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Intricate Capital Structure Influence on Firm Performance: An Empirical Analysis of Oil and Gas Firms in Nigeria

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Emmanuel Samuel Udo[1], Akpan Ededem Jack[2], Johnson Ifeanyi Okoh[3] Oyakhiromhe Bamidele Agbadua[4], Robert Eke[5] Ifeanyi Onyemere[6]**

[1]Department of Banking and Finance, University of Nigeria
https://orcid.org/0000-0002-0635-3216
*[2**]Department of Banking and Finance, University of Nigeria*
(Corresponding Author)
https://orcid.org/0000-0003-3039-009X
[3]National Open University of Nigeria
https://orcid.org/0000-0001-6611-8560
[4]Federal Polytechnic Auchi
[5]Wellspring University Benin City, Edo State.
[6]Sunderland University, United Kingdom

Abstract

This study examined the intricate capital structure and firm performance nexus, focusing on retained earnings in the Nigerian oil and gas industry. The determination of the appropriate capital structure mix between a firm's debt and equity is the springboard of its profitability or collapse. The focus on Nigeria as a major player in the global oil and gas market provides an intriguing motivation for the investigation of the intricate dynamics between capital structure and firm performance metrics, particularly retained earnings, ignored in previous studies despite the significance of retained earnings in policy

formulation, liquidity management, and market value of oil and gas firms in Nigeria. We used a sample of eight oil and gas firms and the pooled mean group autoregressive distributed lag model. The results revealed a positive long-run nexus among capital structure, retained earnings, market value, and performance from 2001 to 2022. The results showed that firms in the oil and gas trust on short-term debts for their operational and business activities. The nexus between retained earnings and the capital structure mix indicates that the higher a firm's earnings retention is, the faster its growth chances. An inverse nexus was observed between long-term debts, retained earnings, market value, and performance. Generally, the findings of this study support the MM 1963 capital structure relevant proposition and are consistent with the trade-off theory and the pecking order theory.

Keywords: *Capital structure, Market value, Oil and gas, Performance, Retained earnings.*

JEL classification: G12; C33; G32; L25; L6; N67, G23, M41

Introduction

The increasing and sustained rivalry and global competition in the oil and gas industry have necessitated not only the development of diverse competitive advantage techniques, innovative products, and strategies for profit maximisation and cost minimisation, but also the need to determine the best-fit mix of capital structure (debt and equity) to successfully implement these techniques and strategies (Manukaji & Egungwu, 2018). Theoretical literature reveals that a firm's choice of capital structure mix depends on the traits that determine the various costs and benefits accompanying such financial decisions (Ayange et al., 2021). Firms create and add value when their returns on investment exceed their costs of capital. Therefore, it is fundamental for firms to have an optimal capital structure to minimise the cost of capital and increase market value (Ayange et al., 2021). This research problem stems from the critical need to understand how the optimal mix of debt and equity influences firm performance and financial stability in Nigeria's oil and gas industry. The oil and gas industry are one of the pivotal sectors in Nigeria, contributing approximately 85% of foreign earnings for economic growth and human capital development. Its operational and business structure varies significantly from other sectors due to the high uncertainties and risk factors associated with its bulky investments and long-term funding structure; determining its capital structure mix is a key

issue (Shubita & Alsawalhah, 2012; Ayange et al., 2021). Debt and equity influence firm value and stock prices in the securities market. Gill, Nahum, and Neil (2011) and Jaisinghani and Kanjilal (2017) argue that debt is preferrable for its significant nexus with profitability than equity. Conversely, Alarussi and Alhaderi (2018) argue that a 1% increase debt in the capital structure mix negatively influences profitability. Ishaya and Abduljeleel (2014), among others, argue that equity capital is preferred for its ability to reduce financial risk and allows for greater flexibility during economic downturns. Brealey, Myers, and Allen (2020) reveal that equity capital lowers the interest rate on debt, especially for established firms with decent track records. Therefore, this argument places a burden on financial managers to have good financial knowledge to analyse and make a prudent judgment on the best capital structure mix. The ripple effect of the various financing option mixes reveals the prowess of each financing option in growing or collapsing the firm's market value, profit, and shareholder wealth (Swain & Patnaik, 2013).

