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Investigating the Moderating Effect of Firm Age on the Relationship between Capital Structure and Financial Performance of Listed Oil and Gas Firms in Nigeria

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Abstract
This study looked at the moderating effect of company age on the connection between capital structure and financial performance in ten (10) oil and gas businesses listed on the Nigerian Exchange Group from 2013 to 2022. Short-term and long-term debt proxied capital structure; Return on Assets proxied financial performance; and company age acted as a moderator. The study used an ex post facto research design and inferential statistics. Diagnostic tests were used to assess the robustness of the random effect models used in the regression. On the one hand, primary findings revealed that short-term debt has a negative insignificant effect on return on assets, while both long-term debt and firm age have a negative significant effect on return on assets; on the other hand, secondary findings revealed that Moderated-Short-term-debt maintained negative insignificant effects on return on assets, while Moderated-long-term-debt has a positive significant effect on return on assets, but the R-squared had changed, indicating the moderating effect of firms age. Based on the data, this study concluded that firm age moderated capital structure, hence improving financial performance. As a result, this study concluded that investors and management should be aware of the firm's age as a factor that can improve the financial performance of Nigerian oil and gas enterprises.

Keywords
Firm age, Long-Term-Debt, Return-on-Assets, Short-Term-Debt

1. Introduction
The capital structure is the combination of equity and debt that a company uses to maximize profits for its stakeholders. A capital structure choice refers to the interaction of a firm's equity capital, preference capital, debt capital, and internal reserves to determine which capital mix is most suited to maximize the firm's profitability. The capital structure decision reflects how a company chooses to finance its operations and expansion through various funding sources. When a firm leans towards debt over equity, it incurs higher interest payments, thereby reducing its net profit. Conversely, a company that relies more on equity financing avoids interest payments and instead distributes dividends to shareholders when profitable. In today's complicated business world, it is critical to understand the elements that influence the capital structure and success of the company.

One of the primary goals of corporate management is to determine the ideal capital structure—a blend of equity and debt—that minimizes the cost of capital while maximizing profitability. Achieving this optimal balance not only enhances returns but also fortifies the firm's competitive position within its industry. Failure to attain this optimal mix can undermine a company's growth and profitability. Capital structures of firms vary based on factors such as their size, nature, asset composition, profitability, growth prospects, risk profile, liquidity, and tenure. Firm age denotes the duration a company has been in operation since its establishment or listing on a stock exchange, typically measured in years. The age of the firm is a conventional measure of reputation in capital structure models because when a firm stays in business for a longer period of time, it establishes itself as a going concern and so boosts its ability to improve financial performance.

Firm age is connected with extensive knowledge, expertise, and a decrease in perceived risks since ancient enterprises are considered to have substantial market shares, strong clientele patronage, customer loyalty, well-established logistic networks, and business associates with varied components of production. Thus, older enterprises are more profitable due to their well-established operational techniques for providing varied goods/services to fulfill the demands of various clients. However, Graham and Harvey (2001) and Carroll (2003) argue that young firms are more vulnerable to distress and failure during a downturn in the stock market because their resources are diverted to establish internal routines, develop credible exchange relationships, and train their employees.

In Nigeria, studies on capital structure focused on its impact on firm financial performance without taking into account other aspects such as business age and its implications for capital structure and financial performance of listed oil and gas firms. For example, (Fatoki et al., 2021; Ajibola et al., 2018; Sulaiman et al., 2017) wrote on quoted manufacturing companies; (Tanko et al., 2021; Ganiyu et al., 2019) concentrated on non-financial companies; (Usman, 2019) studied consumer-goods firms; and Abdulrahman (2021) wrote on the banking industry. All of the aforementioned research discovered that capital structure had the greatest impact on business financial performance without taking into account any other variables such as firm age. The purpose of this study was to investigate the moderating effect of firm age on the relationship between capital structure and financial performance of Oil and Gas firms listed in the Nigerian Exchange Group.

1.1 Hypotheses

***H_{01}*:** Short Term Debt has no significant effect on return on assets of listed Oil and Gas firms in Nigeria.

***H_{02}*:** Long Term Debt has no significant effect on return on assets of listed Oil and Gas firms in Nigeria.

***H_{03}*:** Firm age has no significant moderating effect on Short Term Debt and Return on assets of listed Oil and Gas firms in Nigeria.

