Humanities and Social Sciences Letters
2025 Vol. 13, No. 4, pp. 1596-1614
ISSN(e): 2312-4318
ISSN(p): 2312-5659
DOI: 10.18488/73.v13i4.4536

Inventory turnover ratio and firm profitability: A study of listed agricultural firms in Nigeria

Busola Elizabeth Simon-Ilogho

Department of Accountancy, College of Business and Economics, University of Johannesburg, South Africa.
Email: bsimon-ilogho@uj.ac.za

Article History
Received: 20 November 2024
Revised: 2 September 2025
Accepted: 14 October 2025
Published: 11 November 2025

Keywords
Agriculture
Firm performance
Inventory turnover
Profitability.

ABSTRACT

A manufacturing company's turnover rate affects revenue, which in turn influences the firm's profitability. Efsfective inventory management plays a fundamental role as a determinant of profitability. This study examines the influence of inventory turnover on the profitability of firms within the agricultural sector in Nigeria. The research analyzed listed agricultural firms on the Nigerian Exchange Group over 24 quarters from 2018 to 2023, utilizing secondary data from the financial statements of these firms. Ordinary least squares regression was employed as the data analysis method. The results revealed that inventory turnover ratios have an insignificant influence on profitability, as measured by return on assets (ROA). The findings indicate that the impact of inventory turnover on return on equity (ROE) is negative, while its effect on return on sales (ROS) is positive. The study recommends that more efforts be directed toward improving inventory management efficiency in agricultural firms. However, it is essential to consider and monitor the outcomes on ROE to determine if the costs associated with enhancing inventory management outweigh the benefits, given its negative impact on ROE.

Contribution/Originality: This study examines the effect of inventory turnover on three profitability metrics (ROA, ROE, ROS) in the Nigerian agricultural sector using quarterly data from 2018 to 2023. It reveals sector-specific insights, including ROE's negative response, offering nuanced guidance for inventory strategies in emerging economies' agribusinesses.

1. INTRODUCTION

Financial performance is a critical indicator for investors to assess profitability and financial health, providing insights that inform their decision-making processes. This performance measurement reflects the company's ability to generate profit, meet non-financial objectives, such as corporate social responsibilities, and sustain operations as a going concern (Wijana & Adnyana, 2022). Hence, survival and growth are fundamental to business entities. A company's success is primarily determined by its ability to generate revenue or sales of goods or services in volumes that contribute to profitability (Jayathilaka, 2020). One way to measure whether the firm is in good or bad condition is to evaluate the profitability ratios from the published figures in the firm's financial statements (Amanda, 2019; Olayinka, 2022). Profitability ratios reveal the measure of returns generated from a certain amount of investment. They are usually expressed as ratios that compare specific returns with investments in particular areas expected to yield results.

However, profitability in an industrial-based firm is greatly determined by increased sales (Arif Nasution, 2020). Sales or revenue are either sourced from the turnover of manufactured goods or procured goods or materials.

These items are usually categorized as inventory. They form a significant part of the working capital and are either raw materials, finished goods, or work in progress (Garba, Mourad, & Chamo, 2020; Wajo, 2021). Inventory is a fundamental part of the current assets of businesses. They are involved in business operations (Asuzu, Echekoba, Ubesie, & Egbunike, 2019). They facilitate a firm's ability to store and retrieve needed materials effectively and efficiently, and reduce operational costs (Alnaim & Kouaib, 2023; Asuzu et al., 2019; Khan, Deng, & Khan, 2016). Thus, inventory management is a significant part of sales, influencing most businesses' profitability. It must be considered in several aspects of the manufacturing business operation, such as production, sales, warehousing, marketing, finance, and accounting. Most businesses in production or manufacturing operations may have more in common than the uniqueness observed with those engaged within the primary sector, such as farming, forestry, fishing, and mining, especially with the former three (Olmos, 2022).

Agricultural businesses may have certain uniqueness with their inventory management systems because they mainly use biological assets, chemicals, and materials to produce crops, plants, trees, and animals for distribution as a primary supply chain source. The agricultural sector has played an essential role in economies globally, contributing significantly to development and the empowerment of human activity through the feeding of humanity. The agricultural sector is still a fundamental aspect of economic growth, especially in developing countries, such as Nigeria and Africa. Hence, the inventory management aspect of businesses within the agricultural sector should be a crucial focus because the agricultural industry has always contributed a significant quota to the Gross Domestic Product of Nigeria (Goonawardhana & Dissanayake, 2023).

Over the past two decades, agricultural statistics contributed the highest to the Gross Domestic Product (GDP) in 2002, with 36.9 percent. Since then, it has gradually declined, with the minor contribution being 19.9 percent in 2014. It increased to 24.5 percent in 2020 and has remained Nigeria's most significant sector contributor (World Bank, 2024). From 2022 to the second quarter of 2023, the sector's contribution to the GDP declined to 21 percent (World Bank, 2024). This decline could be due to the inability of supply to meet demand in the agricultural supply chain during that period and the importation of agricultural produce into the country (Shehu & Clarke, 2020). Therefore, the agricultural sector must continuously focus on enhancing profitability, which depends on the quality, timing, and availability of resources (Gómez-Limón, Sánchez-Cañizares, Hidalgo-Fernández, & Castillo-Canalejo, 2023). Thus, managing the operational functions of the firm should be treated as a strategic priority, as it is crucial for boosting the profitability of agricultural firms in this fourth industrial revolution era.

The agricultural sector's success mainly depends on how efficiently it manages its inventories, which exist in various forms and stages of the organization's operations. Agricultural firms need to maintain continuous inventory turnover because a major performance indicator for assessing the effectiveness of inventory management is inventory turnover. It should be calculated using valid techniques for measuring effective performance (Breivik, Larsen, Thyholdt, & Myrland, 2021). The notion of storing inventories for agricultural firms is connected to the idea of cost, and inventory investment is subject to opportunity cost due to tied-up funds. These firms cannot do away with inventories because they directly affect the revenue of the practicing firm (Amahalu, Nweze, & Chinyere, 2017) nor can they stop producing because they still have unsold products (Kawasaki, Washio, Nakamura, & Nagahama, 2023).

The following questions come to mind: How does inventory turnover influence the profitability of Nigerian agricultural sector firms? The research question is further narrowed down to the scope of the listed agricultural firms. What is the influence of inventory turnover on the profitability of Nigerian-listed agricultural firms?

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Inventory Turnover Efficiency

Extant literature indicates that inventories reduce unnecessary costs when managed efficiently and allow for a better quality of products for customers (Khan et al., 2016; Ondari & Muturi, 2016). On average, it represents over

35% of a firm's total assets and about 49% of the current assets of an agricultural firm (Mwaura, 2017; Ondari & Muturi, 2016). Therefore, agricultural firms understand that there is a need to ensure a continuous turnover of goods to facilitate business performance, increase performance and profitability, and keep funds circulating (Onodi, Ibiam, & Akujor, 2021). However, some agricultural firms in Nigeria cannot strike a balance between the cost of goods sold and average inventory, which must be calculated to halt the negative inventory turnover ratio and the low asset and fixed asset ratios (Osabuohien, 2020). The inventory turnover needs to be studied by adopting financial and non-financial performance measures. However, the monetary measure of firm performance will be ideal to capture the essence of the earlier research question. The profitability of agricultural firms is the most suitable financial measure to depict the return on investments and operations of inventory. In addition, the inventory sales also indicate a well-managed inventory, which contributes to increased profitability at the end of a period.

Inventory turnover is a vital efficiency measure for evaluating inventory management effectiveness, and it must be measured using suitable and valid methods since it is so widely used as a diagnostic method. It is characterized as the ratio of the value of products sold to the average inventory, and it is one of the metrics used by managers and industry analysts to evaluate a company's output (Tadayonrad & Ndiaye, 2023). Since the inventory turnover ratio compares inventory to revenue, it can be used to assess efficiency over time and compare inventory performance across companies. The inventory turnover ratio indicates how often a company's manufacturing department turns raw materials into finished products. The rate at which a firm can sell inventory is a significant indicator of its success. This fact makes an agricultural firm that transfers inventory out more quickly appear to outperform its rivals. The higher the holding cost of an item, the less incentive customers have to return to the store to purchase new products (Giri & Masanta, 2018). The inventory turnover ratio is vital because total turnover relies on two key efficiency components, namely, stock purchasing and sales (Herison, Sahabuddin, Azis, & Azis, 2022).

