Impact of capital structure on financial performance of oil and gas firms in Nigeria

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Abstract

This study examines the impact of capital structure on the financial performance of Nigerian oil and gas companies. Using an ex-post facto research methodology, the short-term debt to total asset, long-term debt to total asset, total debt to total equity, and return on asset variables were investigated as proxies for capital structure and financial performance, respectively. Based on the data's availability at the time of the inquiry, the study used an easy sampling strategy to gather secondary data. These data covers the years 2011 through 2020 and were compiled from the annual financial reports of five Nigerian oil and gas companies. Descriptive statistics and panel regression analysis were used to analyze the data. The analysis' findings shows that while long-term debt to total assets has a negative significant influence on return on assets, short-term debt to total assets and total debt to total equity had positive insignificant impacts. According to the findings, managers of oil and gas companies should reduce the amount of long-term debt they have because doing so has a negative effect on their performance. They should also exercise caution when making capital structure decisions.

Keywords Capital structure, Financial performance, Oil and gas firms, Nigeria

JEL Classification G32, P27

Introduction

Scholars from all over the world are interested in the relationship between capital structure and company performance from the perspective of emerging countries. The study on the relationship between capital structure and firm performance from the perspectives of oil and gas industries in developing nations is logically justified by the fact that special concentration on the oil and gas industries is still uncommon. With a high population density and a focus on inclusive and sustainable economic development, Nigeria is a single-product economy. Due to its extreme overdependence on oil and limited

resources, Nigeria faces a significant difficulty in ensuring the stability of the financial sector. Therefore, Nigeria has to grow its financial sector in a sound and sustainable manner. This would help the nation achieve its economic goals by addressing the most fundamental needs of its citizens. It is crucial to note that the financial sector is a significant participant in the nation's oil and gas sector. The oil and gas sector, which connects the two most important economic streams and provides the primary input for the financial industry, has a significant impact on the national economy. The importance of the oil and gas sector to the national economy is so praiseworthy, and this study's motivation to analyze the relationship between capital structure and financial performance of the listed oil and gas firms in Nigeria. The current study will aid in understanding how the oil and gas sectors choose their capital structures in a developing nation context and will serve as a reference for finance managers as they create the optimum capital structures for their companies to improve their financial performance.

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As a result, there are a sizable number of academic research projects that continue to add to the body of knowledge about capital structure in various national and corporate contexts. In order to understand the relationship between capital structure and financial performance from the perspective of an oil and gas-based emerging economy, this study is one of the recent attempts to examine the impact of capital structure on the financial performance of oil and gas companies listed on the Nigeria Stock Exchange (NSE).

In the finance literature, there has long been discussion over how a firm chooses its capital structure and how that decision affects the firm's financial performance. The combination of internal and external financial sources determines whether a company succeeds or fails (Opoku-Asante [25]). According to Omukaga [23], inadequate capital structure decisions to finance a company's activities can result in liquidation, a financial crisis, or bankruptcy. Given the level of competition and technological advancement in Nigeria's oil sector, it is essential that businesses in this sector adopt an ideal capital structure that can ensure its survival. Due to this, it is imperative that businesses in this industry continue to perform at their highest potential in order to ensure the long-term development and prosperity of the economic. The capital structure of a firm refers to the arrangement of various financial resources used to finance operations and capital expenditure (Dahiru and Dogarawa [7]). These funding options include long- or short-term loans, as well as equity financing through the use of preferred stock and common stock. A corporation's major claims on its assets, which include different kinds of stocks and debts, are referred to as its capital structure. It can be challenging at times because the managers of the firms and the investors are both interested about how an organization is financed. This is due to the fact that using the wrong finance mix could seriously affect a business enterprise's performance and ability to survive.

The ratio of debt to equity in a company's financing strategy is a critical factor in financial management. On numerous occasions over the years, researchers have sought to study the connection between the capital structure and financial performance of Nigerian businesses. Divergent opinions exist, nonetheless, regarding how much these firms' capital structures affect their financial success. For instance, Okonkwo et al. [21], Bashiru and Bukar [5], and Echekoba and Ananwude [10] found that capital structure negatively impacted financial performance, but Dahiru and Dogarawa [7] found that capital structure positively impacted financial performance. Additionally, there is not enough literature available on the subject of capital structure and how it affects financial performance in relation to the oil and gas sector in Nigeria with majority of researchers focusing on the manufacturing sector. Further study into this area of literature has been justified as a result of the inconsistent nature of these empirical findings and the requirement to close this gap.

Therefore, this study examined how capital structure affected the financial success of Nigerian oil and gas companies. This research will be helpful to financial managers because it will increase their understanding of the significance of developing a suitable capital structure that enables the business to increase earnings and maximize wealth for its owners. When choosing appropriate techniques to assess and analyze a company's financial status, it will also help investors recognize the link between capital structure and financial performance. This part is followed by the literature review, methodology, results and discussion of the findings, conclusion, and recommendations.

