UMM Journal of Accounting and Financial Management (UMMJAFM)
journals@umm.edu.ng

PETROLEUM ACCOUNTING PRACTICE AND VARIABILITY OF EARNINGS IN NIGERIAN OIL AND GAS SECTOR

KORNA Johnmark Mkav[1*], ANGAHAR Paul Aondona[2], AJEKWE Clement Christopher [3]
[1]Department of Accounting and Finance, Joseph Sarwuan Tarka University, Makurdi
[2&3]Department of Accounting, Benue State University, Makurdi
*Correspondence author: johnmarkkorna@gmail.com; +2348034679861

Abstract
The work investigated accounting practice and earnings variability in the Nigerian oil and gas industry. The specific objective was to determine the effect of full cost and successful efforts accounting on earnings variability. Secondary data was sourced from the director's reports of annual financial statements for the sampled companies studied. The ex-post facto research design was adopted to determine the effect for 8 oil and gas companies purposively selected for the period of 2006-2023. The panel regression model estimation technique was employed using the STATA computer software version 21.0 for statistical analysis. Findings revealed that full cost accounting had a negative significant effect on earnings variability while successful efforts accounting had a positive insignificant effect on earnings variability. It was recommended that oil companies operating in Nigeria should adopt full cost accounting for their operations and practice.

Keywords: Earnings Variability, Full Cost Accounting, Successful Effort Accounting, Earnings Management

Introduction

Earnings management which is defined generally as the manipulation of earnings both inside and outside the boundaries of acceptable accounting principles has been of great concern among accounting practitioners and regulators and considerable attention in accounting literature and subsequently it has been argued that it marks the true financial result and position of businesses and obscures facts that stakeholders ought to know (Loomis, 1999) Notably, earnings management has been a major preoccupation of the accounting bodies and regulatory authorities saddled with statutory responsibility of overseeing and monitoring the activities of corporations. One of the major properties of earnings quality is earnings variability and it has been investigated in research over time. Earnings variability sometimes referred to as earnings smoothness is one of the measures of earnings quality and is a key component of the financial statements of companies.

Attempts to have a uniform financial accounting standard to ensure comparability of financial reporting in the oil and gas industry over the years have been futile (Abdulsalam, 2016). As far back as 1969, the American Institute of Certified Public Accountants (AICPA), the then standard setter in the United States recommended the use of only successful efforts method in order to eliminate full cost accounting method but the recommendation could not stand the test of time. The Financial Accounting Standards Board (FASB) which assumed the role of standards setting in the US in 1973, upon the request of the Securities and Exchange Commission (SEC) issued an exposure draft (SFAS No.19) in 1977, mandating oil and gas companies to use successful

efforts method of accounting (Nicholas 2012). The basis of the argument was that exploratory dry holes do not result in any future cash flow benefit and therefore could not be capitalized or treated as an asset in the statement of affairs of companies. However, proponents of full cost accounting method especially small or infant companies strongly opposed the decision. They argued that the proposed elimination of full cost method would affect their ability to raise capital from financial markets due to the volatility in their earnings or net income if they were forced to adopt the successful effort method (Dehne, 1983). SEC could not withstand political pressure and rescinded the elimination of the full cost accounting method. Cortese et al.. (2008) stated that full cost was a popular accounting method for smaller companies; hence they could capitalize all the costs they incur so that they looked bigger. In 1981, SEC then publicized a new method known as Reserve Recognition Accounting (RRA) to replace both full cost and successful efforts methods since neither of the methods disclosed the proved reserves. The fair value accounting method base was to be used in valuing the proved reserves (SEC, 1979). The challenges faced by the oil and gas companies in terms of subjectivity involved in disclosing the volume and value of proved reserve led to the failure of the RRA method (Nicholas, 2012).

The International Accounting Standard Board in its quest for a comprehensive reporting standard for the oil and gas industry in 2004 issued the International Financial Reporting Standard (IFRS) number 6, (Exploration for and Evaluation of Mineral Resources (IASB 2004). The IFRS 6 required exploration and evaluation assets to be measured and recorded at cost but permitted the use of either full cost or successful efforts methods. In recent times, the International Accounting Standards Board (IASB) has been developing various accounting standards for the oil and gas companies accounting practices. And in consistency with the Financial Accounting Standard Board (FASB), IASB intends to base the preparation of primary financial statements on historical method of accounting (Bryant, 2003). While most academic literature, (Bryant 2003; Magliolo (1986) emphasized on the relevance of reserve estimates in firm valuation, the IASB still plans to use historical cost measurement for both full cost and successful efforts companies but intends to require supplemental disclosures or information on estimates for reserves (IASC 2000). Hitherto, oil and gas companies have the choice to either select to apply full cost method or successful efforts method of accounting in the preparation of their annual financial reports.

In Nigeria today, some oil and gas companies choose to use the successful efforts method of accounting while others prefer the full cost method of accounting. The other method the Reserve Recognition Accounting method is hardly in use due to its unpopularity. The fact that the operating oil and gas companies in Nigeria are from different countries of the world necessitates the use of varying accounting principles and procedures for recording and reporting in accordance with those practiced in their respective companies' home country. The Nigerian Accounting Standard Board (NASB) in 1991 constituted a steering committee on oil and gas accounting with a view to producing a statement on accounting practices for the petroleum industry. The committee's recommendations formed the major part of the statement of accounting standard (SAS 14) released for compliance in 1994. NASB issued another accounting statement for the Downstream Petroleum Industry known as (SAS 17). Both standards have endorsed the use of either the successful efforts or the full cost methods. The use of the methods have

been considered as conforming to generally acceptable accounting principles and both in various forms are widely used in the country today. A survey of nearly 300 oil and gas companies in Nigeria, informed that roughly fifty percent used Full Cost Accounting and the remaining used Successful Efforts Costing (Uche, 2000). The issuance of the standard statements in Nigeria has hitherto not hindered oil companies from adopting any accounting method of their choice. It is on the basis of the aforementioned issues raised; that this research sought to focus on the extent the practice of accounting methods affects variability of earnings in the Nigerian oil and gas industry.