***H_{04}*:** Firm age has no significant moderating effect on Long Term Debt and Return on assets of listed Oil and Gas firms in Nigeria.

2. Literature Review

Firm age is the continuous period of time, usually measured in years that a company has been in existence since it was formed or listed on the floor of a stock market. Firm age is connected with extensive knowledge, expertise, and a reduction in perceived risks, as ancient firms are considered to have big market shares, high client patronage, customer loyalty, well-established logistic networks, and business associates with various production variables. Therefore, established businesses tend to be more profitable because of their long-standing operational methods for delivering diverse goods/services to meet the needs of different customers. Conversely, young businesses are more susceptible during a stock market decline. Mintesinot (2010) suggests that as companies mature, their extensive history makes it easier to persuade lenders, and they gain expertise in identifying cost-effective alternative sources of credit when seeking loan capital.

The age of a firm is commonly recognized as a significant factor in capital structure models. Ullah et al. (2017) claimed that older enterprises require a greater debt ratio to sustain their rating and found that age has a positive relationship with long-term debt but a negative relationship with short-term debt. Similarly, Ahmad and Wan Aris (2015) found that business age can explain capital structure decisions in Malaysia. They went on to say that a firm's age influences its decision to seek debt funding. Abor and Biekpe (2009) conclude that age is crucial when acquiring cash through loans because organizations that have been in business for a long time have collateral to provide banks if they are unable to repay their debt. Age is often seen to have a favorable effect on capital structure.

2.1 Capital Structure

A company's capital structure encompasses the blend of debt and equity utilized to fund its operations and generate profits or deliver services to its clientele. Debt serves as a mechanism through which businesses can raise capital in financial markets. Companies often favor debt over equity due to the tax advantages it offers; interest payments on debt are typically tax-deductible, whereas shareholders must pay taxes on dividends received. Debt generally provides easier access to funds at lower interest rates compared to equity, which tends to be more costly. Capital structure denotes the composition of a company's long-term debt, short-term debt, common stock, and preferred stock. It delineates how a company finances its ongoing activities and growth by tapping into various accessible funding sources. According to Sulaiman, Aruwa, and Umar (2017), capital structure refers to a company's financial architecture, which includes debt and equity. Similarly, Gitman and Zutter (2012) define capital structure as a firm's long-term debt and equity balance.

2.1.1 Short-Term Debt to Total Assets

The short-term debt to total assets ratio measures the portion of a company's total assets financed by short-term debt, which typically has a maturity period of one year or less. This ratio assesses how promptly a company repays its short-term obligations relative to its total assets within a specified accounting period. According to Meyers and Majluf (1984), companies that utilize short-term loans are likely to experience increased investment opportunities. The use of short-term debt expands the available external capital pool and enhances overall corporate financial performance (Seid, 2017). The short-term debt ratio is computed by dividing current obligations by total assets. A lower debt ratio typically indicates a

more stable firm with potential for longevity. According to Amara and Bilal (2014), short-term debt is an effective capital structure metric. Firms seek short-term loans to meet working capital demands, which will improve corporate performance.

2.1.2 Long-Term Debt to Total Assets

A leverage ratio, such as the long-term debt to total assets ratio, compares the amount of long-term debt a company holds to its total assets. This ratio indicates the proportion of assets that would need to be sold or liquidated to repay the company's long-term debt obligations. Long-term debt to total assets measures the extent of long-term financing in a company's capital structure, with long-term debt typically having a repayment period of at least 12 months. Long-term debts often include mortgages and leases, and they are commonly used to finance assets such as equipment, land, buildings, and machinery.

The long-term debt to total assets ratio provides insight into a company's financial health and its capacity to meet its long-term financial commitments. The greater the volume of long-term debt, the more critical it is for a company to maintain positive revenue and consistent cash flow. It is extremely beneficial for management to review its debt structure and estimate debt capacity.

2.2 Financial Performance

Firm performance is defined as a manager's efficient and effective use of organizational resources to meet organizational goals and satisfy all stakeholders (Jones & George, 2009). Three alternative variables are used to represent financial performance. The most important financial performance metric is return on asset (ROA). ROA indicates the ability of a company's assets to generate profit. Another ratio is return on equity (ROE). ROE ratio refers to the returns to shareholders on their equity. The subsequent task involves computing the return on investment (ROI). ROI assesses how effectively a company utilizes its invested capital. Another crucial metric is earnings per share (EPS), which gauges a company's profitability. Similarly, net profit margin (NPM) and Tobin's Q are also utilized as indicators of financial performance.