The organization must increase its sales to enhance inventory turnover, considering these two key components that can indicate efficiency, as substantial quantities of inventory are acquired throughout the year through stock purchasing. Failure to do so may result in the accumulation of storage and other holding costs (Liu, Zhang, Zhou, & Ru, 2018). Furthermore, sales must balance inventory purchases; otherwise, inventory will turn over less effectively. That is why the ordering and sales units must be in synchronization. There are many approaches that a firm can use to increase its product turnover level to achieve this. The organization can boost demand for inventory by implementing a targeted, well-designed, and cost-effective marketing campaign (Atnafu & Balda, 2018).

Additionally, the organization should thoroughly review its pricing strategy by examining factors that could contribute to an overall increase in sales value. It is essential for the organization to consistently evaluate purchase prices with suppliers and negotiate reductions in prices when requesting quotations or placing orders. Furthermore, forecasting accuracy must be enhanced through inventory categorization and trend analysis (Obamiro, 2019). The firm should promote pre-ordering of products for clients, which would allow the business to better plan its acquisition of inventory.

2.2. Firm Profitability

Firm profitability reflects the financial gains that companies achieve through their economic activities. It is assessed using various profitability ratios, such as return on sales (ROS), return on equity (ROE), and return on assets (ROA), which measure the firm's financial performance. Return on sales (ROS) explicitly evaluates the efficiency of a firm's operations by indicating the profit generated from sales. An increasing ROS suggests improved operational efficiency, while a declining ROS may signal potential financial difficulties (Putri & Rahyuda, 2020).

Return on equity (ROE) is a financial metric that demonstrates how effectively a company or its management utilizes the capital shareholders invest (Sunaryo, 2020). In other words, it evaluates a company's profitability relative to its shareholders' equity. A higher ROE indicates that the management is more successful in generating income and fostering growth through equity financing. This metric is useful for comparing companies within the

same industry, indicating which firms are operating with greater financial efficiency (Okoro, Onodugo, Udoh, & Ibe Chukwu, 2019). Return on assets (ROA) evaluates a company's profitability relative to its total assets. It enables managers, investors, and analysts to assess how effectively a company's management uses its assets to generate profits (Kasasbeh, 2021). In essence, ROA measures the ability of the firm's management to generate earnings from its economic resources or assets as reflected on the balance sheet.

2.3. Empirical Review

Over the years, several studies have examined the relationship between profitability and inventory turnover in various industrial sectors. The results have varied due to differences in approaches, scope, location, and timeframe. For instance, Arif Nasution (2020) used return on assets (ROA) to measure the effect of inventory turnover on profitability with financial statements from each firm. Then, a quantitative method of classifying assumptions and simple linear regression analyses was conducted using purposive sampling on a sample of 18 companies. Results from this study showed that inventory turnover does not positively affect return on assets. This result indicates a negative influence of inventory turnover on manufacturing firms' profitability, but does not differentiate the sectors these firms belong to. A clear distinction of sectoral results might provide more insight. The findings revealed an insignificant effect. Additionally, the research employed a simple linear regression to analyze data on listed automotive companies in Indonesia from 2015 to 2017. The number of sampled periods is limited (three), given that only 18 companies were analyzed. The results may reflect a specific pattern that may not fully represent an examination of automobile-based firms mostly dependent on inventory management. The study is also limited by the reliance on return on assets as its sole proxy for profitability measurement.

Similarly, Garba et al. (2020) research conducted on the outcome of the inventory turnover period on the profitability of listed conglomerates in Nigeria revealed an inverse relationship between inventory turnover management and profitability. The study employed feasible generalized least squares regression as the analytical tool, indicating that an increase in inventory turnover correlates with a decrease in profitability. The findings suggest that regular stock-taking is essential to identify necessary stock levels within the organization, enabling the reduction of inventory during periods of low demand. Additionally, the study highlights a negative influence of inventory turnover on the profitability of the examined conglomerate firms in Nigeria. It also emphasizes sector-specific analysis, focusing on the conglomerate sector within Nigeria. Although conglomerates are heterogeneous, comprising various businesses across different subsectors, the results may not be generalizable to sectors with a more homogeneous structure. The data analyzed spans from 2007 to 2016, covering ten years across six firms, resulting in a panel data set of 60 firm-years. Such a dataset may not be ideal for drawing definitive conclusions. Furthermore, the study limited profitability measurement to Return on Assets (ROA), which has limitations due to the subjectivity involved in re-estimating the value of non-current assets during revaluation, affecting the accuracy of profitability assessments (de Oliveira & Silva, 2022; Hladika, Gulin, & Bernat, 2021), regardless of the standards and guidelines available as frameworks.

Pramudita and Gantino (2023) examined the influence of profitability ratios, liquidity ratios, and inventory turnover on the market value of manufacturing firms in Indonesia from 2016 to 2021. The study examined this influence by employing the multiple linear regression analysis of data explicitly obtained from the food and beverage, cosmetics, and household subsectors. Inventory turnover significantly influences the market value of the investigated firms within six years. However, as in most reviewed studies, the examination was not sector-specific, so conclusions are based on heterogeneity in the diversity of industrial practices and operations. Rajagukguk and Siagian (2021) also examined the influence of inventory turnover and accounts receivable on the profitability of chemical-based companies in Indonesia, covering data from 2016 to 2019 (four years). Their study examined nine chemical-based firms listed on the Indonesia Stock Exchange using return on assets as a profitability measure and a criteria-based sampling method to select the nine companies reviewed. They employed simple linear regression to

analyze the effect of inventory turnover on these firms, and the results revealed that inventory turnover has a positive relationship with return on assets. However, the regression results demonstrate that it has no significant effect on profitability (ROA). Their study is limited to the proxy representation of profitability, as return on sales and return on equity would provide further insight into the effect of inventory turnover on profitability.

Another study by Onikoyi, Babafemi, Ojo, and Aje (2017) employed a survey to assess the effect of inventory management practices and turnover on financial performance from 2005 to 2013. The study focused on how stock value and inventory policies affect the profitability of the cost of goods sold. The study found a positive effect on the relationship between inventory turnover and the financial performance of the firms examined. Their study examined this relationship and claimed to have employed the survey research design on a single firm. However, they also claimed to have extracted data from the firm's annual report for nine years, which seems like they adopted a mixed method. This methodology is primarily influential to the outcome of the result obtained, which was, in one part, a correlation analysis and a regression, all revealing the positive and significant impact of inventory turnover on performance and profitability. Furthermore, the results of this study differed from prior studies and those of Farooq (2019), who discussed the impact of inventory turnover on return on assets, return on equity, and net profitability margin on the profitability of non-financial sector firms in Pakistan. The independent variables were broken down into inventory turnover ratio, sales growth, firm size, and working capital, with data collected from 79 organizations from 2006 to 2015. The researcher employed a generalized method of moments as a tool for analysis. The results showed that inventory turnover does not affect profitability measures. Hence, it was recommended that organizations should pay attention to variables that play a significant role in determining the firm's profitability, measured by return on assets (ROA), return on equity (ROE), and net profit margin (NPM). These two studies also did not have a sector-focused examination, which makes the findings general but may limit their generalizability.

