



Impact of Capital Structure on the Financial Performance of Listed Oil and Gas Firms in Nigeria

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Abstract

This study analyzed the impact of short-term debt ratio (STDR) and long-term debt ratio (LTDR) on the financial performance (ROA) of the listed oil and gas firms in Nigeria in order to provide valuable insights for maintaining financial stability. Using ex-post facto research design, seven listed oil and gas companies were selected as sample from 2010-2022. Descriptive and pooled OLS regression analysis techniques were employed. The findings revealed that short-term debt significantly and negatively impacts financial performance of listed oil and gas firms in Nigeria, while long-term debt does not show a significant impact. The study recommends that oil and gas firms in Nigeria should prioritize a deliberate strategy to lessen their reliance on short-term debt (STD) financing, and management should focus on ensuring the productive and efficient deployment of existing long-term capital.

Keywords: capital structure, short-term debt, long-term debt, financial performance, oil & gas
JEL Classification: M21, 018

Contribution to/Originality Knowledge

1.0 Introduction

The oil and gas sector has been instrumental in shaping Nigeria's economy, significantly boosting national revenue and driving economic growth. Therefore, understanding the factors that influence financial performance of firms in this sector is essential (Aribaba et al., 2022). On a global scale, the energy industries are key players in the refined petroleum market and have a substantial impact on the world's economy as the primary fuel source. The production and supply chain processes for oil and gas are highly intricate, capital-intensive, and require advanced technology (Burclaff, 2022).

Nigeria has the largest gas reserves in African continent, and the country's development hinges on effectively harnessing these gas resources. The Nigeria Liquefied Natural Gas (NLNG) facility on Bonny Island, the nation's first gas project, operates six LNG trains with a combined annual capacity of 44 billion cubic meters (Klynveld et al., 2021).

A firm's performance is linked to the methods and processes it employs to efficiently utilize economic resources to achieve its overall objectives (Musa, 2019). Firm performance is crucial for survival, competitiveness, and increasing market value, which can also contribute to

industry and economic growth (Aribaba et al., 2022). Financial performance, a subset of firm performance, measures how effectively a company uses its assets and resources to generate revenue (Alhassan & Mamuda, 2020; Tanko et al., 2021).

Previous studies on the nexus between capital structure and financial performance have often focused on the Pecking Order Theory, which suggests that firms prefer internal financing (retained earnings) followed by debt and equity as a last resort. However, the Signaling Theory offers an alternative perspective, proposing that capital structure decisions can signal information to investors about a firm's financial health and future prospects. Existing studies have explored the relationship between capital structure and financial performance in various industries, including those by Ilugbusi et al. (2021), Arikewuyo (2021), Anozie et al. (2023), Alaba (2019), Bashiru and Bukar (2016), Baidoo (2022), Chinaemerem and Anthony (2012), Chinwe et al. (2020), Opoku-Asante et al. (2022), Oyedokun et al. (2018), and Yijing (2023). There is a lack of consensus on the specific impact of capital structure on financial performance. This current study examined the impact of capital structure on the financial performance (ROA) of the listed oil and gas firms in Nigerian. Specifically, the study assessed the impact of short-term debt ratio (STDR) on the financial performance of oil and gas firms in Nigeria, and determined the impact of long-time debt ratio (LTDR) on the financial performance of oil and gas firms in Nigeria.

Previous studies often rely on static models and pecking order and MM theories, however, in this study we employed signaling theory.

Therefore, the current study aimed to contribute to the existing body of knowledge on the relationship between capital structure and financial performance, offering practical insights tailored to the Nigerian context. The intention is to offer financial managers and other stakeholders in oil and gas sector an intellectual guide when making choice of debt or equity financing in maintaining financial stability in firms. The paper reviews relevant literature, outlines the methodology, presents data analysis results, discusses key findings, and offers conclusions and recommendations.

2.0 Literature Review and Hypothesis Development

In this section we reviewed existing literature and developed hypothesis.

2.1 Conceptual Clarifications

Financial Performance: Both financial and non-financial performance are vital for managing private and public organizations (Alaba, 2019). Financial performance evaluates a company's success in terms of profits, sales, and growth. According to Bawa (2022), financial performance involves the efficient use of current assets to generate sufficient income, reflecting a firm's financial stability over time. This allows for industry or sector comparisons, aiding in strategic planning to achieve business goals. Key indicators of financial performance include Return on Assets (ROA), Return on Equity (ROE), Return on Capital Employed (ROCE), and Earnings Per Share (EPS), often derived from profitability, efficiency, and investor ratios.