Literature review

The conceptual review, theoretical review, and empirical examination of capital structure and financial performance are all included in this part. The capital structure of a firm refers to the arrangement of various financial resources used to finance operations and capital expenditure (Dahiru and Dogarawa [7]). In financial terms, it refers to the method a company selects to use to finance its assets using a suitable ratio of debt to equity. In the financial statements of business firms, it serves to illustrate the proportionate relationship between debt and equity (Bello et al. [6]). Any of the following formats can be used to define the debt-equity mix: Three options are available: 100% equity: 0% debt (unlevered firm), 0% equity: 100% debt (highly levered), and *X*% equity: *Y*% debt (capital mix). In order to reduce the cost of capital to a business, capital structure must be used effectively. By preventing the business from taking on more debt than it can handle, a carefully thought-out capital structure lowers the risk of insolvency (Opoku-Asante [25]). Three capital structure proxies, including the debt-to-equity ratio, the short-term debt to total assets ratio, and the long-term debt to total assets ratio, were identified by Bello et al. [6].

A leverage ratio called the short-term debt to total assets ratio shows how percent of a company's total assets are financed by short-term debt with a one-year or shorter maturity period. The amount of a company's assets that must be sold off in order to satisfy immediate obligations is also determined by its leverage ratio. According to Meyers and Majluf [19], businesses that use short-term debt are likely to have greater prospects for growth in their investment opportunities. Utilizing short-term indebtedness expands the pool of available external

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capital and encourages improved business financial performance (Seid [31]). To illustrate how much of a company's assets are financed by long-term debts like long-term loans, bonds, and other securities, the long-term debt to total assets ratio is a leverage ratio. It illustrates the amount of assets that would need to be liquidated in order to pay off long-term debts. Additionally, the debt to equity ratio is a leverage ratio that assesses how much a company owns vs how much it owes. It evaluates a company's overall debt in relation to the capital that the owners initially contributed and the profits that have been held through time.

Various management researchers have proposed a range of definitions of financial performance that have been impacted by their perspectives, which are perceived to be financial or operational in character. Financial performance is viewed as the outcome of an enterprise's capital mobilization, use, and management (Dinh and Pham [8]). It consists of instruments used to assess a company's total financial standing over time. These instruments can be compared between enterprises in the same industry or between aggregated industries or sectors (Okonkwo et al. [21]). Financial performance is a vague phenomenon that can be assessed in a variety of ways. Financial performance can be gauged using accounting techniques like Return on Assets (R.O.A), Return on Equity (R.O.E) and economic models such as Maris co-efficient and Tobin's Q. claim Dinh and Pahm [8]. However, return on assets, which gauges a company's profitability in relation to its total assets, is used in this study to gauge the financial performance of oil and gas businesses. To determine this, divide the net income by the entire value of the assets. A high proportion indicates the company is particularly effective at turning its assets into revenue and vice versa. The conceptual framework link between the capital structure and financial performance is shown in the figure below (Fig. 1).

Theoretical review
Different academics in the field of corporate finance have advanced various capital structure-related ideas. These ideas aim to clarify how businesses select their capital structure to increase profitability. The capital structure hypothesis, which was developed by Modigliani and Miller [18], contends that a firm's worth is not based on its capital structure but rather on how profitable its operations are. But in 1963, the hypothesis was expanded to include the impact of taxes and high-risk debts. The idea is that when the percentage of debt in the capital structure rises, the cost of capital reduces and vice versa. The trade-off theory, pecking-order theory, and agency cost theory are other theories of capital structure. The idea aims to explain why different industries'
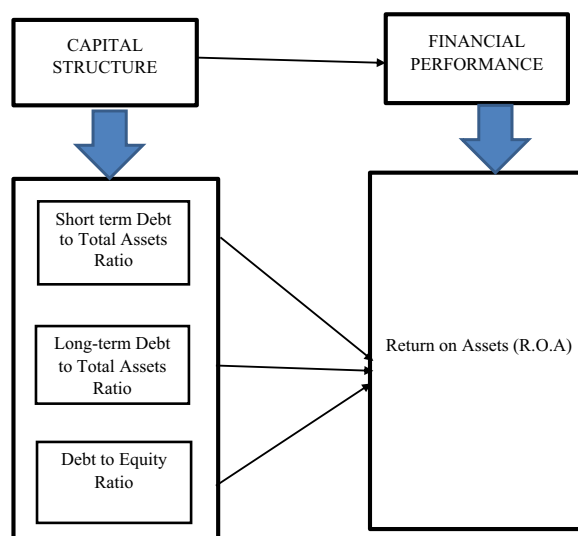

Fig. 1 Showing the link between capital structure and financial performance. *Source*: Author's Framework (2022)

capital structures vary. It asserts that larger companies with substantial assets and significant taxable income will rely more on debt than equity funding. According to the pecking order idea put forth by Myers and Majluf [19], a firm prioritizes its sources of funding in decreasing order, starting with internal financing through the utilization of retained earnings and moving on to debt when this is not an option. When debt funding is no longer feasible, equity financing is often considered as a last resort. It stems from the idea of information asymmetry, whereby firm managers often have access to more knowledge than external users such as creditors and investors, and they attempt to mitigate this risk.