Kwak (2019) analysis of Inventory Turnover as a Performance Measure in the Manufacturing Industry showed that inventory turnover ratios are critical in manufacturing. The study gathered data from 421 manufacturing companies in Korea from 2010 to 2018. The performance of top and bottom companies was compared using Altman's Z-score approach. The study found that inventory turnover ratios were positively correlated with capital intensity for all manufacturing industry companies but negatively correlated with gross margin and debt score. The study also showed that the inventory turnover ratio does not correlate significantly with other financial ratios such as profitability, growth, organizational value, and productivity. These results were based on the Altman score, which is a unique approach compared to similar studies. A representation of performance in the model was the use of Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA). Dashi (2018) studied companies' financial profitability and determining factors, including debt structure, inventory turnover ratios, and liquidity. Data was collected from 49 companies operating in Albania over an accounting period of 2014-2016 using multiple regressions as a method of data analysis. The study found an inverse relationship between financial profitability and inventory turnover, long-term debt, accounts receivable turnover, and short-term debt. In this case, the panel data structure used has more cross-sectional data (49) compared to the time frame, which was three years (2014 to 2016), and their appropriate models to adapt to many companies compared to the number of years.

Another study examined seventy-eight listed firms from the Saudi Stock Exchange from 2017 to 2021 (Alnaim & Kouaib, 2023). The study employed multiple regression analysis. The results revealed that an increased inventory turnover ratio leads to increased costs and profitability, with the possibility of cost reduction. The study measures profitability using Gross Profit Margin (GPM), return on assets (ROA), and earnings per share (EPS). While these are excellent proxies for measuring profitability, they do not capture the profitability measure for direct turnover, such as return on sales (ROS). The study also included manufacturing firms from various industrial sectors, such as energy, capital goods, pharmaceuticals, utilities, consumer durables, and material industries, which encompass several sectors with the exception of the agricultural and forestry industries, due to their unique products. In

addition, the uniqueness of the Nigerian economic climate, which differs from Saudi Arabia, underscores the need to examine a developing African economy like Nigeria.

Asuzu et al. (2019) examined the effect of inventory turnover on the performance of listed Nigerian manufacturing firms in the consumer goods sector, adopting the ex-post factor with the quota sampling method. The study also adopted a multiple regression method of regression analysis. The results revealed an insignificant negative relationship between inventory turnover, net profit margin, and operating cash flow to sales ratio. The measurement of profitability using the operating cash flow to sales ratio effectively captured the measurement of return to sales the considering cash and cash equivalents. The study attempted to focus on the consumer goods sector, an aspect of Nigeria's manufacturing industry, despite the result being insignificant. Therefore, the results can only be attributed to that sector within the location of Nigeria.

Khan et al. (2016) assessed the influence of inventory turnover on the performance of local Chinese supermarkets in the Hubei Province of China. The study captured performance using profit margin percentages and sales. This assessment revealed a negative relationship between inventory turnover and profit margin percentage, but a positive relationship with sales. In addition, they also examined the impact of cash, receivables, and inventory turnover on the profitability of 137 manufacturing firms listed on the Indonesia Stock Exchange between 2013 and 2016 using multiple linear regression. This inventory turnover analysis revealed that inventory turnover positively influences profitability (ROA). This is yet another contradictory result. Although the study was conducted in China and within the SME sector in small supermarkets, it can only make inferences based on this sector. The study also revealed a positive influence on sales, which means a profitability ratio, such as return on sales (ROS), can be adopted for examination.

Yusup and Hariani (2023) examined the effect of inventory turnover, current ratio, and receivable turnover on the profitability of firms in Indonesia. Their study explored data from 70 listed firms in the Indonesian Stock Exchange using a quantitative causal analysis. The results revealed that inventory turnover significantly negatively impacts the profitability of the firms examined. This result implies that when inventory turnover increases, it would be detrimental to the company's profitability. This outcome is not logical in an operational sense because a proper inventory management system that brings about efficient turnover is expected to increase profitability. Wibowo and Rohyati (2018) investigated the impact of the profitability of inventory turnover and working capital turnover in Indonesia from 2012 to 2014. Their study covered thirty listed Indonesian manufacturing companies employing multiple regression analysis and t-tests for their investigative analysis. The return on assets for these firms was used to represent profitability. The results from the study indicate that inventory turnover impacts return on investments, which is the proxy used to represent profitability, significantly and positively. This implies that inventory turnover can positively impact firms' profitability based on their results. Another study in Indonesia, such as that of Wibowo and Rohyati (2018), examined the impact of inventory turnover, but this time on working capital as its performance proxy. They produced a contrasting result with Yusup and Hariani (2023).

Hasanudin, Awaloedin, and Arviany (2022) examined the impact of several variables on the profitability of firms in Indonesia. Their study specifically examined the cash, inventory, and receivables turnover on the return on assets of listed agricultural business companies in Indonesia. Their study covered data from the selected agricultural firms from 2016 to 2020 and analyzed it using panel regression analysis on EViews 9. Their results revealed that the inventory turnover ratio negatively and significantly impacts profitability measured by return on assets. Herison et al. (2022) investigated the impact of working capital, inventory, and accounts receivable turnover on firms' profitability levels. Their study examined companies listed on the Indonesian Stock Exchange from 2015 to 2019 (five years).

Their work employed multiple regression on the dataset from 23 listed firms. The results revealed that inventory turnover has a negative and significant effect on profitability. Eryatna, Eltivia, and Handayawati (2021) examined the impact of inventory turnover, receivable turnover, and cash turnover on the profitability of Indonesia-

listed consumer goods firms. Their study examined 21 listed consumer goods firms in the Indonesian Stock Exchange, extracting their data from 2016 to 2018 for analysis. The study used multiple regression analysis for this examination, revealing that inventory turnover partially affects profitability.

Alnaim and Kouaib (2023) investigated inventory turnover and firm profitability in Saudi Arabia, examining the effect of inventory turnover. Their study examined 78 manufacturing firms listed on the Saudi Stock Exchange with data gathered from 2017 to 2021. After a multiple regression analysis, the results revealed that inventory turnover significantly positively impacts cost and profitability. The study argued that the price is easily manageable, provided there is also a positive impact on profitability (ROA) despite the positive impact of inventory turnover on price.

Most studies captured inventory turnover and firm performance, using proxies that represent profitability. Some proxies among the prior studies were return on assets and net profit margin, both of which express profitability. None of these studies examines the influence of the inventory turnover ratio on the profitability of firms in the agricultural sector.

There is a need to assess this industry, especially in a developing economy like Nigeria, which is heavily dependent on the agricultural sector, given its peculiarities. Moreover, given that profitability expresses the value of returns obtained compared to the value of the investment made into a business operation, it can be expressed by capturing inventory-based elements. Elements such as sales express the volume of inventory turnover in relation to return on sales.

The return on assets expresses the inventory value as a part of current assets plus non-current assets used in business operations. The study examines the return on equity, which provides a unique perspective on profitability in capital employed plus retained earnings, in addition to these proxies for profitability.

The study expresses its hypothesis in a null form as

H_0: The inventory turnover ratio does not influence the profitability of listed agricultural firms in Nigeria.

Which can further be expressed based on the proxies of profitability as

H_0: The inventory turnover ratio does not influence the profitability of listed agricultural firms in Nigeria.

Which can further be expressed based on the proxies of profitability as

H_{01}: The inventory turnover ratio does not have an impact on the return on assets of listed agricultural firms in Nigeria.

H_{02}: The inventory turnover ratio does not have an impact on the return on equity of listed agricultural firms in Nigeria.

H_{03}: Inventory turnover ratio does not have an impact on the return on sales of listed agricultural firms in Nigeria.

2.4. Conceptual Framework

Figure 1 illustrates a conceptual framework showing the relationship between inventory turnover ratio and profitability, and how profitability is measured using three key financial performance indicators, which include return on assets, return on equity, and return on sales.

