

# The Effect of Capital Structure on the Performance of Marginal Oil Fields in Nigeria

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## **Abstract**

*Marginal fields are pivotal to wealth creation and indigenous participation in the oil and gas industry. Despite the potential role of marginal fields in economic growth, indigenous operators are confronted with financing fields development. This study examined the relationship between capital structure and performance of producing marginal oil fields in Nigeria. Ten fields operated by five companies were empirically investigated between 2011 and 2021. Firm's performance indicators are accounting-based measurement namely, Return on Asset (ROA) and Return on Equity (ROE). Capital structure measures are equity, long term debt and short-term debt. Panel Corrected standard errors regression technique was employed to analyse time series cross sectional data. Findings indicate that there was a significant positive relationship between equity and performance of Marginal fields in Nigeria. These corroborate Pecking order theory that firms use retained earnings first, then debts. Long term debt and short-term debt show negative relationship with marginal field operators' performance. This could be attributed to the high cost of borrowing in Nigeria and the unwillingness of local banks to grant loans without adequate collateral.*

*Keywords: Capital Structure; ROA; ROE; Marginal oil fields; Nigeria*

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## **1.0 Introduction**

Capital structure is the ratio of equity and debt a company uses to finance its operations. Research on capital structure attempted to verify the presence of an optimal mix of equity and debts that can enhance the firm's capability to create value. Modigliani and Miller (1958) are the first to demonstrate the irrelevance of capital structure in firm value. The assumption is valuable only in perfect market conditions, wherein all investors have free access to market information. However, real economies are imperfect, thus many financing decisions theories evolved to highlight the importance of capital mix and its role in firm performance. Modigliani and Miller

(1963) revised the conditions and explained that interest expenses are taxable, therefore firm value should increase with higher debt ratios. This paper tries to explore the effect of capital structure on the performance of producing marginal oil field companies in Nigeria.

Marginal Fields are strategically important to the Federal Government of Nigeria's march toward aggressive exploration and production increase, revenue generation, local content participation and opportunity for portfolio rationalization in the oil and gas industry. The Department of Petroleum Resources (DPR), now Nigerian Upstream Petroleum Regulatory Commission (NUPRC) in 2001, issued the first guidelines for Marginal fields bid round and awarded twenty-four licences to 31 indigenous oil and gas companies. By 2011, thirty Marginal fields licences were awarded. Table 1.0 shows the list of 19 Producing Marginal fields as defined in Petroleum Industry Act (2021). Eleven (11) licences were voided in 2020 due to poor performance. The Nigerian Upstream Petroleum Regulatory Commission (NUPRC) in June 29th, 2022, concluded the 2020 Marginal field bid round with the issuance of 57 Petroleum Prospecting Licenses (PPL) to 161 indigenous companies in accordance with the provisions of the Petroleum Industry Act 2021 (Nnodim, 2022).

Table 1.1: List of Producing Marginal fields in Nigeria, at January 1, 2021.

S/No	Field Name	Company Name	Block
1	Ogbele	Niger delta Petroluem Resources limited	OML 54
2	Omerelu	Niger delta Petroluem Resources limited	OML 53
3	Asaramatoru	Prime Exploration & Production (Operator)/Suffolk Petroleum Limited	OML 11
4	Okwok	Oriental Energy Resources Limited	OML 67
5	Ebok	Oriental Energy Resources Limited	OML 67
6	Stubb	Creek Universal Energy Limited	OMLs 13 / 14
7	Umusati/Igbuku	Pillar Oil Limited	OML 56
8	Egbaoma (Ex Asuokpu/Umutu )	Platform Petroleum Limited	OML 38
9	Amoji /Matsogo / Igbolo	Chorus Energy Limited	OML 56
10	Oza	Millenium Oil and Gas Limited	OML 11
11	Ajapa	Brittania U	OML 90
12	Qua Ibo	Network E&P Limited	OML 13
13	Ibigwe	Waltersmith Petroman Limited (Operator)/Morris Petroleum Limited	OML 16
14	Umusadege	Midwestern Oil and Gas Limited/Suntrust Oil Company Limited	OML 56
15	Uquo	Frontier Oil Limited	OML 13
16	Ebendo/Obodeti (Ex Obodugwa /Obodeti)	Energia Limited (Operator)/Oando Production and Development Limited	OML 56

17	Eremor	Excel Exploration & Producton Limited	OML 46
18	Otakikpo	Green Energy International Limited	OML 11
19	Ubima	All Grace Energy Limited	OML 17

Sources: Computed by author.

