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EFFECT OF CAPITAL STRUCTURE ON PROFITABILITY: EVIDENCE FROM OIL AND GAS FIRMS IN NIGERIA

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Abstract

The determination of the best-fit capital structure mix to enhance the profitability of firms, particularly in the oil and gas industry, is one of the most mystifying concerns faced by finance managers. Previous studies in Nigeria predominantly examined capital structure in the financial and manufacturing sectors, while focusing on the performance indicators of ROA and ROE. However, the significance of retained earnings in influencing firm, market-value and profitability has been omitted. The best-fit capital structure mix not only enhances firms' operational efficiency but also their competitive advantages. This study adds to the extant literature by analysing the effect of capital structure on the performance, market value, and profit generating efficiency of firms in the oil and gas sector. The PGM/ARDL approach was employed to test individual effects. The findings reveal a durable nexus between capital structure, retained earnings, market value, performance in the long run. The results show that firms in the oil and gas sector rely on short-term debt to finance their operational and business endeavours. A positive nexus between retained earnings and capital structure was observed. This finding implies that firms with higher earnings retention tend to experience faster growth prospects. An inverse nexus was observed between long-term debt, retained earnings, market value, and performance indicators. This study supports trade-off theory, pecking order theory, and relevant MM 1963 capital structure propositions.

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INTRODUCTION

The escalating and persistent industrial rivalry and competition on a global scale in the oil and gas sector can be traced to globalisation and liberalisation, which encourages firms to develop diverse strategies to retain a competitive advantage for profit maximisation and cost minimisation. The successful implementation of these business and operational strategies depends on the best-fit mix of capital structure (debt and equity) for the firm (Vătavu, 2015; Manukaji & Egungwu, 2018; Asen et al., 2021). The theoretical literature reveals that the capital structure mix of a firm rests on traits that control the various costs and benefits accompanying such financial decisions. Firms create and add value when they provide returns higher than their capital costs. Therefore, it is fundamental for firms to minimise capital costs and increase market value to achieve an optimal capital structure (Khadka, 2007).

The capital structure, profitability and market-value nexus, particularly in the oil and gas industries in emerging market economies, is a remarkable and discussable subject globally. There is a lack of significant theoretical and empirical focus on the dynamic nature of the sector. The oil and gas sector is one of the pivotal sectors in Nigeria, contributing about 85% of foreign earnings for economic and human capital growth. The monocultural export of the Nigerian economy and limited financial resources account for instability in the financial sector. Due to the high uncertainties and risk factors associated with the capital-intensive investments and the long-term funding structure required in the sector (Shubita & Alsawalhan, 2012; Asen et al., 2021).

The influence of the operational and business functionalities of the oil and gas sector in linking and providing the core input for the financial industry to stimulate growth and development cannot be overemphasised in the 21st century's competitive business climate. This study provides an empirical and theoretical framework to understand the best-fit mix of debt and equity to maximise profit, performance, minimise cost, and reduce bankruptcy.

Debt and equity influence firm value in different ways, Gill, Nahum, and Neil (2011) and Jaisinghani and Kanjilal (2017) argued that debt is less costly and has a stronger nexus with profitability than equity. On the contrary, Alarussi and Alhaderi (2018) and Jarallah, Saleh, and Salim (2014) argued that a higher proportion of debt in the capital structure mix negatively influences a firm's performance and diminishes its profit-generating efficiency.

Empirical findings reveal that debt paves the way for agency costs that arise between shareholders and managers: the debt holders and shareholders. Similarly, Ishaya et al. (2014) noted that equity capital increases firms' profit-generating efficiency and performance, and the firm's ownership structure is divided among shareholders. The shareholders guide and protect the control of their businesses. This argument, therefore, places the burden on financial managers to have a good financial understanding to analyse and make a prudent judgment on the best mix of equity and debt. A high degree of instability emanating from kinetic and non-kinetic economic, social, political, and environmental factors reveals that firms are inept at influencing the cost of these financing options (Shubita et al. 2012; Isola 2012).