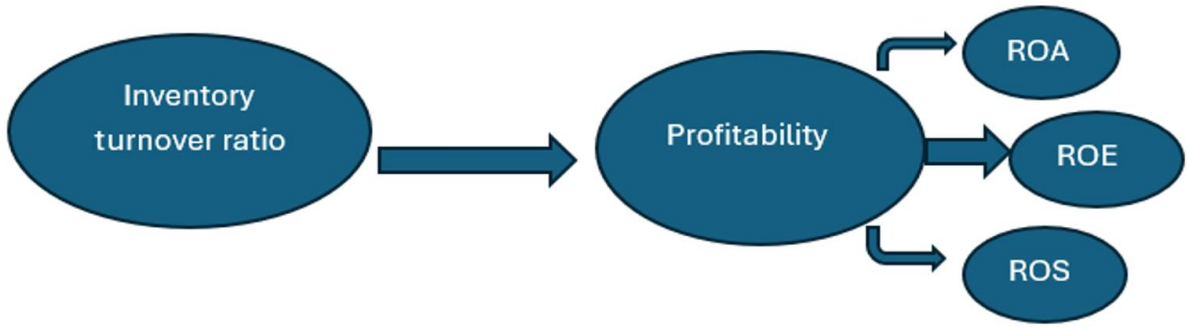

Figure 1. The conceptual model illustrates the relationship between the independent variable and the dependent variable in its proxies.

3. METHODOLOGY

3.1. Research Design

The study explains the causal effect of the independent variable X on the dependent variable Y, which depicts a causal relationship. Therefore, a causal research design was adopted for this study to explain the effect of inventory turnover on profitability. Data was gathered quarterly across six years for a larger sample of data frequency. This was employed by collecting data over 24 quarters from 2018 to 2023 as a quarterly analysis. The quarterly data extraction for analysis is based on the minimum observation requirement needed for a good panel regression analysis in OLS regression. A combination of six and five firms would produce a thirty-year frame observation, which is not ideal.

Given that the number of available agricultural listed firms in the Nigerian Exchange Group is limited to five, and considering the need for a detailed analysis of a frequent operational variable like inventory turnover, it is ideal to focus on the least periodic reporting, which is usually quarterly. The quarterly analysis further provides insights into the influence of inventory turnover within a year. The selected years (2018 to 2023) are chosen to maintain data consistency, as data from some years were unavailable.

3.2. Population of Study and Sampling

The target population was all the top agricultural firms in Nigeria. However, within six years, the sample population consisted of all the agricultural firms listed on the Nigerian Exchange Group. Only five agricultural firms were listed on the Nigerian Stock Exchange during that period. The details are revealed in Table 1. The study adopted a consensus approach by examining the entire number listed on the Nigerian Stock Exchange, which represents 100% of the total sample population.

Table 1. Examined agriculture organisations and the year of listing in the Nigerian exchange group

S/N	Organisation	Listed on
1	Ellah Lakes Plc	1993
2	FTN Cocoa Processor Plc	2008
3	Livestock Feeds Plc	1978
4	Okomu Oil Palm Plc	1997
5	PRESCO Plc	2002

The study made quarterly observations, which is unique compared to previous studies. With this approach, a six-year observation period becomes 24, since each year has four observations. Twenty-four quarterly observations across five firms would produce 120 firm-quarterly observations (see Table 2).

Table 2. Data collected for each listed company per quarter for six years

	Firms	2018				2019				2020				2021				2022				2023			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Ellah Lakes Plc	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
2	FTN Cocoa Plc	+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
3	Livestock Feeds Plc	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
4	Okomu Oil Palm Plc	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
5	PRESCO	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Note: Data per quarter for every year represented by (+).

The choice of these firms was based on past studies undertaken by Acosta, Cano, Peña, Rivera, and Bravo (2018) and Kareem (2014), where it was statistically established that the inventory management study could be applied to the agricultural sector. Thus, inventories (finished products) constitute part of the essential assets in a farming firm.

3.3. Sources of Data

The primary data sources collected for this study are the published annual reports of the listed agricultural firms from the Nigerian Exchange Group and African financial websites. The data is obtained from these sources because of their acclaimed credibility, as they are regulatory units that oversee listed companies in Nigeria. It is expected that published reports from their websites will be authentic. The secondary source of data collection for this study was the financial statements of the agricultural firms listed on the Nigerian Stock Exchange. This aided in addressing the objectives as captured in the survey. The data was based on a panel data regression, and it was extracted from the financial statements over a six-year period from 2018 to 2023.

3.4. Model Specification

A linear regression model was used to test the hypothesis, which was adapted from Garba et al. (2020) and expressed in the model presented below.

$$ROA_{it} = f(ITP, SZ, LEV)_{it} + \varepsilon_{it} \quad (1)$$

Though the model for Garba et al. (2020) is a panel regression (with time series and cross-section indicated by it), the direct linear expression can be derived from the Y=F(x). The model is now expressed as

$$ROA_{it} = \beta_o + \beta_1 ITP_{it} + \beta_2 SZ_{it} + \beta_3 LEV_{it} + \varepsilon_{it} \quad (2)$$

ROA = Return on Assets

ITP =Inventory Turnover Period

SZ = Firm size

LEV = Leverage

Therefore, this study incorporates its variables: profitability (PROF), inventory turnover ratio (ITR), firm size (FSIZE), firm age (FAGE), and net marketing contribution (NMC) into this model.

Therefore

$$PROF_{it} = \beta_{oit} + \beta_1 ITR_{it} + \beta_2 FSIZE_{it} + \beta_3 FAGE_{it} + \beta_4 NMC_{it} + \varepsilon_{it} \quad (3)$$

The difference between the models is the representation of profitability (PROF) into three distinct expressions: ROA, ROE, and ROS. This is to capture the various expressions of profitability concerning the asset value in ROA, the value of owner equity in ROE, and the periodic turnover/revenue/sales in ROS. The study also incorporates firm age (FAGE), firm size (FSIZE), and net marketing contribution (NMC) as control variables.

Therefore

$$ROA_{it} = \beta_{oit} + \beta_1 ITR_{it} + \beta_2 FSIZE_{it} + \beta_3 FAGE_{it} + \beta_4 NMC_{it} + \varepsilon_{it} \quad (4)$$

$$ROE_{it} = \beta_{oit} + \beta_1 ITR_{it} + \beta_2 FSIZE_{it} + \beta_3 FAGE_{it} + \beta_4 NMC_{it} + \varepsilon_{it} \quad (5)$$

$$ROS_{it} = \beta_{oit} + \beta_1 ITR_{it} + \beta_2 FSIZE_{it} + \beta_3 FAGE_{it} + \beta_4 NMC_{it} + \varepsilon_{it} \quad (6)$$

3.5. Measurement of Variables

The variables in this study were measured based on well-established formulas or measurement methods employed by prior studies for reference. For instance, the measurement of financial performance was based on three different ratios with three distinct characteristics to obtain more generalizable results based on profitability. The return on assets (ROA), return on sales, and return on equity were used to capture profitability. This choice is based on the need for heterogeneity in the profitability proxy. Return on assets (resources at disposal) can be found in the

statement of financial position. Return on equity captures ownership wealth and contribution, which is also captured in the statement of financial position. Based on the accounting equation (assets = equity + liabilities), ROE represents the other half of that equation. However, the return on sales is different as it expresses the volume of operations in turnover, which is vital for this study. It also represents the perspective from the income statement since sales are found in the income statement.

The measurement calculation of inventory turnover was based on inventory turnover sub-variables, such as inventory turnover ratio, asset turnover ratio, fixed asset ratio, receivable turnover ratio, and accounts payable turnover ratio. The inventory turnover ratio was captured in a formula and expressed as cost of goods sold divided by average inventory, based on Farooq (2019).

Table 3 presents the operationalization of variables, detailing their definitions, measurements, and sources.

Table 3. Dependent variable and the independent variable measurements and sources

Variables	Names	Measures	Sources
Dependent variables	Return on assets (ROA)	Net profit after tax/ total assets	Farooq (2019)
	Return on sales (ROS)	Net profit after tax/ total revenue or sales	
	Return on equity (ROE)	Net profit after tax/ total equity	
Independent variable	Inventory turnover ratio (ITO)	Cost of goods sold/ average inventory	Farooq (2019)

4. DATA ANALYSIS AND RESULTS

Tables 4 to 6 provide the results of the impact of inventory turnover on profitability measures of return on assets, equity, and sales.