Theoretical framework
The dispute between shareholders and managers (agency cost of equity) or shareholders and creditors is the basis for the agency cost theory as developed by Jensen and Meckling [13]. (agency cost of debt). As a result, a company might not maximize its worth. According to the theory, choosing the best/optimal structure helps eliminate agency conflicts and costs by incentivizing managers to act in the shareholders' best interests by having high debt ratios. As a result, the company's worth rises. However, one of the most frequent objections of the agency theory, according to Mallin [17], is that it neglects all of the other stakeholders who play significant roles in the organization in favor of focusing on just two: agents and principals. Despite these objections, this study uses the agency cost theory to link capital structure and financial performance of oil and gas firms on the presumption

that shareholders primarily use debt to control firm performance.

Empirical review

Following a review of the literature on the subject, some authors (Oyakhire [27], Garba and Inusa [11], Dahiru and Dogarawa [7], Bello et al. [6]) found a positive correlation between capital structure and financial performance, while others (Osuji and Odita [26], Bashiru and Bukar [5], Olajide and Funmi [22], and Opoku-Asante [25] maintained a negative correlation.

Using annual financial statements spanning the years 2014–2018, Oyakhire [27] looked at the effect of capital structure on the financial performance of all listed oil and gas enterprises in Nigeria. The association between capital structure, as measured by the debt ratio, and financial performance, as measured by return on equity (ROE) and return on asset (ROA), was examined using the multiple regression method (ROA). The study's conclusions revealed a positive significant relationship between capital structure and financial performance, and they recommended that oil and gas companies utilize a short-term debt management strategy to enhance their financial performance. Additionally, Garba and Inusa [11] used annual financial statements from the years 2006 to 2010 to analyze the effect of capital structure on the financial performance of enterprises in Nigeria's oil and gas industry. Additionally, Garba and Inusa [11] used annual financial statements from the years 2006 to 2010 to analyze the effect of capital structure on the financial performance of enterprises in Nigeria's oil and gas industry. a panel multiple regression study to examine the relationship between capital structure and financial performance as measured by return on assets (ROA), return on sales (ROS), and return on equity as measured by debt to asset ratio, equity to asset ratio, and short term debt to total asset ratio (ROE). The relationship between debt and return on assets was shown to be statistically significant, and it was recommended that businesses employ debt—especially short-term debt—to boost their performance.

Dahiru and Dogarawa [7] conducted study on the effect of capital structure on the financial performance of listed manufacturing businesses in Nigeria. The study used generalized least square multiple regression to evaluate the panel data, which was collected from the annual reports of 31 sampled companies for the years 2009–2014. The results showed that whereas overall debt and long-term debt have a negative significant impact on the financial performance of manufacturing enterprises, short-term debt has a positive significant influence on business performance. The management of industrial businesses was advised to decrease total debt and long-term debt while increasing the short-term loan portion of their capital

structure. Bello et al. [6]'s investigation into the effect of capital structure on deposit money banks' financial performance in Nigeria. Data was combined from the 2009–2018 annual reports of five conveniently picked Nigerian banks. Pearson's correlation and multiple regression were also used. The results showed that the capital structure, as determined by the short-term debt-to-asset ratio and the overall debt-to-total asset ratio, had a very good impact on financial performance (ROA). It also advised deposit money banks in Nigeria to use a larger proportion of their capital structure for short-term debt while growing and making sizable investments.

On the other hand, Osuji and Odita [26] used a sample of thirty non-financial enterprises listed on the Nigerian Stock Exchange for the years 2004–2010 to investigate the effect of capital structure on Nigerian firms. With the use of the ordinary least square regression method of estimate, panel data from the yearly reports was examined. The results showed that the debt ratio capital structure measure had a considerable negative impact on the firm's performance (ROA and ROE). The effect of capital structure on the financial performance of listed enterprises in the Nigerian oil and gas industry was studied by Bashiru and Bukar [5] for the years 2005 through 2014, panel data from the annual reports of 7 sample firms were examined using multiple regression approaches. The capital structure has a significant detrimental effect on financial performance, according to the findings. It advised managers of oil and gas companies to use prudence when deciding how much debt to take on because it has a detrimental impact on their performance.

