against industry standards or competitors, allowing management to identify strengths and weaknesses within their operational framework. This comparative analysis facilitates targeted improvements and resource allocation to enhance firm performance (Wang & Lee, 2023). It also helps regulatory bodies and policymakers monitor corporate sector stability through aggregated ratio analyses.

Furthermore, advances in technology and data analytics have enabled more sophisticated ratio analysis, incorporating real-time data and predictive modeling to improve accuracy and relevance. These developments underscore the evolving nature of financial ratio analysis as a dynamic, integral component of corporate finance and investment analysis.

Current Ratio

The current ratio is a fundamental liquidity metric that measures a firm's ability to meet its short-term obligations by comparing current assets to current liabilities. It indicates whether a company possesses sufficient liquid resources to cover debts due within a year, providing stakeholders a snapshot of financial stability (Torres & Garcia, 2019). This ratio is crucial for creditors and investors in evaluating operational risk and cash flow management effectiveness.

Typically, the current ratio is calculated by dividing current assets by current liabilities, with a value greater than one suggesting that the firm can cover its short-term liabilities without difficulty (Klein & Becker, 2021). However, an excessively high current ratio might imply inefficient use of assets or overstocking inventory, signaling potential issues in asset management (Fernandez & Soto, 2020). Therefore, the optimal current ratio varies by industry and company strategy.

Empirical studies have demonstrated that the current ratio is a significant predictor of financial distress, with lower ratios often preceding liquidity crises or bankruptcy (Singh & Verma, 2018). In contrast, firms with healthy current ratios tend to exhibit better credit ratings and easier access to financing, emphasizing its role in credit risk assessment and lending decisions (Rodriguez & Lopez, 2022).

The current ratio assists management in strategic planning and working capital optimization by highlighting the balance between liquidity and operational efficiency. Firms use this ratio to adjust cash holdings, inventory levels, and accounts receivable policies, aiming to maintain sufficient liquidity without compromising profitability (Kim & Park, 2023). This balance is critical in dynamic market environments where cash flow volatility is common.

Moreover, advancements in financial analysis tools have enhanced the application of the current ratio by integrating it with predictive analytics and real-time data monitoring. This evolution allows for more accurate liquidity forecasting and risk management, aligning financial health assessment with modern corporate governance demands.

Debt to Equity Ratio

The debt to equity ratio is a key financial leverage metric that compares a company's total liabilities to its shareholder equity, illustrating the extent to which a firm finances its operations through debt versus equity (Fernandes & Rodrigues, 2020). This ratio informs stakeholders about the financial risk and capital structure, as higher values generally indicate greater reliance on debt, which could increase vulnerability to financial distress.

This ratio is calculated by dividing total debt by total equity, and its interpretation varies across industries due to different capital intensity and risk tolerance (Mitchell & Carson, 2018). Companies with high debt to equity ratios may benefit from tax advantages related to debt financing but face higher interest obligations and reduced financial flexibility (Ocampo & Suarez, 2021). Conversely, lower ratios suggest conservative financing but may imply missed growth opportunities through leverage.

Research highlights that the debt to equity ratio is critical in credit risk assessment and investment decisions, as lenders and investors scrutinize it to gauge a company’s solvency and ability to sustain operations under economic stress (Fletcher & Armstrong, 2019). Firms maintaining optimal leverage ratios tend to enjoy better credit ratings and lower capital costs, enhancing their competitiveness and long-term viability (Salazar & Fernandez, 2023).

From a management perspective, maintaining a balanced debt to equity ratio is essential for sustainable growth and

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financial stability. Financial managers use this ratio to align capital structure strategies with business cycles, market conditions, and corporate goals, ensuring an equilibrium between risk and return (Ng & Tran, 2022). Adjusting this ratio helps firms optimize capital cost and shareholder value.

Moreso, advances in financial analytics have refined debt to equity ratio evaluations by integrating scenario analysis and predictive modeling to better forecast financial distress and capital adequacy. These innovations provide deeper insights into risk management and strategic planning, emphasizing the ratio's evolving role in corporate finance.

Asset Turnover Ratio

The asset turnover ratio measures how efficiently a company utilizes its assets to generate sales revenue, reflecting operational effectiveness in asset management (Tanner & Brooks, 2018). It is calculated by dividing net sales by average total assets, providing insights into how well a firm converts investment in assets into revenue streams. Higher ratios indicate better utilization and stronger asset productivity.

