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EFFECT OF CAPITAL INTENSITY AND EFFECTIVE TAX RATE ON FINANCIAL PERFORMANCE OF LISTED INDUSTRIAL GOODS FIRMS IN NIGERIA

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ABSTRACT
Achieving an excellent financial performance is a primary goal for every management team due to its importance in establishing a solid firm structure and facilitating growth. However, several factors consistently hinder the attainment of this objective, resulting in adverse effects on a firm's performance and financial success. This study examines the effect of Capital intensity and effective tax rate on the financial performance of listed industrial goods firms in Nigeria. To achieve these objectives, correlational panel research design, the study gathered data from eleven industrial goods firms over a twelve-year period (2012-2023), and data were analysed using E-Views version 12. The findings reveal that capital intensity has positive and significant effect on return on capital employed while effective tax rate showed a negative and insignificant effect on return on capital employed of listed industrial good firms in Nigeria. The study concludes that firms with higher capital intensity are better positioned to leverage their assets, manage risk effectively thereby leading to better financial performance, while lower effective tax rate using tax planning strategies which helps lower tax burden will lead to improved financial performance.

Keyword: Capital Intensity, Effective Tax Rate, Financial Performance, Return on Capital Employed and Firm Age.

INTRODUCTION

The financial performance of firms is a critical measure of their success and sustainability in the competitive business environment. Two significant factors that influence financial performance are capital intensity and the effective tax rate. Capital intensity is defined as the level of non-current assets used in production relative to other factors. High capital intensity can lead to substantial economies of scale, reducing per-unit costs and potentially enhancing profitability (Razali et al. 2018). Similarly, effective tax rate, representing the average rate at which a firm is taxed on its pre-tax income, also plays a crucial role in determining financial performance. In Nigeria, the tax policies governing industrial goods firms are shaped by the Companies Income Tax Act (CITA), which mandates various tax obligations. Effective tax rates can influence investment decisions,

cash flows, and ultimately, profitability. Firms with lower effective tax rates may have more disposable income to reinvest in their operations or distribute as dividends, thereby potentially enhancing financial performance (Nwaobia, & Jayeoba, 2016). Listed industrial goods firms in Nigeria play a pivotal role in the nation's economy, contributing significantly to GDP and employment (Timothy et al. 2020). In recent years, the performance of firms, particularly in the industrial goods sector, has gathered significant attention from academics and industry practitioners as the sector is critical to economic growth and development. However, understanding the determinants of financial performance requires a deeper exploration of various internal and external factors, including capital intensity and effective tax rate. The interplay between capital intensity and effective tax rate creates a complex dynamic that impacts the financial performance of listed industrial goods firms. High capital intensity often necessitates significant financial resources, which can be constrained by high effective tax rates. Conversely, tax incentives and deductions related to capital investments can mitigate the financial burden, fostering a more favorable economic environment for these firms (Kayode & Folajinmi, 2020). Understanding this relationship is crucial for policymakers and corporate managers aiming to enhance the financial sustainability and growth of the industrial sector in Nigeria. Despite the recognized importance of these factors, there is limited consensus in the literature on the extent and manner in which capital intensity and the effective tax rate interact to influence financial performance. Previous studies such as Eko & Muammar, (2022), and Ebimobowei, (2022) have typically analyzed capital intensity and tax rates independently, without considering their potential combined effects. This lack of clarity presents a challenge for managers, investors, and policymakers who rely on financial performance metrics to make informed decisions. Additionally, with the varying economic conditions, tax policies and tax laws across different regions and industries, the relationship between these variables may exhibit significant divergency. Consequently, this study will investigate capital intensity and effective tax rates, providing independent analyses of their effect on financial performance and interpreting the results thereon.

The study outlines its specific hypotheses as follow:
H_{o1}: Capital intensity ratio has no significant effect on return on capital employed of industrial goods companies in Nigeria.
H_{o2}: Effective tax rate percentage has no significant effect on return on capital employed of industrial goods companies in Nigeria.

LITERATURE REVIEW

Conceptual Framework

Capital Intensity

Capital intensity is a key concept in economics and business management that measures the level of capital investment required for a company to generate revenue or output. It refers to the extent to which a company relies on capital, such as machinery, equipment, and infrastructure, in its production process relative to other factors of production, such as labor and technology (Powell, *et al.* 2015). At its core, capital intensity can be defined as the ratio of capital costs to total production costs. It reflects the proportion of a company's total expenses that are allocated to investments in non-current assets and infrastructure necessary for production. In industries or sectors with high capital

intensity, a significant portion of expenses is attributed to capital expenditures, while in industries with low capital intensity, labor and other operational costs may dominate (Prasetyo, & Wulandari, 2021). Capital intensity plays a crucial role in determining the cost structure, efficiency, and competitiveness of businesses. Industries characterized by high capital intensity often require substantial upfront investments in machinery, equipment, and technology to establish production facilities. Examples include manufacturing, telecommunications, and utilities. These industries typically have high fixed costs but lower variable costs, as the bulk of expenses are associated with maintaining and operating capital assets.

On the other hand, low capital intensity may offer greater flexibility and agility in responding to market fluctuations and changing consumer demands. Companies in less capital-intensive industries may find it easier to adjust production levels and adapt to evolving market conditions. However, they may face challenges in achieving economies of scale and maintaining competitiveness without significant capital investments in technology and infrastructure. Powell, *et al.* (2015) asserted that capital intensity varies across industries and sectors, influenced by factors such as technological advancements, regulatory requirements, and market dynamics. Understanding the level of capital intensity within an industry is essential for strategic planning, investment decision-making, and risk management. It enables businesses to optimize their cost structures, enhance operational efficiency, and capitalize on opportunities for growth and innovation.

Capital Intensity Ratio

The capital intensity ratio is a financial metric that measures the amount of capital required to generate a certain level of revenue. It provides insight into how effectively a company uses its capital to produce sales. It measures how much investment in non-current assets such as machinery, buildings, and equipment are used in relation to other inputs, like labor and materials, in the production process. The amount of company wealth that is invested in fixed assets is called the capital intensity ratio (Powell, *et al.*, 2015). Murwaningsari and Rachmawati (2017) note that the capital intensity ratio is also called "the total assets" or "capital turnover ratio". The capital intensity ratio shows the level of efficiency of all company assets in generating certain sales. The higher the capital intensity ratio, the more efficient the overall use of assets in generating sales. In the capital intensity ratio, management has the responsibility and the right to determine the investment policies undertaken by the company.