This research employs return on assets (ROA) as a key financial performance indicator. ROA evaluates the efficiency with which a company utilizes its assets to generate profitability. Unlike some metrics, ROA considers a company's debt and compares its profits to the total assets employed by the organization over a specific period, yielding earnings. According to Tailab (2014), ROA provides a reliable measure of profitability as it reflects how effectively a firm generates profits from its underlying assets.

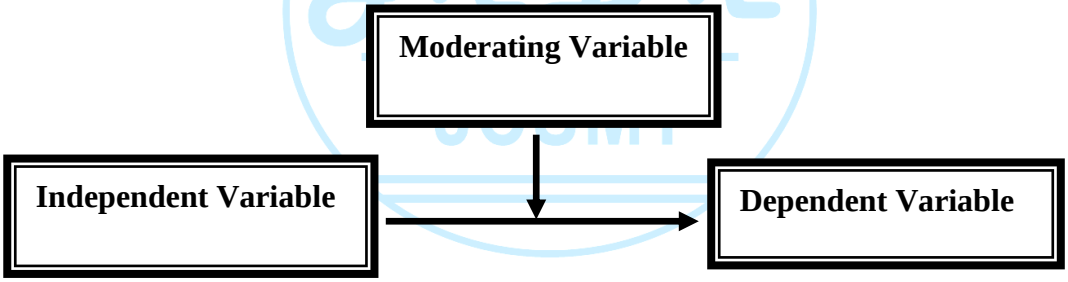

Fig. 1 Conceptual Framework of the Study

2.3 Theoretical Framework

2.3.1 Life-Cycle Theory

This categorizes a firm's life cycle into four distinct stages, each characterized by unique attributes that shape their capital structure strategy. Early-stage firms are typically small and face significant challenges, including high capital-raising costs. As firms move into the growth phase or approach maturity, they tend to be larger and older, benefiting from reduced costs when raising external capital. At maturity, firms often experience lower returns and adjust their capital costs accordingly. Finally, during the decline stage, firms encounter stagnation and declining returns due to external pressures.

2.3.2 The Pecking Order Theory

It suggests that a company's financing pattern favors internal sources of funds over external sources. Highly profitable firms prefer internal funding, while firms with low profitability tend to employ external financing.

2.3.3 Trade-Off Theory

This study is anchored on trade-off theory. The theory further elucidates that, any increase in the level of debt caused an increase in bankruptcy, financial distress and agency costs, and hence decreases firm value. According to Graham and Harvey (2001), the tradeoff theory explains how firms determine their optimal leverage by weighing the benefits and costs of debt. This involves balancing the advantages of tax shields against the disadvantages related to financial distress and bankruptcy costs. The optimal debt ratio is achieved when a firm aligns its borrowing levels to maximize these benefits while minimizing costs, including adjustment costs (Myers, 1984). Karadeniz, Kandir, Balcilar and Onal (2009) emphasize that achieving this balance is crucial for firms to establish an optimal capital structure.

2.4 Empirical Review

Do, Luong, Mai, Dam, Pham, and Nguyen (2022) investigated the impact of capital structure on the performance of manufacturing and processing enterprises listed on the Vietnam stock exchange between 2015 and 2020. The study used short-term debt to total assets (STDA) and long-term debt to total assets (LTDA) ratios as independent variables, with return on assets and Tobin's Q. The regression was carried out using Feasible Generalized Least Squares (FGLS). According to the study, the ratios of short-term debt to total assets (STDA) and long-term debt to total assets (LTDA) have a considerable negative effect on ROA performance. The two control variables, growth and size, both have a favorable impact on ROI.