This ratio varies significantly across industries due to differing capital intensities and business models, requiring careful benchmarking within sectors (Elliott & Burns, 2020). For capital-heavy industries like manufacturing, a lower asset turnover ratio may be typical compared to service-oriented firms, where asset utilization tends to be higher. Thus, industry context is essential for meaningful interpretation.

Asset turnover ratio also impacts profitability, as effective asset use contributes to cost control and margin enhancement (Gallagher & Cohen, 2021). Firms with superior asset turnover generally achieve greater operational efficiency, which positively correlates with return on assets and shareholder value creation. Conversely, poor asset management may signal overinvestment or inefficiencies.

This ratio assists managers and investors in performance evaluation, capital budgeting, and strategic planning by highlighting areas requiring improvement or investment reallocation (Morris & Edwards, 2023). Continuous monitoring of asset turnover enables businesses to optimize asset utilization and sustain competitive advantages.

Lastly, advancements in financial analytics have incorporated real-time data and predictive models to refine asset turnover analysis, enhancing decision-making accuracy and responsiveness in volatile markets. These technological innovations emphasize the growing relevance of asset turnover ratio in dynamic financial environments.

Gross Profit Margin

Gross profit margin is a key financial indicator that measures the percentage of revenue remaining after deducting the cost of goods sold, reflecting a company's efficiency in production and pricing (Ellison & Grant, 2019). It offers insight into how effectively a firm controls production costs and generates profit from core operations. A higher margin typically signals strong pricing power or cost control.

This ratio is calculated by dividing gross profit by total sales revenue and is widely used to compare companies within the same industry (Nguyen & Foley, 2020). Variations in gross profit margin can reflect differences in business models, product mixes, and market positioning, emphasizing its contextual interpretation. Companies with low margins may face competitive pressures or inefficiencies.

The gross profit margin is integral in profitability analysis as it affects net profit and return on assets. Firms that maintain healthy margins can reinvest earnings, enhance innovation, and withstand economic downturns better (Harvey & Leonard, 2021). Conversely, shrinking margins may indicate rising costs or pricing challenges that require management attention.

Additionally, investors and creditors use gross profit margin to assess operational performance and financial stability. It serves as an early warning signal for financial distress and helps in making informed investment decisions (Keller & Martinez, 2023). Management also utilizes this ratio to benchmark performance and guide cost reduction initiatives.

Moreover, with advances in data analytics, real-time monitoring of gross profit margin enhances responsiveness to market changes, enabling dynamic pricing and

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inventory management (Freeman & Walters, 2024). This evolution strengthens the ratio's role in strategic decision-making and competitive advantage building.

Operating Expense Ratio

The Operating Expense Ratio (OER) is a financial metric used to evaluate the efficiency with which a firm manages its operational costs relative to its revenue-generating activities. It is calculated as the ratio of a firm's total operating expenses to its net sales or total revenue:

$$\text{Operating Expense Ratio} = \frac{\text{Operating Expenses}}{\text{Net Sales}} \times 100$$

This ratio reflects the proportion of income consumed by the firm's day-to-day operating activities, excluding costs of goods sold, interest, and taxes. A lower OER indicates greater operational efficiency, suggesting that a smaller portion of revenue is being used to cover non-production costs, thereby enhancing profitability. Conversely, a high OER may signal inefficiencies in cost management, potentially undermining returns on investment and overall financial performance (Kariuki & Kimani, 2023).

In the context of agricultural enterprises, the OER is particularly critical due to the sector's exposure to input cost volatility, logistical challenges and regulatory compliance expenses. As such, the ratio serves as a key indicator of how effectively agricultural firms control overhead and administrative costs, especially under fluctuating regulatory conditions. Assessing the OER enables stakeholders to gauge cost discipline and its implications for firm profitability, especially when aligned with broader financial performance indicators such as Return on Assets (ROA).

Profitability

Profitability refers to a firm's ability to generate earnings relative to its revenue, assets, or equity, indicating operational efficiency and the effectiveness of financial management. It serves as a key measure of business performance, sustainability, and value creation. In this study, profitability is assessed using Return on Assets (ROA), which captures how efficiently firms utilize their assets to produce net income. High profitability signals strong financial health, increased investment attractiveness, and long-term strategic viability in competitive markets (Klein & Lechner, 2018).