According to Nwude, Itiri, Agbadua, and Ude (2016); Dewi, Handayani, and Nuzula (2014); Akeem, Edwin, Kiyanjui, and Kayode (2014), the argument on what constitutes the best capital structure mix is divided into two frontiers: irrelevance and relevance. According to Modigliani and Miller (MM) 1958 capital structure theory, a firm's cost of capital is irrelevant under perfect market conditions of no taxes, rational investors, perfect competition, and no bankruptcy cost. Therefore, whether a firm is financed by debt or equity, the market value is sovereign of its capital structure decisions (Siddik, Kabiraj, & Joghee, 2017). Regardless of the idealistic and unrealistic 1958 MM assumptions, this argument is significant, as it reveals the circumstances under which a firm's capital structure is considered irrelevant and provides a clue on what makes a firm's capital structure relevant. The relevant frontier of MM (1963) envisages that a firm's market value is dependent on its capital structure under imperfect market conditions that acknowledge the significance of tax advantage on the firm's market value, performance, and profit. The pecking order theory asserts that large firms with huge turnover leverage their firms such that their equity portion is higher than their debts in their operational activities and investments. The trade-off theory suggests that firms with diverse asset portfolios should use debt financing to prevent illiquidity, which has a dire impact on daily operations. The agency cost theory posits that firms should focus their capital structure on reducing agency costs (Siddik, Kabiraj, & Joghee, 2017).

Debt financing is a disciplinary tool for checking negative investments and restricting the opportunistic behaviour of managers for personal gains. Hence, firms maximise their values by maximising the use of debt, and the excessive debt increases risk of financial distress, insolvency, and bankruptcy. Additionally, little debt can lead to overinvestment and negative returns, particularly in large and mature firms in developed economies (Barclays & Smith, 2005). Consequently, financial managers must develop optimal firm-specific structures to maximise their firms' market value.

Empirical capital structure studies have predominantly focused on firms' market value and profitability, and their broad implications across industries in developed economies with relatively stable institutional environments, ignoring the specific intricacies of the Nigerian oil and gas sector. Studies assessing the nexus between capital structure, retained earnings, and firm performance metrics in Nigeria are limited, especially concerning the interplay of debt and equity and its implications on financial decision-making in shaping the financial performance metrics in the oil and gas industry in Nigeria. Ayange et al. (2021) attribute the scarcity of studies in Nigeria to the prevalence of political, social and economic instabilities, market inefficiencies, and institutional constraints.

Retained earnings are one of the cheapest sources of internal funding for financing a firm's operational and business activities. This is the residual net income of a company's profits after paying dividends to shareholders, typically deployed to finance its working capital, fixed asset purchases (capital expenditure), debt servicing (Chasan, 2012), or future business expansion (Dinayak, 2014). Droms (1990) reveals that investors benefit more from reinvested earnings than dividends in the long run due to the compounding growth, potential for higher returns, tax efficiency, stability, and financial health of the firm. Harkavy (1953) supports these claims by affirming that the plough-back of corporate profits enhances a firm's corporate securities value. The level of internal funds conveys information on a firm's growth prospects. However, conflicts of interest often arise in the process of determining the percentage of profit to be retained and paid as dividends. The dynamics of retained earnings and the influence of capital structure compositions on the oil and gas industry are vital for funding future growth, dividend payments, and overall financial stability. The ripple effect of the COVID-19 pandemic and the recent Russia-Ukraine conflict on the global oil and gas sector instigated the enquires into the effectiveness of the decisions to plough back residual profits into the business and the extent to which it

determines the growth of firms in the oil and gas industry. Given the distinctive characteristics of the Nigerian oil and gas industry, including regulatory frameworks, market conditions, and industry volatility, this study seeks to contextualise capital structure dynamics within this unique environment and contribute significantly to the literature on capital structure and firm performance in the Nigerian oil and gas industry. This study focuses on capital structure (debt, equity) and the retained earnings nexus within the Nigerian oil and gas firms, considering the industry's distinct operational and investment characteristics as its unique contributions. Exploring the varying capital structure compositions influence on critical financial performance metrics, including market value and profitability, the robust econometric methods, of PMG/ARDL model tailored to accommodate potential data limitations in this specific sector was adopted.