Return on Assets (ROA): ROA is a measure of company's ability to make profit with its assets (Sunaryo, 2020). It's computed by dividing earnings before interest and tax (EBIT) by total assets, expressed as a percentage. Hossain & Ahmed (2021), ROA is a good measure of firm's capability to make more revenue compare to its expenses. It assesses a firm's profitability relative to its total assets, providing insights into management's efficiency in utilizing assets to generate income. Understanding and managing financial performance indicators like ROA is crucial for firms to ensure long-term profitability and competitiveness. These metrics offer valuable insights for strategic decision-making and operational improvement.

Capital Structure: Capital structure denotes the composition of equity and debt utilized to finance a corporation's operations and assets (Mazeed et al., 2019). This structure encompasses the debt-to-equity ratio and significantly influences a corporation's financial stability, potential for growth, and aggregate value (Ahmad et al., 2022). Identifying the optimal capital structure between debt and equity represents a paramount endeavor for enterprises. This ideal balance incorporates diverse factors such as industry specifics, risk appetite, developmental phase, and overall financial condition.

Equity Capital: Aljamaan (2018) elucidated that "equity share capital constitutes a segment of the capital structure that signifies the ownership capital of the company. It represents the company's enduring capital, which remains impervious to withdrawal throughout its duration. Owners bear the predominant risk, yet they also garner the rewards. Their liability is confined to the extent of their financial contribution. This value is computed by dividing net income by the equity capitalization rate, or the estimated rate of return on equity. Interest on debt is deducted from net operating income to derive net income.

Debt Capital: Debt capital in a company's capital structure refers to money that has been borrowed and put to use in the business. Debenture capital is a type of borrowed capital, and the debenture holders are the company's creditors. For the convenience of investors, various types of debentures are issued. Banks and financial institutions can also provide long- and medium-term loans to businesses. Public deposits can be used to fund debt; a public deposit is any money received by a non-banking company as a deposit or loan from the general public, including employees, customers, and shareholders, other than in the form of shares or debentures (Aljamaan 2018). When a firm decides to use debt as a means of financing, it is regarded as a geared or levered company and it has a lower financial risk compared to an ungeared company.

Long-term Debt Ratio: This ratio measures the proportion of long-term debt to total assets, indicating a company's ability to meet long-term obligations. A higher ratio suggests more debt relative to assets, while a lower ratio indicates less debt, making it easier to meet obligations (Al-Malkawi & Alqaralleh, 2021). Maintaining an optimal long-term debt ratio is crucial for a firm's financial stability and ability to meet long-term obligations. Balancing debt and equity financing can enhance a company's growth potential while managing financial risks.

Short-term Debt Ratio: This ratio measures the proportion of short-term debt to total assets, assessing a company's ability to meet short-term obligations. A higher ratio indicates more short-term debt, potentially complicating short-term obligations, while a lower ratio suggests easier management (Ofoegbu & Okoye, 2018). Effective management of short-term debt is vital for ensuring liquidity and operational efficiency. Firms must carefully monitor their short-term debt ratios to maintain financial health and avoid liquidity crises.

2.2 Theoretical Framework

Here we examined the theory that formed the basis of capital structure applications.

2.2.1 Signalling Theory

Proposed by Spence in 1978, signaling theory examines how companies use financing choices to convey information to the market, addressing the information asymmetry between managers and investors (Myers & Majluf, 1984). Unlike pecking order theory, it explains why companies might opt for equity financing even when internal funds are available, using equity issuance as a strategic signal of confidence and growth potential. It also acknowledges that capital structure can be dynamic, allowing companies to adjust their financing mix over time based on evolving needs and market conditions.

2.3 Empirical Review

Ilugbusi et al. (2021) executes a comprehensive analysis of the capital structure and financial performance of enterprises within the oil and gas sector over the period from 2010 to 2019, employing panel regression analysis as their methodological framework. The investigation revealed that the ratio of short-term debt has a negative and statistically significant effect on return on assets, whereas both total debt ratio and long-term debt ratio exhibit negative effects that are not statistically significant. In contrast, the debt-equity ratio demonstrates a positive and statistically significant influence on return on assets. The authors concluded that capital structure exerts a significant impact on financial performance, particularly in terms of return on equity.