Table 4. Inventory turnover on profitability (return on assets)

Variables	Coeff.	Std. err	t-stat	Prob.
ROA(-1)	0.034	0.070	0.481	0.631
ITR	1.399	1.670	0.838	0.403
FIRM_AGE	0.465	7.111	0.065	0.948
FIZE	0.000	0.000	1.037	0.301
ATR	-62.651	26.167	-2.394	0.018
NMC	0.000	0.000	6.803	0.000
C	-12.196	260.433	-0.046	0.962
R-squared	0.520	Mean dependent variable		-15.211
Adj R-squared	0.474	S.D. dependent variable		160.588
F-stat	11.287	Durbin-Watson statistics		2.122
Prob (F-stat)	0.000			

Table 4 shows the ordinary least squares regression table for the effect of inventory turnover on profitability (return on assets). The dataset includes the independent variable of inventory turnover (ITR) and its control variables, which include net marketing contribution (NMC), firm size (FIZE), firm age (FIRM_AGE), and asset turnover ratio (ATR) on profitability, which is measured by return on assets (ROA). Table 4 shows the probability (F-statistic) value of 0.00. The significance level in probability begins from 0.05 (5%) and below. This implies that the entire model is **fit**. A significant relationship exists between the independent and control variables regarding the return on assets (ROA).

The coefficient value describes the relationship, direction, and effect between the dependent variable (ROA) and the independent variable (ITR), as well as control variables (NMC, ATR, FIZE, and FIRM_AGE). The results of the coefficient of ITR from Table 4 show that ITR has approximately a 1.39 influence on ROA. This indicates that if ITR increases by 1, ROA would change by approximately 139%. The significant value of inventory turnover

suggests that profit from asset utilization may not be related to efficient inventory management. The results also show that FIRM_AGE is associated with a 0.465 (47%) increase in ROA.

The test assessed the effects of inventory turnover on return on assets. The R-squared value was calculated to determine the degree of variation of the dependent variable (return on assets), which can be predicted by the independent variable (inventory turnover). The analysis revealed that the inventory turnover ratio accounted for 52% of the variance in return on assets performance ($R2 = 0.52$, adjusted $R2 = 0.47$, $F = 11.28$, and $p < 0.05$). The R-squared value of 52 percent demonstrates the model's explanatory ability. The adjusted R-squared is 47%, indicating the strength of the regression between the independent variables. The standard deviation is 160.6, which indicates how far numbers and individuals of a group are separated from one another. The mean of the dependent variable, representing the center point of the variables, is -15.2. The significance of the F-statistic was confirmed, with a p-value of 0.000, indicating the model's overall significance.

Hypothesis One Test: Inventory Turnover Ratio Does Not Influence the Return on Assets of Listed Agricultural Firms in Nigeria.

Based on the results from Table 4, which reveals that the inventory turnover ratio has an insignificant (0.40) influence on the profitability of the examined firm in terms of ROA, we can accept the null hypothesis, which states that "the inventory turnover ratio does not influence the return on assets of listed agricultural firms in Nigeria."

Decision: Accept the null hypothesis.

Table 5. Inventory turnover on profitability (return on equity)

Variables	Coeff.	Std. err	t-stat	Prob.
ROE(-1)	0.074	0.035	2.113	0.036
ITR	-0.138	0.052	-2.660	0.009
FIRM_AGE	-0.017	0.168	-0.101	0.919
FIZE	0.000	0.000	-4.046	0.000
ATR	-0.115	0.622	-0.184	0.853
NMC	0.000	0.000	-27.473	0.000
C	2.191	6.191	0.354	0.724
R-squared	0.937	Mean dependent variable		1.363
Adj R-squared	0.931	S.D. dependent variable		10.547
F-stat	155.7	Durbin-Watson statistics		2.046
Prob (F-stat)	0.000000			

Table 5 reveals another ordinary least squares regression table depicting an analysis of the influence of inventory turnover on the profitability of the examined firms using return on equity (ROE) as a proxy. The table also reveals the independent variable (inventory turnover) represented by ITR alongside the employed control variables, which are net marketing contribution (NMC), firm size (FIZE), firm age (FIRM_AGE), and asset turnover ratio (ATR). Starting with the Prob (F-stat), Table 5 shows a value of 0.00 with the significance level in probability beginning from 0.05 (5%) and below. This implies that the entire model is fit and appropriate for use, and a significant relationship exists between the independent and control variables regarding the return on equity (ROE).

Moreover, similar to Table 4, it is clear that the coefficient value describes the relationship, direction, and effects between the dependent variable (ROE), the independent variable (ITR), and control variables (NMC, ATR, FIZE, and FIRM_AGE). Therefore, the results of the coefficient of ITR from Table 5, which shows that ITR is approximately -0.13, reveal a 13% decrease in ROE with a possible increase in ITR due to the inverse relationship. This means that if ITR increases by 1, ROE would decrease by approximately 13%. However, this direction of influence is not significant if the probability of ITR exceeds 0.05 concerning ROE. It is also evident from the table that there is a significant value in the inventory turnover row, indicating that efficient inventory management can

influence profit from utilizing equity. Therefore, inventory turnover has a significant negative influence on profitability, with a probability of 0.009.

One way to determine the strength of results is by reading the R-squared. From the table, the R-squared reads approximately 0.937. This reading implies that the inventory turnover ratio accounted for 93.7% variance in return on equity performance (R^2 = 93.7, AR^2 = 93.1, F = 155.7 and p < .05). The R-square value of 94 percent demonstrates the model's explanatory ability. The adjusted R-square is 93% indicating the strength of the regression between the independent variables. The standard deviation is 10.5, which indicates how far numbers and individuals of a group are separated from one another. The central point of the variables is represented by the mean of the dependent variable, which is 1.36. The importance of the F-statistic was determined and it was shown to be significant (0.000).

Hypothesis two test, "Inventory turnover ratio does not influence the return on equity of listed agricultural firms in Nigeria."

Based on the results from Table 5, which reveals that the inventory turnover ratio has a significant negative influence on the profitability of the examined firm in terms of ROE. We can reject the null hypothesis, which states that "the inventory turnover ratio does not influence the return on equity of listed agricultural firms in Nigeria."

Decision: Reject the null hypothesis.

Table 6. Inventory turnover on profitability (return on sales)

Variables	Coeff.	Std. err	T-sta	Prob.
ROS(-1)	0.134	0.032	4.153	0.000
ITR	2.387	0.620	3.850	0.000
FIRM_AGE	0.368	2.266	0.162	0.871
FIZE	0.000	0.000	3.996	0.000
ATR	-12.323	8.342	-1.477	0.142
NMC	0.000	0.000	25.901	0.000
C	-31.981	83.168	-0.384	0.701
R-squared	0.931	Mean dependent variable		-19.248
Adj. R-squared	0.925	S.D. dependent variable		135.597
F-stat	142.067	Durbin-Watson statistics		2.079
Prob (F-stat)	0.000			

Table 6 reveals the regression results of hypothesis three, which examines the influence of ITR on ROS. For this study, we shall first discuss the coefficient values. The coefficient values from the table show the relationship, direction, and effect between the dependent variable (ROS), the independent variable (ITR), and the control variables (NMC, ATR, FIZE, and FIRM_AGE). The results of the coefficient of ITR from Table 6 show that ITR has approximately a 2.38% influence on ROS, which means that if ITR increases by 1, ROS will have a positive 2.38% change in value. However, this change would not be tangible if the probability reading for the regression between ITR and ROS is insignificant above 0.05 (5%). The results revealed a 0.00 probability, which is below the 5% threshold, implying that the influence of ITR on ROS is positively significant.