The ripple effect of various financing option mixes reveals the prowess of each financing option in growing or collapsing the firm (Swain, 2013). According to Akeem et al. (2014), the argument on what constitutes the best capital structure mix can be divided into two frontiers: irrelevance and relevance. According to Modigliani and Miller (MM) (1958), the composition of the capital structure of a firm is irrelevant to its financial performance, profitability and market value under perfect market conditions. Regardless of the unrealistic assumptions, the argument is extremely significant, indicating the circumstances under which a firm's capital structure is considered irrelevant and relevant.

Similarly, the relevant frontier envisages that a firm's market value is dependent on its capital structure in an imperfect market condition that acknowledges tax advantages on the market value and performance of firms. The pecking order theory states that firms with huge turnover should influence their equity portion to be higher than their debts (Mwakanume, 2013). The trade-off theory recommends the use of debt by firms with diverse asset assortments to avoid illiquidity, which has a dire effect on daily operational activities. Agency cost theory posits that firms should focus their capital structure on reducing agency costs (Siddik et al. 2017).

Debt financing is a disciplinary tool to check negative investments and restrict the opportunistic behaviour of managers using the firm's financial resources for personal gain. Hence, firms maximise their values by maximising the use of debt. Extreme debt exposes a firm to the risk of financial distress, insolvency, and bankruptcy. There is a dire need for financial managers to develop firm-specific optimal structures to maximise their firms' market value. Debt and equity constitute a fulcrum in a firm's financing decisions.

The debt-equity mix can be defined under following three options: % equity: 0% debt (unleveraged firm), 0% equity:100% debt (highly leveraged firm), and X% equity: Y% debt (capital mix). To minimise costs, the capital structure must be determined and used resourcefully. Empirically, studies on the capital structure-firm market value and profitability nexus are vastly explored and documented in developed economies with relatively stable institutional environments. Comprehensive investigations on the capital structure-performance nexus, particularly profit-related within the framework of the oil and gas sector in Nigeria, are scarce and can be traced to the pervasiveness of socio-economic and political instabilities (Bhaduri, 2002) and market inadequacies, among others (Agarwal et al., 2004; Abor, 2008; 2005).

This knowledge gap poses a significant challenge, as it hinders the determination of factors influencing profit, particularly market-value and profit generating efficiency of the firm "retained earnings", and the extent to which oil and gas firms in Nigeria utilise their retained earnings for growth-cost reduction. Retainer earnings are one of the cheapest sources of funding for a firm's continuous financing, it's the residual net income of a company's profits after paying dividends to shareholders, typically deployed to finance working capital, fixed asset purchases (capital expenditure), debt servicing (Chasan, 2012), or future business expansion (Yemi & Serikr, 2018).

According to Droms (1990), investors profit more from ploughed earnings than dividends in the long run. Harkavy (1953) supported Droms's (1990) claims by affirming that plough-back profits lead to appreciation in the value of a firm's corporate securities. The level of internally generated funds conveys evidence of a firm's growth prospects. However, conflicts of interest often arise when determining the fraction of the profit to be retained and paid as dividends. Shareholders desire a higher pay-out ratio because plough-back profit raises uncertainty about ownership level and control over decisions (Siddik et al. 2017).

In recent times, the ripple effect of the covid-19 pandemic and the Russia-Ukraine conflict affecting the oil and gas sector has paved the way for investors and scholars to question the effectiveness of the decisions to plough back residual profits into the business and to what extent it determines the growth of firms in the industry. The status quo gearing this controversy is the strict earnings retention policy of most firms in the industry without a conceivable investment idea to manage or checkmate unexpected internal or external crises that may instigate volatility in the sector.

The lack of sustainable and consistent growth in present dividends and the prospect of future capital gains accruing to shareholders resulting from ploughback profits have significantly dampened investment in the oil and gas sector in Nigeria. Studies on capital structure, performance, market value, and profitability have shown conflicting and contradictory results and be traced to the distinctiveness of their capital structure composition and the financing choices.