Yijing (2023) conducted an empirical investigation into the financial performance of twenty selected agricultural companies listed on stock exchanges from 2018 to 2022, with a particular focus on the interrelationship between capital structure and key financial indicators such as return on assets (ROA) and return on equity (ROE). The results indicated that both total debt and short-term debt exert a negative influence on ROA and ROE, while long-term liabilities do not have a significant effect on financial performance. The study advocates for the maintenance of a balanced capital structure to mitigate risk, emphasizing the importance of monitoring the gearing ratio and strategically adjusting long-term debt ratios. Policymakers are urged to create a balance between bond and equity markets to bolster profitability within the agricultural sector.

Adibeli and Amahalu (2023) conducted an examination of the influence of debt financing on the creation of shareholder wealth within publicly traded manufacturing firms in Nigeria over a decade-long period (2012–2021). The analysis of data revealed significant positive

correlations: the debt ratio exhibited a positive association with earnings per share, the short-term debt ratio was positively correlated with return on equity, and the long-term debt ratio demonstrated a positive relationship with cash value added. The study concludes that debt financing plays a significant role in the enhancement of shareholder wealth. Based on these insights, the authors recommend the strategic utilization of debt to improve overall financial performance, the optimization of capital structure, and the development of long-term financing strategies to sustain financial viability.

David et al (2024), examined the impact of debt financing factors on the profitability of healthcare enterprises, taking return on equity (ROE) as a gauge for their financial outcomes. Results revealed that prolonged debt (PD) and equity positions negatively influence ROE, while the size of the firm is indicated to have a positive contribution. Interestingly, short-term debt (STD) exhibited a positive association with ROE. Given these observations, the investigation advises that health service providers boost their connection with extended-term liabilities, minimize reliance on temporary borrowing, prioritize the protection of investor interests, and secure ongoing financing in the field. It is advisable for managers to carefully weigh the advantages of debt against equity to enhance operational efficacy.

Prince, Okeke, Olufunke, et al. (2023), In their study spanning the years 2001–2022, employed PGM/ARDL technique in analyzing the nexus between capital structure and financial performance in the oil and gas industry. Their study reported that there is a positive and significant relationship between profitability (ROE) and short-term debt in this sector.

In their research, Akmal, Aiman, and Aamir (2023) investigated the impact of capital structure on wealth and business performance in emerging markets, with a focus on Pakistan. Analyzing data from 289 non-financial enterprises listed on the Pakistan Stock Exchange over six years (2017–2022), the study found an inverse relationship between leverage (LTDR) and firm performance.

Ebe, Nwankwo, Obaji, and Inyaeze (2023), explored relationship between debt financing variables and the profitability of entities. Total debt ratio has a negative effect on profitability among listed manufacturing firms. Long-term debt ratio shows a positive but insignificant association with firms' profitability.

Sebil (2024) explored how different debt financing strategies affect company's profitability. The results of this study showed that the debt-to-equity ratio (DE) has a positive but statistically insignificant effect on ROI, suggesting that the mix of debt and equity might not strongly influence ROI. However, DE has a significant positive effect on ROA, indicating that a well-balanced capital structure with an optimal debt-to-equity ratio can significantly improve ROA.

Osuji et al. (2024) investigated the relationship between a company's debt structure and its financial performance in Nigeria. The study focused on 15 consumer and industrial goods companies listed on the Nigerian Exchange Group from 2013 to 2022. Their findings reveal intriguing differences between the two sectors. Short-term debt has a negative and significant effect on ROA for consumer goods companies, while long-term debt has a positive but

insignificant impact. Conversely, the opposite pattern emerges for industrial goods companies, where short-term debt has a positive (though insignificant) effect on ROA, and long-term debt has a negative (though insignificant) effect.