Computed data from Nigerian National Petroleum Company Limited (NNPC Ltd) Annual statistics bulletin (2021) shows that between 2011 and 2021, Marginal oil fields accounted for 2.6 % of Nigeria total crude oil production. This volume was far lower than Government projected target of 20% increase from Marginal fields. The poor performance of these fields were attributed to lack of finance, fiscal regime, insecurity, pipeline vandalism, lack of infrastructure, host communities, among other factors (Ogunsola and Olugbenga 2017; Oruwari, 2018; and Akinwale & Akinbami, 2016; Kulasingam, 2014). Finance is major challenge of Marginal field development and this research is intended to investigate the capital structure of field operators. The objectives of Marginal fields award in Nigeria according to DPR (2020) are:

- I. Increase oil and gas reserves base through aggressive exploration and development effort.
- II. Decreased production cost.
- III. Grow production capacity by expanding the scope of participation in Nigeria's Petroleum sector, through diversification of resources and inflow of investments.
- IV. Provide opportunity for portfolio rationalization.
- V. Promote indigenous participation.
- VI. Create employment.
- VII. Promote common usage of assets/ facilities to ensure optimum utilization of available capacities.

### **1.1 Aim and Objectives of Study**

This study aims to examine the relationship between capital structure and Performance of producing Marginal fields in Nigeria.

The specific objectives are:

1. To determine the effect of equity on Marginal fields Return on Asset
2. To determine the effect of Long-term debt on Marginal fields Return on Asset.
3. To determine the effect of short-term debt on Marginal fields Return on Asset.
4. To determine the effect of equity on Marginal fields Return on Equity.
5. To determine the effect of Long-term debt on Marginal fields Return on Equity.
6. To determine the effect of short-term debt on Marginal fields Return on Equity.

### **1.2 Research Hypotheses**

Based on the research objectives the following hypotheses were specified in null forms.

**H<sub>01</sub>:** There is no significant relationship between equity and Return on Assets of Marginal field operators in Nigeria.

**H<sub>02</sub>:** There is no significant relationship between Long term debts and Return on Assets of Marginal field operators in Nigeria.

**H<sub>03</sub>:** There is no significant relationship between short term debts and Return on Assets of Marginal field operators in Nigeria.

**H<sub>04</sub>:** There is no significant relationship between equity and Return on Equity of Marginal field operators in Nigeria.

**H<sub>05</sub>:** There is no significant relationship between Long term debts and Return on Equity of Marginal field operators in Nigeria.

**H<sub>06</sub>:** There is no significant relationship between short term debts and Return on Equity of Marginal field operators in Nigeria.

## **2.0 Literature Review**

### **2.1 Conceptual Framework**

The Department of Petroleum Resources (2020) defined Marginal fields as any field discovered and left unattended for a period of not less than ten (10) years, from the date of first discovery or such field as the President may, from time to time, identify as a Marginal field. It was also defined as field whose internal rate of return is lower than the industrial benchmark yield and higher than the industrial discount rate when the oil field is developed by conventional technology (Wang et al., 2012).

Pakistan Ministry of Petroleum and Natural Resources (2013) defines Marginal field as any field which is uneconomical for development (including re-development efforts like infield drilling) and production using current technologies based on the terms of current Petroleum concession Agreements applied to the size of the reserves. They went further to define a marginal field as an oil or gas reservoir that cannot be exploited economically under the existing E&P Policies, pricing structure and available technologies.

The Petroleum (Amendment) Act, 1996 of Nigeria state that 183 fields within the existing oil concessions have remained underdeveloped or abandoned due to a combination of economic and technical challenges. It was estimated that the total volume of oil reserve located within these fields, known as marginal fields, are 2.3 billion barrels of stock tank oil initially in place (STOIP).

### **2.2 Theoretical framework**

#### **2.2.1 Modigliani and Miller Theory**

The traditional theory of capital structure guide companies towards an ideal mix of debt and equity that minimizes the cost of capital and maximizes the company value. Modigliani and Miller (1958) capital structure irrelevance proposition was the first known theory on capital structure in modern times. They stated that in a perfect capital market, the capital structure does not affect a firm's value. The theory of capital structure irrelevance suggest that a firm's value depends on the ability of its assets to create value and is irrelevant if the assets originate in

internal capital or external capital. Modigliani & Miller (1963) further argued that, due to the tax deductibility of interest payments, companies may prefer debt to equity. Companies have an advantage in using debt to internal capital, due to tax shields. This tax shield allows firms to pay lower tax than required, when using debt capital. The theory argues that high debt, create more firm's value.