The problem however is that even though there has been a lot of research work aimed at exploring the effect of accounting practices (i.e. the use of full cost and or successful efforts accounting methods) in the oil and gas industry, not many of such works have been carried out in Nigeria. Works such as Aguguom & Salawu (2022), Taiwo, et al (2020), Munir et al (2020), Sabo (2019), Anaekenwa et al (2019), have turned to focus more on the general attributes of the firm which include size, ownership control, pre-adoption earnings, prior year earnings, regulation, risk, debt-to-equity, incentive compensation etc proxy by four main categories: political costs, regulations, debt contracts, and incentive compensation plans as explanatory variables thereby ignoring investigations on reported earnings variability of oil companies. The two gaps enumerated above necessitated the need to carry out a research in this area.

Objectives of the Study

The broad objective of the study was to ascertain the effect accounting practice has on variability of reported earnings in the Nigerian oil and gas industry. The specific objectives included the following:

(1) To ascertain the effect of full cost accounting on earnings variability in the Nigerian oil and gas industry
(2) To determine the effect of successful efforts accounting on earnings variability in the Nigerian oil and gas industry

Hypotheses of the Study

The research hypotheses were as follows:

Ho_1: Full cost accounting method does not significantly affect earnings variability in the Nigerian oil and gas industry.

Ho_2: Earnings variability is not significantly affected by the practice of successful efforts accounting in the Nigerian oil and gas industry.

Empirical Review

Some empirical studies have been carried out on the variables of interest in this study namely: reported earnings variability and accounting practice. The empirical studies are hereby reviewed in this section as follows:

Aguguom & Salawu (2022) studied earnings smoothing and market share price: evidence from Nigeria. The reason for the study was that empirical studies of earnings smoothing revealed inconclusiveness as most corporate organizations considered earnings smoothing irresistible. A theoretical debate suggested that earnings smoothing happened as a strategic flattening of curves to remain afloat or intentionally to fix managerial incompetence. Following this argument therefore, the research investigated the impact of earnings smoothing on the market share price of listed companies in Nigeria. The study adopted ex-post facto research design using data sourced from published financial statements of selected companies. The population comprised 173 listed companies in Nigeria, covering a period of 2009-2020 as of 31st December 2020. 51

companies were purposively selected. The reliability and validity of the data was based on financial statements audited by the external auditors. The panel data was employed for the estimation using the Unobserved Effects Model (UEM), and Hausman test results to choose between random effect and fixed-effect models. The study found that earnings smoothing had a positive significance on market share price. Introducing control variables, SMOTH exhibited a negative significant impact on MSP while LEV revealed a negative significant impact.

Solomon *et al* (2022) carried out a study on the effect of debt covenant violation on accrual-based earnings management of listed consumer goods firms in Nigeria. The study examined the effect of debt covenant violation on accrual-based earnings management of listed consumer goods firms in Nigeria. The study used data extracted from the financial statement of 15 listed consumer goods firms in Nigeria for the period of 2011 to 2018. The study employed ex-post facto design and panel regression technique of data analysis. The study revealed that debt covenant violation has negative significant influence on accrual-based earnings management of listed consumer goods firms in Nigeria.

Macgregor & Ibanichuka (2021) examined accounting information quality and firm performance of quoted oil and gas companies in Nigeria. The aim of the study was to empirically analyze the relationship between accounting information quality and firm performance of oil and gas companies in Nigeria. Time series data on different types of accounting information quality and earnings per share from 2009-2018 were collected from central bank of Nigeria statistical bulletin, annual central bank of Nigeria reports, national bureau of statistics and Federal Inland Revenue Service. Ordinary Least Square regression analysis, Autoregressive Distribution Lag, Co-integration, Augmented Dickey-Fuller Unit root test, Serial Correlation and Heteroskedasticity test and Error Correction model with the aid of E-view version 10 were employed. The empirical results indicated that accounting information quality significantly relate to firm performance; explaining about 83.1% of total variation in earnings per share, audit lag and disclosure quality were each found to significantly relate to earnings per share.

Alwan, *et al* (2021), studied earnings quality and income smoothing motives: evidence from Indonesia. The research was conducted to analyze the quality of earnings and income smoothing motives in manufacturing companies in Indonesia. The research approach was carried out with a quantitative approach. The sampling method using purposive sampling was associated with several criteria so that a sample of 130 was determined, which was analyzed during the 4 years of the study. The data used was financial reports of manufacturing industries listed on the Indonesia Stock Exchange in 2013–2019. The partial least square method was used for data analysis. The results of the study showed that institutional ownership had no effect on earnings quality, institutional ownership had a negative effect on income smoothing, leverage had a negative effect on income smoothing, independent commissioners had a positive effect on earnings quality as well as independent commissioners had a positive effect on income smoothing. The research assumed that the tendency of income smoothing could affect the quality of efficient earnings.

Rusdiah *et al* (2021) investigated the effect of firm size, debt, current ratio, and investment opportunity set on earnings quality: An Empirical Study in Indonesia.

The study analyzed the effect of the variables firm size, the leverage ratio as manifested by the debt-to-equity ratio, the liquidity ratio exemplified by the current ratio, and the investment opportunity set (IOS) on earnings quality. The study subjects were initial public offer (IPO) companies engaged in the food and beverage sector with a study observation period using secondary data (financial statements), namely in 2016–2019, totaling 17 companies. Several stages of testing were carried out to answer statistical analysis such as the use of normality test, heteroscedasticity test, multicollinearity test, *T*-test, and *F*-test) and the final testing stage was the regression test. The results of the study showed that the firm size, leverage ratio, does not contribute to earnings quality. Liquidity positively contributed to earnings quality, IOS also contributed to earnings quality.

Erekle (2020) studied earnings persistence and predictability within the emerging economy of Georgia. The purpose of the study was to provide the first empirical assessment of the persistence and predictability of earnings within the Georgian private sector entities. The sample comprised of all the Georgian private sector entities which according to the new Law of Georgia on Accounting, Reporting and Auditing (2016), had to submit their audited financial statements by 1 October 2018. Financial data had been officially withdrawn from the Ministry of Finance of Georgia and the descriptive data had been obtained by the use of Link Klipper and ScrapeStorm tools through the official "Reportal" website. The final sample consisted of 450 large Georgian private sector entities. The study used a simple, one-year-lagged earnings auto-regression to detect the persistence and predictability within the next series of earnings. A weighted least square method had been used as a statistical procedure. Findings revealed that current earnings persisted within the next year's series of earnings at less than 25%, while the reliance on current year's earnings enabled the researcher to predict the next year's earnings only with a chance of 20%. Further analysis had witnessed that cash flows from operations persisted at less than 40% and were able of predicting the next year's cash flows at below 35%. Overall, the properties of earnings and cash flows within the private sector of Georgia were of relatively poor quality, with the latter demonstrating higher properties compared to earnings.