Fatoki, et al., (2021) evaluated the capital structure and financial performance of Kenyan listed industrial enterprises. Return on Assets (ROA) and Return on Equity (ROE) serve as proxy indicators for assessing financial performance, while Total Debt Ratio and Debt to Equity Ratio are employed to evaluate a company's capital structure. The data used spanned 7 companies from 2010 to 2016. While the Panel Vector Auto regression was used and analysed in EVIEWS 10, the Wald Granger causality test was performed to determine the probability of causation between the variables. The findings demonstrated that capital structure had little impact on ROA and ROE. However, using the debt-equity ratio as a measure of capital structure, it was determined that there is a bidirectional relationship between DER and ROA, whereas the converse was true for ROE. The study indicates that listed manufacturing firms' capital structure composition choices reflect both the efficiency risk and franchise value theories. It thus proposes that enterprises strive for higher returns in order to increase the firm's value and maximize shareholder wealth.

A study of 22 companies in the hotel industry in India to establish the relationship between capital employed and profitability, (Shireen & Kavita, 2019) To reach a reliable conclusion, we used a correlation technique. The independent variables included Total Debt to Equity Ratio (TDE), Total Debt to Total Assets Ratio (TDTA), Short-Term Debt to Total Assets Ratio (STDTA), and Long-Term Debt to Total Assets Ratio (LTDTA). The dependent variables were net profit (NP), Return on Capital Employed (ROCE), Return on Assets (ROA), Return on Equity (ROE), and Interest Coverage. The correlation matrix shows that TDTA is negatively correlated with ROCE, ROE, and IC. TDE correlates negatively with ROCE, IC, and ROA but positively with ROE. STDTA is negatively correlated with ROA, but positively correlated with ROCE, ROE, and IC. Finally, LTDTA is negatively correlated with all of the dependent variables (ROCE, ROE, ROA, and IC).

Syed and Waqas (2018) examined impact of capital structure and corporate governance on a firm's budgetary performance in Pakistan's listed cement industry was investigated using panel data on a sample of ten companies listed on the Pakistan Stock Exchange (PSX) from 2007 to 2016, with a Pooled regression Model used to test the hypotheses. The study employed ROA, ROE and net profit ratio (NPR) as dependent variables to evaluate business performance. Similarly, the study represented capital structure and corporate governance using independent variables such as long-term debt (LTDR), short-term debt ratio (STDR), board size, and audit committee. Using panel least squares estimation, the results revealed that LTDR and STDR have a negative significant effect on ROA and NPR, but have a negative negligible effect on ROE.

In a study of manufacturing firms from the Nigerian Stock Exchange, (Ajibola, et al., 2018) evaluated the effect of capital structure on their financial performance over a ten-year period (2005-2014). The study, which used short-term debt ratio (STD), long-term debt ratio (LTD), and total debt ratio (TD) as independent variables and return on assets (ROA) and return on equity (ROE) as dependent variables, found a mixed influence of capital structure on company performance. The results, which are based on ordinary least squares, show that long-term debt ratio and overall debt ratio have a positive significant effect on ROE, but STD has a positive negligible effect. The study also found that all of the independent variables (LTD, STD, and TD) had a negative, negligible effect on ROA. The data indicate that LTD has the greatest impact on ROE; consequently, enterprises should continue to use LTD in their capital structure.

Siddik et al. (2017) Using panel data from 22 Bangladeshi banks from 2005 to 2014, researchers studied the effects of capital structure on bank performance. Short-term debt (STD) to total assets, long-term debt (LTD) to total assets, and total debt (TD) to total assets all represented capital structure, as did return on equity (ROE), return on assets (ROA), and earnings per share (EPS). The data acquired from the bank reports were analyzed using pooled ordinary least squares. The results show that all independent factors, with the exception of TD to EPS, have a significant negative effect on ROA, ROE, and EPS. The findings show that the corporation should avoid using debt in its capital structure, as it has a negative impact on bank performance.

Sulaiman, et al., (2017) between 2010 and 2015, researchers investigated the impact of debt interest-bearing capital structure on the performance of 30 industrial enterprises listed on the Nigerian Stock Exchange. Short-term debt to total equity (STDTE) and long-term debt to total equity (LTDTE) were used to define capital structure, while return on assets (ROA), return on equity (ROE), and earnings per share (EPS) were used to measure financial performance. The study included multiple regression and panel data sets. Firm size and growth were used as control variables. The study found that LTDTE and firm size have a considerable beneficial effect on ROE, but STDTE and firm growth had an insignificant effect. STDTE, LTDTE, company size, and firm growth all have little impact on ROA and EPS.