Return on Assets (ROA)

Return on Assets is a financial ratio that quantifies the profitability of a company in relation to its total assets. It is calculated as net income divided by total assets and reflects how efficiently a firm employs its asset base to generate profit. ROA is particularly useful in comparing firms across capital-intensive industries, offering insights into asset utilization, operational efficiency, and managerial effectiveness. In this study, ROA is employed as the primary indicator of firm-level profitability (Fernandez & Taylor, 2018).

Theoretical Review

This study is underpinned by Agency Theory, which provides a foundational framework for understanding the relationship between ownership, managerial behavior, and regulatory oversight in shaping the financial performance of firms. Originally developed by Jensen and Meckling (1976), Agency Theory explains the dynamics between principals (such as shareholders or owners) and agents (such as managers), particularly when decision-making authority is delegated to the latter. A central concern of the theory is the emergence of agency problems, which occur when agents prioritize their personal interests over those of the principals, especially in contexts where information asymmetry exists. These misalignments can lead to inefficiencies, reduced profitability, and erosion of shareholder value.

Agency Theory emphasizes the importance of mechanisms to align managerial decisions with ownership interests. Among such mechanisms are financial monitoring tools like financial ratios that allow principals to assess firm performance objectively. Ratios such as Return on Assets (ROA), Debt-to-Equity Ratio, and Operating Expense Ratio serve as quantifiable indicators of how effectively managers utilize resources and control costs, thereby offering insight into the firm's financial health and managerial accountability. Additionally, regulatory frameworks act as external governance structures that can reduce agency costs by enhancing transparency, standardizing financial reporting, and limiting managerial opportunism. These frameworks help mitigate the

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information gap between managers and stakeholders, especially in firms with dispersed ownership.

The relevance of Agency Theory is particularly pronounced in emerging economies such as Nigeria, where institutional weaknesses and inconsistent regulatory enforcement can exacerbate agency problems. Agricultural enterprises in such settings often face significant challenges related to financial management, reporting standards, and access to reliable data. In this context, Agency Theory helps explain how the presence or absence of effective regulatory mechanisms impacts profitability by shaping the behaviors and financial decisions of managers. It also underscores the strategic role of regulation in promoting cost discipline, accountability, and overall firm sustainability.

Therefore, Agency Theory not only offers a theoretical basis for analyzing the relationship between financial ratios and firm performance but also highlights the critical role of the regulatory environment in aligning agent-principal objectives. This theoretical lens is particularly suited to the agricultural sector in Nigeria, where firms operate in a complex environment characterized by capital constraints, market volatility, and evolving regulatory policies. Through this framework, the study investigates how financial ratios function as internal monitoring tools and how external regulation interacts with them to influence the profitability of agricultural enterprises.

Empirical Review

Jimoh and Attah (2022) evaluated how firm-specific financial characteristics influence profitability in Nigerian agricultural companies. Their panel regression analysis on data from five listed firms between 2010 and 2020 revealed that liquidity, asset maturity, and dividend payout positively affect return on assets (ROA), while firm size negatively influences it. The study highlights financial ratios' crucial role in profitability but does not address the regulatory impact governing these ratios.

Osumuo Odinakachi (2023) examined the influence of corporate governance variables on profitability in Nigerian agricultural firms. Using an ex-post facto design and regression analysis on data from 2015 to 2022, the study found that board size, audit committee size, and gender diversity significantly improved financial performance. These findings emphasize governance structures as internal regulatory mechanisms that enhance profitability, although external regulatory policies were not specifically investigated.

Alohan and Okpara (2025) studied the effect of cash management ratios on profitability in listed Nigerian agricultural firms. Analyzing panel data from 2010 to 2023 with least squares regression, they demonstrated that cash equivalents, operating cash flow, and cash turnover ratios significantly and positively influence return on assets (ROA). Their results highlight liquidity management as a key financial factor contributing to profitability, though regulatory frameworks surrounding cash management were not the focus.

Olanisebe, Abubakar, and Basakkwace (2023) analyzed the effect of board attributes such as independence, diversity, and size on profitability in Nigerian agricultural companies. Using regression on data from 2010 to 2023, they found board characteristics significantly impact profitability, suggesting governance mechanisms function as internal regulatory tools. This reinforces the importance of board composition in shaping firm success, but the study does not explore the role of external financial regulations.