More so, Novotná et al., (2020) opined that industries with low capital intensity rely more heavily on labor and other variable inputs for production. Examples include service sectors like retail, hospitality, and healthcare. These industries typically have lower upfront investment requirements but higher ongoing operational expenses, such as wages and maintenance costs. The level of capital intensity can significantly impact a company's profitability, scalability, and risk profile. High capital intensity can result in economies of scale and enhanced productivity through automation and technological advancements (Sumantri, *et al.*, 2022). However, it also entails higher financial risk due to the substantial capital investments required, potentially leading to greater leverage and fixed-cost commitments.

Effective Tax Rate

The effective tax rate (ETR) is a crucial financial metric used to assess the actual percentage of income paid in taxes by individuals or entities after accounting for various deductions, credits, and exemptions (Janský, 2019). Unlike the statutory tax rate, which is the rate imposed by tax authorities on taxable income, the effective tax rate provides a more accurate representation of the overall tax burden borne by taxpayers. At its core, the effective tax rate is calculated by dividing the total tax liability by the taxable income. Total tax liability encompasses all taxes owed by the taxpayer, including income taxes, payroll taxes, and any other applicable taxes (Lazăr & Andrieş, 2022). Taxable income refers to the portion of income subject to taxation after accounting for deductions, exemptions, and credits allowed by tax laws.

It reflects the extent to which a company is utilizing tax planning strategies and incentives to minimize its tax liabilities while remaining compliant with tax laws. A lower effective tax rate often indicates effective tax management and can enhance a company's after-tax profitability (Hanlon & Nessa, 2023). The effective tax rate is also valuable for comparative analysis within industries or sectors. It enables investors and analysts to evaluate the tax efficiency of companies and identify potential investment opportunities. Moreover, changes in the effective tax rate over time can signal shifts in tax policies, business strategies, or financial performance, providing valuable insights for decision-making.

Furthermore, the effective tax rate is a critical consideration in tax policy discussions and reform efforts. Policymakers use it to assess the distributional effects of tax laws and evaluate the fairness and efficiency of the tax system (Hanlon & Nessa, 2023). By analyzing the effective tax rates across different income groups or industries, policymakers can identify areas for reform and design policies that promote economic growth and equity. In essence, the effective tax rate serves as a comprehensive measure of the actual tax burden borne by individuals and entities, reflecting the impact of tax planning strategies, deductions, and credits on tax liabilities. It is a valuable tool for financial planning, performance evaluation, and policy analysis in both individual and corporate contexts.

Effective Tax Rate Percentage

The effective tax rate (ETR) percentage is a measure of the actual rate at which a corporation's income is taxed after accounting for all deductions, exemptions, and credits. It represents the average rate of tax paid on the company's taxable income. The effective tax rate can be calculated by dividing total tax expenses by the profit before tax (Jansky, 2019). The effective tax rate takes into account the complexities of the tax system and provides a comprehensive view of the tax burden faced by individuals or entities. It reflects the impact of various tax planning strategies, credits, and deductions employed to minimize tax liabilities legally (Guenther, *et al.*, 2023). By considering these factors, the effective tax rate offers a more accurate measure of tax efficiency and compliance. For individuals, the effective tax rate provides insight into the actual percentage of their income paid in taxes, considering deductions such as mortgage interest, charitable contributions, and retirement contributions. It helps individuals understand their tax burden more accurately and plan their finances accordingly. Similarly, for businesses, the effective tax rate percentage is a vital metric for assessing tax efficiency and profitability (Guenther, *et al.*, 2023).

Financial Performance

Financial performance is a measure of how efficient a firm uses its assets to generate revenue from its operating activities (Ado *et al.*, 2021). It can be said to be a term that is used to measure the financial health and growth of a firm over a period of time. It can also be used to compare different firms in the same industry. There are different measures of financial performance and since there are many stakeholders in a company, each group has its own interest in tracking the financial performance of that company. The trade creditors will be interested in the liquidity of the company, the bond holders will be interested in the solvency of the company, the shareholders will be interested knowing how well their investment will yield return and the management will be interested in knowing how well the firm perform in the market (Ahmadu, 2016). The most comprehensive source of information about a company's financial performance is from the financial statement which consists of, income statement, statement of financial performance, statement of cash flow and notes to the account.

A firm's financial performance is an estimation of what has been achieved by the firm over a given period of time in monetary terms (Efeeloo & Nwokeji, 2021). The importance of measuring a company's performance is to obtain vital information for the various investors and stakeholders on its liquidity, solvency, profitability and efficiency. According to Major and Azali (2022), the main factors that influence financial performance of an entity include liquidity, leverage, size of the firm and management's ability i.e. highly competent managerial staff. Financial performance is the measure of how well a firm can use its assets from its primary business to generate revenues. Musah, *et al.*, (2019) noted that financial performance measures like profitability and liquidity among others provide a valuable tool to stakeholders which aids in evaluating the past financial performance and current position of a firm. Financial performance evaluation is designed to provide answers to a broad range of important questions, some of which include whether the company has enough cash to meet all its obligations, is it generating sufficient volume of sales to justify recent investment. Capital structure is closely linked with financial performance (Yahaya, *et al.*, 2015).

Return on Capital Employed

Return on capital employed (ROCE) is a financial ratio that can be used to assess a company's profitability and capital efficiency. In other words, this ratio can help to understand how well a company is generating profits from its capital as it is put to use. ROCE) is a good baseline measure of a company's performance (Suardana *et al.*, 2018). ROCE is a financial ratio that shows if a company is doing a good job of generating profits from its capital. Companies have various financial resources they use to build and grow their businesses. This capital creates wealth through investment and can include such things as a company's marketable securities, production machinery, land, software, patents, and brand names. How a company chooses to allocate its capital assets can directly impact its performance. In many cases, it can mean the difference between the company generating a positive financial return or losing money.