### 2.2.2 Trade off Theory

Myers (1984) postulated the Trade-off theory that supports capital structure relevance. The trade-off theory of capital structure refers to the idea that a company chooses how much debt finance and how much equity finance to use by balancing the costs and benefits. The classical version of the hypothesis dates to Kraus and Litzenberger (1973) who considered a balance between costs of bankruptcy and tax saving benefits of debt. An important part of the theory explained that entities are funded with both equity and debt. The theory state tax shield as an advantage of debt financing. The disadvantage was costs of financial distress such as bankruptcy costs of debt. The marginal benefit of further increases in debt reduces as debt increases, while the marginal cost increases. Therefore, to optimize the overall value of firm, there should be a trade-off in selecting debt and equity financing.

### 2.2.3 Pecking Order Theory

Myers and Majluf (1984) argued the existence of information asymmetry between managers and investors, managers have more inside information than investors. Owing to the information asymmetries between the firm and potential investors, the firm prefer retained earnings to debt, short-term debt over long-term debt and debt over equity. Arowoshegbe and Idialu (2013) suggested that the relationship between firm profitability and capital structure can be explained by the Pecking Order Theory which holds that firms prefer internal sources of finance to external sources. The order of the preference is from the one that is least sensitive and least risky to the most sensitive and riskier. Thus, firms with access to retained earnings rely more on them as opposed to depending on debt.

### 2.2.4 Agency theory

Jensen and Meckling (1976), it states that the governance of a company is based on conflicts of interest between the company's owners (shareholders), its managers and major providers of debt finance. They proposed two kinds of agency costs, that is, agency costs of equity and debt. The conflicts between managers and shareholders is agency costs of equity, while conflicts between shareholders and creditors is agency costs of debt. The owners may try to monitor and control the managers' behaviours. These monitoring and control actions results in agency costs of equity. When a lender provides money to a firm, managers may transfer value from creditors to shareholders. These monitoring and control actions results in agency cost of debt (Chen, et al., 2011).

## 2.3 Empirical framework

Etale, Edoumiekumo, Kpolode, and Nkak (2020) investigated the relationship between capital structure and firm's performance of quoted industrial goods listed on Nigeria stock exchange. Five secondary data from 2014 to 2019 was employed, using multiple regression model in testing their hypotheses. Result shows that capital structure has a statistically significant

relationship with performance. They recommended that long term financing should be considered first when deciding the capital structure component of an entity.

Arikekpar (2020) examined the impact of capital structure on firm performance of some selected manufacturing companies in Nigeria. Five manufacturing companies' annual financial statements listed on Nigerian exchange between 2014 and 2018 were used. The study used fixed effect regression model to test the significant impact of capital structure on firm's performance, Return on asset (ROA), Return on equity (ROE) and Earnings per share (EPS) were used as proxies for firm's performance, while equity ratio and debt ratio as indicators for capital structure. The findings reveal that capital structure has positive significant effect on financial performance of selected firms in Nigeria. The research recommends manufacturing companies to implement policies that will increase in profit after tax, dividends, and turnover. These can lead to significant and positive change in company's performance and market value.

Vishnu (2019) analyzed the influence of capital structure on the financial performance of small finance banks in India. The study covers a period of two years from 2017 to 2018 and 8 banks. To measure the capital structure, debt to total assets ratio and debt to equity ratios were used. Return on Capital employed (ROCE), net profit ratio and net interest margin were used as financial performance measures. The results show that capital structure has a significant impact on the financial performance of the banks in India.

Ngwoke and Sergius (2019) investigated the impact of capital structure on financial performance of listed food and beverage companies in Nigeria with secondary data ranging from 2007 to 2016. The ex post facto research design and multiple regression analysis was employed by using e-view statistical package. Results show that capital structure which was represented by current debt had a significant and positive effect on return on equity. However, long term debt has no significant statistical relationship with performance. Therefore, recommended that entities should consider equity first as a source of financing economic activities before any other sources.

Vătavu (2015) aims to establish the relationship between capital structure and financial performance in 196 Romanian companies listed on the Bucharest Stock Exchange and operating in the manufacturing sector, over a period of eight-years (2003-2010). Capital structure measures were long-term debt, short-term debt, total debt, and total equity. Performance indicators are return on assets and return on equity. Findings show that Romanian companies perform better when they avoid debt and operate more with equity. However, it seems most manufacturing companies do have insufficient internal finance to embark on profitable investments and assets are not effectively applied.

Akeem, Edwin, Kiyanjui and Kayode (2014) examines the effect of capital structure on firm's performance with a case study of manufacturing companies in Nigeria from 2003 to 2012. Regression technique was used to explore the impact of some key variables namely, returns on asset and Returns on equity. Total debt to total Asset and total debt to equity ratio for firm performance. Secondary data was from ten (10) manufacturing companies. Findings show that capital structure measures (total debt and debt to equity ratio) are negatively related to firm performance. They recommended that firms should use more equity than debt in financing their business activities. Hence firms should establish the point at which the



weighted average cost of capital is minimal as firm's capital structure is optimal at this point.