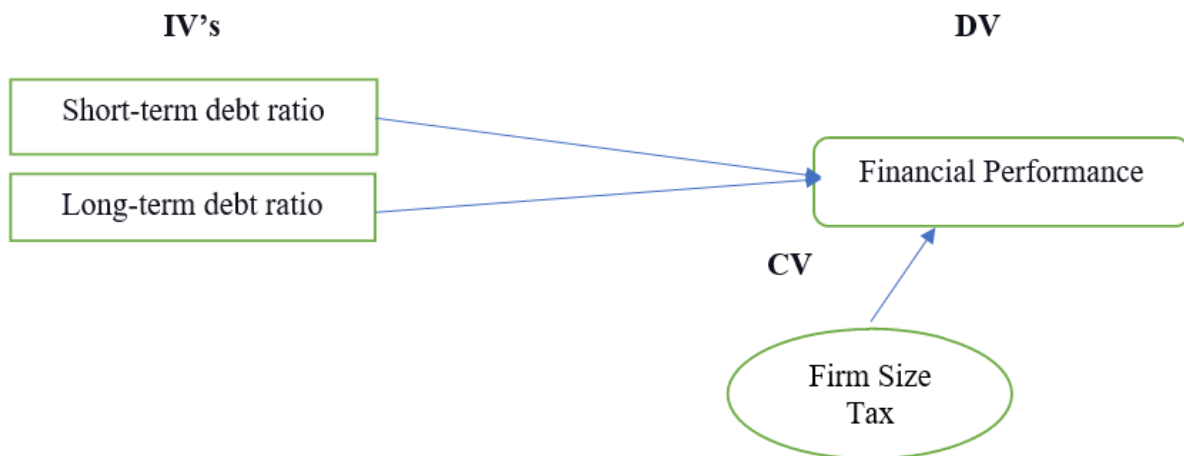
2.4 Hypothesis

Based on the above assertions, the following hypotheses were formulated in null form:

- Short-term debt ratio (STDR) has no significant impact on the financial performance of oil and gas firms in Nigeria.
- Long-term debt ratio (LTDR) has no significant impact on the financial performance of oil and gas firms in Nigeria.

2.5 Conceptual Framework

Based on the review of previous studies, the conceptual framework in Fig.2.1 was developed.



Source: Research Framework by Author 2024.

3.0 Methodology

This research adopts an ex post facto design to explore the influence of capital structure on the financial performance of listed oil and gas companies in Nigeria over a 14-year period (2010 to 2023). The study utilizes secondary data extracted from the audited annual reports and financial statements of the selected firms. To ensure the accuracy and relevance of the results, the sample includes only those seven (7) firms out of 11 (population) that remained continuously listed from 2010 to 2023. After conducting statistical analysis of Random effect, Fixed-effect and the pooled Ordinary Least Squares (OLS), Hausman test was runned to choose between the three (using Eview 9.0). Firm size and tax paid are included as control variables to account for their potential impact on the financial performance.

3.1 Variables and their Measurement

<i>Variable Name</i>	<i>Notation</i>	<i>Variable Measurement</i>	<i>Variable Type</i>
Return on assets	ROA	This is the ratio of net profit to total assets.	Dependent Variable
Short term debt ratio	STDR	It is the ratio of short-term debt to total equity (Nwaolisa & Chijindu, 2016a).	Independent Variable
Long term debt ratio	LTDR	Ttotal liabilities divided by total assets of the firm (Nwaolisa & Chijindu, 2016).	Independent Variable
Firm Size	BSZ	Log of total assets of the firms	Control Variable
Taxes	TAX	Taxes paid by the firms	Control Variable

Source: Authors Compilation 2025

3.2 Model Specification

This study's model explores how short-term and long-term debt ratios relate to financial performance, measured by return on assets (ROA). Drawing on Signaling Theory, it suggests that a firm's debt structure signals its financial health and prospects to external stakeholders. Short-term debt may reflect management's confidence in liquidity and operational efficiency, while long-term debt indicates expectations of stable cash flows and growth. Through examining the impact of these debt components on ROA, the model assesses their role in conveying firm quality and reducing information asymmetry between managers and investors. Firm size and taxes are controlled for to isolate the signaling effect of debt structure on performance. The study formulates the following equation to look into the possible nexus between STDR and LTDR, and financial performance (ROA):

$$ROA_{it} = \beta_0 + \beta_1 STDR_{it} + \beta_2 LTDR_{it} + \beta_3 TA_{it} + \beta_4 TAX_{it} + e_{it} \quad (1)$$

Where:

ROA_{it} is the return on assets;

β₀ represent the fixed intercept,

β₁-β₈ is the coefficient of the independent variables,

STDR_{it} denotes short term debt ratio

LTDR_{it} denotes long term debt ratio

TA_{it} denotes firm total assets

TAX_{it} represents taxes paid by the firms

i represents the number of companies in the panel data,

t represents the period of the panel data and

e_{it1} and e_{it2} are the error terms.