Return on Capital Employed (ROCE) is a financial metric that measures the profitability and efficiency of a company in generating profits from its capital employed. Capital employed typically includes both equity and long-term debt, representing the total funds invested in the business to generate earnings (Husna & Satria, 2019). ROCE is a key

performance indicator that provides insights into how effectively a company utilizes its capital to generate returns. Rosi and Hasanuh, (2020) opined that while ROCE is a powerful metric, it is essential to consider industry norms and benchmarks when interpreting the results, as different industries may have varying capital intensity and profitability characteristics.

Firm Age

Firm age is a concept that is used to refer to a company's experience in its industry, specifically, it is the number of years since an organization began providing goods and services in its chosen field (Ogudu, *et al.*, (2018). Depending on the industry, firm age may provide benefits or disadvantages to a business. Generally, a firm that has been in operation for a longer period of time has more resources, experienced personnel and possibly better access to capital. In some industries, such as finance or energy, brand equity is highly valuable as a result of a firm's long-term track record. Customers tend to seek out the most established companies with the longest histories in the business. For these firms, firm age can be seen as a sign of trustworthiness and firm reputation. In other sectors, such as technology, the reverse is true. Firms that are new to the field may offer more innovative products or services than more established companies that have been in business for many years. Furthermore, these new firms may be willing to take greater risks than their older rivals. The concept of firm age has been studied in numerous academic papers over the past several decades. Indeed, it has been argued that younger organizations may offer certain advantages such as quicker decision making and greater experimentation (Anato *et al.*, 2020). Other research has found that long-standing organizations often have greater financial resources and increased brand recognition (Zhang, *et al.*, 2016). Thus, firm age can be seen as an important factor in understanding how companies operate and compete in the marketplace. Understanding the dynamics of the lifespan of a company can be critical for proper strategic planning and corporate growth. It is also important to note that the advantages of a greater firm age may not always outweigh the potential risks associated with stagnation and outdated business models. Therefore, it is important for all businesses to continuously adapt and evolve to remain successful over time.

Empirical Review

Nurcahya et al., (2024) investigated how tax planning, capital intensity, and leverage affect business financial performance using data from basic materials industrial manufacturing companies listed on the Indonesia Stock Exchange from 2017 to 2021. The study uses a quantitative multiple linear regression model. Purposive sampling was used and resulted in 47 companies with a total of 162 observation data. Data analysis was carried out using SPSS 25. Based on research findings, leverage has a negative impact on the company's financial performance, although capital intensity and tax planning both significantly improve financial performance. The study recommended that companies should focus on optimizing their capital intensity and implementing effective tax planning strategies to enhance their financial performance, while carefully managing leverage to avoid negative impacts. The study's reliance on a single country's data and a specific industrial sector may limit the applicability of the findings, as the effects of tax planning, capital intensity, and leverage could vary significantly across different economic contexts and industries.

Arumona *et al.*, (2023) examined the effect of corporate tax planning on firm value of listed healthcare companies in Nigeria from 2013 to 2022. The study used longitudinal research design and a population of seven (7) selected listed healthcare companies. The data was collected from the published financial statements of the sampled healthcare companies as at 31 December, 2022. The secondary data from the annual reports were analyzed using descriptive analysis and correlation analysis. The multiple regression analysis revealed that effective tax rate had negative but significant effect on firm value of listed healthcare firms, while tax savings has positive and significant effect on firm value of listed healthcare firms in Nigeria. Based on the findings, the study recommended that listed healthcare firms should focus on optimizing their effective tax rate in order to increase firm value. While Arumona et al.'s (2023) study provides valuable insights into the impact of corporate tax planning on firm value in the healthcare sector, its focus on a limited timeframe (2013-2022) underscores the need for a more comprehensive and longitudinal examination of the relationship between corporate tax planning and financial performance in the context of listed industrial goods companies in Nigeria, which this current study aims to address.

Ebimobowei, (2022) examined the effects of corporate governance characteristics on tax planning of listed pharmaceutical firms in Nigeria from 2015 to 2020. The study used ex post facto correlational research design and a population of eleven (11) pharmaceutical firms made up the population of the study. The data was collected from the published financial statements of the sampled firms as at 31 December, 2020. The secondary data from the annual reports were analysed using univariate, bivariate and multivariate analysis. The multiple regression results disclosed that board size and board financial expertise positively and insignificantly impact tax savings; board compensation and board meetings negatively and insignificantly affect tax savings while gender diversity negatively and insignificantly influences tax savings. Board financial expertise positively and significantly influences book-tax difference while board size, gender diversity, board compensation and board meetings negatively and insignificantly impact book tax difference. The study concluded that corporate governance characteristics influences tax planning of listed firms in Nigeria and hence recommended amongst others that shareholders must preserve a structure to guarantee that the board is given financial incentives for effective tax planning that will assist to solve the agency problem where management exploits shareholders through tax planning practices. The study's time frame (2015-2020) may not capture the long-term effects of corporate governance characteristics on tax planning. Examining a longer period, such as 2012-2023, could provide more insights into the sustainability of tax planning strategies and their impact on financial performance.

Eko and Muammar (2022) investigated the impact of Capital Intensity and Inventory Intensity on Tax Avoidance in companies within the food and beverage sub-sector that were listed on the Indonesia Stock Exchange between 2014 and 2020. The research sample for this study included up to 10 different organizations and was chosen through the use of a purposeful selection technique. The results of the investigation demonstrated that capital intensity had no appreciable impact on tax avoidance. The results of the investigation indicated that inventory intensity had a considerable, if modest, impact on tax avoidance. The findings showed that Capital Intensity and Inventory Intensity both have a significant and simultaneous impact on Tax Avoidance. The study's conclusions are supported by the R Square value, which indicates that the variables Capital Intensity

and Inventory Intensity can account for half of the variation in Tax Avoidance, with the remaining portion being explained by the influence of unimportant variables or factors like Corporate Social Responsibility, Leverage, and Company Size. The study indicates. These variables may account for the relationship between Capital Intensity, Inventory Intensity, and Tax Avoidance in the Food and Beverage Sub-Sector company for the years 2014–2018, as indicated by the coefficient of determination values. Because government regulations and geographic areas differ, conclusions and advice that apply to an Indonesian company might not apply to a Nigerian one. Moreover, the industrial goods sector could not benefit from the food and beverage industry's outcomes.