The impact of capital structure on the performance of quoted non-financial enterprises in Nigeria between 1996 and 2014 was also studied by Olajide and Funmi [22]. Tobin's Q, return on equity, price earnings ratio, and return on assets were used to assess performance. Debt ratio was used to assess capital structure. Principal component analysis, the panel unit root test, and generalized moments from the first and second generations of econometrics were all used in the study. The results showed a weak and substantial relationship between capital structure and firm performance, and they cautioned companies against taking on debt since it has a detrimental effect on performance.

Additionally, Opoku-Asante [25] examined the association between capital structure and business financial performance in Ghana and Nigeria using 425 cross-sectional firm-year samples from 2014 to 2019. Performance was measured by return on assets and return on equity, while capital structure was assessed by short-term debt to total assets, long-term debt to total assets, and total debt to total assets. The data was analyzed using Pearson's correlation technique, which led to the conclusions that total

debt has a strong negative association with return on assets while debt maturity had no effect on the relationship between capital structure and financial performance. Similar to this, Javed and Akhtar [12] used correlation analysis to investigate the relationship between capital structure and financial performance between 2004 and 2008. The investigation's findings revealed a strong relationship between the crucial elements. Debt capital and return on investment, however, had a high and adverse link. Using the agency cost theory, Onaolapo and Kajola [24] objectively evaluated the connection between capital structure and performance of non-financial enterprises in Nigeria between 2001 and 2007. The study's results demonstrate that capital structure significantly lowers an enterprise's return on equity and return on assets, supporting the agency cost argument.

Similar to this, Adesina et al. [3] employed Ordinary Least Square to look into the connection between the financial performance of banks listed on the Nigerian Stock Exchange and their post-consolidation capital structure. The capital structure of the aforementioned banks and their financial performance were shown to be strongly and favorably correlated by the study. Analysis of the impact of capital structure decisions on the profitability of Turkey's manufacturing industry from 2005 to 2011 by Toraman et al. [33]. The regression analysis' findings revealed that the ratios of short-term debt to total assets and long-term liabilities to total assets have a detrimental effect on return on assets. However, operational income, consumer spending, and profitability were all closely related. The relationship between the capital structure and the industrial performance of five listed enterprises in Nigeria was also examined by Oke and Afolabi [20]. The writers claimed that performance, finances, and equity, debt, and were all positively associated. However, performance and debt financing were incompatible. In order to investigate the connection between capital structure and business financial performance from 1995 to 2011, Salim and Yadav [30] conducted a panel data analysis. Growth and performance were found to be positively connected across all industries, according to the authors. The findings of Tobin's Q also revealed a large direct association between short-term debt and long-term debt, as well as a significant negative relationship between overall debt and business performance.

It is also important to note that numerous studies from both developed and developing economies have examined the connection between capital structure and firm performance in various economies (e.g., Margaritis and Psillaki [16], Abdullah and Tursoy [1], and Ahmed and Bhuiyan [4]) and have reported various findings. For instance, a positive correlation between capital structure and the success of companies listed in Germany was found by Abdullah and Tursoy [1]. However, Ebaid [9] found no evidence of a connection between capital structure and business performance in the context of Egyptian companies.

For example, Sheikh and Wang [32] found a negative association between the performance of non-financial listed companies on the Karachi Stock Exchange and the capital structure. Their pooled OLS result shows a negative correlation between capital structure (total debt ratio and long-term debt ratio) and financial performance when the fixed effect model shows a negative link (market-to-book ratio). Abdullah and Tursoy [1] found a correlation between capital structure and firm performance that was favorable based on data from non-financial firms listed in Germany. Their research also showed that German listed companies had high leverage compared to those in comparable nations.

In contrast, Vo and Ellis [36] used data from listed companies on the Ho Chi Minh City Stock Exchange to identify the detrimental effects of financial leverage on the shareholder value of businesses. Li et al. [14] analysis of a cross-sectional sample from 2012 revealed negative effects of capital structure on the performance of European SMEs. In addition to this, research have shown that leverage has little to no effect on how well a corporation performs. According to a recent study by Tripathy and Shaik, there is a correlation between increased business profitability and leverage [34]. They used pooled OLS, fixed effects, and the random-effects model to analyze data from 56 food processing companies that were listed on the Bombay Stock Exchange between 2000 and 2018. Their empirical data show that leverage significantly increases the business value in the Indian food manufacturing sector. From the perspective of the Indonesian food and beverage sectors, Salim and Susilowati [29] investigated the elements that affect capital structure and the impact it has on business value. According to their study, capital structure does not significantly affect firm value, despite having a favorable correlation with it.