Arowoshegbe and Idialu (2013) examined the relationship of capital structure to profitability of quoted firms in Nigeria. The research was on a panel data from sixty non-financial companies between 1996 and 2010. Net Profit Margin (NPM) and Operating Profit Margin (OPM) were dependent variables and Debt Ratio (DR) as independent variable. The results indicated a significant negative relationship between capital structure and profitability.

Salim and Yadav (2012) investigates the relationship between capital structure and firm performance. 237 listed companies on Bursa Malaysia Stock exchange were studied from 1995 to 2011. The research applied four performance measures such as, return on equity, return on asset, Tobin's Q and earning per share, as dependent variables. Capital structure indicators are long term debt, short term debt, total debt ratios and growth. Size was a control variable. Findings shows that firm performance, which is measured by return on asset, Return on Equity and earning per share have negative relationship with short term debt, long term debt, total debt. However, there is a positive relationship between growth and performance for all sectors. Tobin's Q reports that there is significantly positive relationship between short term debt (STD) and long-term debt (LTD). It also shows that total debt (TD) has negative and significant relationship with firm's performance.

Simon-Oke and Babatunde (2011) examined the impact of capital structure on industrial performance in Nigeria. Panel data regression model was employed to evaluate Five (5) quoted firms from 1999 to 2007. The variables used were debt financing, equity financing, debt-equity ratio and Profitability index which measure firms' performance. The findings showed that equity financing and debt-equity ratio have a positive relationship with firms' performance. A negative relationship exists between debt financing and firms' performance. This is due to high cost of borrowing in the country. The study recommended efficient management of borrowed fund.

Zeitun and Tian (2007) investigated the effect which capital structure on corporate performance using a panel data sample representing of 167 Jordanian companies during 1989-2003. Their results showed that a firm's capital structure had a significantly negative impact on the firm's performance measures, in both the accounting and market's measures. They also found that the short-term debt to total assets level has a significantly positive effect on the market performance measure (Tobin's Q). The Gulf Crisis in the early 1990s was found to impact positively on Jordanian corporate performance. Whereas, the outbreak of Intifadah in Gaza West bank in September 2000 impacted negatively on corporate performance.

### 3.1 METHODOLOGY

#### 3.1 Sample and source of data

The study covered a period of 10 years, from 2011 to 2021. The population of the study were all 19 producing Marginal oil fields as 2021. Ten (10) Marginal oil fields operated by five (5) indigenous companies were sampled for analysis. The study used mainly secondary sources of data. The major source of data was annual financial Statement and reports of Marginal field companies.

#### 3.2 Dependent Variables

Almatari, et al. (2014), categorized measurements of performance into two: Accounting based measurement and marketing-based measurement. According to them, accounting based measurement is generally considered as an effective indicator of the company's profitability when compared to marketing-based measurement. Thus, two accounting-based measurement used in this study are Return on assets (ROA), which is net income to total assets; and Return on equity (ROE), which is the ratio of net income to shareholders' equity. This was in line with several studies (Paymaster and Kpolode, 2021; Arshad, 2020; Arikekpar, 2020; Dinh and Pham, 2020; Aniefor and Onatuyeh, 2019; Vishnu, 2019; Bello et al., 2016; Vätavu, 2015; Aremu, 2013; Salim and Yadav, 2012; Simon-Oke and Babatunde, 2011).

#### 3.3 Independent and Control variables

The capital structure indicators, which are the independent variables are shareholder equity, long term debt and short-term debt. Previous empirical studies (Simon-Oke and Babatunde, 2011; Ebaid, 2009; Jermias, 2008) show that firm size and taxation are some of the most influential factors for financing decisions in oil and gas industry. These factors were applied as control variables with debts and equity to establish the relationships with firm performance. Larger firm may have higher capabilities. Taxation and firm size (measured by the log of total assets of the firm) are included in the model as control variables.

#### 3.4 Method of Data Analysis

Econometric package was employed to analyze the Time Series Cross-Sectional data in this study. The first estimation procedure was the cross-sectional dependence test, followed by the descriptive statistic and correlation analysis. Panel-corrected standard errors (PSCE) regression technique was employed.