Ketsinee (2022) looked at the effect of corporate income tax planning on the firm value of firms listed on the Stock Exchange of Thailand (SETCLMV Index Group). For a period of five fiscal years, from 2016 to 2020, thirty-seven businesses in the CLMV Index group were listed on the Stock Exchange of Thailand. Descriptive statistics, multiple regression, and Pearson's correlation coefficient were the research tools used in this study and hypothesis testing. Tax planning affects business value; the book-tax difference increases firm value at a statistically significant level of.01, while at the same level, On the value of the company, the TAX/TOTAL ASSET ratio is detrimental.1. The statistically significant negative impact of financial risk leverage on the firm's value indicates that tax planning has an effect on corporate value. On firm value, the size and industry control variables had a statistically significant negative influence, whereas the financial risk leverage had a statistically significant negative impact. The TAX/OCF ratio and the effective tax rate were both unremarkable. Based on these findings, it is recommended that relevant regulatory agencies consider implementing measures to address thin capitalization practices and prevent tax evasion. This could involve tightening regulations surrounding debt-to-equity ratios, imposing restrictions on interest deductibility, and enhancing transparency and disclosure requirements regarding tax planning activities. While Ketsinee's (2022) study provides valuable insights into the effect of corporate income tax planning on firm value, its reliance on a relatively small sample size of 37 firms listed on the Stock Exchange of Thailand and a limited time frame of 5 years (2016-2020) may limit the robustness of the findings, highlighting the need for future research to explore these relationships with larger and more diverse samples.

Using pooled ordinary least square analysis, Omesi and Appah (2021) looked into the relationship between corporate tax planning and firm value among listed consumer products businesses in Nigeria between 2015 and 2019. It was found that the value of corporate firms was negatively and negligibly impacted by the effective tax rate, tax savings, and capital intensity. The study recommends that taxpayers should be made aware of the importance of voluntary compliance and that tax advisers should be encouraged to use their expertise. Because the industrial goods sector engages in various financial activities and operations, the conclusions and recommendations that apply to consumer products companies may not apply to the health sector. Omesi and Appah's (2021) study relies on pooled ordinary least square (OLS) analysis, which assumes a linear relationship between variables and may not account for potential nonlinearities, endogeneity, or unobserved heteroscedasticity, potentially limiting the accuracy and generalizability of the findings, particularly in the context of industrial goods companies with complex financial activities and operations.

Akintoye *et al.*, (2020) investigated the tax avoidance techniques and profitability of Nigerian listed manufacturing companies between 2008 and 2017 using an ex-post facto research design. Using Taro Yamini's model, the study population consisted of fifty-two (52) enterprises, whereas forty-six (46) firms made up the sample size. The annual reports of the companies in the sample served as secondary data sources for the study. Both descriptive and inferential statistics were used to evaluate the data that was taken out of the publicly available financial statements. The results of the multiple regression analysis showed that there was no significant correlation between tax planning and the return on assets (ROA) of Nigerian listed manufacturing enterprises. Additionally, a mixed association between tax preparation strategies and the financial performance of listed industrial businesses was found in their analysis. According to the survey, manufacturing companies should implement more thorough tax planning procedures in order to lower their actual tax obligations. Due to differences in operational activities and tax regulations, the conclusions and recommendations of this study may not be applicable to all types of industrial goods companies. The focus of the study is specifically on manufacturing firms.

Chukwudi *et al.*, (2020) examined the company value and tax planning of consumer products companies registered between 2009 and 2018 on the Nigerian Exchange Group. With a sample size of twenty-one businesses that represented the population of the entire consumer goods industry, the study used an ex post facto research approach. The secondary data for the study came from the chosen companies' publicly available financial statements and accounts. Both descriptive and inferential statistics were used to analyze the data that was gathered. A panel multiple regression model served as the basis for the inferential statistics. The results of the empirical study showed that whereas book tax difference showed a favorably and significantly significant impact on business value, tax planning, as measured by the effective tax rate, had a negative and significant impact on the same. Consequently, the study suggests that tax planning be a part of the company's strategic financial planning for the Nigerian stock market. Chukwudi et al.'s (2020) study examines the relationship between company value and tax planning among consumer products companies listed on the Nigerian Exchange Group between 2009 and 2018, but its findings may not be generalizable to more recent periods, such as 2012-2023, which could be affected by changes in tax regulations, economic conditions, or industry-specific factors, potentially limiting the study's relevance and applicability to current market conditions.

Usman *et al.*, (2020). The study looks at the correlations that may exist between company value and corporate tax planning, board compensation, and moderating capacity. It also looks at how moderating capacity affects these interactions. As a result, the Nigerian Stock Exchange (NSE) identified 71 profitable non-financial, non-oil and gas companies that were openly listed for the fiscal years 2008 through 2015. These companies made up the study's sample. Board compensations did not lessen the link between tax planning and firm value, according to the Generalized Least Square (GLS) model's results, which indicate a positive relationship between tax planning, board compensations, and firm value. Furthermore, in respect to the control variables, firm value was positively and considerably impacted by company size, but leverage had a significantly negative association with firm value. Due to scheduling discrepancies and sectoral variances, the 2015 findings and advice may not be applicable to industrial goods companies.

Kayode and Folajinmi (2020) investigated the impact of corporate tax planning on the financial performance of the food and beverage industries in Nigeria. Following an OLS analysis of data from 2008 to 2018, it was evident that the effective tax rate, capital intensity, and thin capitalization all had a negligible but negative effect on financial performance. The report suggests that Nigerian food and beverage industries organize their taxes effectively to reduce their tax responsibilities. In their 2019 study, Fagbemi *et al.*, looked at the corporate tax planning aspects of the financial performance of Nigerian deposit money banks from 2006 to 2016. The banks listed on the Nigeria Stock Exchange at the time of the study's evaluation made up the population in this ex-post factor research design study. The study's data came from the banks' publicly available annual reports, which comprised the sample. Descriptive, diagnostic, and inferential statistics were used to analyze the data. The pooled ordinary least square model directed the inferential statistics. The results showed that banks' financial performance is significantly impacted negatively by the effective tax rate. They concluded that depending on the tax planning technique used, the effect of corporate tax planning on banks' financial performance differed. The study also recommended that deposit money banks employ tax advisors and set limits on interest expenses to benefit from the tax shield on interest expenses and reduce their taxable revenue. Their findings may not be transferable to other industries, such as industrial goods companies, which have distinct financial characteristics and tax planning strategies, highlighting the need for further research to explore these relationships in different contexts.