Omollo et al. (2018) in Kenya and Okeke et al. (2018) in Nigeria, observed that the performance and retained earnings nexus is positive and significant. The pecking order theory contributes to the results of this study as it acknowledges managers' desire to raise funds internally to finance their operations (Donaldson, 1961). Gordon's (1959) model theory posits that investors would desire present dividends and the firm's dividend policy and its market value nexus is direct. Similarly, Thuranira (2014) reported negative and non-significant retained earnings and firm performance causality.

This study is unique as it conducts a thorough analysis of capital structure, profitability, and market value. From the review of extant studies and to the best of our knowledge, this is one of the very few studies capturing the three constructs, particularly in the oil and gas sector in Nigeria from 2001 to 2022. This study provides valuable insights into the effectiveness of retained earnings utilisation for financial stability and risk management in the oil and gas sectors. This study also adds to the literature by adopting the PMG-ARDL model proposed by Pesaran et al. (1999), which most previous studies have ignored and predominately used the panel classical regression model. The PMG-ARDL model was adopted for its compatibility with the dataset of the study. The model assumes long-run coefficients to be identical while allowing for short-run coefficients and error variances to diverge across groups. It allows the dataset to determine each firm's short-run dynamics given the number of time-series observations available in each case.

2. Literature Review

Capital Structure Mix

The capital structure comprises all financial options debt-equity available for a firm to finance its business activities. Capital structure composition includes all varieties of debt, equity, and convertible bonds. Debt is disintegrated into long short-term periods to scrutinise the individual effect. Firms deeply financed by debt offer creditors less protection in the event of bankruptcy. Short-term financing instruments collectively infer a firm's current liabilities.

Mirza et al. (2013), Fosu (2013), Thamila et al. (2013), and Adesina et al. (2015) revealed that short-term debt indicates a firm's performance efficiency. Long-term financing instruments include preferred shares, term loans, and bonds of various types, collectively 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 et al. (2013) argued that a firm's financing structure should be chosen with an interest directed toward maximising shareholder equity.

Firms Efficiency (Retained Earnings)

A firm's profit-generating efficiency is measured by its retained earnings and retained earnings reduces a firm dependence on external sources of funds to finance its operational and business activities (Masood, 2017). The higher the earnings retention of a firm, the faster its growth chances (Campbell 2012). Retained earnings are a cheaper source of funds than external equity, as they do not cause ownership dilution but have positive implications, indicating that the company has potential investment opportunities. Firms may have a high mix of debt and equity because of their profit-generating deficiencies. However, the demerit of retained earnings is that they are a limited source of financing with a high opportunity cost since they are foregone dividends by equity holders (Chasan 2012).

Theoretical Arguments

The 1958 Modigliani and Miller (MM) hypothesis holds that a firm's choice of capital structure is irreverent to its market value, performance, or efficiency in generating profits in a perfect market of homogeneous expectations, no taxes, and no transaction costs. The theory has been heavily criticised for its unrealistic assumption of a perfect market. Myers and Majluf (1984); Myers (1984); and Jensen and Mechling (1976) argued that if capital structure decisions are irrelevant in a perfect market, then market imperfections may be evidence for their relevance. The MM 1958 theory was subsequently corrected for its capital structure irrelevance proposition for taxes.

The MM theory of 1963 recognises the relevance and benefit of tax advantages to a firm's capital structure, market value, performance, and profit-generating efficiency. Tax law allows firms to deduct interest payments at an expense; however, dividend payments to stockholders are not deductible. This differential treatment inspires firms to employ debt in their capital structures.

According to 1963 theory, all things being equal, if all their other assumptions hold, this differential treatment will lead to an optimal capital structure of 100% debt. Walter (1956) supported the effect of dividend policies and capital structure relevance propositions on firm value. Similarly, Gordon's model theory suggests that investors would prefer current dividends and that there is a direct relationship between a firm's dividend policy and its market value. Ross (1977) argued further that a firm with the expectation of higher profits will expect to take on more debt. Therefore, the news of taking more debt will signal to investors that the firm's value and profit-generating efficiency are higher, regardless of the intention to take such debt, where the cost of debt will be determined by market competition.