The assessment of the ability of the independent variable to capture and explain the dependent variable can be seen with the R-squared and adjusted R-squared results. The analysis revealed that the inventory turnover ratio accounted for 0.931, which is a 93.1% variance in return on sales, a proxy for profitability ($R2$ = 93.1, $AR2$ = 92.5, F = 142, and p < .05). The R-squared value of 93% demonstrates the model's explanatory ability. The adjusted R-squared is 92.5%, indicating the strength of the regression between the independent variables. The standard deviation is 135.6, which indicates how far numbers and individuals of a group are separated from one another. The center point of the variables is represented by the mean of the dependent variable, which is -19.24. The importance of the F-statistic was determined, and it was shown to be significant (0.000).

Hypothesis three test: "Inventory turnover ratio does not influence the return on the sale of listed agricultural firms in Nigeria."

Based on the results from Table 6, which reveals that the inventory turnover ratio has a significantly positive influence on the profitability of the examined firm in terms of ROS, we can also reject the null hypothesis, which states that "the inventory turnover ratio does not influence the return on sales of listed agricultural firms in Nigeria."

Decision: Reject the null hypothesis.

5. DISCUSSION AND IMPLICATIONS

The regression model results indicated that inventory turnover has no significant influence on profitability in ROA, consistent with the empirical findings from the first hypothesis tested. The increase in profitability appears unrelated to inventory management. However, if more efforts are directed toward efficient inventory management, the significance level of its impact on profitability may increase. These results are particularly relevant when considering three indicators of profitability. The ROE and ROS results revealed significant influences of inventory turnover on profitability, with ROE being negatively affected and ROS positively affected. The findings related to return on assets (ROA) reflect the profit generated from investment in assets, providing insight into the insignificance of the inventory turnover ratio in influencing returns from the volume invested in assets. Assets include current and non-current assets, with inventory categorized as a current asset. This suggests that the cost of sales or net sales relative to the average inventory constitutes a small percentage of total asset investment, making it less tangible in impacting profitability. Although the turnover ratio primarily measures revenue or cost of sales concerning the average inventory, the return on assets typically captures profit and revenue after deducting costs, which explains its limited sensitivity to inventory turnover fluctuations. This means the net sales of inventory cannot significantly affect the outcome of the results from ROA, which is also seen in the results of Arif Nasution (2020), Rajagukguk and Siagian (2021), where inventory turnover had no impact on ROA. The study's findings on the test of hypothesis one agree with the conclusions from Farooq (2019), who used a generalized method of moments to capture endogeneity. His findings showed that inventory turnover is not related to return on equity. However, the logged version of return on assets in the work of Farooq (2019) revealed a significant impact. The study of Asuzu et al. (2019) and Arif Nasution (2020) also indicated that inventory turnover might not have any influence over profitability, as they all examined the return on assets with other profitability proxies like net profit margin, return on equity, and operating cash flow to sales ratio.

The findings from the test of hypothesis two on the effect of inventory turnover on return on equity show that inventory turnover also has a significant impact on profitability in terms of return on equity. This result disagrees with Farooq (2019), who also examined profitability in the form of return on equity and found it to have a significant impact. However, the coefficients resulting from the work of Farooq (2019) while examining ROE also revealed a significant and negative directional impact when the ROE was logged, which aligns with the significant result obtained from this study with the use of lag. The result from this paper is in disagreement with the studies of Alnaim and Kouaib (2023), Khan et al. (2016), Kwak (2019), and Onikoyi et al. (2017), which all revealed a significant impact of inventory turnover on the profitability of the manufacturing firm.

The test of hypothesis three revealed that inventory turnover positively influences the profitability of the examined firms regarding return on sales. An increase in profitability (return on sales) results from efficient inventory management. These findings agree with the work of Gunarto (2007), which concluded that inventory turnover positively and significantly affects return on assets. However, in this case, this examination was on return on sales, not assets. An increase in profitability (return on sales) does result from efficient inventory management. These results also disagree with the works of Dashi (2018) and Garba et al. (2020), which reveal a negative and significant influence of inventory turnover on firms' profitability. The study also disagrees with Asuzu et al. (2019)

and Arif Nasution's (2020) results. The examination of profitability using ROS is unique because most studies did not utilize return on sales.

5.1. Observations and Contribution to Knowledge

However, the nature of this study, which focuses on a sectoral assessment of agricultural-based firms, provides a unique insight into that industry in a developing economy like Nigeria. In addition, the different outcomes from the three representations of profitability are explained in the following observations: The outcome of this study depends on the uniqueness of agricultural firms in Nigeria. Several factors need to be considered when assessing the results obtained from the analysis. They are highlighted and explained in paragraphs as follows.

The profitability outcome from the examined firms cannot be solely attributed to the influence of the sale of inventory products or content, given that cost accumulation over quarters and periods would reduce the profit before that figure is obtained in the financial statement, as shown in Anggadini and Juliana (2019). This cost was not controlled for this study. Most of the reviewed studies, such as Alnaim and Kouaib (2023), Asuzu et al. (2019), Hasanudin et al. (2022), Wibowo and Rohyati (2018), and Yusup and Hariani (2023) did not control for the accumulated periodic cost, which includes the cost of goods sold that could have played a role in the level of profit declared as the return on ROA, ROS, and ROE. It has been established that overhead costs and operating expenses heavily contribute to determining profitability (Cooper & Kaplan, 1988; Kaplan & Cooper, 1998). This outcome can be best explained by the insignificant result obtained from the ROA examination.

The insignificance revealed in the result for the test of hypothesis one about the influence of inventory turnover on the profitability of agricultural firms in face value shows that inventory management may not be responsible for the performance of agricultural firms in terms of profitability. However, this also implies that the inventory management system that has boosted sales has not been effective enough to impact profitability. This result also means that other operations contributed to an agricultural business's return and profit. Other factors contributing to profit may have diminished the significance of revenue directly from inventory turnover and not the overall sales. Inventory turnover does not capture the entirety of the revenue value of agricultural firms because of what they categorize as inventory (Barnard, Foltz, Yeager, & Brewer, 2020). Agricultural businesses also generate revenue from insurance, subsidies, and government payments (Hazell & Varangis, 2020; Kambali & Panakaje, 2022), which may have a more significant contribution to revenue than the turnover directly from inventory.

An accounting standard perspective further provides insight into the findings of the study. Nigerian firms prepare their accounts based on the International Financial Reporting Standards (IFRS) and IAS 41 & IAS 2; animals and certain plants are treated as biological assets rather than inventory (Morshed & Ramadan, 2023). In addition, based on IAS 2, certain products from animals and plants are categorized as inventory products based on these standards. The value of inventory sold may not tangibly contribute to the changes in profit before tax and will thus not influence the profitability ratio used in this study, as revealed in Tables 4, 5, and 6. Certain animal products may be better classified as assets under the statement of financial position as biological assets rather than as inventory, based on these standards. Examples of such assets include animals that can produce eggs and wool, and products that can be sold as commodities, yet the animals self-regenerate the products. Other instances are bearer plants, long-lasting trees like vine plants, oil palms, and rubber trees (Nakasone & Castillo, 2023). This explains why the results of models two and three on ROE and ROS differ from those of ROA. ROA deals more with asset profitability, which is why the results of agricultural-based firms with biological assets reveal insignificance. However, the same is not seen with return on equity (ROE), which focuses on the shareholders' equity, and ROS, which directly deals with sales/turnovers, and has a significantly different result.

Finally, several factors influence firms' profitability within a particular economic or political climate, which is one of the reasons that may affect the entrance or exit of multinational firms from economies. Evidence in the works of Akuh (2024), Akinyemi and Mohammed (2023), and Mba (2021) shows that the Nigerian economic climate has

not been so favorable to firms for survival, growth, and expansion. These peculiarities within the economy that were not controlled could also explain the impact of revenue from inventory on the profitability of the examined agricultural firms. Thus, this study has successfully examined a sector-focused (Agric firms) assessment of the influence of inventory turnover on the profitability of agricultural firms, which has not been investigated in previous studies to the best of the search. In addition to this contribution to existing knowledge, the study employed a unique approach of quarterly examinations of each firm for six years, resulting in 144 firm-quarterly observations for firms in the agricultural sector in Nigeria, which was previously not attempted. Hence, the results obtained from this study were based on the quarterly data. Therefore, inferences are based on the data collected quarterly.