Empirical studies of capital structure-retained earnings in other sectors have revealed diverse results. In Kenya, Omollo, Muturi, and Wanjare (2018) and firms in Nigeria, Okeke, and Okeke (2018) report a positive and significant nexus between performance and retained earnings. The pecking order theory contributes to the findings of this study, as it acknowledges managers' craving for internally funding for their activities. Gordon's (1959) model theory suggests that investors would prefer current dividends.

literature review

Capital Structure Mix

Capital structure comprises all financial options (debt and equity) available for a firm to finance its operations and business activities. The capital structure mix is not limited to debt and equity, but includes all varieties of debt, equity, and convertible bonds of the firm. Debt is decomposed into long-term and short-term periods to examine its individual effects. Firms heavily financed by debt expose creditors to risk of bankruptcy. Short-term financing instruments collectively indicate a firm's current liabilities. Mirza and Javed (2013), Fosu (2013), Thamila and Arulvel (2013), and Adesina et al. (2015) reveal that the shorter the debt, the more efficient the firm's performance. Long-term financing instruments including preferred shares, and the various types of term loans and bonds are referred to as "non-current liabilities of the firm". The best capital structure mix lowers capital utilisation costs and

increases the firm's market value, profitability, and retained earnings. Swain and Patnaik (2013) argue that a firm financing structure should be chosen with an interest directed towards maximising shareholder equity. MM 1956 theory under irrelevant frontiers revealed that investors can create their desired leverage levels using personal borrowing, thus offsetting the benefits or costs of corporate leverage. The trade-off theory posits that a firm's optimal capital structure is determined by balancing the costs and benefits of debt and equity financing. Interest payments on debt are tax-deductible, thus, providing significant tax shields which increases the firm's value. 1% increase in a debt level, increases the prospect of financial distress.
The pecking order theory reveals that firms prioritise internal financing (retained earnings) over external financing (debt and equity) due to information asymmetry.

1.2 Retained Earnings

The retained earnings of a firm play a critical role in reducing its reliance on external sources of funds to finance its operations and business activities and support sustainable development opportunities (Masood, 2017). The higher a firm's earnings retention, the faster its growth prospects, facilitating faster expansion and investment (Campbell, 2012). Retained earnings are a cost-effective source of funds compared to external equity financing sources to fund the business and operational activities of the firm. Unlike new shares, which dilute ownership and potentially affect shareholder confidence, retained earnings provide a source of funds without such drawbacks. According to Masood (2017), this stability signals to stakeholders the potential investment opportunities embedded in a firm to boost their market perception. Substantial retained earnings influence a firm's capital structure decisions, and firms may opt for lower levels of external debt or equity financing to optimise their capital mix and reduce their financial risk (Chasan, 2012). However, reliance on retained earnings reflects a company's inability to generate sufficient internal funds, leading to a higher mix of debt or equity financing to meet operational needs (Masood, 2017). The disadvantage of retained earnings is that they are a limited source of financing with a high opportunity cost because they are foregone dividends by equity holders (Chasan, 2012). This trade-off between reinvestment and dividend payouts underscores the importance of

strategic financial management for maximising shareholder value while supporting long-term growth objectives.

1.3 Theoretical Arguments

MM theory (1958) posits that a firm's capital structure decision is irrelevant to its market value and profitability under imperfect market conditions. The MM theory was criticised for its unrealistic assumption of a perfect market. Myers (1984), Myers and Majluf (1984), and Jensen and Meckling (1976) argue that if capital structure decisions are irrelevant in a perfect market, then market imperfections may explain its relevance. The MM theory of 1963 subsequently corrected the 1958 theory by recognising the benefit of tax advantages and argued that the capital structure of a firm is relevant to its market value. Tax law allows firms to deduct interest payments as an expense; however, dividend payments to stockholders are not deductible. This differential treatment inspires firms to employ debt in their capital structures. According to MM theory, all things being equal, if all their other assumptions hold, this differential treatment will lead to an optimal capital structure of 100% debt. Ross (1977) argues that 1% change in a firm's profitability indicates creditworthiness of the firm, signalling the firm's value to investors regardless of its intention to take debt, where the cost of debt will be determined by market competition. An increase in the debt-to-equity ratio increases the firm's market value by increasing the present value of the interest tax shield. This implies that the cost of capital will not increase even if leverage increases to excessive levels. The pecking order theory argues that firms prefer internal funds before sourcing external funds. Thus, in the presence of information asymmetry, retained earnings are preferred to short-term debts, short-term debts to long-term debts, and long-term debts to equities. The objective of minimising the additional costs of raising capital when sourcing external finance is key to market value. Firms adopt a hierarchical order of sources of capital from least sensitive (least risky) to most sensitive (most risky).