#### 3.5 Model Specification

An economic model is a representation of the basic features of an economic phenomenon and the specification of the model is based on available information relevant to the research. To determine the relationship between Marginal fields performance and its determinants, an empirical model used by previous authors (Demirguc-Kunt and Huizinga, 1999; Simon-Oke and Afolabi, 2011; Salim and Yadav, 2012; Zulfiqar and Din, 2015; Vätavu, 2015; Pacini et al., 2017; Aniefor, 2019; Vishnu, 2019; and Arshad, 2020) was adopted and modified to suit the objectives of the study. The functional form of the performance models specified as follows:

#### **Marginal Fields companies Return on Asset**

$$ROA_{it} = \eta_0 + \eta_1 \ln SZ_{it} + \eta_2 TAX_{it} + \phi \ln EQT_{it} + e_{it}$$

[1]



$$ROA_{it} = \alpha_0 + \alpha_1 \ln SZ_{it} + \alpha_2 TAX_{it} + \psi \ln LTD_{it} + v_{it}$$

[2]

$$ROA_{it} = \vartheta_0 + \vartheta_1 \ln SZ_{it} + \vartheta_2 TAX_{it} + \rho \ln STD_{it} + s_{it}$$

[3]

**Marginal Fields companies Return on Equity**

$$ROE_{it} = \eta_0 + \eta_1 \ln SZ_{it} + \eta_2 TAX_{it} + \phi \ln EQT_{it} + e_{it}$$

[4]

$$ROE_{it} = \alpha_0 + \alpha_1 \ln SZ_{it} + \alpha_2 TAX_{it} + \psi \ln LTD_{it} + v_{it}$$

[5]

$$ROE_{it} = \vartheta_0 + \vartheta_1 \ln SZ_{it} + \vartheta_2 TAX_{it} + \rho \ln STD_{it} + s_{it}$$

[6]

Where,

ROA<sub>it</sub> (performance) = Marginal oil field companies Return on Assets, over time, t

ROE<sub>it</sub> (performance) = Marginal oil field companies Return on Equity, over time, t

EQT<sub>it</sub> = Shareholders Equity

LTD<sub>it</sub> = Long term Debt

STD<sub>it</sub> = Short term Debt

TAX<sub>it</sub> = Taxation (Control Variable)

SZ<sub>it</sub> = Firm Size (Control Variable)