Uzuagu and Ekanem (2021) surveyed managers and accountants in agro-allied industries in Akwa Ibom State, Nigeria, to explore perceptions of financial ratios' influence on performance. Their results indicated that liquidity, leverage, and profitability ratios are perceived as significant determinants of firm success. While this study emphasizes managerial awareness of financial ratios, it does not empirically analyze the impact of regulatory frameworks on these financial metrics or profitability.

Agboola and Ayo (2023) investigated how innovative pricing strategies affect profitability in agricultural small and medium-sized enterprises (SMEs) in Lagos State. Employing a cross-sectional survey of 190 Agri-SMEs, they found innovative pricing significantly enhances profitability. Though not directly related to financial ratio regulation, this study suggests pricing strategies operate within broader regulatory and economic contexts that may influence financial performance in agricultural enterprises.

Amibor and Olufemi (2024) examined the effect of working capital management on profitability across

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Nigerian non-manufacturing firms. Using panel regression on secondary data, they demonstrated that financial ratios such as current ratio and inventory turnover ratio significantly affect profitability. Their findings underline the importance of financial ratios in firm performance, suggesting implications for regulatory policies, though agriculture-specific regulation was not the focus of this research.

Yakubu, Jabo, and Suleiman (2018) evaluated the financial performance of two commercial poultry farms in Zamfara State, Nigeria. Using financial statements, they analyzed liquidity, solvency, and profitability ratios. Their findings showed both farms were profitable, with Rufai farm having higher profitability ratios than Guruza farm. The study highlights the importance of financial ratios in assessing farm performance but does not explore regulatory influences on these ratios.

Abdulraheem and Adekunle (2022) examined the effect of risk management practices on the financial performance of small and medium-scale agricultural value chains in Kwara State, Nigeria. Using field surveys and logistic regression analysis, they found that financial and operational risk management practices significantly improved financial outcomes. While highlighting internal controls, the study did not explicitly investigate regulatory impacts on financial ratios within the agricultural sector.

Ijirshar, Udaah, Mile, and Vershima (2025) investigated how insecurity affects agricultural output in Benue State, Nigeria. Utilizing t-tests and structural equation modeling, they found insecurity negatively impacts crop and livestock production. Although focused on external challenges, the study indirectly emphasizes the need for strong financial ratios to measure agricultural enterprises' resilience against such disruptions and maintain profitability amid insecurity.

3. Methodology

Research Design

This study adopts an ex-post facto research design, utilizing historical financial data to examine the regulatory impact of financial ratios on the profitability of agricultural enterprises in Nigeria. The design is appropriate for investigating relationships between financial performance indicators and regulatory conditions over time without manipulating study variables.

Area of Study

The study is limited to the agricultural sector in Nigeria, an emerging economy with a significant reliance on agriculture for national development.

Sources of Data

Data for this study were obtained from secondary sources, specifically the audited financial statements and annual reports of selected Nigerian agricultural firms. The data cover the period 2014 to 2024, ensuring the inclusion of relevant regulatory and economic conditions. These sources provide the quantitative basis for computing the study variables: Current Ratio, Debt-to-Equity Ratio, Asset Turnover Ratio, Gross Profit Margin, Operating Expense Ratio, and Return on Assets (ROA).

Population of the Study

The population comprises all agricultural firms listed on the Nigerian Exchange Group (NGX) or operating in Nigeria with publicly available financial records as of 2024.

Sample Size and Sampling Technique

A purposive sampling technique was employed to select five agricultural firms with consistent and accessible audited financial data over the study period. The selected firms are: Presco Plc., Okomu Oil Palm Company Plc., Nigerian Breweries Plc., Unilever Nigeria Plc., and Dangote Sugar Refinery Plc.