2. Methodlogy

2.1 Data

This study examines the oil and gas firms listed on the Nigerian Stock Exchange from January 2001 to December 2022. Some criteria were

adopted in selecting subject firms to guard against data omission and to ensure uniformity in the presentation. Firms that had problems with NSE and the Securities and Exchange Commission (SEC) within the period under review were removed. This selection process zeroed in on eight (8) listed firms, from which data were collated for analysis. The sample firms constitute 95% of the quoted oil and gas firms. Purposive sampling was used.

Table 1: Selected firms in oil and gas sector

Company	**Date Incorporated**
Ardova Plc	November 12, 1964
Capital Oil Plc	August 29, 1985
Conoil Plc	June 30, 1970
Eterna Plc	January 13, 1989
MRS Oil Nigeria Plc	August 12, 1969
Oando Plc	August 25, 1969
Rak Unity Petroleum Company Plc	December 20, 1982
Total Energies Marketing Nigeria Plc	January 6, 1956

Source: Authors' compilation (2023)

2.2 Models

This study adopts and modifies the linear model specification of Akparhuere et al. (2015) in their study of the effect of capital structure on retained earnings in the oil and gas sector in Nigeria from 2002 to 2011. This study proxies for firm performance using retained earnings (REE), return on assets (ROA), return on equity (ROE), and market value proxied by Tobin's Q, while Akparhuere et al. (2015) only focused on retained earnings. The factors affecting and explaining the capital structure-performance nexus in the oil and gas sector include firm size and age. The study objectives are expressed in equations 1–4.

$REE_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \mu_{it}$ (eq1)

$ROA_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \varepsilon_{it}$(eq2)

$ROE_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \varepsilon_{it}$ (eq3)

$Tobin'sQ_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \varepsilon_{it}$(eq4)

Where: REE_{it} = Retained Earnings; ROA_{it} = Return on Asset and ROE_{it} = Return on Equity (accounting measures of firm performance); Tobin's

Q_{it} = Tobin's Q (market value); STDR = Short-term debt ratio; LTDR = Long-term debt ratio; ECR= Equity capital ratio (capital stricture indicators); FMS = Firm size; and FMA = Firm Age (control variables).
i = (Cross-sectional variables) Number of oil and gas firms
t = Period; and μ = Error terms and ε_{it} = the error term for the country I at time t.

2.4 Cross-Sectional Dependence (CSD) Tests

Firms within the sector are interrelated via global oil prices, government regulations, or environmental policies that can affect all firms in the sector simultaneously. Neglecting the CSD test may lead to misleading and biased estimates of the coefficients associated with capital structure and retained earnings. Acknowledging and addressing CSD issues ensures the robustness and credibility of our findings. The null hypothesis of Pesaran's (2004) CSD and Pesaran Scaled LM tests was tested. The CSD test equation is expressed as follows:

$$\text{CD} = \frac{\sqrt{2T}}{N(N-1)} \left(\sum_{i=1}^{N-1} \quad \sum_{J-i=1}^{N} Pij\right)$$

Where P_{ij} = the pairwise correlation, N= the sample, T = time
Subsequently, the slope homogeneity test of Pesaran and Yamagata (2008) was applied to reveal the slope heterogeneity between the cross sections. The null and alternative hypotheses of the slope homogeneity analysis are as follows:

2.5 Pooled Group Mean Autoregressive Distributed Lag Model

The PMG/ARDL model proposed by Pesaran et al. (1999) was employed because it is compatible with the dataset used in this study. Hence, financial data often exhibit non-stationary characteristics, implying that the statistical properties (mean and variance) vary over time. This model deals with small sample sizes, which can be a limitation in studies that focus on specific industries. This is particularly relevant in the Nigerian oil and gas industry because of the limited number of publicly traded firms. The model assumes that long-run coefficients are identical, while allowing for short-run coefficients and error variances to differ across firms. This is crucial in this study, as it confirms the presence of a long-term equilibrium nexus between capital structure,

retained earnings, market value, and firm performance. The PMG/ARDL model allows for the determination of sectorial short-run dynamics, considering the sum of time-series observations available in each case. The model integrates variables with different levels of integration, such as I(0), I(1), or both, as long as they are not of higher-order I (2). The ARDL model is expressed linearly as $y_{it} = \sum_{j=1}^{p} \gamma_{ij,t-j} + \sum_{j=0}^{p} \beta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it}$ (Eq. 6)