6. CONCLUSION AND RECOMMENDATIONS

The insignificance revealed in the first result pertains to the influence of inventory turnover on the profitability of agricultural firms, which implies that more inventory turnover is needed to significantly impact profitability. In that case, the study recommends that more effort be made towards efficient inventory management that would reduce potential costs while boosting inventory turnover to influence the profitability of firms within the agricultural sector. However, the study highlights other factors that influence the profitability of an agricultural-based firm, such as costs, low volume of inventory in the agricultural sector compared to overall sales/revenue value, the significance of a harsh climate in the Nigerian economy, and accounting standard differences influencing disparities in results with extant literature based on the discussions.

The results reveal the significant impact of inventory turnover on profitability as represented by ROE and ROS, solidifying previous empirical studies demonstrating the effects of inventory turnover on firms' profitability. The tests of hypotheses two and three showed variations in the direction of impact, with hypothesis two revealing a negative and hypothesis three showing a positive. This disparity highlights the unique outcomes of inventory turnover on these profitability aspects, with a negative effect on returns on equity and a positive impact on returns from sales. Unsurprisingly, inventory management positively influenced sales because inventory turnover is a sales-based management metric.

Further research could explore more nuanced factors influencing the relationship between inventory turnover and profitability, including firm-specific characteristics and external economic conditions. Future studies should also control for some factors highlighted in the discussion section to obtain more accurate results for reference and application. In addition to these considerations, future studies could cover longer periods. An introduction of interacting variables, such as the cost of firms and even accounting standards, can be considered to see if they play roles in mediating or moderating the relationships between the volume of inventory turnover and the profitability of agricultural firms.

The study provides empirical evidence on the impact of inventory turnover on profitability in agricultural firms listed on the Nigerian Stock Exchange over six years (2018-2023), with 144 observations from data collected quarterly over six years. The results demonstrate that inventory turnover insignificantly influences profitability with ROA, negatively impacts profitability with ROE, and has a significant positive impact on profitability with ROA.

This finding indicated that efficient inventory turnover significantly contributes to the ROS and ROE profitability metrics. The study identified critical variables such as net marketing contribution, firm size, firm age, asset turnover ratios, and their effects on profitability ratios. Overall, the study underscores the importance of inventory management in optimizing financial performance, particularly within the agricultural sector.

Funding: The study received no specific financial support.
Institutional Review Board Statement: Not applicable.
Transparency: The author states that the manuscript is honest, truthful, and transparent, that no important aspects of the study have been omitted, and that all deviations from the planned study have been made clear. The study followed all the rules of writing ethics.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

REFERENCES

Acosta, I. C. G., Cano, L. A. F., Peña, O. D. L., Rivera, C. L., & Bravo, B. J. J. (2018). Design of an inventory management system in an agricultural supply chain considering the deterioration of the product: The case of small citrus producers in a developing country. *Journal of Applied Engineering Science*, *16*(4), 523-537. https://doi.org/10.5937/jaes16-17696

Akinyemi, I. A., & Mohammed, M. O. B. (2023). Achieving national sustainable development through educational planning and administration in Nigeria: The harsh reality. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, *9*(1), 60-75.

Akuh, E. A. (2024). Economic hardship and educational management in Nigeria. *American Journal of Alternative Education*, *1*(7), 37-42.

Alnaim, M., & Kouaib, A. (2023). Inventory turnover and firm profitability: A Saudi Arabian investigation. *Processes*, *11*(3), 716. https://doi.org/10.3390/pr11030716

Amahalu, N., Nweze, C., & Chinyere, O. (2017). Effect of backflush accounting on financial performance of quoted food and beverage firms in Nigeria. *EPH-International Journal of Medical and Health Science*, *3*(1), 28-38.

Amanda, R. I. (2019). The impact of cash turnover, receivable turnover, inventory turnover, current ratio and debt to equity ratio on profitability. *Journal of Research in Management*, *2*(2), 14-22.

Anggadini, S. D., & Juliana, D. (2019). Factors affecting profitability. *Journal of Economic Studies*, *14*(3), 1-7.

Arif Nasution, A. (2020). Effect of inventory turnover on the level of profitability. *Materials Science and Engineering Conference Series*, *725*(1), 012137.

Asuzu, P. U., Echekoba, F. N., Ubesie, C. M., & Egbunike, F. C. (2019). Inventory turnover and firm performance of quoted consumer goods manufacturing firms in Nigeria. *Journal of Global Accounting*, *6*(3), 97-123.

Atnafu, D., & Balda, A. (2018). The impact of inventory management practice on firms' competitiveness and organizational performance: Empirical evidence from micro and small enterprises in Ethiopia. *Cogent Business & Management*, *5*(1), 1503219. https://doi.org/10.1080/23311975.2018.1503219

Barnard, F. L., Foltz, J., Yeager, E. A., & Brewer, B. (2020). *Agribusiness management*. New York: Routledge.

Breivik, J., Larsen, N. M., Thyholdt, S. B., & Myrland, Ø. (2021). Measuring inventory turnover efficiency using stochastic frontier analysis: Building materials and hardware retail chains in Norway. *International Journal of Systems Science: Operations & Logistics*, *10*(1), 1964635. https://doi.org/10.1080/23302674.2021.1964635

Cooper, R., & Kaplan, R. S. (1988). Measure costs right: make the right decisions. *Harvard Business Review*, *66*(5), 96-103.

Dashi, K. (2018). Financial profitability of firms and its determining factors. *Acta Universitatis Danubius. Œconomica*, *14*(4), 619-630.

de Oliveira, L. P., & Silva, C. A. T. (2022). Analysis of subjectivity in measuring assets assessed by level 3 of the fair value hierarchy. *Custose Agronegocio on Line LINE*, *18*(2), 373-396.

Eryatna, E. N., Eltivia, N., & Handayawati, K. U. (2021). *The effect of cash turnover, receivable turnover, and inventory turnover towards profitability of consumer goods companies in Indonesia*. Paper presented at the 2nd Annual Management, Business and Economic Conference (AMBEC 2020).

Farooq, U. (2019). Impact of inventory turnover on the profitability of non-financial sector firms in Pakistan. *Journal of Finance and Accounting Research*, *1*(1), 34-51.

Garba, S., Mourad, B., & Chamo, M. A. (2020). The effect of inventory turnover period on the profitability of listed Nigerian conglomerate companies. *International Journal of Financial Research*, *11*(2), 287-292. https://doi.org/10.5430/ijfr.v11n2p287

Giri, B. C., & Masanta, M. (2018). Developing a closed-loop supply chain model with price and quality dependent demand and learning in production in a stochastic environment. *International Journal of Systems Science: Operations & Logistics*, *7*(2), 147-163. https://doi.org/10.1080/23302674.2018.1542042

Gómez-Limón, J. A., Sánchez-Cañizares, S., Hidalgo-Fernández, A., & Castillo-Canalejo, A. M. (2023). Profit and viability persistence: Evidence from the Spanish agricultural sector. *Agribusiness*, *39*(4), 1300-1332. https://doi.org/10.1002/agr.21822

Goonawardhana, V. U. W., & Dissanayake, D. M. U. H. (2023). The Effect of financial development on economic growth; Incorporation with impact of the COVID-19 pandemic: Evidence from Asian frontier financial markets. *South Asian Journal of Business Insights*, *3*(2), 69-89. https://doi.org/10.4038/sajbi.v3i2.58

Gunarto, G. (2007). The effect of inventory turnover on firm profitability: Evidence from manufacturing companies. *Jurnal Akuntansi dan Keuangan Indonesia*, *4*(1), 1–14.

Hasanudin, H., Awaloedin, D. T., & Arviany, D. D. (2022). The impact of cash turnover, accounts receivable turnover, and inventory turnover on return on assets (ROA) for agribusiness companies listed on the Indonesia stock exchange (IDX) during the period 2016-2020. *Jurnal Info Sains: Informatika dan Sains*, *12*(02), 37-44.