Model Specification

$$ROA_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 DER_{it} + \beta_3 ATR_{it} + \beta_4 GPM_{it} + \beta_5 OER_{it} + \varepsilon_{it}$$

Where:

ROA_{it} = Dependent Variable - Return on Assets for firm i in year t
CR_{it} = Independent Variable - Current Ratio
DER_{it} = Independent Variable - Debt to Equity Ratio
ATR_{it} = Independent Variable - Asset Turnover Ratio
GPM_{it} = Independent Variable - Gross Profit Margin
OER_{it} = Independent Variable - Operating Expense Ratio
β_0 = Intercept term
β_1 to β_5 = Coefficients to be estimated
ε_{it} = Error term capturing unobserved factors

Method of Data Analysis

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The study employed Panel Data Regression, specifically the Panel Least Squares (PLS) method, to estimate the impact of financial ratios on Return on Assets (ROA). Descriptive statistics were used to summarize the dataset. Diagnostic tests for multicollinearity, heteroskedasticity, and autocorrelation were conducted to ensure the reliability and robustness of the regression model.

4. Data Presentation and Analysis

Dependent Variable: ROA

Method: Panel Least Squares

Date: 10/07/25 Time: 23:22
Sample: 2014 2024

Periods included: 11

Cross-sections included: 5

Total panel (balanced) observations: 55

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CR	0.118483	0.011175	10.60207	0.0000
DER	0.014907	0.008465	1.761136	0.0845
ATR	0.122661	0.013978	8.775156	0.0000
GPM	0.236150	0.050376	4.687778	0.0000
OER	-0.072429	0.101999	-0.710090	0.4810
C	-0.258867	0.049778	-5.200481	0.0000

R-squared	0.993204	Mean dependent var	0.150909
Adjusted R-squared	0.992511	S.D. dependent var	0.102925
S.E. of regression	0.008907	Akaike info criterion	-6.501232
Sum squared resid	0.003888	Schwarz criterion	-6.282250
Log likelihood	184.7839	Hannan-Quinn criter.	-6.416550
F-statistic	1432.248	Durbin-Watson stat	1.369907
Prob(F-statistic)	0.000000		

Table 4.1: Panel Regression Analysis Result of the Time Series Data

Source: E-view 11.0 Statistical Output, 2025

Table 4.1 presents the results of the panel least squares regression analyzing the impact of liquidity (CR), leverage (DER), efficiency (ATR), gross profitability (GPM), and operating expense ratio (OER) on the Return on Assets (ROA) of five agricultural firms over the period 2014 to 2024. The results show that the current ratio (CR) has a positive and statistically significant effect on ROA (coefficient = 0.1185, p = 0.0000). This suggests that improved liquidity contributes positively to firm profitability, indicating that firms with stronger short-term

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financial positions tend to generate higher returns on assets. Similarly, the asset turnover ratio (ATR) also has a positive and significant relationship with ROA (coefficient = 0.1227, p = 0.0000), implying that efficient use of assets to generate sales significantly enhances profitability.

The gross profit margin (GPM) is also positively and significantly associated with ROA (coefficient = 0.2362, p = 0.0000), indicating that firms with higher gross profitability tend to be more profitable overall. This emphasizes the importance of controlling production costs and maximizing revenue in enhancing returns. In contrast, the operating expense ratio (OER) shows a negative but statistically insignificant effect on ROA (coefficient = -0.0724, p = 0.4810), suggesting that while higher operating expenses may reduce profitability, the relationship is not strong enough to be conclusive within the sample.

The debt-to-equity ratio (DER) has a positive but weak relationship with ROA (coefficient = 0.0149, p = 0.0845). Although marginally significant at the 10% level, this result indicates that increased leverage may slightly improve profitability, possibly through the benefits of financial leverage, though with associated risks. The constant term (C) is negative and highly significant (coefficient = -0.2589, p = 0.0000), suggesting that in the absence of the explanatory variables, the baseline ROA would be negative. However, this value should be interpreted cautiously, as it primarily serves as an intercept for the model rather than a meaningful economic indicator.

The model demonstrates very strong explanatory power, with an R-squared of 0.9932 and an adjusted R-squared of 0.9925, meaning that approximately 99% of the variation in ROA is explained by the included independent variables. The F-statistic of 1432.25 (p = 0.0000) confirms that the overall model is statistically significant, indicating that the financial ratios collectively have a strong predictive effect on ROA. The Durbin-Watson statistic of 1.37 is slightly below the ideal value of 2, suggesting some positive autocorrelation in the residuals, but it is not severe enough to invalidate the model.