where *t* is the period (t = 1,2,3 . . .T), and *i* stands for the firms (i = 1,2,3. . . . N); X_{it} (k × 1) is the vector of explanatory variables for group *i*; μ_i is the fixed effect; γ_{ij} is scalar to represent the coefficients of the lagged dependent variable; β_{ij} is k × 1 coefficient vectors; and ε_{it} is the error term. The error correction model for the re-parameterised ARDL (p, q, q . . . q) can be specified as $\Delta y_{it} = \theta_i[y_{it-1} - \lambda_i X_{it}] + \sum_{j=1}^{p-1} \gamma_{ij}\Delta y_{it-j} + \sum_{j=0}^{q-1} \beta_{ij}\Delta y_{it-j} + \mu_i + \varepsilon_{it}$…… (Eq. 2)

where θ_i is the coefficient of the speed of adjustment to the long-run status, λ_i is the vector of long-run relationships, $[y_{it-1} - \lambda_i X_{it}]$ is the error correction term, and γ_{ij} and β_{ij} are short-run coefficients.

3. Findings and Discussions

3.1 Descriptive Statistics

Table 2 presents the summary statistics of the study variables. The mean and median values of these variables were not significantly different, indicating no extreme projection; hence, the series was stable for standard analysis. The mean values are all positive, indicating a positive increasing propensity effect of the capital structure on retained earnings, performance, and market value. The low standard deviation values compared to the mean values indicate that the variables are not highly volatile around the mean. The kurtosis of country-specific variables showed a blend of mesokurtic (=3), leptokurtic (>3), and platykurtic (<3) variables. On average, firms in Nigeria's oil and gas sector use 55% short-term debt, 15% long-term debt, and 49% equity capital to finance their operational and business activities. The results show a 55% reliance on short-term loans and 49% equity capital to shore up the credit facility. Strict issuance conditions and higher interest rates are associated with access to long-term credit facilities. Mirza and Javed (2013), Fosu (2013),

Thamila and Arulvel (2013), and Adesina et al. (2015) reveal that the shorter the debt, the more efficient the firm's performance. The 1987 financial market liberalisation policy decreased the use of long-term debt and shifted debt maturity in the short term. Lucey and Zhang (2011) assert that the high proportion of short-term debts over long-term debts in emerging market firms can be attributed to weak financial and legal institutions in developing countries, forcing creditors to use short-term debts to monitor and discipline borrowers' behaviour. The REE of 14.15% shows that shareholders prefer higher dividend payouts rather than higher REE because of uncertainty in the ownership level and control over decisions. This implies that dividends provide stakeholders with direct returns on their investments, which allows them to have more control over their returns. A high REE indicates fund retention for future investments or operations, which could be riskier or less predictable for shareholders compared to immediate dividends. ROA's effects on the capital structure mix (debt and equity) are relative to its asset base at 13.2%. The capital structure-performance nexus of 46.2% for ROE indicates that a robust nexus, debt, and equity significantly affect ROE for shareholders.

Table 2: Descriptive statistics

	REE	DPR	NPM	ROA	ROE	TOBIN _S_Q	STDR	LTDR	ECR	FMS	FAM
Mean	14.150	0.7434	0.5588	0.1322	0.4620	7.2408	0.5510	0.1573	0.4905	16.224	56.085
Median	14.127	0.7267	0.5669	0.1144	0.1722	7.4564	0.4617	0.1088	0.4405	16.200	56.000
Std. Dev.	1.9737	0.3142	0.1958	0.0779	2.2256	1.4739	0.5083	0.1475	0.3372	1.3277	22.403
Skewness	0.0676	2.3521	-0.144	0.8774	12.167	-0.366	4.0517	1.3383	5.2522	-0.458	-0.118
Kurtosis	2.5860	17.892	2.0645	3.6287	155.85	2.3388	25.284	4.2658	39.419	3.2125	2.0810
N	175	175	175	175	175	175	175	175	175	175	175

Source: Authors' computation (2023)

3.2 Unit Root Test

The unit root test was conducted using the summary method of Levin, Lin, and Chut Breitun t-stat; Im, Pesaran, and Shin W-stat; ADF-Fisher Chi-Sq; and PP-Fisher Chi-Sq to determine the dataset stationarity for a meaningful analysis.