Taiwo, *et al* (2020) carried out a study on earnings predictability of quoted firms in Nigeria. The study evaluated the earnings predictability of Nigerian quoted firms with a view to establishing the ability or inability of earnings to predict itself. Also, the study examined the impact of volatility on earnings predictability of Nigerian quoted firms. The total number of seventy three (73) quoted Nigerian firms constituted the population of the study and the entire 73 firms were studied. The causal relationship research design was adopted. The secondary data used were collected from the financial statements of the quoted firms for the period 1996 to 2015. The system generalized method of moment (GMM) was used to estimate the dynamic panel regression models of the study. The study found that earnings of firms are predictable. The study also found that volatility had adverse effect on earnings predictability.

Mazadu, (2020) carried out a study on earnings predictability and adoption of the International Financial Reporting Standards (IFRS) in the Nigerian deposit money banks. The study investigated the effect of earnings predictability on the IFRS adoption in the Nigerian deposit money banks. The population of the study was all the 14 listed Nigerian deposit

money banks as at 31st December 2016 out of which ten banks were drawn as sample. The multivariate technique of data analysis was employed using a multiple regression model, structured using longitudinal balanced panel data. The findings of the study revealed that earnings under IFRS adoption predicted and influenced the share price of listed Nigerian deposit money banks more than before adopting of IFRS.

Munir, *et al* (2020) examined the effect of monitoring characteristics on earnings quality of listed conglomerate firms in Nigeria for the period of ten years from 2010-2019. Three variables independent directors, audit committee and institutional ownership were used to represent monitoring characteristics. The Francis et al (2005) model was used as measure of earnings quality. Multiple panel regression was used to test the model of the study using Ordinary Least Square (OLS) regression and data was collected from the annual reports and accounts of the sampled firms. The findings of the study revealed that two of the monitoring characteristics variables (IND and INST) positively and significantly affected earnings quality while AC had a significant but negative effect on earnings quality of listed conglomerate firms in Nigeria.

Hung *et al* (2020) studied the impact of earnings quality on firm value: the case of Vietnam. The study aimed at investigating the impact level of earnings quality on firm value. The study had used data with 3,910 observations at listed firms on Vietnam Stock Exchange for the period from 2010 to 2018, and GLS regression analysis was employed in the research. Earnings quality was measured in the aspects of earnings management, earnings persistence, and timeliness of profitability. The study also considered a number of controlled variables that positively influenced the firm's value such as firm size, fixed asset investment rate and dividend payout ratio. The results showed that earnings quality was positively associated with firm value with having statistical significance. In contrast, some determinants negatively influenced firm value such as financial leverage, ratio of market value to book value, and revenue growth. Determinants of firm size, the rate of investment in fixed assets, rate of dividend payment positively affected the firm value. In contrast, determinants of financial leverage, revenue growth rate and market value to book value ratio were inversely related to firm value according to economic value, Tobin‟s Q or Price.

Nurani & Widi (2020) studied earnings persistence, earnings power, and equity valuation in consumer goods firms. The purpose of this study was to examine the influence of earnings persistence and earnings power on equity valuation. The purposive sampling method was applied to determine the samples of selected 100 firms. The study employed secondary data obtained from the annual reports and financial statements of consumer goods firms listed on the Indonesian Stock Exchange for the period 2010–2014. The analysis technique used a multiple regression analysis. Findings showed that, partially, earnings persistence and earnings power affect equity valuation by investors. Earnings persistence had a negative influence, whereas earnings power had a positive influence on equity valuation.

Sabo (2019) carried out a study on earnings quality of the Nigerian oil and gas companies during global decline of oil prices. The objective of the study was to examine the significant relationship between the Nigerian oil and gas companies and earnings quality during the decline of oil prices in the world market based on the agency theory. The sample of the study was 20 companies drawn equally

from the oil and gas and the non-oil and gas companies.
Dummy variables 1 and 0 were assigned to both the oil and gas and the non-oil and gas companies respectively. The companies were selected from the Nigerian Exchange Group for the period of 2014 - 2016 with a total of 60 observations. A discretionary accrual model based on the modified Jones model by Kothari et al. (2005) was used to examine earnings quality of the oil and gas sector. The study revealed a significant negative relationship between Nigerian oil and gas companies and earnings quality during the global decline in the prices of oil. The regression results showed other determinants of earnings management as control variables which included firm performance, financial leverage and firm size to have a significant impact on the earnings quality of the Nigerian oil and gas companies.

Maher *et al* (2019), examined the impact of accounting earnings quality on the going concern in the Iraqi tourism firms. The aim of the study was to explore the effect of the quality of accounting earnings in improving a company's ongoing concerns by using a sample of hotels listed on the Iraq Stock Exchange. The study used a quantitative methodology to measure the variables based on models derived from the relevant literature. The study involved the financial data of all hotels listed on the Iraq Stock Exchange for the period 2008-2017, which were extracted from the financial reports of the companies as well as the bulletins of the Iraq Stock Exchange. The results showed a significant correlation between earnings quality and the going concern of the hotels, and the age of the hotels additionally had an impact on its going concern status. One of the most important determinants of this study was the small size of the research population represented in the Iraqi hotels sector listed in the financial market, which included only 9 hotels. The research was the first study of its kind in that it tested the impact of the quality of accounting earnings in enhancing the value of the company in the Iraqi environment, which was currently witnessing a vigorous movement to encourage tourism into the country.