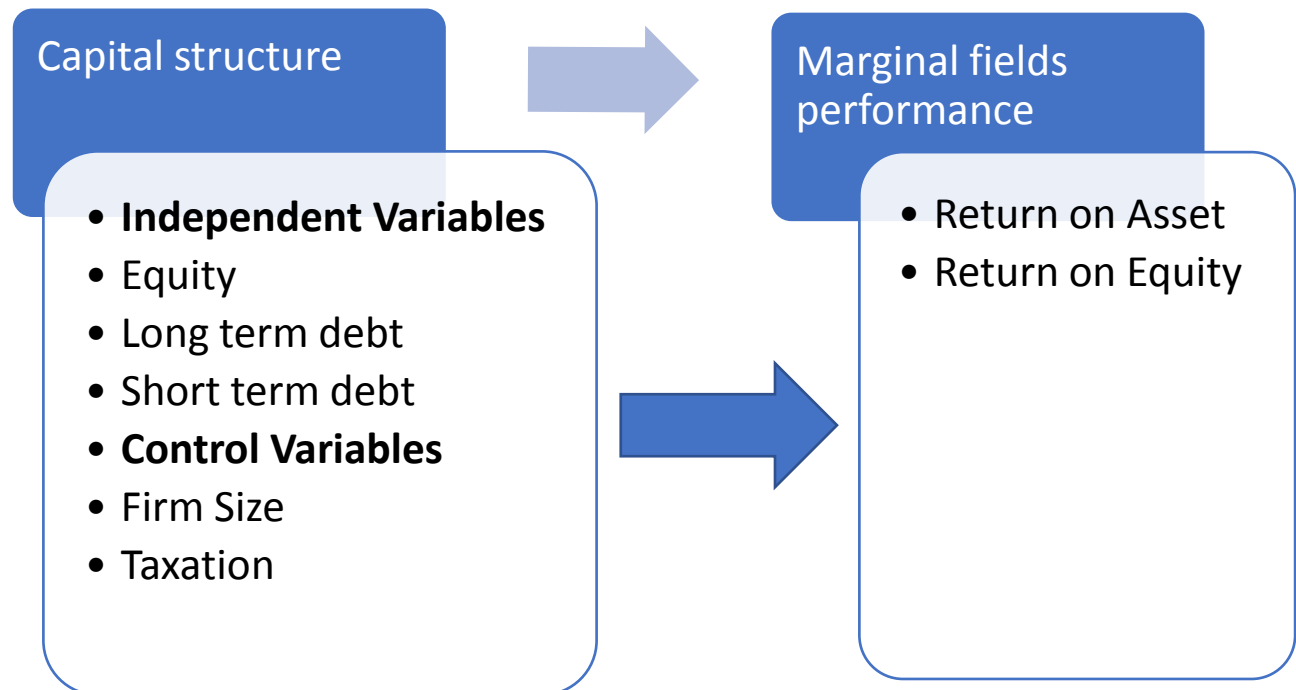


Figure 1.1: Research Model

## 4.0 Result and Discussion

### 4.1 Cross-sectional Dependence (CSD) test

Table 1.2 reveals that four of the seven variables exhibit cross-sectional dependence at the 1% significance level. Thus, we proceed with the tests and estimation techniques that take account of cross-sectional dependence. This justifies using the PSCE techniques as they control the problem of cross-sectional dependence.

Table 1.2 Cross-Sectional Dependence (CSD) Results

Variable	CD-test
ROA	0.08
ROE	0.862
lnEQUITY	3.285***
lnLTD	2.853***
lnSTD	2.650***
lnSIZE	4.295***
TAX	0.145

Note: \*\*\* significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

Source: Researcher's Computations

### 4.2 Descriptive Statistics

The summary of the descriptive statistics presented in Table 1.3. show the sample mean for ROA and ROE is -0.05 and -7.69, respectively. Their respective standard deviations of 19.09 and 61.31 indicate that the companies are greatly dispersed from the sample average. We also observe that ROA, ROE, and PLR have negative skewness relative to other variables. The sample mean for Equity, long term and short-term debts shows 154,929 (38%), 128,575 (31.6%) and 123,971 (30.4%) respectively. EQT mean is higher compared to LTD and STD and this conforms to Pecking Order Theory which suggests the preference for retained earnings before debt financing.

Statistics	ROA	ROE	EQT	LTD	STD	SZ	TAX
Mean	-0.04896	-7.69717	154929.4	128574.8	123971.2	407526.8	127.75
Median	1.9	3.156723	86295.06	48247	41197.27	236546.4	-471.952
Maximum	41.76248	75.12663	674546	585138	522740.7	1422003	67667
Minimum	-111.275	-334	18238	0	248.679	27030.14	-35748
Std. Dev.	19.09203	61.31064	165174.7	156195.8	145841.4	390430.4	15325.59
Skewness	-3.89577	-3.97133	1.697156	1.32905	1.254989	0.907041	1.725015
Kurtosis	25.11916	20.05703	5.120157	3.907011	3.472768	2.705228	10.32528
Jarque-Bera	1122.846	722.8073	32.70018	16.10501	13.3188	6.896316	131.1248
Probability	0	0	0	0.000318	0.001282	0.031804	0
Observations	49	49	49	49	49	49	48

### 4.3 Correlation Analysis

Table 1.4 present Pearson's Correlation, the relationships between ROA and other variables, only ROE and Equity exhibit a positive and significant association at the 1%, 10%, and 5% levels, respectively. ROE shows no significant association with all other variables. Noticeably, Size shows strong, positive, and significant correlated with Equity, Long-term Debt (LTD) and Short-Term Debt (STD) at 1% level. Short-Term Debt is positive and significantly correlated to Shareholders Equity and Long-Term Debt (LTD) at 1% level. Equity and Short-Term Debt (STD) have positive and significant correlation at 1% level.

Table 1.4 Pearson's Correlation Coefficients

Variables	ROA	ROE	lnEQUITY	lnLTD	lnSTD	lnSIZE	TAX
ROA	1.000						
ROE	0.679***	1.000					
lnEQUITY	0.264*	0.232	1.000				
lnLTD	0.171	-0.063	0.588***	1.000			
lnSTD	0.026	-0.152	0.579***	0.870***	1.000		
lnSIZE	0.18	-0.064	0.826***	0.894***	0.875***	1.000	
TAX	0.038	0.077	0.111	0.023	0.272*	0.147	1.000

Note: \*\*\* significant at 1% level; \*\* significant at 5% level; \* significant at 10% level

Source: Researcher's Computations

### 4.4 Regression Analysis: Return on Asset (Panel-Corrected standard errors technique)

Table 1.5 shows regression analysis of ROA and other independent and control variables using Panel-Corrected standard errors technique. Hypothesis one to three were analyzed.

