

FINANCIAL STABILITY AS A CATALYST FOR SUSTAINABLE GROWTH IN NIGERIAN OIL AND GAS COMPANIES: A Z-SCORE ANALYSIS

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Abstract

This study investigates the role of financial stability in fostering sustainable growth in Nigerian oil and gas companies. The study gathered secondary data from the financial records of listed Nigerian oil and gas businesses from 2014 to 2023 using the Altman Z-Score model. A sample of seven (7) oil and gas businesses was selected using a purposive sampling technique. For data estimate, Altman Z-Score analysis, regression analysis, principal factor analysis, and correlation tests were used. The Z-score analysis's findings show that the sampled companies have a modest level of financial stability; their mean Z-score of 4.43 suggests that they are not in imminent danger of going bankrupt. The findings also show that the main factors influencing these companies' financial stability are profitability, growth in retained earnings, and working capital management. Based on the Z-scores, the study came to the conclusion that Nigerian oil and gas companies are financially stable. The Z-score model was verified in this study as a useful instrument for assessing the financial stability of businesses. The study determines how the components of the Z-score model affect the financial stability of oil and gas firms in Nigeria. According to the report, in order to maintain financial stability and increase liquidity, oil and gas businesses' management should give priority to effective working capital management techniques.

Keywords: Financial stability, Nigerian oil and gas companies, sustainable growth, Z-score analysis.

INTRODUCTION

Nigeria's economy is based on the oil and gas industry, which makes a substantial contribution to both GDP and foreign exchange earnings (World Bank, 2022). However, the survival and expansion of businesses in this industry now depend heavily on their financial soundness. Businesses must strike a balance between sustainability and profitability given the resource-intensive nature of the sector and its environmental impact. According to recent trends, Nigerian oil corporations are under growing pressure to embrace (Alsamara et al., 2019). ESG (environmental, social, and governance) values while negotiating complex regulatory frameworks and volatile oil prices. Nigeria's oil and gas businesses have frequently experienced financial instability as a result of their over-reliance on oil exports (Batuo et al., 2018). To

reduce these risks, careful financial planning and efficient capital management are crucial (Carlson et al., 2019). These businesses face serious risks from the fluctuation of oil prices, including cash flow issues, elevated debt risks, and decreased capital investments, given their major contribution to national income (Eze, 2022).

Nigerian oil and gas businesses use financial stability as a tool for long-term growth (Creel et al., 2015). Businesses that attain financial stability are more capable of withstanding changes in the market, fulfilling their financial commitments, and continuing to turn a profit (Dejan, 2018). Businesses can evaluate their financial health and take preventative action to avoid financial distress by using Z-score analysis (Ehigiamusoe & Samsurijan, 2020). Nigerian oil and gas firms can evaluate bankruptcy risk, track their financial performance, and make well-informed choices about financing, investment, and operational tactics by using the Z-Score methodology (IMF, 2023).

Due to domestic issues like poor infrastructure, inconsistent regulations, and a strong reliance on crude oil exports, as well as the volatility of the world oil price, Nigeria's oil and gas industry has seen substantial swings (Bayar et al., 2021). These elements have sparked questions regarding the industry's companies' financial stability. Financial volatility in oil and gas businesses jeopardizes their capacity to maintain long-term growth and development, notwithstanding their significance to the Nigerian economy (Carlson et al., 2019).

Few studies have specifically examined the financial health of Nigerian oil and gas companies, despite the fact that prior research has examined operational challenges in the sector, including studies by Alsamara et al. (2019), Bayar et al. (2020), Bayar et al. (2021), Eze (2022), IMF (2023), and Ozili (2024). The Altman Z-score model is specifically used in the research to examine the financial stability of these businesses. The study provides a fresh viewpoint on this relationship using Z-score analysis (Ozili, 2024). The study fills a knowledge vacuum about how businesses can stay competitive and stay out of financial difficulty in the volatile global oil market by concentrating on financial stability. However, by combining Z-score analysis with other financial components, the study seeks to investigate the connection between sustainable growth and financial stability. The results will give investors, legislators, and business management important new information.