Tim (2017) investigated the impact of capital structure on firm performance: a study of Dutch unlisted SMEs. The study, which was based on trade-off theory and pecking order theory, used short-term debt (STD), long-term debt (LTD), and total debt (TD) as independent variables and return on assets (ROA) and return on capital employed (ROCE) as

dependent variables, with size and liquidity serving as control variables. The study found that STD, LTD, and TD all have a negative significant influence on ROA, whereas STD and TD have a positive significant effect on ROCE and LTD has a negative significant effect on ROCE.

3. Methodology

The study uses an ex post facto research design. The Robust Random effect model regression output served as the foundation for the regression analysis. The study applied the Robust Random effects model following diagnostic tests that evaluated the internal consistency of the data. The study focused on a population consisting of ten (10) oil and gas companies listed on the Nigerian Exchange Group from 2013 to 2022. The study's data were taken from the sampled firms' annual reports/financial statements.

3.1 Model Specification

This study adopted and modified regression model used by (Matemilola, et al., 2017).

$$ROA_{it}=\alpha_0 + \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 FAG_{it} + \beta_4 FSIZ_{it} + \mathcal{E}_{it} \quad (i)$$

$$ROA_{it}=\alpha_0 + \beta_1 STD_{it} + \beta_2 LTD_{it} + \beta_3 STD_{it}*FAG_{it} + \beta_4 LTD_{it}*FAG_{it} + \beta_5 FSIZ_{it} + \mathcal{E}_{it} \quad (ii)$$

Where:

ROA = Return on Assets
CS = Short term debt
LTD = Long term debt
FAG = Firm Age
FSIZ = Firm size
α = Constant (fixed effect parameter)
β_{1-2} = Coefficients of the study variables
i = Cross sections (Number of firms),
t = Time series (Number of years)
$\mathcal{E}$it = Error term

The *apriori* expectation is that $\beta_1, \beta_2, \beta_3, \beta_4 > 0$.

Table 1 Variable, symbol, measurement and source

Variable	Symbol	Measurement	Source
Independent Variable			
Short Term Debt	STD	Short-term debt to total assets.	Do, et al. (2022); Sulaiman, et al., (2017)
Long Term Debt	LTD	Long-term debt to total assets.	Do, et al. (2022); Sulaiman, et al., (2017)
Dependent Variable			
Return on Assets	ROA	Profit after tax/Total Assets	Aziz (2019) Fatoki, et al., (2021)
Moderating Variable			
Firm age	FAG	No of years from incorporation	Mandala, et al. (2019), Matemilola, et al. (2017).
Control Variable			
Firm Size	FSIZ	Natural Log of Total Assets	Do, et al., (2022); Matemilola et al.(2017)

Source: Compiled by the researchers (2024)

4. Results and Discussion

Table 2 shows the descriptive statistics of the variables of the study. The table shows the mean of ROA as 0.0304 indicating that the average profit the oil and gas companies earned during the period under study is as low as 3.04% while the standard deviation of ROA is 0.2159 which indicates a deviation from both sides of the mean by 21.59%. The maximum profit earned for the period covered by this study is 1.75 (175%) while some losses were also suffered during the period to the tune of 55.8%. The table also shows that during the period under study, the average STD debt incurred is 52.14% while 21.19% for LTD; while the maximum STD debt collected by the company is 94.95% while 192.28% debt for LTD; the minimum STD and LTD debt incurred is 0.1001 and 0.0017 respectively, which means there are accounting years that some companies did not incur much debt. The table further shows information on the moderating variable (firm age). The average period of the incorporation of the companies is 42 years, the maximum years is 72 while the minimum years of incorporation of the companies is 5 years.

Table 2 Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum	Skewness	Kurtosis
ROA	90	0.0304	0.2159	-0.558	1.7507	5.3429	46.9797
STD	90	0.5214	0.1960	0.1001	0.9495	-0.3372	2.4004
LTD	90	0.2119	0.2964	0.0017	1.9228	3.5885	18.8963
FAG	90	1.5713	0.2651	0.6989	1.8573	-1.4706	4.6576
FSIZ	90	7.7057	0.8020	5.31	9.14	-0.9293	4.3128

Source: STATA 16 Output (2024)

The table also shows that the skewness of the independent and dependent variables spans from -0.3372 to 5.3429, indicating positively skewed ROA, but short term debt, the moderating variable and the control variable are negatively skewed by -0.3372, -1.4706 and -0.9293 respectively. The Kurtosis varies from 2.4004 to 46.9797, indicating that the curve of the ROA series is leptokurtic, indicating a high peak in the data. This demonstrates low and high divergence from the average value in assessing the extent to which independent factors explained the dependent variables, and it is more peaked than a Gaussian distribution (favorable) and greater than zero).