An increase in the debt-to-equity ratio increases the market value of the firm by increasing the present value of the interest tax shield. This implies that the cost of capital will not increase, even if the use of leverage increases to excessive levels. The literature on agency costs also indicates that debt financing is a way of forcing managers to focus on the overall objectives of the firm instead of their interests. Pecking order theory argues that firms have a preference for internal funds before sourcing external funds, and retained earnings are preferred to short-term debt and long-term debt in the presence of information asymmetry. The objective of minimising the additional costs of raising capital when sourcing for 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) to remind and retain their competitive advantage.

3. METHODLOGY

3.1 Data

The population of this study consists of all ten (10) listed oil and gas firms on the Nigerian Stock Exchange (NSE) from January 2001 to December 2022. Some criteria were adopted in selecting subject firms to guard against data omission and 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. Eight (8) publicly traded firms with up-to-date, audited financial accounts as of 31 December 2022 were selected in this selection process, from which data were collated for analysis. The sample firms constitute 95% of the oil and gas companies quoted on the Nigerian Stock Exchange (NSE). A purposive sampling technique was used.

Table 1: Selected Firms in Oil and Gas Sectors as of 31st December 2022

Company	Date Listed	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	February 24, 1992	August 25, 1969
Rak Unity Petroleum Company Plc		December 20, 1982
Total Energies Marketing Nigeria Plc	-	January 6, 1956

Source: Compiled by the Authors (2023)

3.2 Technique of Analysis

This study adopts and modifies the linear model specification of Akparhuere et al. (2015) to study the effect of capital structure on retained earnings in Nigeria's oil and gas sector in Nigeria from 2002-2011. The model is expressed as: $RET_{it} = \beta_0 + SCB_{1it} + DB_{2it} + \varepsilon_{it}$ .....(Eq1)

where RET = Retained Earnings; SCB = Rate of change in Share Capital; DB = Rate of change in debt level.

General Model Specification

The models in this study rely heavily on the modified model; the factors affecting and explaining the capital structure, performance, market value, and profitability nexus in the oil and gas sector include firm size and age. The model is re-expressed as

$REE_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \varepsilon_{it}$ (Eq2)

$ROA_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \varepsilon_{it}$ (Eq3)

$ROE_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \varepsilon_{it}$ (Eq4)

$Tobin's Q_{it} = \beta_0 + \beta_1 LTDR_{it}, + \beta_2 STDR_t, + \beta_3 ECR_{it} + \beta_4 FMSit + \beta_5 AST_{it} + \beta_6 AFM_{it} + \varepsilon_{it}$ (Eq5)

The above models were used to test the effect of

1. Capital structure-retained earnings nexus in Nigerian listed firms in the oil and gas sector
2. Capital structure-performance nexus in listed firms in the oil and gas sector in Nigeria
3. Capital structure-market value nexus in listed firms in the oil and gas sector in Nigeria

Where: REE_{it} = Retained Earnings (profit generating efficiency indicator)

ROA_{it} = Return on Asset and ROE_{it} = Return on Equity (performance indicator)

Tobin's Q_{it} = Tobin's Q (market value)

STDR =Short-term debt; LTDR =Long-term debt and ECR=Equity capital (capital stricture ratios)

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 $\mathcal{E}_{it}$ = the error term for the country I at time t;

3.3 Cross-Sectional Dependence (CSD) and Slope Homogeneity Tests

Firms in the oil and gas sector are interconnected through several economic and financial policies and social networks. Neglecting the CSD test may yield misleading and biased estimates. The CSD test equation is expressed as:

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

Where P_{ij} = the pairwise correlation. N= the sample, T = time

Subsequently, the slope homogeneity test of (46) was applied to unveil the slope heterogeneity between the cross-sections. The null and alternative hypotheses of the slope homogeneity analyses are as follows:

Null hypothesis

$\mathbf{H_0}$: $\beta_i = \beta$ for all i (no cross-section dependence): $\mathbf{H_1}$: $\beta i \neq \beta j$ for $i \neq j$ (cross-section's dependence)

3.4 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. The pooled mean group estimator assumes long-run coefficients to be identical but allows short-run coefficients and error variances to differ across groups. It has the practical advantage of allowing data to be determined for each sector's short-run dynamics, considering the number of time-series observations available in each case. The panel ARDL model specifies that the variables can be of different levels of integration, such as I(0), I(1), or both, as long as they are not of higher-order I (2).