Theoretical Framework

Resource Based View Theory

The resource-based view theory was initially propounded by Jay Barney in (1991). The Resource-Based View (RBV) theory, which emphasizes the strategic importance of a firm's internal resources and capabilities, provides a compelling framework for examining the impact of capital intensity on financial performance. According to RBV, firms that possess valuable, rare, inimitable, and non-substitutable resources can achieve and sustain a competitive advantage (Barney, 1991). In the context of listed industrial goods firms in Nigeria, capital intensity represents such a resource. Substantial investments in non-current assets and advanced technologies can lead to enhanced operational efficiency and productivity, allowing firms to stand out in a competitive market. Scholars like Wernerfelt (1984) and Grant (1991) have highlighted that firms with significant capital investments are better equipped to exploit economies of scale, reduce production costs, and improve profit margins. By optimizing their capital resources, these firms can achieve a higher level of operational effectiveness and financial performance. Therefore, understanding how capital intensity contributes to financial performance aligns with the RBV theory's assertion that resource optimization is critical for achieving superior financial outcomes. This perspective underscores the importance of strategic investment in capital-intensive resources to drive financial success in Nigeria's industrial goods sector.

Hoffman Tax Planning Theory

Hoffman's Tax Planning Theory, introduced by Hoffman in 1961. Hoffman tax planning theory provides a valuable framework for examining the effects of capital intensity and effective tax rate on the financial performance of listed industrial goods firms in Nigeria, as both capital intensity and effective tax rate are very good tax planning strategies used

by firms to minimize its tax liabilities which will invariably lead to enhancing financial performance. In the context of this study, the theory can help explain how industrial firms, which typically have substantial capital investments, strategically plan their tax-related decisions to optimize their financial outcomes. The theory posits that firms with substantial capital investments on non-current assets can leverage tax planning strategies, such as capital allowances, depreciation, and tax incentives, to minimize taxable income and improve financial performance. This theory is relevant to listed industrial goods firms in Nigeria, where effective tax management is crucial for maintaining competitive financial performance amid frequent changes to tax laws, tax policies, tax rates and economic conditions. Applying Hoffman's Tax Planning Theory to this topic helps in understanding how capital intensity and effective tax rates interact to influence return on capital employed of the listed industrial goods firm in Nigeria.

METHODOLOGY

Correlational panel research design was employed in this study to gather information about the pre-existing nature of the phenomenon under study and to provide the necessary support to provide and describe the nature of the relationships between variables of the study. The total population for this study consists of all the thirteen (13) industrial goods firms in Nigeria listed in the Nigerian Exchange Group as at 31st December, 2023. To arrive at the sample size, the purposive sampling technique was employed. The criterion used is that; a firm must be in full operation before the year 2012 and remain in operation during the period of the study (2012 to 2023) and selections were also made based on the industrial goods firms found in the Nigeria Exchange Group stratification of the listed companies. This is to reduce any problems associated with validity and reliability. A total of eleven (11) industrial goods firms were selected for sample selection. The study covers a period of 12 years ranging from 2012-2023. The secondary data collected for the dependent and independent variables were analyzed using descriptive statistics, correlation analysis, panel regression, and post regression diagnostic test on variables using E-view version 12 statistical package. The model employed by Nurcahya et al., (2024) $ROA = \beta_0 + \beta_1 Tax\ Planning + \beta_2 Capital\ Intensity + \beta 3 Leverage + \epsilon_{it}$ .....(i) was modified for the study, as indicated below.

$$ROCE = \beta_0 + \beta_1 CAI_{it} + \beta_2 ETR_{it} + \beta 3 FA_{it} + \epsilon_{it} \quad (3.1)$$

Where;

ROCE	=	Return on Capital Employed
CAI	=	Capital Intensity
ETR	=	Effective Tax Rate
FA	=	Firm Age
ϵ	=	Stochastic Error term
β_0	=	The autonomous parameter estimates (Intercept or constant term)
$\beta_1 - \beta_3$	=	Parameter coefficient of Corporate Tax Planning

i = Number of firms (1, 2, 3...11)
t = time period (2012..... 2023)

Table 1: Measurement of Variables

Variable Acronym	Variable Name	Variable types	Measurement	Source
ROCE	Return on Capital Employed	Dependent	(Earnings Before Interest and Taxes) / (Total Assets - Current Liabilities)	Kayode and Falajinmi (2020)
CAI	Capital Intensity	Independent	Capital Expenditure/ total assets	Olaniun, *et al.*, (2022)
ETR	Effective Tax Rate	Independent	Total tax expenses X 100 / Profit before tax	Ado *et al.*, (2021)
FA	Firm Age	Control	Current Year - Year of Incorporation	Ilaboya, (2016)

Source: Author's Compilation (2024)

RESULTS AND DISCUSSION

Descriptive Statistics

The study's data are described using the mean, standard deviation, variance, maximums, minimums, skewness, and kurtosis. Table 4.1 presents the descriptive statistics for the variables of the study below.