Table 3 Correlation coefficients matrix (Multicollinearity)

Variable	ROA	STD	LTD	FAG	FSIZ
ROA	1.000				
STD	0.0266	1.000			
LTD	-0.2726	-0.3766	1.000		
FAG	-0.0439	0.5137	-0.1897	1.000	
FSIZ	-0.1339	0.5181	-0.0540	0.8423	1.0000

Source: STATA 16 Output (2024)

Table 3 displays the correlation coefficient matrix for the research variables. The table reveals that ROA is negatively correlated with all variables (LTD, FAG and FSIZ) except STD which is positively correlated. This suggests an inverse relationship between the dependent, independent (except STD), moderating and control variables. The table also reflects the variables' multicollinearity status. The highest coefficient of 0.8 indicating the lack of multicollinearity (Gujarati & Porter, 2010).

Table 4 Variance inflation factor test (Multicollinearity)

Variable	VIF	1/VIF (Tolerance)
FSIZ	3.87	0.258299
FAG	3.73	0.268429
STD	1.65	0.606985
LTD	1.27	0.790085
Mean VIF	**2.63**	

Source: STATA 16 Output (2024)

Table 4 shows that the VIF coefficients range from 1.27 to 3.87, with the mean VIF being 2.63. The VIF tolerance level ranges from 0.258299 to 0.790085. These results imply that there is no multicollinearity in the study's independent variables. The benchmark values for VIF are 1–4, the mean VIF is 1–10, and the VIF tolerance limit is less than 1 (Rajkumar & Hanitha, 2015).

Table 5 Shapiro-Wilk Test (Normality Test)

Variable	Obs.	W	V	Z	Prob>z
ROA	90	0.45305	41.371	8.210	0.00000
STD	90	0.97294	2.046	1.579	0.05712
LTD	90	0.61563	29.073	7.432	0.00000
FAG	90	0.83754	12.288	5.533	0.00000
FSIZ	90	0.87772	9.249	4.906	0.00000

Source: STATA 16 Output (2024)

Table 5 displays significant probabilities (Prob>z 0.000) for all variables, showing that the data residuals do not follow a normal distribution. Because of the lack of normality distribution in data residuals, regression analysis must be performed using a robust regression technique (Gujarati, 2003). Robust standard error often enhances estimator efficiency (Greene, 2008).

Several tests were performed to confirm that the coefficients of estimations were consistent and could be used to draw inferences. Regression can only be estimated accurately if the basic assumptions of multiple linear regressions are met (Greene 2003). The Breusch and Pagan Lagrangian multiplier Test, normality, heteroscedasticity, autocorrelation, multicollinearity, Link Test, and Ramsey RESET Test were among the assumptions used.

Table 6 Diagnostic Tests

Diagnostic Items	Probability	Appropriate Regression Tool
Hausman Test	chi2(4) 8.83(0.0654)	Random effect models
Breusch and Pagan Lagrangian multiplier Test	chibar2(01) 0.00 (1.000)	Random effect models
Breusch-Pagan/Cook-Weisberg Test (Hettest)	chi2(1) 3.25(0.0715)	Robust Random effect models
Wooldridge Test (Autocorrelation) in panel data	F(1,9) 0.263(0.6202)	Robust Random effect models
Link Test	_hat (0.017/_hatsq(0.957)	Model well specified
Ramsey RESET Test	F(3,82) 3.03 Prob.>F= 0.0342	No missing variable in the model

Source: STATA 16 Output (2024)