4.0 Result

Table 1 offers a comprehensive summary of statistical characteristics for four different variables such as short-term debt ratio (STDR), long term debt ratio (LTDR), firm size (TA), and taxation (TAX).

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	53	.481619	.4305355	.0008976	2.627292
STDR	53	.3805575	.3830929	-.0602887	1.136414
LTDR	53	.9079665	1.297604	.8134480	8.189694
TA	53	7.70e+07	7.39e+07	.0227475	3.08e+08
TX	53	2196819	5366252	-7958945	3.63e+07

Source: Author's computation using Eview 9.0 2025.

The dataset includes 53 observations for the return on assets (ROA). The average ROA is 0.481619 with a standard deviation of 0.4305355, indicating moderate variation among the listed oil and gas firms in Nigeria. The ROA ranges from a minimum of 0 to a maximum of 2.627292, suggesting that some firms have zero or low returns on their assets, while others achieve very high returns. The Short-Term Debt Ratio (STDR) has a mean value of 0.3805575 and a standard deviation of 0.380929, also indicating moderate variation in the use of short-term debt among these firms. The STDR ranges from -0.062887 to 1.136414, showing that some firms have negative or very high levels of short-term debt relative to their assets. The Long-Term Debt Ratio (LTDR) has a mean value of -0.9079665 and a higher standard deviation of 1.297604, indicating significant variation in the use of long-term debt. The LTDR ranges from 0 to 0.189694, suggesting that some firms have no long-term debt or very low levels of long-term debt relative to their assets. Firm Size (Total Assets, TA) has 53 observations with a mean value of 7.70e+07 and a standard deviation of 7.39e+07, indicating substantial variation in the total assets among the firms. The minimum value is 7,227,475 and the maximum value is 3.08e+08, suggesting a wide range of firm sizes. Tax Paid (TX) has 61 observations with a mean value of 2,196,819 and a standard deviation of 5,366,252, indicating high variation in the amount of tax paid by the firms. The minimum value is -7,958,945 and the maximum value is 3.63e+07, suggesting that some firms have negative tax values (possibly due to tax credits or refunds) while others pay very high taxes.

Table 2 Pooled Ordinary Least Square

Variables	Coef.	Std. Err	t-test	P>t
LSTDR	-2.487576	.1296346	-19.19	0.000
LLTDR	-.0715503	.11544	-0.62	0.545
LTA	-.0243729	.0512255	0.641	0.641
LTX	.0108969	.0217236	0.50	0.623
_CONS	-1.914319	.8260847	-2.32	0.035
R-squared = 0.9808		Number of obs = 53	F(6, 15) = 127.57	
Adj R-squared = 0.9731		Root MSE = .04597	Prob > F = 0.0000	

Source: Author's computation using Eview 9.0 2025.

The model demonstrated a strong explanatory power, with an R-squared of 0.9808 and an adjusted R-squared of 0.9731, signifying that approximately 98% of the variance in financial performance can be accounted for by the independent variables within the model. The overall model's statistical significance was confirmed by an F-statistic of 127.57 and an associated p-

value of 0.0000, which is well below the 0.05 threshold, thereby indicating that the included predictors collectively have a significant impact on financial performance.

Regarding the specific null hypotheses, the analysis revealed distinct outcomes. For H01: short-term debt ratio (STDR) has no significant impact on the financial performance of oil and gas firms in Nigeria, the coefficient for the log-transformed Short-term Debt Ratio (LSTDR) was found to be -2.487576, accompanied by a p-value of 0.000. This extremely low p-value (less than 0.05) leads to the rejection of Hypothesis 1, providing strong evidence that STDR indeed has a statistically significant impact on financial performance (ROA). The negative sign of the coefficient suggests an inverse relationship, where higher short-term debt ratios are associated with diminished financial performance. Conversely, for H02: Long-term debt ratio (LTDR) has no significant impact on the financial performance of oil and gas firms in Nigeria, the log-transformed Long-term Debt Ratio (LLTDR) exhibited a coefficient of -0.0715503 with a p-value of 0.545. Since this p-value exceeds the 0.05 significance level, we fail to reject H02. Therefore, based on these regression results, there is no statistically significant evidence to conclude that Long-term Debt Ratio impacts the financial performance of oil and gas firms in Nigeria. In essence, while short-term debt management appears to be a critical factor negatively influencing the financial performance of these firms, the long-term debt ratio does not emerge as a significant determinant within this empirical framework.