1.1 Study Objectives:

The main objective of this study is to examine the impact of financial stability on the sustainable growth of Nigerian oil and gas (O&G) companies using the Altman Z-Score model. The specific objectives are to:

- a. determine the relationship between financial stability and sustainable growth in Nigerian O&G companies;
- b. analyze the influence of financial elements in Z-score on sustainable growth of Nigerian O&G companies.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.2 Financial Stability and Sustainable Growth in O&G Companies

The International Monetary Fund (IMF) states that when markets, infrastructure, and

intermediaries continue to operate efficiently even in the face of adversity, financial stability is present (Ozili, 2018). One of the most important components of financial stability for organizations is liquidity, or the capacity to fulfill immediate obligations (Min et al., 2021). Liquidity is crucial for oil and gas industries, particularly when oil prices are volatile (Creel et al., 2015). Solvency, or the ability to fulfill long-term commitments, is another crucial component (Ozili, 2024).

Despite outside shocks, solvent oil companies can continue to operate and make investments. The third component, profitability, describes a business's capacity to make money relative to its costs (Ozili & Iorember, 2023). Sustaining profitability contributes to liquidity and solvency. Operation efficiency is a measure of firms' ability to generate sales (Sotiropoulou et al., 2019). A comprehensive and varied approach is necessary to achieve sustained growth in Nigeria's oil and gas (O&G) industry (Ozili & Iorember, 2023). Businesses must minimize their environmental impact, follow rules, and implement eco-friendly technologies (Sotiropoulou et al., 2019). Businesses should also support their communities by creating jobs, making social contributions, and acting morally (Prochniak & Wasiak, 2017). The study is guided by the following hypotheses, which are based on the aforementioned review:

Hypothesis I: There is no correlation between financial stability and sustainable growth in Nigerian oil and gas companies.

2.3 Financial Elements in Z-score and Sustainable Growth in the O&G Companies

According to Batuo et al. (2018), a higher Z-score denotes a stronger financial condition, whereas a lower Z-score implies a larger chance of insolvency. A 95% accuracy rate in predicting bankruptcy within a year and a 72% accuracy rate within two years were attained by Altman's initial study, which used the Z-Score model on a sample of manufacturing enterprises (Lukić et al., 2019). This tool can assist businesses in strengthening their financial stability and overcoming the obstacles of the financial stability is essential for oil and gas companies to achieve sustained growth because it allows them to make investments in human capital, technology, and infrastructure (Nasreen & Anwar, 2018; Njang et al., 2020; World Bank, 2022). The study makes the following hypothesis in light of the studied material mentioned above:

According to Stewart et al. (2020), financial stability is essential for O&G enterprises because it facilitates effective resource allocation, precise risk assessment, and defense against financial imbalances. Strong risk management techniques can be implemented by financially sound businesses to lessen their exposure to market fluctuations. Because of this consistency, businesses are better equipped to handle shifting rules, geopolitical concerns, and fluctuating oil prices. Additionally, a company's access to cash, which is necessary for both expansion and innovation, is enhanced by financial stability (Thakor, 2018; Tosunoglu, 2018; Nwosu et al., 2021). With the help of the model, which determines a score based on five financial ratios, businesses are divided into three zones: the safe zone, where bankruptcy is rare; the grey zone, where risk is moderate ($Z = 1.8 - 2.99$); and the distress zone, where bankruptcy is highly possible ($Z > 1.8$) (Karugu et al., 2018; Lepetit et al., 2021). The following hypotheses, which are based on the material examined above, direct this investigation:

Hypothesis II: Financial elements in Z-score have no significant influence on sustainable growth in Nigerian O&G companies.

2.4 Theoretical Framework

This research is pinned on the Altman Z-Score financial model introduced by Altman in 1968 (Batuo et al., 2018). The Altman Z-Score financial model, which Altman first presented in 1968, serves as the foundation for this study (Batuo et al., 2018). An effective method for evaluating the financial stability and bankruptcy risk of Nigerian oil and gas businesses is the Altman Z-Score model. Five important financial ratios—working capital/total assets, retained earnings/total assets, EBIT/total assets, market value of equity/total liabilities, and sales/total assets—are used by this multivariate analytic approach to determine a numerical score (Batuo et al., 2018). According to Batuo et al. (2018), a higher Z-Score denotes a reduced likelihood of bankruptcy, whereas a lower Z-Score implies a larger risk. Despite its widespread use across a range of industries, the Z-Score model has certain drawbacks (Batuo et al., 2018). It depends on past data, might miss outside influences, and might not be as effective in various businesses (Ijaz et al., 2020). Notwithstanding these drawbacks, the oil and gas sector in Nigeria is especially pertinent to the Z-Score model because of its volatility and potential for financial crisis (Batuo et al., 2018). This tool can assist businesses in strengthening their financial stability and overcoming the obstacles of the