Hazell, P., & Varangis, P. (2020). Best practices for subsidizing agricultural insurance. *Global Food Security*, *25*, 100326.

Herison, R., Sahabuddin, R., Azis, M., & Azis, F. (2022). The effect of working capital turnover, accounts receivable turnover and inventory turnover on profitability levels on the Indonesia Stock Exchange 2015-2019. *Psychology and Education*, *59*(1), 385–396.

Hladika, M., Gulin, D., & Bernat, I. (2021). Revaluation as a model of subsequent measurement of property, plant, and equipment–case of croatia. *Croatian Economic Survey*, *23*(1), 63-95. https://doi.org/10.15179/ces.23.1.3

Jayathilaka, A. K. (2020). Operating profit and net profit: Measurements of profitability. *Open Access Library Journal*, *7*(12), 1-11.

Kambali, U., & Panakaje, N. (2022). A review on access to agriculture finance by farmers and its impact on their income. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, *6*(1), 302–327. https://doi.org/10.5281/zenodo.6513302

Kaplan, R. S., & Cooper, R. (1998). *Cost & effect: Using integrated cost systems to drive profitability and performance*. Boston, MA: Harvard Business Press.

Kareem, B. (2014). Evaluation of inventory management systems of the Nigeria production industries. *Evaluation*, *4*(2), 38-45.

Kasasbeh, F. I. (2021). Impact of financing decisions ratios on firm accounting-based performance: Evidence from Jordan listed companies. *Future Business Journal*, *7*(1), 15. https://doi.org/10.1186/s43093-021-00061-0

Kawasaki, N., Washio, T., Nakamura, K., & Nagahama, K.-I. (2023). Maintaining agricultural production by building local distribution systems in the Northern Area of Japan. *Land*, *12*(2), 320.

Khan, J. A., Deng, S., & Khan, M. H. A. K. (2016). An Empirical analysis of inventory turnover performance within a local Chinese supermarket. *European Scientific Journal*, *12*(34), 145-157. https://doi.org/10.19044/esj.2016.v12n34p145

Kwak, J. K. (2019). Analysis of inventory turnover as a performance measure in manufacturing industry. *Processes*, *7*(10), 760. https://doi.org/10.3390/pr7100760

Liu, H., Zhang, J., Zhou, C., & Ru, Y. (2018). Optimal purchase and inventory retrieval policies for perishable seasonal agricultural products. *Omega*, *79*, 133-145. https://doi.org/10.1016/j.omega.2017.08.006

Mba, A. U. (2021). Economic recession in Nigeria: Historical perspective and implications on current economic realities in Nigeria. *African Journal of Business and Economic Development*, *1*(11), 15–23.

Morshed, A., & Ramadan, A. (2023). Qualitative analysis of IAS 2 capability for handling the financial information generated by cost techniques. *International Journal of Financial Studies*, *11*(2), 67. https://doi.org/10.3390/ijfs11020067

Mwaura, K. M. (2017). *Inventory management and financial performance of agricultural firms listed in the Nairobi securities exchange*. Master's Thesis, University of Nairobi.

Nakasone, G. T., & Castillo, C. (2023). Implementation of IAS 41 (Agriculture): The case of a Peruvian MYPE company. *Contabilidad y Negocios*, *18*(35), 14-38. https://doi.org/10.18800/contabilidad.202301.007

Obamiro, J. K. (2019). *Inventory management practices and organizational performance*. Lagos, Nigeria: Pumark Nigeria Ltd.

Okoro, B. C., Onodugo, V. A., Udoh, B. E., & Ibe Chukwu, B. (2019). Does board nationality influence the return on equity of money deposit banks? Empirical evidence from Nigeria. *International Journal of Mechanical Engineering and Technology*, *10*(7), 1-7.

Olayinka, A. A. (2022). Financial statement analysis as a tool for investment decisions and assessment of companies' performance. *International Journal of Financial, Accounting, and Management*, *4*(1), 49-66. https://doi.org/10.35912/ijfam.v4i1.852

Olmos, V. M. (2022). Forestry and the forest products sector: Production, income and employment, and international trade. *Forest Policy and Economics*, *135*, 102648. https://doi.org/10.1016/j.forpol.2021.102648

Ondari, M., & Muturi, W. (2016). Effects of inventory management on the financial performance of firms: A case of sugar manufacturing firms in Kenya. *International Journal of Social Sciences and Information Technology*, *2*(3), 1167–1186.

Onikoyi, I. A., Babafemi, E., Ojo, S., & Aje, C. O. (2017). Effect of inventory management practices on financial performance of Larfage Wapco Plc. Nigeria. *European Journal of Business and Management*, *9*(8), 113-122.

Onodi, B. E., Ibiam, O., & Akujor, J. C. (2021). Management accounting information system and the financial performance of consumer goods firms in Nigeria. *European Journal of Business and Management Research*, *6*(1), 112-120. https://doi.org/10.24018/ejbmr.2021.6.1.684

Osabuohien, E. S. (2020). *The Palgrave handbook of agricultural and rural development in Africa*. Switzerland: Springer.

Pramudita, A., & Gantino, R. (2023). The influence of profitability ratio, liquidity ratio, firm size and inventory turnover on firm value (PBV)(study on food and beverage and cosmetics and household sub-sector manufacturing companies listed on the Indonesia Stock Exchange 2016-2021 Period). *Journal of Economics, Finance and Management Studies*, *6*(1), 24-32. https://doi.org/10.47191/jefms/v6-i1-04

Putri, I. G. A. P. T., & Rahyuda, H. (2020). Effect of capital structure and sales growth on firm value with profitability as mediation. *International Research Journal of Management, IT and Social Sciences*, *7*(1), 145-155. https://doi.org/10.21744/irjmis.v7n1.833

Rajagukguk, A., & Siagian, H. (2021). Inventory turnover and accounts receivable turnover on profitability: An evidence of chemical companies listed in IDX. *Jurnal Bisnis Dan Kajian Strategi Manajemen*, *5*(2), 129-138. https://doi.org/10.35308/jbkan.v5i2.4058

Shehu, B. G., & Clarke, M. L. (2020). Successful and sustainable crop based biodiesel programme in Nigeria through ecological optimisation and intersectoral policy realignment. *Renewable and Sustainable Energy Reviews*, *134*, 110383. https://doi.org/10.1016/j.rser.2020.110383

Sunaryo, D. (2020). The effect of net profit margin, return on asset, return on equity on share prices in The Southeast Asian metal industry. *International Journal of Science, Technology & Management*, *1*(3), 198-208.

Tadayonrad, Y., & Ndiaye, A. B. (2023). A new key performance indicator model for demand forecasting in inventory management considering supply chain reliability and seasonality. *Supply Chain Analytics*, *3*, 100026. https://doi.org/10.1016/j.sca.2023.100026

Wajo, A. R. (2021). Effect of cash turnover, receivable turnover, inventory turnover and growth opportunity on profitability. *ATESTASI: Jurnal Ilmiah Akuntansi*, *4*(1), 61-69.

Wibowo, S. S. A., & Rohyati, E. (2018). The effect of working capital turnover and profitability of inventory turnover manufacturing companies listed in Indonesia Stock Exchange. *Journal of Applied Accounting and Taxation*, *3*(1), 95-98. https://doi.org/10.5281/zenodo.1305183

Wijana, I. M. D., & Adnyana, I. M. D. (2022). Profitability: Can it increase fixed assets investment? *International Journal of Sustainability, Education, and Global Creative Economic*, *5*(2), 38-49.

World Bank. (2024). *Agriculture, forestry, and fishing, value added (% of GDP) - Nigeria | Data. Data.worldbank.org*. Retrieved from https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=NG

Yusup, W. E., & Hariani, S. (2023). The effect of receivables turnover, inventory turnover and current ratio on profitability. *Jurnal Riset Manajemen dan Bisnis*, *8*(1), 23-32. https://doi.org/10.36407/jrmb.v8i1.987