Table 1.5: Return on Asset (ROA) Results

Variables	ROA and Equity (Model 1)		ROA and LTD (model 2)		ROA and STD (Model 3)	
	Coefficient	z-Statistics	Coefficient	z-Statistics	Coefficient	z-Statistics
lnSIZE	-3.651**	-2.163	0.311	0.0981	16.13***	4.8
TAX	6.83e-05	0.688	5.68e-05	0.785	0.000148	1.636
lnEQUITY	12.00***	4.786				
lnLTD			2.247	1.357		
lnSTD					-9.031***	-5.05
Constant	-84.13***	-4.371	-27.67	-1.221	-96.76***	-3.87
Year Dummies	Yes		Yes		Yes	
Observations	48		43		48	
R-squared	0.387		0.303		0.429	
No. of Companies	5		5		5	
Wald Statistic	1139		774.2		339.9	

Note: \*\*\* significant at 1% level; \*\* significant at 5% level; \* significant at 10% level; ln: Natural logarithm

Source: Researcher's Computations

#### 4.4.1. Hypothesis One (ROA and Equity)

**H<sub>01</sub>:** There is no significant relationship between Shareholders equity and Return on Asset of Marginal fields in Nigeria?

$$ROA_{it} = \eta_0 + \eta_1 \ln SZ_{it} + \eta_2 TAX_{it} + \phi \ln EQ_{it} + e_{it} \quad [1]$$

From table 1.5 the coefficient of Size is negative and statistically significant at the 5% level. This implies that a percentage change in Size will cause a decline in ROA by 3.65%, on average, ceteris paribus. Shareholder equity has a significant and positive effect on ROA at 1% level of significance. Also, a percentage change in Equity will cause an increase in ROA by 12%, on average, ceteris paribus. The effect of Tax is positive but statistically not significant. Therefore, we reject the null hypothesis that equity doesn't have a significant effect on ROA of Marginal field operators.

#### 4.4.2. Hypothesis Two (ROA and LTD)

**H<sub>02</sub>:** There is no significant relationship between Long term debt and Return on Asset of Marginal field operators in Nigeria?

$$ROA_{it} = \alpha_0 + \alpha_1 \ln SZ_{it} + \alpha_2 TAX_{it} + \psi \ln LTD_{it} + v_{it} \quad [2]$$

Long term debt has a positive effect on ROA, but not statistically significant. the coefficient of Size, Tax and LTD are positive but statistically not significant. Therefore, we accept the null hypothesis that Long-term debt doesn't have a significant effect on Marginal field ROA.

#### 4.4.3. Hypothesis Three (ROA and STD)

**H<sub>03</sub>:** There is no significant relationship between Short term debt finance and Return of Asset of Marginal field operators in Nigeria?

$$ROA_{it} = \theta_0 + \theta_1 \ln SZ_{it} + \theta_2 TAX_{it} + \rho \ln STD_{it} + s_{it} \quad [3]$$

Size have a positive relationship with ROA and statistically significant at 1% level. This implies that a percentage change in SIZE will cause a rise in ROA by 16.13%, on average, ceteris paribus. Equation 3 reveals Short term debts to have significant and negative effect on ROA at 1% level. A percentage change in Short-Term debt will cause a decrease in ROA by 9.03%, on average, ceteris paribus. The effect from TAX is positive but statistically not significant. Therefore, we accept the null hypothesis that Short-term debt doesn't have a significant effect on Marginal field Performance.

**4.5 Regression Analysis: Return on Equity (Panel-Corrected standard errors technique)**

Table 1.6 shows the result of Panel-Corrected standard errors (PCSE) technique employed to estimate models four to six, representing Return on Equity (ROE) and independent variables.

**Table 1.6:** Return on Equity (ROE) results

Variables	ROE and Equity (Model 4)		ROE and LTD (Model 4)		ROE and STD (Model 6)	
	Coefficient	z-Statistics	Coefficient	z-Statistics	Coefficient	z-Statistics
lnSIZE	-47.23***	-3.169	-2.065	-0.197	23.22**	2.191
TAX	0.000640	1.123	0.000345	0.85	0.000665	0.811
lnEQUITY	66.84***	4.264				
lnLTD			-1.067	-0.196		
lnSTD					-20.47**	-2.46
Constant	-161.2**	-2.085	38.54	0.555	-63.12	-0.638
Year Dummies	Yes		Yes		Yes	
Observations	48		43		48	
R-squared	0.472		0.195		0.247	
No. of Companies	5		5		5	
Wald Statistic	84.85		1614		271.2	

Note: \*\*\* significant at 1% level; \*\* significant at 5% level; \* significant at 10% level; ln: Natural logarithm

Source: Researcher's Computations

**4.5.1. Hypothesis four (ROE and Equity)**

H<sub>04</sub>: There is no significant relationship between Shareholders equity and Return on Equity of Marginal field operators in Nigeria?

$$ROE_{it} = \eta_0 + \eta_1 \ln SZ_{it} + \eta_2 TAX_{it} + \phi \ln EQT_{it} + e_{it} \quad [4]$$

Equity has a significant and positive effect on ROE at 1% level. A percentage change in equity will cause an increase in ROE by 66.84%, on average, ceteris paribus. Therefore, we reject the null hypothesis that equity doesn't have a significant effect on Marginal Field ROE. The coefficient of Size is negative and statistically significant at the 1% level. This implies that a percentage change in Size will cause a decline in ROE by 47.23%, on average, ceteris paribus.