Anaekenwa *et al* (2019) studied earnings quality and firms book value taking empirical evidence from the listed firms in Nigeria. The study examined the effect of earnings quality on book value of quoted companies in Nigeria from 2000 to 2016. A sample of 51 firms was purposively selected for the study out of the population of 173 firms that were listed on the Nigerian Stock Exchange for the period. The study adopted Ex-post facto research design. Data was extracted from the published audited financial statements of the firms. Pooled OLS technique was employed in data analysis. The study measured earnings quality with four separate earnings attributes: Accruals quality (AQ), earnings persistence (EPERS), earnings predictability (EPRED), and earnings smoothness (ESMOTH). The study revealed that earnings quality significantly affected book value of the listed firms in Nigeria. Specifically, accruals quality (AQ), earnings persistence (EPERS) and earnings smoothness (ESMOTH) each had a positive effect on book value while earnings predictability (EPRED) had negative effect on book value.

Ojugbeli (2018) studied governance structures/ attributes and earnings quality in an oil driven economy: A study of Nigerian oil and gas firms. The study analyzed the concept of governance structures/attributes and examined how firm-level governance structure could affect the quality of accounting earnings of firms in oil driven economy (Nigeria). Data from nine (9) firms listed in the oil

and gas sector in Nigeria were obtained between years 2009-2016 and subjected to analysis. The formulated hypothesis was tested based on the specified multiple regression model; and with the F-Statistics from the OLS regression output. The governance attributes analyzed (CEO ownership, managerial ownership, board size, board independence, board meetings, gender diversity, audit committee size, independence and expertise) were found to have significant effect on earnings quality of the sampled listed oil and gas firms.

Mohamed, *et al* (2018) studied the impact of earnings quality on the stock performance in the stock exchange market: evidence from Egypt. The purpose of the study was to measure impact of three determinants on the firm performance using the earnings quality as an intermediary variable. The three determinants measured in the research were firm specific return volatility, earnings management, and the corporate governance. The research was applied in the Egyptian stock exchange market during the time frame 2010-2017. The data was analyzed using secondary data drawn from the annual reports of the 30 sampled most active companies of Egygt. Statistical techniques, like the Jarque-Bera Test, Pearson correlation, and structure equation modeling were employed for testing of hypotheses. The results of the statistical analysis indicated significant impact on firms' specific return volatility, earnings management, corporate governance, of firms' stock performance in the Egyptian stock exchange market.

Methodology

Research Design

This study adopted ex-post facto research design. The design was also used because of the availability of data from the annual reports of the sampled oil and gas companies under investigation. The data obtained from the sampled companies were used for analysis because the companies were registered and they presented a more reliable source of information since their accounts were published accounts.

The scope of this study was limited to the Nigerian oil and gas industry (upstream sector only). The period for the study covered fifteen years from 2006 to 2020. The choice of the period was to be able to use recent data so that the findings of the study could be recent and relevant to the contemporary situation.

Secondary data was generated from published annual reports of the sampled companies. The study used published raw data from director's report in the annual reports of companies selected for the study. Annual reports which were the major source of data were obtained from the Nigerian Exchange Group and processed by a public online database maintained by MachameRatios Database, a registered regression data providing company. Data for the list of exploration oil and gas companies registered in Nigeria were obtained or downloaded from a registered google online information provider nairametrics.coM

Techniques of Data Analysis

The statistical techniques which were employed in testing and analyzing all the hypotheses were as follows: Panel regression analysis, correlation test, heteroskedasticity test, hausman test, multicollinearity test. These tools or techniques were very relevant in testing the hypotheses because they were the most widely used statistical techniques in social and management sciences. Their ability to measure the degree of association between dependent and independent variables as well as determine the causal effect of the relationship made them relevant to this study. The instruments were employed

through the use of the STATA computer software version 16.0 to ensure accuracy in statistical analysis.

Model Specification

The model adopted for this study was the panel regression analysis model which is a tool popularly used by researchers to measure the extent of the causal relationship between the dependent and independent variables. In order to test for the relevance of the hypotheses regarding the effect of accounting practice on earnings variability of oil and gas companies in Nigeria, the following multiple regression equation as used in Onwumere (2009) was applied for the respective variables and analysis of the hypotheses:

$Y = f(X_1, X_2, X_3)$ - (1)

where Y is the dependent variable which describes earnings variability

X is the independent variable which represents accounting practices (full cost and successful efforts accounting), f represents an acronym for function of the independent variable.

The above equation takes the form of a two-variable linear function:

$Y = \alpha + \beta_1 X_1, \beta_1 X_2, \beta_1 X_3 + \mu$ - (2)

Where,

Y= dependent variable
X= independent variable
α = constant indicating the point of interception with Y.
β = slope or gradient or coefficient of X
μ = error or control term
Rewritten as

EarVar=f (AcctgPract) - (3)

The following models was therefore specified for analysis of the stated hypotheses:

$EarVar = \alpha + \beta_1 FCAcctgPract + \beta_1 SEAcctgPract + \mu$ - - - - - - - - - - -(4)

Where,
EarVar= Earnings Variability
FCAcctgPract = Full Cost Accounting Practice
SEAcctgChoi = Successful Efforts Accounting Practice
α = constant indicating the point of interception with independent variable.
β = slope or gradient or coefficient of dependent variable

μ = control variables represented by FSIZE, ROA and LEV

Data Presentation

Data collected from the sampled oil and gas companies have been presented in tables and analyzed. In this section, analysis was done in the following manner:

4.2.2 Descriptive Statistics

Table 4.1: Descriptive Statistics of the Study Variables

Variables	Obs	Mean	Std Dev	Min	Max
EVAR	120	0.1628	1.6266	-3.58	3.47
FC	120	0.5667	0.3321	0	1
SE	120	0.4333	0.4976	0	1
ROA	120	3.24	19.67	-71/36	176.27
FSIZE	120	3.65+e07	5.57+e7	55.542	2.78+e8
LEV	120	32	15.91	4	64

Source: STATA Output, 2022.