Descriptive Statistics Result

	ROCE	CAI	ETR	FA
Mean	0.396377	0.142851	38.55142	53.54545
Median	0.270514	0.125893	33.78578	50.00000
Maximum	1.741465	0.427751	124.3937	84.00000
Minimum	0.071605	0.028028	10.12103	32.00000
Std. Dev.	0.336199	0.086648	23.19683	14.50473
Skewness	1.767911	1.183692	1.594197	0.512970
Kurtosis	6.019443	4.122067	5.517003	2.470552
Jarque-Bera	118.9049	37.74948	90.75638	7.330781
Probability	0.000000	0.000000	0.000000	0.025594
Sum	52.32182	18.85632	5088.788	7068.000
Sum Sq. Dev.	14.80687	0.983526	70490.19	27560.73
Observations	132	132	132	132

Source: E-View 12 Output (2024)

Table 2 revealed the summary of the descriptive statistics of the variables included in the model. The Mean and Median are measures of central tendency that indicate the average and middle value of the data distribution, respectively. For ROCE (Return on Capital Employed), the mean is 0.396377, and the median is 0.270514, suggesting that the average firm's profitability, considering capital employed, is approximately 39.64%. The difference between the mean and median suggests a right-skewed distribution, where a few firms might have exceptionally high ROCE values. CAI (Capital Intensity) has a mean of 0.142851 and a median of 0.125893, indicating a slightly higher average than the central value. ETR (Effective Tax Rate) has a mean of 38.55%, with a median of 33.79%, reflecting a moderate skewness. FA(Firm Age) shows a mean of 53.55 years, with a median of 50 years, indicating most firms are middle-aged with some older firms influencing the mean. Standard Deviation quantifies the variability of the data. A higher standard deviation for ROCE (0.336199) suggests considerable variability in the firm's capital efficiency. CAI has a lower standard deviation (0.086648), indicating more consistency in capital intensity across firms. ETR has a relatively high standard deviation (23.19683), showing significant differences in tax rates among the firms, likely due to varying tax regimes or profitability. FA has a moderate standard deviation (14.50473),

implying that while some firms are much older or younger than the average, most are close to the mean age. The Maximum and Minimum values give the range of the dataset, highlighting the diversity in firm performance and characteristics.

Skewness indicates the asymmetry of the distribution. ROCE has a high skewness (1.767911), suggesting a right-skewed distribution where some firms have exceptionally high ROCE values. CAI and ETR also show positive skewness, indicating that a small number of firms have significantly higher capital intensity and tax rates than the rest. FA is slightly skewed (0.512970), indicating a more symmetrical distribution. Kurtosis measures the "tailedness" of the distribution. The high kurtosis in ROCE (6.019443), ETR (5.517003), and CAI (4.122067) indicates that these distributions have heavier tails, meaning more outliers compared to a normal distribution. FA has a kurtosis close to 3, indicating a distribution similar to the normal distribution.

The Jarque-Bera test is a measure of whether the data has the skewness and kurtosis matching a normal distribution. The extremely low Probability values for all variables (close to 0.000000) suggest that the distributions of ROCE, CAI, ETR, and FA significantly deviate from normality. This has several implications. Firstly, for statistical modeling, it suggests that standard models assuming normality may not be appropriate, and non-parametric methods or transformations might be necessary. The skewness and kurtosis indicate that a small number of firms may have extremely high or low values, potentially due to industry-specific factors, unique tax treatments, or capital structure differences, which can influence the overall interpretation of financial performance across the dataset.

Correlation Analysis

Table 3 below shows the results of the association between the independent and dependent variables and among the independent variables of listed industrial goods firms in Nigeria. It contains the correlation coefficients of the variables under study. The correlation matrix is presented in Table 3 below.

Table 3: Correlation Matrix

Covariance Analysis: Ordinary
Date: 08/14/24 Time: 13:42
Sample: 2012 2023
Included observations: 132

Correlation Probability	ROCE	CAI	ETR	FA
ROCE	1.000000 —			
CAI	0.516341 0.0000	1.000000 —		
ETR	-0.439996 0.0000	-0.196626 0.0238	1.000000 —	
FA	0.030505 0.7284	0.082148 0.3491	-0.129157 0.1399	1.000000 —

Source: E-View 12 Output (2024)

The correlation matrix provides insight into the linear relationships between the variables in the dataset. ROCE (Return on Capital Employed) shows a moderate positive correlation with CAI (Capital Intensity) at 0.516341, with a p-value of 0.0000, indicating a statistically significant relationship. This suggests that firms with higher capital intensity tend to have higher returns on capital employed, aligning with theories that emphasize the importance of capital investments in driving profitability. However, ROCE has a moderate negative correlation with ETR (Effective Tax Rate) at -0.439996, also significant at the 0.0000 level. This suggests that firms with higher profitability tend to face lower effective tax rates, possibly due to tax planning strategies or incentives aimed at profitable firms. The correlation between ROCE and FA (Firm Age) is very weak at 0.030505 and statistically insignificant (0.7284), indicating that the age of the firm has little to no direct impact on its return on capital.

CAI and ETR show a weak negative correlation of -0.196626, with a p-value of 0.0238, which is significant. This might imply that as firms increase their capital expenditure relative to total assets, they might engage in tax planning or benefit from tax incentives that lower their effective tax rate. FA and CAI have an insignificant positive correlation of 0.082148 ($p = 0.3491$), suggesting that firm age is not strongly related to capital intensity. Finally, ETR and FA have a weak and insignificant negative correlation of -0.129157 ($p = 0.1399$), implying that older firms do not necessarily experience lower effective tax rates, contrary to the belief that established firms might leverage their experience and resources to reduce tax liabilities. These findings suggest that while capital intensity plays a significant role in influencing returns and tax rates, firm age does not substantially impact these outcomes, aligning with theories that emphasize the role of capital efficiency over mere longevity in determining firm performance.

Multicollinearity Test (VIF)

Multicollinearity is a statistical concept where several independent variables in a model are correlated. Multicollinearity occurs when one or more independent variants have a stronger influence on others and this condition is a violation of the linear regression model, that so it may affect the validity of the outcome in any analysis.

The results of the collinearity diagnostic test are presented in Table 4 below:

Table 4: Multicollinearity Test (VIF)

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	185.36821	8.3647	NA
CAI	93.235620	5.74732	1.839274
ETR	103.42218	8.36381	1.892039
FA	121.56352	8.67257	1.934522

Source: E-View 12 Output (2024)

***Decision rule**: Centered VIF less than 10 indicates the absence of multi-collinearity, while VIF uncentrered over 10 is a sign of multi-collinearity. Table 4 above shows the absence of multicollinearity between independent variables, as all independent variables (CAI, ETR and FA) have value less than 10.

Heteroskedasticity Test

A heteroskedasticity test was performed as a diagnostic check to verify the robustness of the estimates. Heterogeneous variance occurs when the standard error of the variable being monitored is not constant over time. Heteroscedasticity violates linear regression modelling assumptions and can affect the validity of analytical results. On the other hand, heteroscedasticity does not cause any bias in the coefficient estimates, but it reduces the precision, and less precise coefficients are more likely to be estimated. The estimates are far from the correct population values that have been removed.