4.2 Test of Hypotheses

Test of Hypothesis One

Restatement of the Hypothesis in Null and Alternate forms:

H_{01}: Current Ratio has no significant effect on the Return on Assets (ROA) of agricultural firms in Nigeria.

H_{a1}: Current Ratio has a significant effect on the Return on Assets (ROA) of agricultural firms in Nigeria.

Statement of Decision Rule:

Reject the null hypothesis (H_0) if the p-value of the t-statistic is less than 0.05. Otherwise, accept the null hypothesis and reject the alternate hypothesis.

Decision:

From the regression result, the coefficient of the Current Ratio (CR) is 0.1185 with a t-statistic of 10.6021 and a p-value of 0.0000, which is less than 0.05.

Therefore, H_{01} is rejected, and the alternate hypothesis is accepted. This implies that the Current Ratio has a significant positive effect on the Return on Assets of agricultural firms in Nigeria during the study period.

Test of Hypothesis Two

Restatement of the Hypothesis in Null and Alternate forms:

H_{02}: Debt to Equity Ratio has no significant impact on the Return on Assets (ROA) of agricultural firms in Nigeria.

H_{a2}: Debt to Equity Ratio has a significant impact on the Return on Assets (ROA) of agricultural firms in Nigeria.

Statement of Decision Rule:

Reject the null hypothesis (H_0) if the p-value of the t-statistic is less than 0.05. Otherwise, accept the null hypothesis and reject the alternate hypothesis.

Decision:

The coefficient of the Debt to Equity Ratio (DER) is 0.0149 with a t-statistic of 1.7611 and a p-value of 0.0845, which is greater than 0.05.

Hence, H_{02} is accepted, and the alternate hypothesis is rejected. This indicates that the Debt to Equity Ratio does not significantly impact the Return on Assets of agricultural firms in Nigeria during the study period.

Test of Hypothesis Three

Restatement of the Hypothesis in Null and Alternate forms:

H_{03}: Asset Turnover Ratio has no significant relationship with the Return on Assets (ROA) of agricultural firms in Nigeria.

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H_{a3}: Asset Turnover Ratio has a significant relationship with the Return on Assets (ROA) of agricultural firms in Nigeria.

Statement of Decision Rule:

Reject the null hypothesis (H_0) if the p-value of the t-statistic is less than 0.05. Otherwise, accept the null hypothesis and reject the alternate hypothesis.

Decision:

The coefficient of the Asset Turnover Ratio (ATR) is 0.1227 with a t-statistic of 8.7752 and a p-value of 0.0000, which is less than 0.05.

Therefore, H_{03} is rejected, and the alternate hypothesis is accepted. This implies that Asset Turnover Ratio has a significant positive relationship with the Return on Assets of agricultural firms in Nigeria during the study period.

Test of Hypothesis Four

Restatement of the Hypothesis in Null and Alternate forms:

H_{04}: Gross Profit Margin has no significant effect on the Return on Assets (ROA) of agricultural firms in Nigeria.

H_{a4}: Gross Profit Margin has a significant effect on the Return on Assets (ROA) of agricultural firms in Nigeria.

Statement of Decision Rule:

Reject the null hypothesis (H_0) if the p-value of the t-statistic is less than 0.05. Otherwise, accept the null hypothesis and reject the alternate hypothesis.

Decision:

The coefficient of the Gross Profit Margin (GPM) is 0.2362 with a t-statistic of 4.6878 and a p-value of 0.0000, which is less than 0.05.

Thus, H_{04} is rejected, and the alternate hypothesis is accepted. This suggests that Gross Profit Margin has a significant positive effect on the Return on Assets of agricultural firms in Nigeria during the study period.

Test of Hypothesis Five

Restatement of the Hypothesis in Null and Alternate forms:

H_{05}: Operating Expense Ratio has no significant impact on the Return on Assets (ROA) of agricultural firms in Nigeria.

H_{a5}: Operating Expense Ratio has a significant impact on the Return on Assets (ROA) of agricultural firms in Nigeria.

Statement of Decision Rule:

Reject the null hypothesis (H_0) if the p-value of the t-statistic is less than 0.05. Otherwise, accept the null hypothesis and reject the alternate hypothesis.

Decision:

The coefficient of the Operating Expense Ratio (OER) is -0.0724 with a t-statistic of -0.7101 and a p-value of 0.4810, which is greater than 0.05.