Literature gap

However, this study has added to the body of knowledge in the terrace of scope and methodological ground. Despite the fact that Nigeria's oil and gas industry is vital to the growth and survival of the nation, there doesn't seem to be any fresh research on the topic. The majority of recent literature concentrated on other industries, like the banking, service and manufacturing sectors. There is a dearth of empirical research in the area of scope on the impact of capital structure on financial performance from the perspectives of developing countries, with a focus on the oil and gas industries in particular, It is also important to note that numerous studies (e.g., Margaritis and

Psillaki [16], Abdullah and Tursoy [1], and Ahmed and Bhuiyan [4]; Oyakhire [27]; Garba and Inusa [11]; Ebaid [9]) from both developed and developing economies have examined the connection between capital structure and financial performance but this study is being undertaken in oil and gas industry in Nigeria specifically. However, as regards the methodological vacuum filled in the literatures, principal component analyses, pearson correlation methods were utilized by various scholars (Javed and Akhtar [12]; Opoku-Asante [25]; Bello, et al. [6]), Generalized Method of Moment (Olajide and Funmi [22]; Dahiru and Dogarawa [7]); ordinary least square regression (Sheikh and Wang [32]; Adesina, Nwidobie and Adesina [3]; Osuji and Odita [26]), panel multiple regression (Tripathy and Shaik [34]; Li, et al. [14]; Salim and Susilowati [29]; Vo and Ellis [36]; Toraman, et al. [33]; Oke and Afolabi [20]; Salim and Yadav [30]; Bashiru and Bukar [5]) while this study utilized a static panel data technique for the study.

Methods
In this study, the ex post facto research design was employed. The choice of the design was necessary because the data needed for the study's analysis came from the yearly financial reports of the chosen companies. As a result, analysis is based on already-existing historical data that may be obtained from financial reports. 10 oil and gas companies that were listed on the Nigerian Stock Exchange as of December 31, 2020 make up the study's population. Convenience sampling was employed to obtain the sample for this study, and 5 companies were chosen for the study whose data was accessible during the study period; those without complete data were not taken into consideration. The essential cross-sectional data for this study was taken from five oil and gas companies' annual financial reports during a ten-year period, from 2011 to 2020, which served as the sole source of secondary data. Quantitative information was acquired for this inquiry. Using descriptive and inferential statistical techniques, the panel data that was obtained from the companies' annual financial reports was examined. To assess the significance of the effects of the independent variables (short term debt to asset ratio, long term debt to asset ratio, and debt to equity ratio) on the dependent variable, panel multiple regression was used (return on asset).

Model specification
This study used the Bello et al. [6] model to examine how capital structure affects deposit money banks' financial performance in Nigeria. The following is the functional model specification for the study:

$$\text{ROA} = f(\text{SDTA}, \text{LDTA}, \text{TDTE}) \qquad (1)$$

Hence the econometrical form of the equation is;

$$\text{ROA}_{i,t} = \beta_0 + \beta_1 \text{SDTA}_{i,t} + \beta_2 \text{LDTA}_{i,t} + \beta_3 \text{TDTE}_{i,t} + \mu_0 \qquad (2)$$

where
   ROA = Return on Asset.
   SDTA = Short term Debt to Total Asset.
   LDTA = Long term Debt to Total Asset.
   TDTE = Total Debt to Total Equity.
   $\beta_1 - \beta_3$ = Beta coefficient that measures the sensitivity of variable X to change in variable Y(ROA).
   β_0 = constant.
   μ_0 = error term.

Scope of the study
The study examined the impact of the capital structure on the financial performance of Nigerian oil and gas businesses. The study's target population consisted of the 10 listed oil and gas companies on the Nigerian Stock Exchange. The sample size for the study was five listed oil and gas businesses on the Nigerian Stock Exchange. The research was done from 2011 to 2020.

Results
Pre-test analysis
Unit root test
According to certain claims, macroeconomic and financial data exhibit a stochastic propensity that, if unchecked, can have an impact on estimators' statistical behavior. As a result, before looking at the connection between capital structure and financial performance of Nigerian oil and gas enterprises, this research explores the stochastic features of the series in the model by looking at their order of integration using a series of unit root tests. Table 1 shows that the unit root tests for non-stationarity (i.e., the Levin, Lin, and Chu t and PP-Fisher Chi-square tests) frequently reject the null hypothesis of non-stationarity at the 5% level for all variables expressed in level terms. With a 5% level of significance, the unit root tests demonstrate that Return on Asset (ROA),

Table 1 Showing the unit root test

Variables	Level		Order of integration
	Levin, Lin and Chu t*	PP-Fisher Chi-square tests	
ROA	0.0213**	0.0382**	1 (0)
SDTA	0.0039**	0.0088**	1 (0)
LDTA	0.0001**	0.0005**	1 (0)
TDTE	0.0000**	0.0001**	1 (0)

Source: Author's Computation (2022)

** Indicates 5% level of significance

Short Term Debt to Total Assets (SDTA), Long Term Debt to Total Assets (LDTA), and Total Debt to Total Equity (TDTE) are stationary and integrated of order one, or I(0), for all periods.