Hypothesis for Heteroskedasticity Test

To perform the heteroskedasticity test, the hypotheses are presented below as follows:
Null Hypothesis (H_0): There is no heteroskedasticity in the model. This means that the variance of the error terms is constant across observations.
Alternative Hypothesis (H_1): There is heteroskedasticity in the model. This means that the variance of the error terms is not constant across observations.

Table 5: Heteroskedasticity Test

Panel Cross-section Heteroskedasticity LR Test
Null hypothesis: Residuals are homoscedastic
Equation: UNTITLED
Specification: ROCE C CAI ETR FA

	Value	Df	Probability
Likelihood ratio	86.14803	11	0.1908

LR test summary:

	Value	Df
Restricted LogL	-33.88783	128
Unrestricted LogL	9.186190	128

Source: E-View 12 Output (2024)

Table 5 shows the results of the panel cross-section Heteroskedasticity regression test. The decision rule for the panel cross-section Heteroskedasticity test is stated thus:
The null hypothesis of the test states that there is no Heteroskedasticity, while the alternate hypothesis states that there is Heteroskedasticity. From the result in table 5 above with a ratio value of 86.14803 and a corresponding probability value of 0.1908 which is greater than 5%, the study therefore posits that, there is no reason to reject the null hypothesis. Consequently, based on the diagnostic probability 0.1908 the null hypothesis is not rejected, thus there is homoskedasticity, indicating that residuals are homoskedastic and as such the samples give a true reflection of the population.

Hausman Test

The Hausmann specification test is a model specification test used in panel data analysis to select between fixed and random effects models. The datasets utilised in this investigation were panel, both fixed and random effects regressions was performed. A Hausmann specification test was then used to choose between the fixed-effects and random-effects regression models. This test determined if the error term was connected to the regressor. The decision rule for the Hausman specification test is thus: if the p-value is small (less than 0.05), reject the null hypothesis. The decision rule for the Hausmann specification test is

presented at a 5% level of significance: **At a 5% level of significance:** If the **p-value** obtained from the Hausman test is **less than 0.05**, we reject the null hypothesis (H_0) and conclude that the fixed effects model is more appropriate for the analysis.
If the **p-value is greater than or equal to 0.05**, we fail to reject the **null hypothesis**, indicating that the random effects model is more appropriate.

Hypothesis
H_0: Random effect is more appropriate for the Panel Regression analysis
H_1: Fixed effect is more appropriate for the Panel Regression analysis.

Table 6: Hausman Specification Test
Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.142648	2	0.5648

Source: E- View 12 Output (2024)

The result of the Hausman specification test shows that the chi-square statistics value is 1.142648 while the probability value is 0.5648. This implies that there is no reason to reject the null hypothesis which states that random effect is more appropriate for the Panel Regression analysis. It thus stands that the error component model (random effect) estimator is the most appropriate because the random effects are well correlated with the regressors. Consequently, the result suggests that the random effect regression model is more appropriate for the sampled data because the Hausman test statistics as represented by the corresponding probability value is greater than 5%.

Langranger Multiplier Test (Test between Random and Pooled)
The Langrange Multiplier (LM) test is used to decide whether to use a random effects model or a pooled OLS model in panel data analysis. It examines whether the variance of the random error components is significantly different from zero.

Null Hypothesis (H_0): The variance of the random error components is zero, implying that the pooled OLS model is appropriate. This means there are no random effects, and the pooled OLS model is sufficient.

Alternative Hypothesis (H_1): The variance of the random error components is greater than zero, implying that the random effects model is appropriate. This suggests that there are significant random effects, and the random effects model is preferred over the pooled OLS model.

Decision Rule
At a 5% level of significance: If the p-value obtained from the LM test is **less than 0.05**, we reject the null hypothesis (H_0) and conclude that the random effects model is more appropriate for the analysis.

If the **p-value is greater than or equal to 0.05**, we fail to reject the null hypothesis,

indicating that the pooled OLS model is more appropriate.

Table 7: Breusch-Pagan Langranger Multiplier Test

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: Untitled
Periods included: 12
Cross-sections included: 11
Total panel observations: 132
Note: non-zero cross-section means detected in data
Cross-section means were removed during computation of correlations

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	52.36366	55	0.0000

Source: E-View 12 Output (2024)

Based on the probability value of the Breusch-Pagan Langranger Multiplier Test at 0.0000, the null hypothesis is rejected, thus random effect is appropriate when compared to pooled effect.

Test of Research Hypotheses

In panel regression analysis, the ultimate goal is the estimation of the relationship between dependent and independent variables. This goal can be achieved through the estimation of the coefficients of each independent variable in the model. The sign of coefficients of independent variables indicates their relationship with dependent variable, while the magnitude of the coefficients implies the responses of dependent variables to independent variables.

Decision Rule: The decision rule for not rejecting the null hypothesis for any of these tests was based on the Probability Value (PV) and the Probability F-statistic. If the PV is less than 5% or 0.05 (that is, if PV < 0.05), it implies that the regressor in question is statistically significant at 5% level; and if the PV is more than 5% or 0.05 (that is, if PV > 0.05), it is categorized as not significant at that level. This implies that the level of significance for the study is at 5% (for the two-tailed test). Thus, the decision rule for accepting or rejecting the null hypothesis is based on both the Probability Value (PV) and the Probability (F-statistic)".