Table 4.1 showed the result of the descriptive statistics of the study variables. For earnings variability, the mean value of 0.1628 indicated that earnings quality was high since the value was significantly more than 0. This was because literature suggested that the lower the percentage of earnings variability the lower the earnings quality and vice versa. Earnings variability was widely dispersed amongst the sampled companies as seen in the minimum and maximum values of -3.58 and 3.47. This was also confirmed by the high standard deviation value of 1.6266. The oil and gas company with the highest and lowest earnings variability was 11PLC. With respect to independent variables, the percentage of companies using full cost method of accounting for oil and gas operations reporting was 56.67%. This implied that majority of the oil and gas companies accounted for all their costs whether they led to successful discovery of oil in commercial quantities or not. This also implied that majority of the companies capitalized their expenditures costs irrespective of whether the wells were undeveloped, leading to dry hole or not. Literature has shown that this method allows heavy capitalization of cost which is defrayed as depreciation, depletion and amortization (DD&A) cost across certain number of years to pave way for smooth profit accruing to the companies even in the years such heavy costs were incurred. The mild variability in the values as depicted by the standard deviation of 0.3321 suggested that a good number of the companies practiced full cost method since 1 represented the highest while 0 was the lowest. The percentage of companies that adopted successful efforts method of accounting for oil and gas practices on the other hand, was 43.33%. This implied that minority of the companies choose successful efforts method of accounting for oil and gas expenditure reporting. This also suggested that some of the sampled companies capitalize all their cost irrespective of whether such cost led to successful discovery of oil in commercial quantities or not. For successful efforts method, the capitalized costs were those that led to successful discovery of oil and gas which were fully developed. This practice usually leads to dwindling profits as majority of costs are expensed in the profit and loss for those years in which such heavy costs were incurred. This increases the variability of earnings within the company as it progresses from one year to another. For the control variables, result indicated that the companies studied had a miserable mean return on assets of 3.24% which was considered too low. This was because some companies had very high ROA (176.27%) while others had very low ROA (-71.36%). This development proved the above assertion that the companies had a wide variation in their ROA (19.67%) arising from the different accounting choices they made to account for their expenditure costs. For the firm size which was represented by total assets, the mean value of 3.65% showed that the companies had huge assets base to carry out their operations. However, very wide variations were noticed in the data set as depicted by the standard deviation value of N 55,5million. This was made possible by the wide minimum and maximum values of N55.542 million and N278 billion. The last issue considered was the age of the companies. The companies were 32 years old on average as shown by the mean value of age. The minimum and maximum values of 4 and 64 years implied that while some companies were young, most of them were old as depicted in the low standard deviation value of about 16 years.

Robustness Checks

Before running regression analysis, certain assumptions about the characteristics of the data had to be checked. This section treated such checks for data validation.

Normality of the Data

Normality tests were conducted using histogram of residuals, pnorm and qnorm graphs. These were presented in this section for each of the three models:

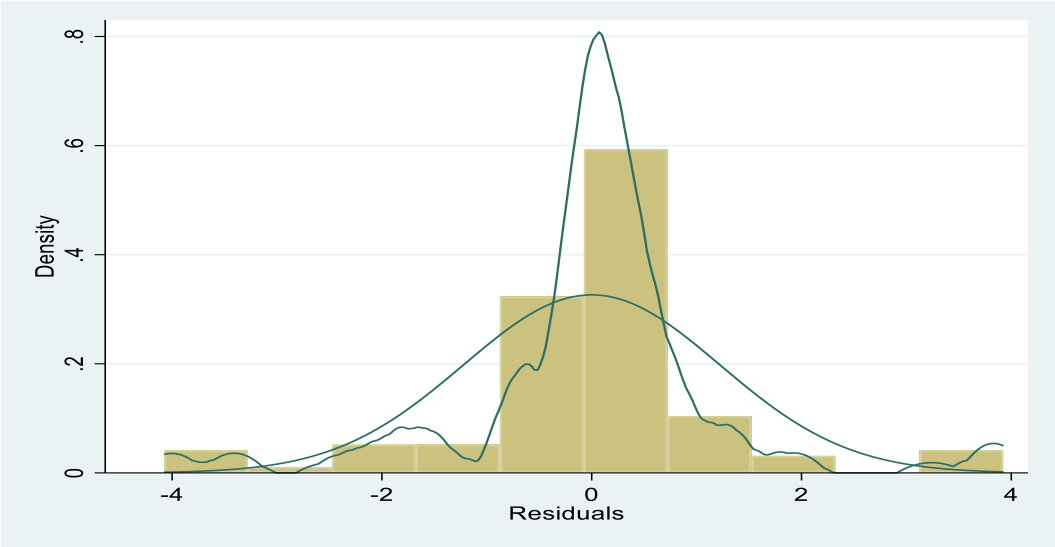

Figure 4.1: Histogram of Residuals for Model 1

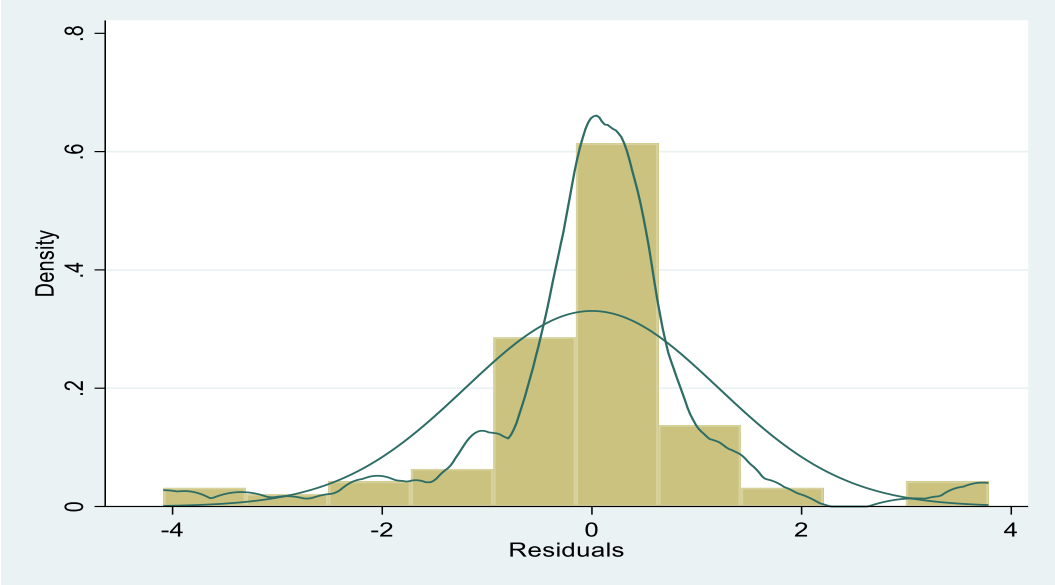

Figure 4.2: Histogram of Residuals for Model 2

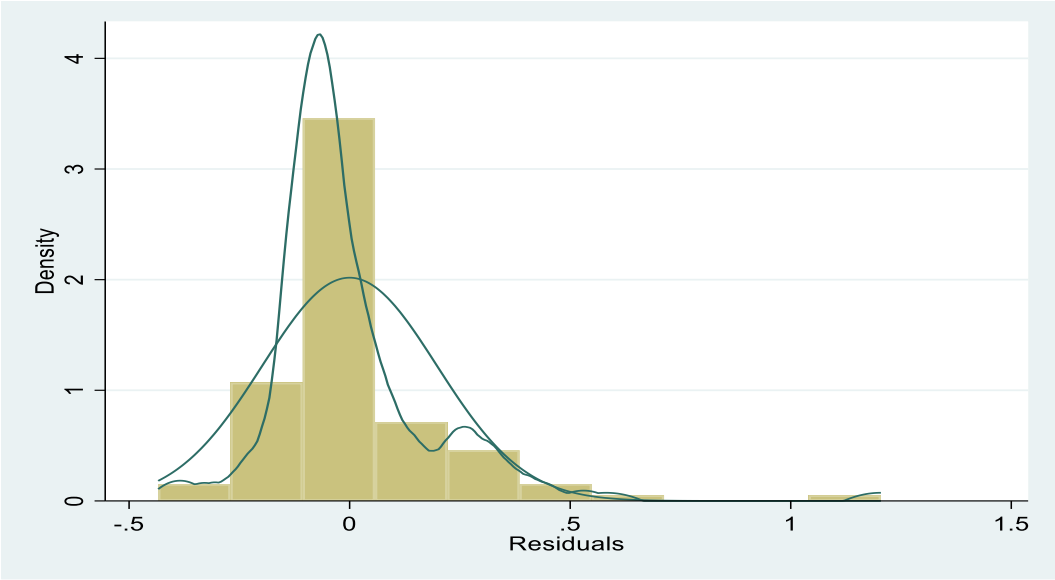

Figure 4.3: Histogram of Residuals for Model 3

The histogram of residuals for models 1-3 as shown in figures 4.1 – 4.3 revealed that the data used for this study were normally distributed since they almost had a dome shape of the curve falling around the origin, 0. However, that of model 3 seemed to be left aligned implying that some level of kurtosis challenge may have been seen.