Descriptive statistics results

An overview of the statistics used in this empirical investigation is given in Table 2 below. Short term debt to total asset (SDTA) and Total Debt to Total Equity (TDTE) have mean values of 0.511800 and 1.628600, respectively. Long term debt to total asset (LDTA) has the lowest mean value of 0.284200, while Return on Asset (ROA) has the highest mean value of 2.599580. Table 2 shows that Return on Assets is the highest while Short Term Debt to Total Assets is the lowest, indicating that operational data values are typically further from the mean. The standard deviation measures how concentrated the data are around the mean. A distribution's skewness is a gauge of how asymmetrical it is. In contrast to Return on Assets (ROA) and Long Term Debt to Total Assets (LDTA), which were negatively skewed and indicated that the majority of the distribution is concentrated on the left, Short Term Debt to Total Assets (SDTA) and Total Debt to Total Equity (TDTE) were positively skewed, indicating that the majority of the distribution is concentrated on the right (that is, left-skewed) (that is, right-skewed).

It follows that skewness has a propensity to reveal whether the distribution's mean value is higher or lower than the median. Thus, a positively skewed figure implies that the mean value is higher than the median, whereas a negatively skewed number demonstrates that the mean value is lower than the median.

Kurtosis reveals that the distribution is leptokurtic since all of the variables used had positive kurtosis values (too tall) (Tables 3, 4).

Discussion

Short term debt to total assets (SDTA), long term debt to total assets (LDTA), and total debt to total equity (TDTE) are correctly signed in line with a priori expectation, according to the results of pooled panel regression analysis. According to the pooled PLS results, the ratios of short-term debt to total assets and long-term debt to total assets have a little negative impact on return on assets, as indicated by their respective negative coefficients of -0.208373 and -0.128486. However, the positive coefficient at the 5% level of significance shows that the ratio of total debt to total equity has a positive but minor impact on return on assets. The explanatory factors together account for around 45% and 40% of the variation in return on asset, according to the R^2 and adjusted R^2, which are both 0.447254 and 0.404856. (Short term debt to total Assets Ratio, Long term debt to Total Assets Ratio, and Total Debt to Total Equity). Other predictor factors that are not included in this model account for the remaining

Table 2 Showing the descriptive statistics

Descriptive statistics	ROA	SDTA	LDTA	TDTE
Mean	2.599580	0.511800	0.284200	1.628600
Std. Dev	2.698900	0.249511	0.410102	4.922916
Skewness	3.405158	− 0.143420	2.654647	− 1.829155
Kurtosis	22.05006	1.763114	9.677972	12.26121
Probability	0.000000	0.186497	0.000000	0.000000
Observations	50	50	50	50

Source: Author's Computation (2022)

Table 4 Tests on panel models

Test statistics/*P*-values	Poolability test	Test statistics/*P*-values	Hausman test
F-statistics	1.252995 (0.2829)	Chi-Square	3.644968 (0.0111)

Source: Author's Computation (2022)

Table 3 Results of static panel data analysis

Variables	Pooled OLS			Fixed effects model			Random effects model		
	Coef	Std. error	*P*-value	Coef	Std. error	*P*-value	Coef	Std. error	*P*-value
C	0.118047	0.093330	0.2123	− 0.403899	0.221889	0.0778	0.118047	0.093330	0.2123
SDTA	− 0.208373	0.193684	0.2876	0.773829	0.450861	0.0955	− 0.208373	0.193684	0.2876
LDTA	− 0.128486	0.092646	0.1722	− 0.221931	0.120975	0.0465	− 0.128486	0.092646	0.1722
TDTE	0.033001	0.025008	0.1935	0.047559	0.031341	0.1387	0.033001	0.025008	0.1935
R-square	0.447254			0.391453			0.338742		
Adj *R*-square	0.404856			0.371254			0.294046		
Prob (*F*-stat)	0.162229			0.038874			0.162229		
Durbin Watson	2.008529			2.047759			2.008529		

Source: Author's Computation (2022)

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percentage of variation. The *F*-statistics probability of 0.162219 confirms that the parameter estimations in the regression at 5% are not significant. Additionally, the data series appears to lack autocorrelation, according to the Durbin Watson value of 2.008529.

According to the results of the fixed effect model from the aforementioned table, the ratios of short-term debt to total assets and total debt to equity are significant at 5%, but the ratio of long-term debt to total assets is not significant at all. This outcome is in line with Dahiru and Dogarawa's findings [7]. The explanatory factors together account for around 39 and 37 percent of the variation in return on asset, respectively, according to the R^2 and modified R^2 values of 0.391453 and 0.371254, respectively. Other elements outside the scope of this model account for the remaining % of variation. The significance of the parameter estimations in the regression at 5% is further supported by the *F*-statistics probability of 0.038874. Inadequate autocorrelation in.