Table 6 shows the study's diagnostic tests, which indicate which regression analysis tool is appropriate for the study. Because the Hausman Test yielded insignificant probabilities, random effect models were chosen over fixed effects models. Further investigation using the Breusch-Pagan Lagrangian multiplier reveals a negligible likelihood that accepts the null hypotheses; thus, random effect models are suited for analysis rather than Ordinary Least Square regression. Furthermore, the Breusch-Pagan/Cook-Weisberg Test found a substantial probability, indicating the presence of heteroskedasticity in the data, hence the analysis should be based on Robust Random effect models rather than Random effect models. In the same vein, the Wooldridge Test for Autocorrelation yields a negligible probability, indicating the usage of Robust Random effect models, confirming Breusch-Pagan/Cook-Weisberg's approach. The table also includes the Linktest and Ramsey RESET tests. The Linktest yields an insignificant _hatsq (0.957), indicating that the model is properly specified, whilst the Ramsey RESET specification error test yields an insignificant P-Value (0.6429), indicating that the model has no missing variables. As a result, the study's findings were established using Robust Random Effect Model Regression.

Table 7 Hierarchical Regression Results: Firm Age Moderating Effect: Capital Structure and Financial Performance

Variables	Step 1			Step 2		
	Coefficient	Z-value	P-value	Coefficient	Z-value	P-value
STD	-0.008	-0.07	0.943	0.563	0.76	0.445
LTD	-0.195	-7.08	0.000	- 1.763	-4.51	0.000
FAG	0.086	0.66	0.508			
FSIZ	-0.062	-2.44	0.015	-0.089	-5.72	0.000
STD*FAG				-0.298	-0.69	0.490
LTD*FAG				1.099	4.13	0.000
Constant	0.425	4.55	0.000	0.704	5.76	0.000
R-Sq. Overall	0.1499			0.1886		
Wald Chi2	141.21			334.58		
Prob>Chi2	0.0000			0.0000		

Note: Step 1 (IVs, MV and DV) and step 2 (IVs, MV*DV).

Table 7 step 1 reveals 141.21 Wald chi2(3) with 0.000 Prob.>chi2 of independent variables at the 5% level of significance, indicating 95% confidence that the connection between the variables is not due to chance but rather 95% confidence in the models. The Table also demonstrates that the independent factors influenced the dependent variable (ROA), with an R-squared coefficient of determination of 0.1499. This means that the independent variables accounted for 14.99% of the variability in the dependent variable (ROA), while 85% of the other variables were not included in the model. Furthermore, the regression findings revealed a -0.008 coefficient and 0.943 likelihood of STD, indicating a negative insignificant influence on ROA. A unit increase in STD reduces ROA by 0.8%. The findings are compatible with that of (Sulaiman, et al., 2017), but not with those of (Do, et al., 2022; Syed & Waqas, 2018). The regression findings revealed a -0.195 coefficient and 0.00 likelihood of LTD, indicating a negative significant influence on ROA. A unit increase in LTD decreases ROA by 19.5%. This is consistent with the findings of Do, et al. (2022).

Table 7 step 2 shows 334.58 Wald chi2(3) with 0.000 Prob.>chi2 of independent variables at 5% level of significance, indicating 95% confidence that the relationship between the variables is not due to chance, but rather 95% confidence in the model. The Table also demonstrates that the independent factors influenced the dependent variable (ROA), with R-squared coefficient of determination of 0.1886. Table 7 step 2 also demonstrates that the moderating variable influenced the independent variables, which in turn affected the dependent variable (ROA) with a coefficient of determination (R-squared) of 0.1886. This means that both the moderating and independent variables explained 19% of the changes in the dependent variable (ROA), which is higher than the primary R-squared value of 15%. Furthermore, the difference between main R-squared and moderated R-squared clearly demonstrated the degree of moderating. $\Delta R2$ - $\Delta R2$ is 18.86% - 14.99%, resulting in 3.87%. This demonstrates that firm age has reduced the relationship between capital structure and return on assets among Nigeria's listed oil and gas businesses.

5. Conclusion and Recommendation

Based on the data, this study concluded that firm age moderated capital structure, hence improving financial performance. As a result, the study concluded that investors and management should be aware of the firm's age as a factor that can improve the financial performance of Nigerian oil and gas enterprises. Theoretically, this conclusion is consistent with trade-off theory, which predicts that older enterprises with a higher reputation in the capital market take on more debt due to reduced debt-related agency charges and bankruptcy costs, resulting in greater financial performance.

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Declaration of Conflict

We hereby declare that there are no form of financial interests or personal relationship that could have been of influence to this work.

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