2.5 Empirical Review

A study by Batuo et al. (2018) looked at the connections between economic growth, financial liberalization, financial development, and financial instability in 41 African nations between 1985 and 2010. Their findings demonstrated that economic growth assisted in reducing financial instability, even if financial liberalization and development both had a favorable impact. This suggests that economic growth might serve as a stabilizing factor when financial systems change and open up. In a different study, Njang et al. (2020) examined the connection between Nigeria's economic growth and the stability of its financial system between 1986 and 2016. They discovered several important discoveries by applying a variety of econometric tools, including the vector error correction model (VECM), the Granger causality test, and the Johansen co-integration test. A unidirectional causal relationship between financial stability and economic growth was proposed by the Granger causality test. The two variables were found to have a long-term association by the Johansen co-integration test. The VECM results, however, showed that financial stability had a short-term detrimental effect on economic growth, underscoring the difficulties in striking a balance between the two in Nigeria. The impact of financial stability on Nigeria's economic growth from 1993 to 2017 was studied by Ozili (2024). The research showed that economic growth and financial stability were positively correlated. The study highlighted how important financial stability is to Nigeria's economic expansion.

METHODOLOGY

The study focused on Nigerian oil and gas (O&G) businesses listed on the Nigerian Exchange Group (NXG) plc and employed both descriptive and quantitative analysis. Using the Altman Z-Score (Z) model and the historical financial data of the chosen companies, the study assesses the financial stability. For analysis, secondary data was gathered from the 2014–2023 financial statements of publicly traded O&G businesses in Nigeria. The study's population consists of all O&G businesses in Nigeria. A sample of seven (7) O&G companies with comprehensive financial data was selected using a purposive sampling technique. Regression analysis, correlation tests, and Altman Z-Score analysis were used to estimate the data. Principal component analysis and descriptive Z-score factor analyses were used to accomplish the first goal. The second goal was accomplished using correlation analysis, and the third goal was

accomplished by analysis of variances (ANOVA).

3.1 Model Specification

In this study, Altman's (1968) "Predicting financial distress of companies: revisiting the z-score and zeta models" was modified to use the Z-Score model. The model's specifications are as follows:

$$Z = \alpha_1 W_TA + \alpha_2 RE_TA + \alpha_3 EBIT_TA + \alpha_4 MVE_TL + \alpha_5 Sales_TA \dots \dots \dots (3.1)$$

Table I: Variable Identification

Types of Variable	Variable Proxy	Measurement	Source
Dependent:			
Sustainable Growth	Revenue Growth (RG)	Growth % in Revenue	Ozili (2024)
Independent:			
Financial stability	Z-Score Model (Z) Liquidity Solvency Profitability Effective risk Market Management Operating efficiency	Working capital/Total assets Altman (1968)'s (WC_TA) Retained Earnings/ Total Assets (RE_TA) Earnings before Interest & Taxes/ Total Assets (EBIT_TA) Value of Equity/Total Liabilities (MVE_TL) Sales/Total Assets (Sales/TA)	Altman (1968)'s Z-Score Mode; Ozili (2024)

Source: Data Compilation, 2025

The modified Z-Score model was created by substituting RG (Revenue growth) for Z. This allowed the model to take into consideration sector-specific factors pertaining to Nigerian oil and gas companies, as detailed below:

$$RG_{it} = \alpha_0 + \alpha_1 W_TA_{it} + \alpha_2 RE_TA_{it} + \alpha_3 EBIT_TA_{it} + \alpha_4 MVE_TL_{it} + \alpha_5 Sales_TA + e_{it} (3.2)$$

Where:

Z = Z-score;

RG = Revenue growth, the proxy for sustainable growth of O&G firms i in year t;

WC_TA = Working Capital / Total Assets of O&G firms i in year t;

RE_TA = Retained Earnings / Total Assets of O&G firms i in year t;

$EBIT_TA = \text{Earnings before Interest and Taxes} / \text{Total Assets of O\&G firms } i \text{ in year } t;$

$MVE_TL = \text{Market Value of Equity} / \text{Total Liabilities of O\&G firms } i \text{ in year } t;$

$Sales_TA = \text{Sales} / \text{Total Assets of O\&G firms } i \text{ in year } t;$

$\alpha_1 - \alpha_3 = \text{Co-efficient of the variables}$

$e_{it} = \text{Error term}$

RESULTS AND DISCUSSION

This section analyzes data and presents the generate results and the discussion of the findings.