As shown by the negative coefficients of $-$ 0.208373 and $-$ 0.128486, respectively, the results of the random effect model also show that the ratios of short-term debt to total assets and long-term debt to total assets have a negative, insignificant effect on return assets. However, as shown by the positive coefficient 0.033001 at 5% significance level, the ratio of total debt to total equity had a positive but minor impact on return on assets. The R^2 and modified R^2 values of 0.338742 and 0.294046 still support the finding that the predictor variables accounted for 34% and 29% of the variation in Return on Asset, respectively, and that the remaining percentage was explained by additional variables not included in this model. The data series has no autocorrelation, as shown by the Durbin Watson value of 2.008529.

The Hausman test was used to determine which model was most appropriate for the investigation, and the findings revealed that fixed effects models were chosen over random effects models. This is as a result of the probability value of 0.0111, which shows that the preferred model's random effects null hypothesis is rejected.

Conclusion and recommendations

This study looked at how Nigerian oil and gas companies' financial performance was impacted by their capital structure. Three panel estimators were used to regress Return on Assets (ROA) on three capital structure metrics for the period of 2011–2020: Short Term Debt to Total Assets (SDTA), Long Term Debt to Total Assets (LDTA), and Total Debt to Total Equity (TDTE). The results show that the financial performance of Nigerian oil and gas businesses has a significant inverse relationship with the long-term debt-to-total-asset ratio, a measure of capital structure. This implies that the amount of profit a company

will make will decrease as its long-term debt ratio rises. This is inline with studies such as [2, 15, 28, 35].

On the basis of the aforementioned, the study advises oil and gas businesses to reduce their long-term debt ratios because doing so has a negative impact on their performance. This can be accomplished by issuing more shares through bonus and right issues, taking out more short-term debt, and raising revenue. It can also be accomplished by increasing retained earnings. Second, before making an investment, prospective investors should pay close attention to how Nigeria's oil and gas companies' capital structures have changed, since this factor typically affects the predicted rate of return. Last but not least, managers should properly match their capital structure to prevent overmatching and mismatching of financial resources; failure to do so will negatively affect the company's long-term operations, leading to layoffs and a decline in revenue.

Abbreviations

ROA	Return on assets
ROE	Return on equity
ROS	Return on sales
EPS	Earnings per share
SDTA	Short term debt to total assets
LDTA	Long term debt to total assets
TDTE	Total debt to total equity
PLS	Panel least square
P-value	Probability value
Coef	Coefficient
Std. Error	Standard error
FE	Fixed effects
RE	Random effects

Author contributions
ORA gathered and manually compiled the dataset from the annual reports of Central Bank of Nigeria Bulletin while TAM helped in analyzing the data and was a major contributor in writing the manuscript. VEI assisted in reviewing the relevant literatures relating to the relationship between electronic banking and banking performance in Nigeria while However, NSY sorted the references. All authors read and approved the final manuscript.

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Declarations

Ethics approval and consent to participate
Note applicable.

Consent for publication
Note applicable.

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On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