ARDL (p, q, q . . . . . . q) model is expressed in simple form;

$$y_{it} = \sum_{j=1}^{p} \gamma_{ij,t-j} + \sum_{j=0}^{p} \beta_{ij} X_{i,t-j} + \mu_i + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(Eq6)}$$

where t = period (t = 1,2,3 . . .T), and i = firms (i = 1,2,3. . . . N); X_{it} ($k \times 1$) = 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} are $k \times 1$ coefficient vectors; and ε_{it} = error term.

The error correction model for the re-parameterised ARDL (p, q, q . . . q) is specified as

$$\Delta y_{it} = \theta_i[y_{it-1} - \lambda_i X_{it}] + \sum_{j=1}^{p-1} \gamma_{ij}\Delta y_{it-j} + \sum_{j=0}^{q-1} \beta_{ij}\Delta y_{it-j} + \mu_i + \varepsilon_{it} \quad \text{(Eq7)}$$

where y=REE, ROE, ROA, and Tobins' Q; X = set of explanatory variables; θ_i = coefficient of the speed of adjustment to the long run; λ_i = the vector of long-run nexus; $[y_{it-1} - \lambda_i X_{it}]$ = error correction term; γ_{ij} and β_{ij} = short-run dynamic coefficients.

4. EMPIRICAL FINDINGS AND DISCUSSIONS

4.1 Descriptive Statistics

Table 2 presents summary statistics of the study variables. The mean and median values of the variables are not far apart, indicating no extreme projection, and the series is stable for standard analysis. Positive mean values indicate a positive increasing propensity effect of 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. Kurtosis shows 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 operations and business activities. The results show a 55% reliance on short-term loans and 49% equity capital to shore up this credit facility.

Challenges, such as strict issuance conditions and higher interest rates, are associated with accessing long-term credit facilities. Mirza et al. (2013), Fosu (2013), Thamila et al. (2013), and Abor (2008) revealed 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 to the short term. Lucey et al. (2011) assert that the high proportion of short-term debt over long-term debt in emerging market firms can be attributed to the weak financial and legal institutions in developing countries like Nigeria, forcing creditors to use short-term debt to monitor and discipline borrower behaviour. The retained earnings of 14.15% show that shareholders prefer higher dividend payouts than higher retained earnings due to uncertainty about ownership level and control over decisions. The performance indicators of ROA and ROE show a 13.2% and 46.2% capital structure-performance nexus, respectively, and a 7.2% average impact on market value.

Table 2: Descriptive Statistics

	REE	DPR	NPM	ROA	ROE	TOBIN_S_Q	STDR	LTDR	ECR	FMS	FAM
Mean	14.150	0.743	0.558	0.132	0.462	7.240	0.551	0.157	0.490	16.224	56.085
Median	14.127	0.726	0.566	0.114	0.172	7.456	0.461	0.108	0.440	16.200	56.000
Std. Dev.	1.973	0.314	0.195	0.077	2.225	1.473	0.508	0.147	0.337	1.327	22.403
Skewness	0.067	2.352	0.144	0.877	12.167	0.366	4.0517	1.338	5.252	0.458	0.118
Kurtosis	2.586	17.89	2.064	3.628	155.85	2.338	25.284	4.265	39.419	3.212	2.081
N	175	175	175	175	175	175	175	175	175	175	175

Source: Authors' Computation (2023)

4.2 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 stationarity of the dataset for a robust analysis.

Table 3: Summary of Panel Unit Root Test Results

Variables	**Levin, Lin &Chut**	**Breitun t-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. P-values are in parentheses. The results show that all explanatory and control variables are stationary at level.