Table 3: Summary of panel unit root test results

Variables	Levin, Lin & Chut	Breitunt-stat	Im, Pesaran & Shin W-stat	ADF-Fisher Chi-Sq	PP-Fisher Chi-Sq	Status
ECR	34.0423*** (0.0000)	-7.91893*** (0.0000)	-7.66577*** (0.0000)	110.137*** (0.0000)	250.402*** (0.0000)	1(0)
LTDR	-4.00291*** (0.0000)	-6.80445*** (0.0000)	-5.3681*** (0.0000)	80.5630*** (0.0027)	229.044*** (0.0002)	1(0)
ROA	-4.78906*** (0.0000)	-0.70201*** (0.2413)	-6.51502*** (0.0000)	97.6679*** (0.0000)	209.216*** (0.0000)	1(0)
DPR	-5.50497*** (0.0000)	0.77728 (0.7815)	-7.42021** (0.0000)	112.351* (0.0000)	234.444*** (0.0000)	1(0)
STDR	-14.8383*** (0.0000)	-6.76110*** (0.0000)	-10.9254** (0.0000)	138.305** (0.0000)	260.685*** (0.0000)	1(0)
logTOBIN_S_Q	-5.35865*** (0.0000)	-5.68768* (0.0000)	-7.23945*** (0.0000)	105.291*** (0.0000)	244.655*** (0.0000)	1(0)
ROE	-2.29973 (0.0107)	2.21615* (0.9867)	-3.37353*** (0.0004)	68.2886** (0.0001)	175.752*** (0.0000)	1(1)
NPM	-6.01908*** (0.0000)	-1.76351* (0.0389)	-4.46514*** (0.0000)	72.6531*** (0.0000)	215.854*** (0.0000)	1(0)
REE	-6.41906*** (0.0000)	-1.71783*** (0.0429)	-6.41906*** (0.0000)	96.7111* (0.0000)	186.441*** (0.0000)	1(0)
FMS	-3.34181*** (0.0004)	-4.24323*** (0.0000`)	-3.97365*** (0.000)	43.7559*** (0.0002)	89.0047 (0.000)	I(1)
logFAM	-5.80966*** (0.0000)	-4.05762*** (0.000)	-3.19852*** (0.0007)	36.5977 (0.0024)	79.4481*** (0.0000)	I (1)

Source: Authors' computation (2023)
***, **, * mean significant at 1%, 5%, and 10% respectively.

The unit root results show that the series is stationary at I (0) and I (1) following diverse test techniques. Thus, it satisfies the condition for the adoption of the PGM/ARDL model.

Table 4: Pesaran's residual cross-sectional dependence test results

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	1870.797	780	0.0000
Pesaran scaled LM	27.61733		0.0000
Pesaran CD	6.885804		0.0000

Source: Authors (2023)

From these results, the null hypothesis of no cross-sectional dependence was rejected. This implies that the sample firms in the oil and gas sector are cross-sectionally dependent on one another, and any shock in any firm can easily be transmitted to other firms within the sector. The Breusch-Pagan LM test statistic value of 1870.797 is well into the upper tail of a χ^2 780. The asymptotically standard normal Pesaran CD test statistic value of 6.885804 is significantly lower than that of the scaled

LM tests, the Pesaran CD test further confirming the rejection of the null hypothesis at the conventional significance level.

Table 5: PGM/ARDL estimate

Dependent variable	**REE**	**ROA**	**ROE**	**Tobins' Q**
Variable	Coefficient	Coefficient	Coefficient	Coefficient
Long-run equation				
LTDR	-7.439 (0.0000)	0.5936 (0.0000)	-0.4483 (0.0077)	-8.021 (0.0000)
STDR	0.3136 (0.4302)	0.0060 (0.6998)	0.2046 (0.0012)	11.065 (0.0000)
ECR	0.3069 (0.5389)	-0.063 (0.0024)	-0.026 (0.8289)	0.314 (0.0000)
LOGFMS	0.646 (0.000)	0.0021 (0.1037)	-0.0101 (0.6569)	0.673 (0.0000)
FAM	0.025 (0.0019)	0.00230 (0.0000)	0.0164 (0.0000)	-0.072 (0.0000)
Short-run equation				
COINTEQ01	-0.406 (0.0004)	-0.512 (0.000)	-0.6367 (0.0000)	-0.123 (0.000)
C	1.092 (0.1142)	-0.045 (0.4807)	0.209 (0.4668)	-0.775 (0.0007)
Firm-specific short-run equation (COINTEQ01)				
Ardova Plc	-0.9116 (0.000)	-0.52224 (0.000)	-0.329438 (0.0000)	-0.2835 (0.000)
Capital Oil Plc	-0.2171 (0.0001)	-0.28262 (0.0013)	-0.6693 (0.000)	-0.23647 (0.000)
Conoil Plc	-0.8106 (0.000)	-0.41192 (0.000)	-0.46929 (0.0057)	-0.5506 (0.0000)
Eterna Plc	-0.41526 (0.0003)	-0.56094 (0.000)	-0.74919 (0.000)	-0.28825 (0.000)
MRS Oil Nigeria Plc	-0.01787 (0.003)	-0.20280 (0.000)	-0.72119 (0.000)	-0.6944 (0.000)
Oando Plc	-0.3370 (0.000)	-0.17733 (0.000)	-0.14486 (0.0000)	-0.25833 (0.000)
Rak Unity Petroleum Company Plc	-0.20730 (0.0000)	-0.12981 (0.000)	-0.81055 (0.0000)	-0.97250 (0.000)
Total Energies Marketing Nigeria Plc	-0.333040 (0.0000)	-0.40652 (0.000)	-0.704529 (0.0000)	-0.20480 (0.000)