1. Abdullah H, Tursoy T (2021) Capital structure and firm performance: evidence of Germany under IFRS adoption. Rev Manag Sci 15:379–398. https://doi.org/10.1007/s11846-019-00344-5
2. Abubakar A (2021) Financial leverage and financial performance of oil and gas companies in Nigeria. Turk J Comput Math Educ 12(3):4170–4180
3. Adesina JB, Nwidobie BM, Adesina OO (2015) Capital structure and financial performance in Nigeria. Int J Bus Social Res 5(2):21–31
4. Ahmed R, Bhuyan R (2020) Capital structure and firm performance in Australian service sector firms: a panel data analysis. J Risk Financ Manag 3(9):214. https://doi.org/10.3390/jrfm13090214
5. Bashiru M, Bukar M (2016) The Impact of capital structure on financial performance of listed firms in the Nigerian oil and gas industry. Int J Public Adm Manag Res 3(4):38–44
6. Bello S, Pembi S, Vandi P (2020) Impact of capital structure on financial performance of deposit money banks in Nigeria. Int J Manag Social Sci Peace Conflict Stud 2(3):135–147
7. Dahiru I, Dogarawa B (2016) Effect of capital structure on financial performance of listed manufacturing firms in Nigeria. SSRN Electron J. https://doi.org/10.2139/ssrn.3492011
8. Dinh H, Pham C (2020) The effect of capital structure on financial performance of Vietnamese listing pharmacutical enterprises. J Asian Financ Econ Bus 7(9):329–340. https://doi.org/10.13106/jafeb.7(9).329
9. Ebaid IE (2009) The impact of capital-structure choice on firm performance: empirical evidence from Egypt. J Risk Finance 10:477–487. https://doi.org/10.1108/15265940911001385
10. Echekoba O, Ananwude J (2017) Impact of capital structure on financial performance in non-financial firms in Nigeria. J Manag Sci 6(8):66–78
11. Garba A, Inusa A (2017) Capital structure and firms' performance: evidence from listed oil and gas firms in Nigeria. SAU J Manag Social Sci 2(2):50–62
12. Javed B, Akhtar S (2012) Interrelationships between capital structure and financial performance, firm size and growth: comparison of industrial sector in KSE. Eur J Bus Manag 15(4):148–157
13. Jensen M, Meckling W (1976) Agency costs of free cash flow, corporate finance, and takeovers. J Financ Econ 3:305–320
14. Li XW, Du JG, Long HY (2019) Dynamic analysis of international green behavior from the perspective of the mapping knowledge domain. Environ Sci Pollut Res 26(6):6087–6098
15. Margaritis D, Psillaki M (2007) Capital structure and firm efficiency. J Bus Finance Acc 34(9–10):1447–1469
16. Margaritis D, Psillaki M (2010) Capital structure, equity ownership and firm performance. J Bank Finance 34(3):621–632
17. Mallin CA (2007) Corporate governance, 2nd edn. Oxford University Press, Oxford
18. Modigliani F, Miller M (1958) The cost of capital, corporation and the theory of investment. Am Econ Rev 48(3):261–297
19 Myers S, Majluf N (1984) Corporate financing and invetment decisions. J Financ Econ 13:187–198
20. Oke OS, Afolabi B (2011) Capital structure and industrial performance in Nigeria. Int Bus Manag 2(1):100–106
21. Okonkwo R (2017) Capital structure and firm performance. J Finance 3(5):11–20
22. Olajide S, Funmi R (2018) Capital structure and performance of quoted firms in Nigeria: a principal component analysis. SSRN Electron J. https://doi.org/10.2139/ssrn.2631469
23. Omukaga A (2017) Effect of capital structure on financial performance of firms in the commercial and service sector in the Nairobi securities exchange for the period 2012–2016. Retrieved from http://erepo.usiu.ac.ke/bitstream/handle/11732/3503/KIZITO%20O.%20OMUKAGA.pdf?sequence=1&isAllowed=y
24. Onaolapo AA, Kajola SO (2010) Capital structure and firm performance: evidence from Nigeria. Eur J Econ Finance Adm Sci 25(1):70–82
25 Opoku-Asante K (2022) The relationship between capital structure and financial performance of firms in Ghana and Nigeria. Eur J Bus Manag Res 7(1):237–244. https://doi.org/10.24018/ejbmr.2022.7.1.1282
26. Osuji C, Odita A (2012) Impact of capital structure on the financial performance of Nigerian firms. Arab J Bus Manag Rev 1(12):43–61
27. Oyakhire V (2019) Capital structure and performance of oil and gas companies in Nigeria. Int J Finance Commer 1(3):1–5
28. Petrovic J (2008) Unlocking the role of a board director: a review of literature. Emerald Insights J 6(7):1373–1391. https://doi.org/10.1108/00251740810911993
29. Salim MN, Susilowati R (2019) The effect of internal factors on capital structure and its impact on firm value: empirical evidence from the food and beverages industry listed on Indonesia stock exchange 2013–2017. Int J Eng Technol Manag Res 6(7):173–191. https://doi.org/10.5281/zenodo.3359550
30. Salim M, Yadav R (2012) Capital structure and firm profitability: evidence form Malaysian listed companies. Proc Social Behav Sci 65:156–166
31. Seid K (2017) The impact of capital structure on firm performance: empirical evidence from private manufacturing companies of Amhara regional state of Ethiopia. Res J Finance Acc 8(11):24–34
32. Sheikh NA, Wang Z (2012) Effects of corporate governance on capital structure: empirical evidence from Pakistan. Corp Gov Int J Bus Soc 12(5):629–641. https://doi.org/10.1108/14720701211275569
33. Toraman C, Kihc Y, Reis SG (2013) The effects of capital structure decisions on firm performance: evidence from Turkey. Int Conf Econ Social Stud 1(1):10–11
34. Tripathy S, Shaik A (2020) Leverage and firm performance: empirical evidence from Indian food processing industry. Manag Sci Lett 10(6):1233–1240. https://doi.org/10.5267/j.msl.2019.11.035
35. Uchechukwu N, Kingsley AM (2016) Effect of capital structure on firm performance (a study of selected quoted banks in Nigerian stock exchange). Int J Bus Manag 4(4):114–122
36. Vo XV, Ellis C (2017) An empirical investigation of capital structure and firm value in Vietnam. Financ Res Lett 22:90–94. https://doi.org/10.1016/j.frl.2016.10.014

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