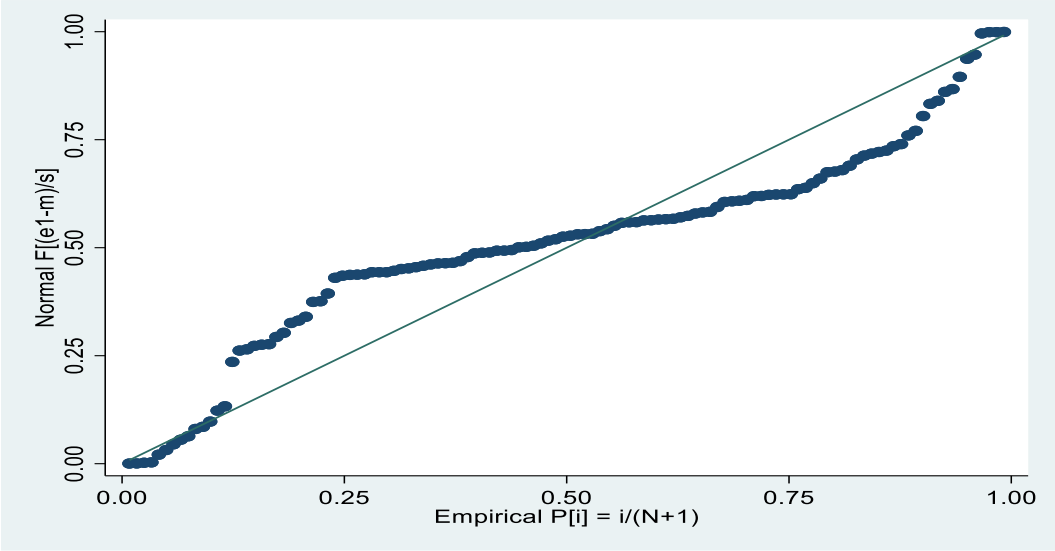

Figure 4.4: Pnorm for Model 1

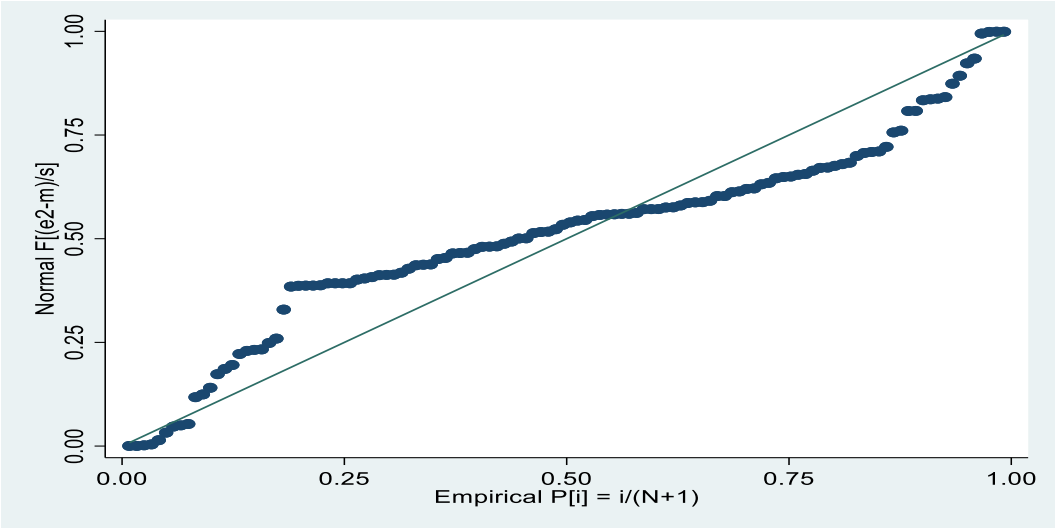

Figure 4.5: Pnorm for Model 2

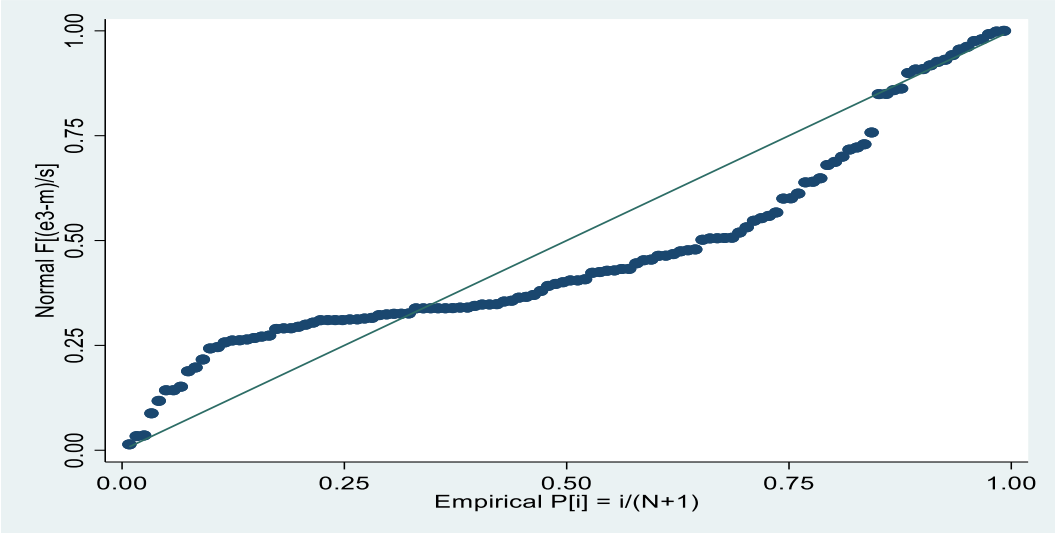

Figure 4.6: Pnorm for Model 3

Figures 4.4 – 4.6 showed that the data set used for this study was normally distributed because their probability of normality as depicted by the plots were along the line of best fit producing end-to-end plots for all the 3 models. The data sets almost clustered above and below the line showing a good degree of uniform normality.