The unit root results show that the series is stationary in levels I (0) and at the first difference I (1) following diverse test techniques, and there is a non-existence of second-order integrated variables. Thus, the condition for the adoption of the PGM/ARDL model is satisfied.

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

Sources: Authors (2023)

From the 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 each other, and any shock to 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 2 780. The asymptotically standard normal Pesaran CD test statistic value of 6.885804 is significantly below that of the scaled LM tests; the Pesaran CD test further confirms the rejection of the null hypothesis at a conventional significance level.

Table 5. PGM/ARDL Estimate

Dependent variable	**REE**	**ROA**	**ROE**	**Tobins'Q**
Variable	Coefficient	Coefficient	Coefficient	Coefficient
Long Run Equation				
LTDR	-7.439226 (0.0000)	0.593671 (0.0000)	-0.448318 (0.0077)	-8.021228 (0.0000)
STDR	0.313670 (0.4302)	0.006098 (0.6998)	0.204658 (0.0012)	11.06544 (0.0000)
ECR	0.306971 (0.5389)	-0.063071 (0.0024)	-0.026543 (0.8289)	0.314854 (0.0000)
LOGFMS	0.646310 (0.000)	0.002191 (0.1037)	-0.010163 (0.6569)	0.673545 (0.0000)
FAM	0.025206 (0.0019)	0.002305 (0.0000)	0.016432 (0.0000)	-0.072004 (0.0000)
Short Run Equation				
COINTEQ01	-0.406179 (0.0004)	-0.512637 (0.000)	-0.636777 (0.0000)	-0.12359 (0.000)
C	1.092587 (0.1142)	-0.045942 (0.4807)	0.209304 (0.4668)	-0.77525 (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)

4.3 Discussion of Results

The results presented in Table 5 are in line with the broad and specific objectives of this study.

REE: The results revealed that STDR had a significant positive effect on REE, while ECR, FMS, and FAM collectively had a positive but non-significant effect on REE. Similarly, LTDR has a negative and significant impact on the REE of oil and gas firms in Nigeria. 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.

ROA: LTDR, STDR, FMS, and FAM have a positive influence on ROA, while ECR has a negative and non-significant influence on ROA. 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: STDR, FMS, and FAM positively influenced ROE, whereas LTDR and ECR negatively influenced ROE. In the long run, a 1% increase in STDR, FMS, and FAM leads to 78.4%, 0.10%, and 0.01% increases in ROE, respectively, while a 1% increase in LTDR decreases ROE by 44% at a 5% significance level.

Tobin's Q: STDR, ECR, FMS, and FAM had a positive and significant influence on Tobin's Q, while LTDR had a negative and significant influence 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 debt is consistent with pecking order theory, which states that firms with high profit-generating efficiency have a low debt level; the results are also consistent with those of Oyakhire (2019), Garaba et al. (2017), and Dahiru et al. (2016). The long-run results indicate that the 1987 financial market liberalisation policy decreased the use of LTDR and shifted debt maturity to STDR.

The results are also consistent with trade-off theory, confirming that debt increases can increase a firm's profitability while reducing its taxes (Hull et al., 2014; Margaritis et al., 2010). The results contradict the MM 1958 irrelevant proposition and support the MM 1963 relevant proposition under imperfect market conditions, which acknowledges the significance of tax advantage on debt, firm-market value, and performance. The LTDR results across the four models revealed diverse nexuses. The nexus between REE, ROE, and Tobin's Q is negative and statistically significant. In the long run, a 1% increase in the capital structure mix leads to 7.43%, 44.8%, and 8.02% decreases in REE and ROE Tobin's Q, respectively. The negative nexus shows insufficient utilisation of plough-back profits into a profitable investment that would facilitate growth.

The implication is that retaining a greater proportion of firms' earnings without an available investment opportunity stunts the growth of the firm and reduces the confidence of both existing and potential investors, as it shows management's inefficiency in maximising the benefits of retained earnings. The findings of Nassara (2016) for Turkey, Salim and Yadav (2012), and Seyed and Pejman (2013) for the Tehran Stock Exchange corroborate our results. Similarly, a positive and significant nexus is observed between ROA and LTDR, at 59.3%. Long-term debt places multi-year, fixed financial obligations on firms.