Source: Authors' computation (2023)

3.3 Discussion of Results

In line with the objectives of investigating the capital structure, retained earnings, market value, and financial performance nexus, Table 5 presents the PGM and ARDL results for the models.

Retained Earnings (REE): The results from Table 5 reveal that STDR had a significant positive effect on REE. This implies that an increase in short-term debt levels is associated with higher retained earnings for oil and gas firms in Nigeria. This result suggests that utilising short-term

debt financing contributes positively to the firm's profitability and ability to generate internal funds for future investments or operations. However, ECR, FMS, and FAM collectively had a positive but non-significant effect on REE. This indicates that while firm age and size may contribute positively to retained earnings, their impact is not statistically significant. The negative and significant impact of LTDR on REE indicates that higher levels of long-term debt are associated with lower retained earnings. This finding underscores the importance of managing long-term debt levels effectively to maintain healthy levels of retained earnings and financial stability. In the long run, a 1% increase in the capital structure mix leads to a 91.3% and 30.6% increase in REE, while a 1% increase in LTDR decreases REE by 7.4% at the 5% significance level. These findings underscore the need for oil and gas firms to carefully manage their capital structure mix to optimise retained earnings. Balancing the use of short-term and long-term debt, along with equity financing, is crucial for financial sustainability. The negative impact of LTDR on REE indicates the need to implement effective risk management strategies to mitigate the adverse effects of high long-term debt levels.

ROA: LTDR, STDR, FMS, and FAM have a positive influence on ROA, this result indicates that capital structure components contribute positively to the firm's asset utilisation and profitability. The utilisation of both long-term and short-term debts, along with effective management of fixed maturity securities and financial assets, improved return on assets. The negative and non-significant influence of ECR on ROA indicates that while equity financing is important for financial stability and risk management, its impact on ROA in this context is not statistically significant. In the long run, a 1% increase in the capital structure mix leads to a 59.3% and 0.006% increase in ROA, while a 1% increase in ECR decreases ROA by 0.06% at the 5% significance level.

ROE: The positive influence of STDR, FMS, and FAM on ROE indicates that short-term debt, larger firm size, and longer firm age improve financial stability, operational efficiency, and market presence, leading to enhanced ROE. LTDR and ECR negatively influenced ROE due to fluctuations in global oil prices, impacting on revenue streams and exacerbating the financial instability. LTDR is associated with significant interest expenses which erode profitability, and decrease ROE. The burden of servicing debt can outweigh the benefits of the tax shield

provided by interest payments. The Nigeria's macroeconomic environment characterized by inflation, exchange rate volatility, and political instability, impact the financial performance of firms. In the long run, a 1% increase in STDR, FMS, and FAM leads to a 78.4%, 0.10%, and 0.01% increase in ROE, respectively, while a 1% increase in LTDR decreased ROE by 44% at a 5% significance level.

Tobin's Q: STDR, ECR, FMS, and FAM had positive and significant influences on Tobin's Q, while LTDR had negative and significant influences on Tobin's Q. In the long run, a 1% increase in capital STDR, ECR, FMS, and FAM leads to an 86.5%, 31.4%, 67.3%, and 0.07% increase in Tobin's Q, respectively, while a 1% increase in LTDR decreases Tobin's Q by 8.0% at a 5% significance level. The positive nexus between REE, ROA, ROE, Tobin's Q, and short-term debts supports the pecking order theory. The long-run results indicate that the 1987 financial market liberalisation policy discourages LTDR and embraces STDR. The results are also consistent with the trade-off theory, confirming that increasing debt can increase a firm's profitability while reducing its taxes.