**4.5.2. Hypothesis five (ROE and LTD)**

H<sub>05</sub>: There is no significant relationship between Long-term debt and Return on Equity of Marginal field operators in Nigeria?

$$ROE_{it} = \alpha_0 + \alpha_1 \ln SZ_{it} + \alpha_2 TAX_{it} + \psi \ln LTD_{it} + v_{it} \quad [5]$$

Size and Long-term debt have negative coefficients and statistically insignificant relationship with Long term debt. Therefore, we accept the null hypothesis that Long-term debt doesn't have a significant effect on Marginal Field ROE.

#### 4.5.3. Hypothesis six (ROE and STD)

H<sub>06</sub>: There is no significant relationship between Short-term debt and Return on Equity of Marginal field operators in Nigeria?

$$ROE_{it} = \vartheta_0 + \vartheta_1 \ln SZ_{it} + \vartheta_2 TAX_{it} + \rho \ln STD_{it} + s_{it} \quad [6]$$

Size is positive and statistically significant at the 5% level. This implies that a percentage change in Size will cause a rise in ROE by 23.22%, on average, ceteris paribus. The effect from Tax is positive but statistically not significant. The equation reveals short term debt has a negative coefficient and statistically significant relationship with ROE at 5% level. A percentage change in STD will cause a decrease in ROE by 20.47%, on average, ceteris paribus. Thus, we accept the null hypothesis that short-term debt doesn't have a significant effect on Marginal Field Performance.

### 5.1 Discussion of Finding

The study empirically investigated the influence of capital structure on the performance of Marginal oil fields in Nigeria within a ten years period. Accounting based measurement such as Return on Asset (ROA) and Return on Equity (ROE) were indicators of Marginal oil fields performance. Equity, long term debt and short-term debt constituted the capital structure variables. Whereas, Firm size and taxation were control variables. Regression analysis shows equity has positive relationship and significance influence on the performance (ROA/ROE) of Marginal oil fields. This conform with Pecking order theory, which stated preference of equity to debt.

The study further reveals that long term debt and short-term debt impacted adversely on the performance (ROA/ROE) of Marginal fields in Nigeria. This collaborate previous research by (Ebaid, 2009; Zeitun & Tian, 2007; Abor, 2007; Salim & Yadav, 2012; Paymaster & Kpolode; 2021). However, (Etale, et al., 2020; Arikekpar, 2020; Berger & Bonaccora di Patti, 2006; Frank & Goyal, 2003), studies suggested that capital structure have positive and significant impact on firm performance.

Odeleye (2014) opined that local banks were weary of granting Marginal field companies loans due to their poor credit worthiness. Simon-Oke and Afolabi (2011) in their study attributed the negative relationship between debts and firm performance to the high cost of loans in Nigeria. Accessing debt finance from local banks is extremely difficult and expensive. This can be attributed to the lack of adequate collateral by marginal oil field operators. Most operators only asset for collateral are the oil reserve.

### 5.2 Conclusion

Over the study period, the most profitable Marginal field operators were those maintaining a high proportion of equity in their capital mix, avoiding debt finance. Shareholders' equity has a positive effect on performance, while long term debt and short-term debt have negative relationships with performance indicators. The study recommends increased shareholder's equity, this can be achieved through merger and formation of consortium by indigenous companies. Operators are also advised to design more flexible and innovative financing packages involving a range of partners from both the public and private sectors. Having more local and



foreign technical/financial partners or joint venture will increase the value of their shareholder's equity available to fund new investment in Marginal oil before seeking for external debts.

Marginal field companies are recommended to review their debt mobilization strategies by focusing more on sources with lower interest rates and relatively long-term maturity period. Such channels for debt mobilization can be syndicated lending (where two or more banks coalesce to issue huge loans), mezzanine debt, Islamic financing, acquisition debt and project bond finance. This will help Marginal field operators to take advantage of tax benefits inherent in debt financing. To enhance financial performance, operators are encouraged to improve their spending efficiency and make deliberate efforts to cut down on waste.

This research explored the relationship between Capital Structure and the performance of Marginal field companies in Nigeria. The study will contribute to already existing pool of knowledge. The study was limited to two accounting-based measurement of performance (ROA and ROE). For future studies, other variables can be used, and more companies investigated over a longer period.

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