4.2 Pagan Lagrangian Multiplier Test for Random Effects

This test is particularly valuable in ensuring the validity of model assumptions and the reliability of regression results. In this context, we delve into the mechanics and implications of the Pagan Lagrangian Multiplier Test for Random Effects, shedding light on its significance in assessing the robustness of econometric analyses.

Table 3: Pagan Lagrangian Multiplier Test for Random Effects

Estimated results:	Var	sd = sqrt (Var)
LROA	078522	.2802178
E	.0022322	.0472465
U	0	0
Test: $\text{Var}(u) = 0$	$\text{chibar2}(01) = 0.00$	$\text{Prob} > \text{chibar2} = 1.0000$

Source: Author's Estimation Using EViews 9

The probability associated with the chi-square test statistic is 1.0000. A p-value of 1.0000 suggests that there is no statistical evidence to reject the null hypothesis. In this context, since the p-value is statistically insignificant, the pooled OLS is preferred than the random effect model.

4.3 Discussion of Findings

The findings from our analysis present a mixed alignment with existing literature on capital structure and financial performance (ROA), particularly within the Nigerian context and the oil and gas sector. Our findings uncover that short-term debt ratio (STDR) has a negative and statistically significant impact on financial performance (likely ROA, given the context of previous research) aligns strongly with several prior studies. Ilugbusi et al. (2021), also focusing on the Nigerian oil and gas sector, similarly found a negative and statistically

significant effect of short-term debt ratio on return on assets. Yijing (2023), while examining agricultural companies, also reported a negative influence of short-term debt on ROA and ROE. Osuji et al. (2024) observed this same negative and significant effect of short-term debt on ROA for Nigerian consumer goods companies. This consistent finding across different sectors and within the same oil and gas industry suggests that excessive reliance on short-term debt can indeed be detrimental to a firm's profitability, possibly due to higher interest costs, liquidity risks, or the need for frequent refinancing.

The intuition behind this negative impact is that short-term debt often comes with higher interest rate tighter repayment schedules compare to long-term debt. Too much reliance on STD may put pressure on firm to meet immediate obligation. This liquidity risk can force firms to divert resources from productive investment to debt servicing thereby reducing their ROA.

However, it contrasts with David et al. (2024) and Prince, Okeke, Olufunke, et al. (2023), who found a positive association between short-term debt and ROE in healthcare and oil and gas industries, respectively, and Adibeli and Amahalu (2023) who found a positive correlation with ROE. These conflicting results highlight the nuance of debt's impact, potentially influenced by industry specifics, firm-specific characteristics, or the specific measure of financial performance.

Conversely, on long-term debt ratio (LTDR) our findings show that LTDR does not have a statistically significant impact on financial performance (ROA) this resonates with several studies. Ilugbusi et al. (2021) and Yijing (2023) also found out that long-term debt have no significant effects on ROA, as did Ebe, Nwankwo, Obaji, and Inyaeze (2023) for manufacturing firms, and Osuji et al. (2024) for consumer goods companies in Nigeria. This consistency suggests that, for the Nigerian oil and gas sector specifically, and in some other contexts, long-term debt might be managed in a way that its level does not significantly drive financial performance, or its effects are offset by other factors. Intuitively, long-term debt often provides firms with stable, lower interest rate financing option and longer maturity period.

However, this finding stands in contrast to Akmal, Aiman, and Aamir (2023) who found an inverse relationship between leverage (LTDR) and firm performance in emerging markets. It also differs from Adibeli and Amahalu (2023) who found a positive relationship between long-term debt ratio and cash value added, and David et al. (2024) who noted a negative influence of LTDR on ROE in healthcare sector.

5.0 Conclusion and Recommendations

Our findings indicate that short-term debt significantly and negatively impacts financial performance of listed oil and gas firms in Nigeria, while long-term debt does not show a significant impact. However, the non-significant impact of long-term debt in our findings provides an interesting divergence from some studies while consistent with others, suggesting that its role in this specific industry and economic context may be more nuanced or less direct than that of short-term obligations. The study recommends that oil and gas firms in Nigeria should prioritize a deliberate strategy to lessen their reliance on short-term debt (STD)

financing. This involves seeking more stable and cost-effective long-term financing alternatives where feasible and given that long-term debt (LTD) has not demonstrated a significant impact on financial performance (ROA) in this study, management should focus on ensuring the productive and efficient deployment of existing long-term capital.

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