Moreover, Campbell (2012) posits that a 1% change in retained earnings enhances the growth and financial performance of firms'. The results contradict the MM 1958 irrelevant proposition and support the MM 1963 relevant proposition under imperfect market conditions that acknowledges the significance of tax advantage on firm market value and performance. The LTDR results across the four models reveal diverse nexuses. Generally, the nexus between REE, ROE, and Tobin's Q was negative and statistically significant. In the long run, a 1% increase in the capital structure mix leads to a 7.43%, 44.8%, and 8.02% decrease in REE and ROE Tobin's Q, respectively. The negative nexus shows insufficient utilisation of ploughed back profits in a profitable investment that would facilitate growth. The implication is that retaining a greater proportion of firms' earnings without available investment opportunities stunts the growth of the firms and reduces the confidence of both existing and potential investors.

Similarly, a positive and significant relationship is observed between ROA and LTDR (59.3%). Long-term debt places multiyear fixed financial obligations on firms. This result is consistent with MM 1963, a capital structure-relevant proposition in the oil and gas sector. The trade-off theory endorses the adoption of debt funding by firms with diverse asset collections to avoid illiquidity, which has a dire impact on daily

operations. The excessive debt composition in the capital structure increases the risk of financial distress, insolvency, and bankruptcy. Generally, the capital structure-market value nexus is statistically significant. The results support the MM 1963 relevant proposition, while a 1% increase in LTDR decreases market value by 8.02%, supporting the MM 1958 irrelevant proposition. Generally, firm size and age had positive impacts on REE, ROA, ROE, and Tobin's Q across the study models. The results reveal that information asymmetry issues are easily resolved in larger firms than in smaller firms with lenders, thus lowering their debt ratios.

Conclusion

The determination of the best-fit capital structure mix remains an energetic subject of debate because of the global dynamic structure of the oil and gas sector. This study examines the capital structure-retained earnings nexus in Nigeria and, by extension, its impact on market value and financial performance. The distinctiveness of this study's contribution is in its assessment of the significance of retained earnings within Nigeria's oil and gas industry, a dimension largely ignored in previous Nigerian studies. This study covers a span of 21 years (2001-2022). The PGM/ARDL technique was used to estimate both the long-term and short-run capital structures, retained earnings, market value, and performance nexus of firms in the oil and gas industry. The results reveal that short-term debt positively and significantly influences the retained earnings, market value, and performance of firms in the oil and gas sector. This implies that oil and gas leveraging on short-term debt effectively fund their operations and investments that achieve positive returns in the short run, thus boosting earnings and market value. However, this also indicates a higher financial risk due to potential liquidity challenges if short-term debt obligations are not carefully managed. Long-term debt had a positive relationship with return on assets, and a negative nexus was observed between retained earnings, return on equity, and market value. This implies that investments financed through long-term debts generate returns that exceed the cost of borrowing, boosting earnings and market value. The negative nexus with retained earnings, ROE, and market value when linked to long-term debts implies that the long-term debt burden impacts a firm's ability to generate sufficient earnings and returns for equity shareholders, which reduces their market confidence and valuation.

Equity capital has a negative influence on ROA and equity, indicating that the equity capital of most oil and gas firms is not efficiently utilised to generate returns, thus indicating underperformance relative to the level of equity investment. The positive influence on retained earnings implies that a higher equity base strengthens internal funding capabilities, allowing firms to retain more earnings for growth and stability. With respect to theoretical implications, no single capital structure can explain capital structure decisions or their dynamics. The relevance and irrelevance of propositions explaining this variation remain ambiguous. This study reveals insights from capital structure theories portable to Nigeria because certain firm-specific factors are relevant in explaining capital structure, performance, and market value decisions. The results designate that capital structure significantly impacts financial performance metrics, such as ROA, ROE, retained earnings, and market value. Firms must optimise their debt-to-equity mix to maximise profitability and valuation metrics. This study underscores the importance of balancing short-term and long-term debts to maintain financial flexibility. These findings highlight the importance of prudent risk management. Oil and gas firms must assess the trade-offs between debt and equity financing in terms of risk and returns. This study recommends further research on the integration of environmental, social, and governance factors into capital structure decisions within the oil and gas industry.

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