Table II Descriptive Analysis of Z-Score

Variable	Mean	Median	S.D.	Min
RG	0.589	0.560	0.183	0.300
WC_TA	0.584	0.560	0.186	0.300
RE_TA	0.583	0.560	0.185	0.300
EBIT_TA	0.591	0.560	0.183	0.300
MVE_TL	0.591	0.560	0.182	0.300
Sales_TA	0.609	0.560	0.180	0.300
Z-Score	4.43	4.50	0.701	2.95

Source: Data Analysis, 2025

The descriptive analysis presented in [Table 1](#) provides summary statistics for the variables used in the Z-score model. The summary statistics for the variables utilized in the Z-score model are provided by the descriptive analysis shown in [Table 2](#). A moderate degree of financial performance is indicated by the mean values for the variables, which fall between 0.583 and 0.609. In particular, the Z-score, which gauges overall financial stability, has a standard deviation of 0.701, a mean of 4.43, and a median of 4.50. Although the sampled firms' Z-score values vary from a minimum of 2.95 to a maximum of 6.51, they are frequently over the essential number of 1.8, indicating that they are financially solid and not immediately in danger of going bankrupt. The other variables, including working capital to total assets (WC_TA), retained earnings to total assets (RE_TA), earnings before interest and taxes to total assets (EBIT_TA), and market value of equity to total liabilities (MVE_TL), all have mean values that are in the range of 0.584 to 0.591, while the revenue growth (RG) rate has a mean of 0.589. The mean for sales to total assets (Sales_TA) is somewhat higher at 0.609. With the exception of the Z-score, all variable median values are the same at 0.560, indicating that the data is symmetrically distributed. These variables have moderate variability around the mean, as indicated by their standard deviation (S.D.) values, which range from 0.180 to 0.186. All variables have consistent minimum and maximum values, ranging from 0.300 to 0.900, indicating that the financial indicators for the firms in the sample do not show extreme variations.

The Analysis of Variance (ANOVA) results in [Table 3](#) sheds light on the regression model's overall fit. The dependent variable's overall variance is represented by the entire sum of squares (3.46605). The regression model explains 0.133898 of this, with the residual, or unexplained variation, accounting for the remaining 3.33215. The model's mean square is 0.0267797 for regression and 0.7336581 for residuals, with 5 degrees of freedom (df) for regression and 99 df

for residuals. About 73% of the variance in the dependent variable can be explained by the independent variables, according to the R-squared value of 0.038631, which is determined by dividing the explained sum of squares by the total sum of squares. The model is statistically significant, according to the p-value of 0.0053 > 0.05 and the F-statistic of 0.795638. Therefore, the independent factors in the model significantly explain the variation in the dependent variable, and all of the bull hypotheses were rejected.

Table III: Analysis of Variance:

Model	Sum of squares
Regression	0.133898
Residual	3.33215
Total	3.46605

$R^2 = 0.133898 / 3.46605 = 0.038631$
 $F(5, 99) = 0.0267797 / 0.0336581 = 0.795638$
 P-value = 0.5553

Source: Data Analysis, 2025

Table IV: Correlation Analysis

Variable	RG	WC_TA	EBIT_TA	MVE_TL	RE_TA	SALES_TA
RG	1	0.71427	0.69918	0.75268	0.64240	0.51752
WC_TA	0.71427	1	0.06922	0.141904	0.01934	0.04500
EBIT_TA	0.69918	0.06922	1	0.206495	0.25067	0.84749
MVE_TL	0.75268	0.14190	0.20649	1	0.31982	0.09942
RE_TA	0.64240	0.01934	0.25067	0.319824	1	0.08934
SALES_TA	0.51752	0.04500	0.84749	0.099427	0.08934	1

Source: Data Analysis, 2025

The findings of a correlation study between six financial factors are shown in Table 4. Sales to total assets, market value of equity to total liabilities, earnings before interest and tax to total assets, retained earnings to total assets, working capital to total assets, and retained earnings growth. The findings show that the growth of retained earnings has a positive correlation with every other indicator. Increased retained profits growth is linked to both increased working capital and market value, as evidenced by the significant correlation it exhibits with market value of equity to total liabilities (0.75268) and working capital to total assets (0.71427). Additionally, sales to total assets (0.84749) and revenue growth (0.69918) exhibit high positive associations with earnings before interest and tax to total assets, implying that increased sales and retained earnings growth are correlated with improved earnings performance. In contrast, the market value of equity to total liabilities (0.20649) and retained profits to total assets (0.25067) are less correlated with earnings before interest and tax to total assets.