This result is consistent with the MM 1963 capital structure relevant proposition in the oil and gas sector. The trade-off theory recommends the use of debt financing by firms with diverse asset collections to avoid illiquidity, which has a dire impact on daily operations. The excessive use of debt in the capital structure exposes the firm to the risk of financial distress and bankruptcy.

Generally, the capital structure-market value (Tobin's Q) nexus is positive and statistically significant. The results support the MM 1963 relevant proposition, while a 1% increase in LTDR decreases the market value by 8.02%, supporting the MM 1958 irrelevant proposition. The capital structure should be chosen with an interest directed toward maximising shareholder equity (Swain et al., 2013). The general findings of this study corroborate those of Pinto et al. (2017), Ullah et al. (2017), and Chung et al. (2018) in the Pakistani and Korean clothing and textile sectors, and Putri (2020) in 51 industrial consumer goods companies listed on the Indonesian Stock Exchange. The dataset was from 2013 to 2018.

Firm size and age had positive impacts on REE, ROA, ROE, and Tobin's Q across the study models. The results show that information asymmetry problems are more easily resolved in larger firms than in smaller firms with lenders, thus lowering debt ratios. The findings of Mackie-Manson (1990), Al-Sakran (2001), and Hovakimian et al. (2004) reveal that smaller firms are more likely to use equity finance, while larger firms are more likely to use debt. Similarly, the positive impact of firm age indicates that a firm is an ongoing business; hence, age is positively related to debt. Hall et al. (2004) argued that age is positively related to long-term debt but negatively related to short-term debt. In contrast, Esperanca et al. (2003) revealed a negative nexus between age, LTDR, and STDR. The short-run (COINTEQ01) is rightly signed across the models, with specific firms converging back to their long-run function whenever there is an imbalance caused by internal and external socioeconomic, political, and industry-specific factors.

5. CONCLUSION

The best-fit capital structure mix is still a spirited subject of debate in the 21st-century competitive business climate, particularly in the oil and gas industry, owing to the dynamic structure of the industry globally. This study assesses the capital structure-performance nexus in Nigeria and, by extension, its impact on market value and profit-related ratios. This study introduces retained earnings as a profit-related ratio, which previous studies neglected in Nigeria, to contribute to the debate on the significance of retained earnings on the growth and market value of firms in the oil and gas sector. Retained earnings are a cheaper source of funds than external debt, as they do not cause ownership dilution but have a positive implication, as the stakeholders perceive that the company has potential investment opportunities.

This study spans 2001–2022 and uses the PGM/ARDL technique for estimating the long-run nexus between capital structure, retained earnings, market value, and financial performance of firms in the oil and gas industry. The results reveal that short-term debt positively and significantly affects the profitability, market value, and ROE and ROA of firms in the oil and gas sector.

Long-term debt had a positive nexus with return on assets, and a negative nexus was observed between retained earnings, return on equity, and market value. ROE and ROA have a negative influence on equity capital and a positive influence on retained earnings. Based on these theoretical implications, no single capital structure can explain capital structure decisions and their dynamics. The relevance and irrelevance of propositions explaining this variation remain ambiguous. The results of this empirical study reveal that insights from modern capital structure theories are portable to Nigeria since certain firm-specific factors are relevant in explaining capital structure, performance, and market value decisions.

In developing countries, the capital structure composition of a firm varies from that obtained in developed countries due to the level of economic and financial market development in terms of per capita income, capital market development, the sophistication of financial intermediaries, and the corporate ability to raise external funds; the difference in the institution in terms of the legal and corporate regulatory framework, pricing regulations, and investor protection; the smaller firm sizes observed in developing countries; and the differential tax treatment of debt and equity (Demirguc-Kunt & Maksimovic, 1999).

COMPETING INTERESTS

The authors have no competing interests to declare.

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