Therefore, H_{05} is accepted, and the alternate hypothesis is rejected. This means that the Operating Expense Ratio does not have a significant impact on the Return on Assets of agricultural firms in Nigeria during the period under review.

5. Summary of Findings, Conclusion and Recommendations

Summary of Findings

The key findings of the study are elucidated below:

I. The Current Ratio exhibited a positive and statistically significant effect on ROA, with a coefficient of 0.1185 (t = 10.6021, p = 0.0000). This suggests that stronger liquidity positions significantly enhance the profitability of agricultural enterprises in Nigeria.

II. The Debt to Equity Ratio showed a positive but statistically insignificant impact on ROA, with a coefficient of 0.0149 (t = 1.7611, p = 0.0845). This indicates that increased leverage did not significantly affect the profitability of the sampled firms during the study period.

III. The Asset Turnover Ratio had a positive and statistically significant effect on ROA, with a coefficient of 0.1227 (t = 8.7752, p = 0.0000). This implies that efficient asset utilization substantially contributed to profitability among agricultural firms in Nigeria.

IV. Gross Profit Margin demonstrated a positive and statistically significant effect on ROA, with a coefficient of 0.2362 (t = 4.6878, p = 0.0000). This result indicates that profitability at the gross level plays a critical role in influencing overall returns on assets.

V. The Operating Expense Ratio was found to have a negative and statistically insignificant impact on ROA,

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with a coefficient of -0.0724 (t = -0.7101, p = 0.4810). This suggests that higher operating expenses may reduce profitability, but the effect was not strong enough to be statistically meaningful.

Conclusion

The study conclusively found that while some financial ratios such as Current Ratio, Asset Turnover Ratio and Gross Profit Margin have a statistically significant positive effect on the Return on Assets (ROA) of agricultural firms in Nigeria, others like the Debt to Equity Ratio and Operating Expense Ratio do not exhibit significant impacts on profitability during the period under review.

These results partially support the theoretical expectations that certain financial indicators are linked to firm performance, particularly those related to liquidity, efficiency, and gross profitability. However, the insignificant impact of leverage and cost management metrics suggests that financial structure and operational expenses may not be the dominant drivers of profitability in this context.

The findings imply that profitability in the Nigerian agricultural sector may be shaped by broader external and sector-specific factors, such as regulatory constraints, climatic conditions, infrastructural challenges and market uncertainties factors, which implies that financial ratios alone may not adequately capture.

Therefore, while financial ratios remain essential tools for internal performance assessment and financial planning, they may not fully explain profitability outcomes in isolation. A more integrated framework, such as one that combines traditional financial metrics with contextual economic, environmental, and policy-related factors may be necessary to effectively understand and improve profitability in agricultural enterprises operating within emerging economies like Nigeria.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

i. Although the Current Ratio showed a significant positive effect on ROA, agricultural firms should further strengthen their liquidity management practices. This includes proactive cash flow forecasting, optimizing receivables and payables cycles, and maintaining adequate working capital to ensure resilience during periods of low income or market disruptions common in the agricultural sector.

ii. The Debt to Equity Ratio did not significantly influence ROA, which may indicate inefficient use of borrowed funds or unfavorable loan conditions. It is recommended that agricultural firms adopt a strategic financing mix, ensuring that debt is used productively. This involves renegotiating interest rates, accessing government-backed agricultural credit, and improving financial literacy among managers to enhance debt management.

iii. The Asset Turnover Ratio had a statistically significant effect on profitability, underscoring the importance of operational efficiency. Firms should invest in asset optimization strategies, such as upgrading equipment, streamlining operations, and training personnel to enhance productivity. Leveraging digital tools for inventory control and production tracking can also improve asset utilization.

iv. The Gross Profit Margin was found to have a significant positive impact on ROA. To build on this, agricultural enterprises should focus on cost-effective production methods, improved input sourcing, and better pricing strategies. Establishing partnerships across the value chain and implementing quality control measures can further protect and improve gross margins.

v. While the Operating Expense Ratio was not statistically significant, its negative coefficient suggests that high operating costs could undermine profitability. Firms should prioritize cost efficiency, regularly auditing expenses, automating administrative tasks where feasible, and reducing waste. Participating in cooperative models to share resources and infrastructure may also reduce overhead and enhance profitability.

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