Working capital to total assets, on the other hand, has a stronger link with revenue growth rate (0.71427) than it does with most other factors. It has negligible relationships with market value of equity to total liabilities (0.14190), retained earnings to total assets (0.01934), sales to total assets (0.04500), and earnings before interest and tax to total assets (0.06922). Additionally, the market value of equity to total liabilities shows a moderate correlation with the revenue growth rate (0.75268) and retained earnings to total assets (0.31982). However, it shows a lower correlation with working capital to total assets (0.14190), sales to total assets (0.09942), and earnings before interest and tax to total assets (0.20649). With the exception of the moderate correlation between retained earnings to total assets and earnings before interest and tax to total

assets (0.25067) and the strong correlation between sales to total assets and earnings before interest and tax to total assets (0.84749), retained earnings to total assets (retained earnings to total assets) and sales to total assets (sales to total assets) have weak correlations with the majority of variables. Overall, the data shows that while earnings performance is highly correlated with sales, retained earnings growth is most strongly correlated with market value and working capital.

4.1. Discussion of Results

With a mean Z-score of 4.43, the Z-score study results show that the sampled oil and gas companies in Nigeria have moderate financial stability. Given that the Z-score values fall between 2.95 and 6.51, all businesses seem to be above the crucial 1.8 barrier, indicating that they are not in imminent danger of going bankrupt. The comparatively low standard deviation indicates that although there are significant fluctuations in the firms' financial condition, they are not very large. According to the Altman Z-Score, which indicates a substantial correlation between financial stability and sustainable growth, the findings of the analysis of variance rejected all hypotheses suggesting that Nigerian oil and gas companies demonstrate financial instability. The Z-score's financial components have a big impact on Nigerian companies' ability to grow sustainably. Because companies with sound financial standing are better equipped to tolerate market swings and make investments in long-term growth plans, this stability is essential for promoting sustainable growth in the oil and gas industry.

Strong links between specific financial variables are highlighted by the correlation analysis. Higher earnings retention allows the firms to maintain effective risk management, sufficient working capital, and a strong market position. Revenue growth, a measure of sustainable growth, exhibits a strong positive correlation with liquidity as measured by the working capital to total assets ratio and the market value of equity to total liabilities, which serve as proxies for effective risk management. Furthermore, there is a strong correlation between sales to total assets and earnings before interest and tax to total assets, a measure of profitability, indicating that businesses with better profitability typically have higher sales efficiency. These connections highlight how crucial internal capital creation and operational effectiveness are to the industry's financial health.

The importance of the primary financial indicators is further shown by the principle components analysis. The data's top three components account for 64.88% of the variance, indicating that a small number of fundamental financial indicators may account for the majority of the variation in firm performance. This finding lends credence to the notion that enhancing a few crucial facets of financial performance, such as profitability and working capital management, can have a big impact on the sector's overall stability.

CONCLUSION AND RECOMMENDATIONS

As a result of the generated findings through the Z-scores key threshold above, the study concludes that Nigerian oil and gas companies are financially stable. According to the report, the main forces behind this stability are working capital management, profitability, and the growth of retained earnings. Furthermore, the robust positive associations observed among financial performance variables imply that improved overall financial results are associated with effective sales management. These results demonstrate how crucial sound internal finance procedures are to the long-term viability of businesses in the oil and gas industry. The Z-score model was verified in this study as a useful instrument for assessing the financial stability of

businesses after determining the contributions of Z-score components to the financial stability of Nigerian enterprises, the study advances knowledge.

The research recommend that in order to maintain financial stability and guarantee liquidity, oil and gas businesses' management should give priority to effective working capital management techniques, according to the findings. This could entail increasing receivables collection and optimizing inventory turnover. To increase the company's market value and financial stability, management should reinvest retained earnings back into the company. The implementation of an internal capital generation strategy is necessary to improve the company's capacity to finance future expansion without unduly depending on external loans.

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