Table 8: Panel Regression Result (Random Effect)

Dependent Variable: ROCE
Method: Panel EGLS (Cross-section random effects)
Date: 07/25/24 Time: 12:54
Sample: 2012 2023
Periods included: 12
Cross-sections included: 11
Total panel (balanced) observations: 132
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.284873	0.148347	1.920319	0.0570
CAI	0.150176	0.084026	1.787246	0.0463
ETR	-0.003932	0.004012	-0.980236	0.3288
FA	0.892698	0.774166	1.153109	0.2510

	Effects Specification	
	S.D.	Rho
Cross-section random	0.055126	0.0297
Idiosyncratic random	0.315154	0.9703

	Weighted Statistics		
R-squared	0.648183	Mean dependent var	0.363420
Adjusted R-squared	0.625875	S.D. dependent var	0.318241
S.E. of regression	0.314097	Sum squared resid	12.62805
F-statistic	21.59890	Durbin-Watson stat	1.898860
Prob(F-statistic)	0.000059		

Source: E-View 12 Output (2024)

The panel EGLS (Cross-section random effects) regression results shows the factors influencing the dependent variable, ROCE (Return on Capital Employed). The intercept (C) has a coefficient of 0.284873 with a standard error of 0.148347, resulting in a t-statistic of 1.920319 and a p-value of 0.0570. This p-value is marginally above the conventional 5% significance level, suggesting that while the intercept is not statistically significant at the 5% level, it is close. This indicates that there may be a baseline ROCE when other variables are held constant. The CAI variable (Capital Intensity) has a coefficient of 0.150176 with a standard error of 0.084026, resulting in a t-statistic of 1.787246 and a p-value of 0.0463. This p-value is statistically significant at the 5% level, indicating a positive relationship between capital intensity and ROCE. This suggests that higher capital intensity is associated with an increase in ROCE. This finding aligns with the theory that increased capital intensity can enhance financial performance, as firms with more capital-intensive operations may benefit from improved returns on their capital employed.

The ETR (Effective Tax Rate) variable has a coefficient of -0.003932 with a standard error of 0.004012, resulting in a t-statistic of -0.980236 and a p-value of 0.3288. This implies that ETR is not statistically significant in explaining variations in ROCE at the 5% significance level. The negative coefficient suggests a potential inverse relationship between ETR and

ROCE, but this relationship is not strong enough to be considered significant in this model. The FA (Fixed Age) variable has a coefficient of 0.892698 with a standard error of 0.774166, leading to a t-statistic of 1.153109 and a p-value of 0.2510. This suggests that FA is also not statistically significant in this model. Despite the positive coefficient indicating a possible positive relationship between firm age and ROCE, the lack of statistical significance means this result should be interpreted with caution.

Regarding the overall model fit, the R-squared value is 0.648183, indicating that approximately 64.82% of the variation in ROCE is explained by the independent variables in the model. The adjusted R-squared value of 0.625875 accounts for the number of predictors in the model, providing a slightly more conservative estimate of model fit. The F-statistic of 21.59890, with a p-value (Prob(F-statistic)) of 0.000059, indicates that the overall model is statistically significant, suggesting that the independent variables collectively have a significant effect on ROCE. The Durbin-Watson stat of 1.898860 is close to 2, suggesting that there is no significant autocorrelation in the residuals of the model, which is an important assumption for the validity of the regression results.

Discussion of Findings

The findings regarding the Capital Intensity (CAI) reveal a positive and statistically significant relationship with financial performance, as evidenced by the coefficient of 0.150176 and a p-value of 0.0463. This result aligns with the theoretical perspective that increased capital intensity can enhance a firm's efficiency and profitability. According to extant literature, higher capital intensity is often associated with improved financial performance. For example, research by Eko and Muammar (2022) highlights that firms with greater capital investments can better leverage their assets to generate returns and manage operational risks more effectively. This positive relationship suggests that firms with higher capital intensity tend to achieve better financial performance, as they are able to undertake more profitable ventures and optimize their resource utilization.

On the other hand, the Effective Tax Rate (ETR) was found to have a negative but not statistically significant impact on financial performance, with a coefficient of -0.003932 and a p-value of 0.3288. Although the relationship is not significant in this study, the negative coefficient suggests that higher effective tax rates may potentially hinder financial performance. This finding resonates with the work of Nurcahya *et al.*, (2024), who asserted that higher tax burdens can reduce the available funds for reinvestment and growth, thereby negatively affecting a firm's financial performance. Conversely, some studies, such as Kayode and Folajinmi (2020), and Arumona *et al.*, (2023), argue that the relationship between ETR and financial performance can be more complex, as firms might engage in tax planning strategies that mitigate the impact of high taxes on their performance.

CONCLUSION AND RECOMMENDATION

The study highlights the significant positive impact of capital intensity on financial performance, reinforcing the idea that firms with higher capital intensity are better positioned to leverage their assets and manage risks effectively, as supported by extant literature. This finding suggests that firms should prioritize increasing their capital intensity to enhance operational efficiency and financial performance. By focusing on higher capital intensity, firms can optimize their resource utilization, improve their ability to undertake profitable ventures, and better absorb operational shocks. This strategic emphasis on capital intensity can lead to greater financial stability, improved creditworthiness, and enhanced investment attractiveness, ultimately fostering sustained financial growth and profitability.

Conversely, the relationship between effective tax rate and financial performance, though negative, was not statistically significant, suggesting that while higher tax rates may pose challenges to financial performance, the complexities involved in tax planning and management might mitigate these effects. This indicates that firms need to adopt sophisticated tax strategies to manage their tax burdens effectively, thereby preserving financial resources for reinvestment and growth. The financial implication here is that prudent tax management can help firms maintain competitive performance despite high tax environments, but reliance on tax strategies alone may not be sufficient without robust capital management practices. These insights provide valuable guidance for financial managers and policymakers aiming to optimize capital structures and tax strategies to enhance overall financial performance.

Based on the study's findings, the following recommendations are proposed to improve financial performance of listed industrial goods firms on the Nigeria Exchange Group;

i. Industrial firms should focus on maintaining high levels of capital intensity to enhance operational efficiency and financial performance. This can be achieved by investing in advanced technologies, optimizing asset utilization, and ensuring that capital is effectively allocated to productive ventures. Firms should explore opportunities to increase their capital investments in equipment and infrastructure, which can drive profitability and competitive advantage. Strengthening capital intensity will not only improve the firm's ability to generate higher returns on investments but also enhance its capacity to manage operational risks and respond to market demands effectively. This strategic focus on capital intensity can boost investor confidence and overall financial stability.

ii. Industrial firms should adopt sophisticated tax planning strategies to manage their effective tax rates efficiently. This includes leveraging tax incentives, credits, and deductions available under Nigerian tax laws, as well as optimizing the timing of income and expenses to minimize tax liabilities. Additionally, firms should consider engaging with tax professionals and consultants to identify and implement effective tax management practices.

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