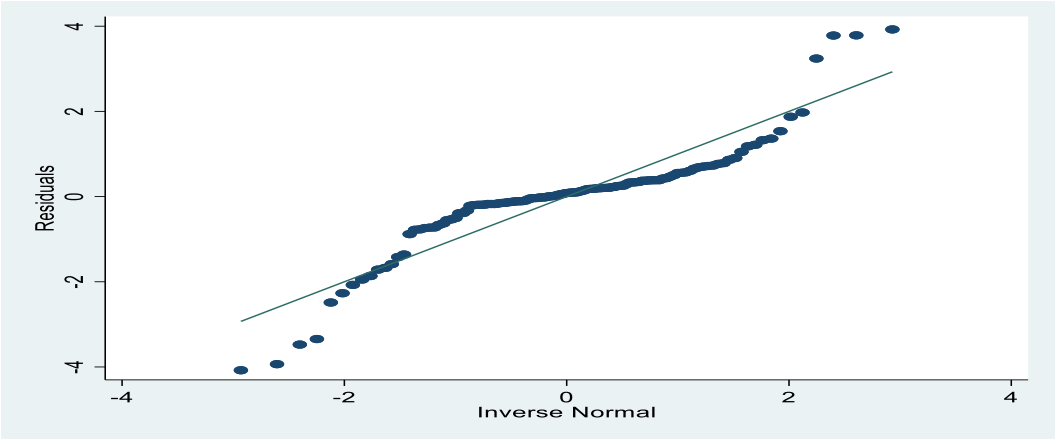

Figure 4.7: Quartile Normality for Model 1

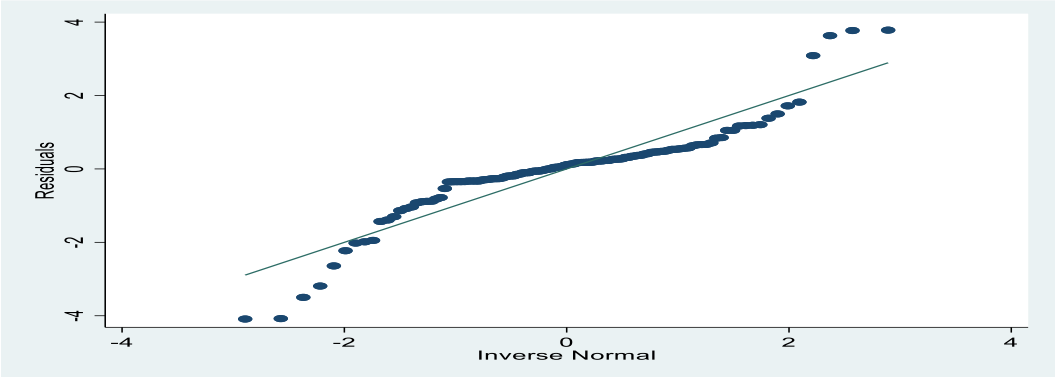

Figure 4.8: Quartile Normality for Model 2

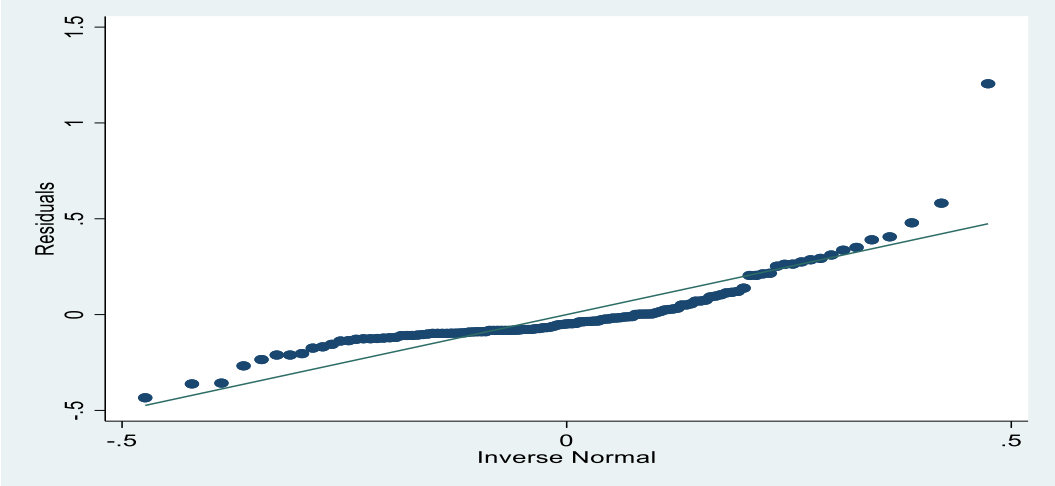

Figure 4.9: Quartile Normality for

Model 3

Figures 4.7 – 4.9 showed the plots of the quartile normal distribution of the data sets. Since the plots were found along the line of best fit for each quartile with little variations at their upper ends, the data sets may have been adjudged to be normally distributed.

Test for Multicollinearity

Table 4.3: Variance Inflation Factor (VIF)

```
. vif

    Variable |       VIF       1/VIF
-------------+----------------------
    FULLCOST |      1.42    0.703652
 SUCCESSFUL |      1.39    0.717061
       FSIZE |      1.18    0.845911
         ROA |      1.12    0.893701
         AGE |      1.09    0.917798
-------------+----------------------
    Mean VIF |      1.24
```

The data set was also tested for multicollinearity with the help of Variance Inflation Factor which showed that the data sets were free from collinearity issues amongst the independent variables used in the study. The mean VIF value was significantly less than 5 as well as their individual values as depicted in table 4.3.

Test for Model Misspecification

Table 4.4: Ramsey RESET and Link Test

Tests		Model 1	Model 2	Model 3
Ramsey RESET	F(3,111)	0.14	5.90	1.69
	Prob>t	0.9342	0.0009	0.1722
Link test	Hart square	0.931	0.849	0.493

Source: STATA Output, 2022

Table 4.4 showed the test statistics for model specification using two measures. For the first which was Ramsey RESET statistics, the prob>t values for models 1 and 2 were insignificant (0.9342 and 0.1722 respectively) which implied that the 2 models were correctly specified. Model 2 was misspecified using Ramsey RESET statistics. Therefore, a link test which was another test that checked model misspecification was used. Here, all the three models had hart square values greater than 0.05 (0.931, 0.849 and 0.493 for models 1, 2 and 3 respectively). This showed that the two models were correctly specified.

Test for Equality of Variances

Table 4.5: Heteroskedasticity Test

	Model 1	Model 2	Model 3
Chi2(1)	7.02	19.13	3.95
Prob>chi2	0.000	0.000	0.0469

Source: STATA output, 2022

From table 4.5, the prob>chi2 values for the two models were less than 0.05 which implied that the data sets were heteroskedastic. To manage this problem, the final regression models were run with robust standard error term specifications in order to correct the equal variances that were present in the standard error estimates produced by the models. This reduced the possibility of spurious results.

Choice of the Model

Table 4.6: Hausman Test

	Model 1	Model 2	Model 3
Chi2(4)	6.42	2.28	3.47
Prob>chi2	0.1698	0.6849	0.4830

Source: STATA Output, 2022

Table 4.6 presented the Hausman tests for the two models to help in choosing the right regression model to run the data. Since the prob>chi2 for all the models were greater than 0.05, random effect regression models were used.

4.2.3.6 Choice of the Random Effect Model

Table 4.7: Lagrangian Multiplier Test

	Model 1	Model 2	Model 3
Chibar2(01)	0.00	10.19	136.26
Prob>chibar2	1.000	0.0007	0.000

Source: STATA Output, 2022

Table 4.7 presented the results for the tests that further suggested the kind of random effect model to be used. The choice was whether to use ordinary least square (OLS) or random effect regression. For model 1 where prob>chibar2>0.05, OLS was used, while for models 2 where prob>chibar2 were less than 0.05, random effect models were adopted.

Regression Results

The regression result of the study was presented in the table as follows:

Table 4.8 Regression Result for Earnings Variability

Variable	Coefficient	Robust Std Error	T	prob/t/
Full Cost	-0.8669	0.6511	-2.33	0.013
Successful Effort	-0.2069	0.2770	-0.70	0.486
ROA	0.1139	0.1937	0.59	0.556
FSIZE	-1.653	0.6055	-2.73	0.006
LEV	0.1562	0.6542	0.24	0.811
Cons	4.6963	2.8307	1.66	0.097
Obs	120			
Prob>f	0.0113			
R-square	0.1033			

Source: STATA Output, 2022

Table 4.8 showed the result of the regression analysis of the effect of accounting practice on earnings variability. The table indicated that if companies increased their adoption of full cost method of accounting practice for oil and gas expenditures reporting by 1, earnings variability will reduce by 86.69%. This suggested that full cost method of accounting as applied in the oil and gas sector had the potentials of reducing earnings variability amongst the sampled oil and gas companies in Nigeria. Since an increase in the choice of full cost method

would deteriorate earnings variability, earnings quality would have been diminished when full cost method was chosen as an accounting method of accounting for oil and gas capital expenditure costs.

Similarly, an increase in the application of successful efforts method by one company, earnings variability would reduce by 20.69%. This showed that successful efforts method as a choice of accounting practice for oil and gas capital expenditure could deteriorate earnings variability of the sampled oil and gas companies in Nigeria. As successful efforts method could reduce earnings variability, it is assumed that it would correspondingly reduce earnings quality of the companies in the industry. For the control variables, the result showed that an increase in the percentage return on assets will also increase earnings variability by 11.39%. So also an increase in leverage could increase earnings variability by 15.62%. An increase in total asset base by N1 on the other hand, could result to a reduction in earnings variability by 165.3%. Overall, what increased earnings variability in particular and earnings quality in general was not the accounting method of practice made per say but, how the company was profitable and how leveraged it was. Lastly, it was found that the use of accounting method as a criterion for affecting earnings variability accounted for 10.33% of variations in earning variability leaving a whopping 89.67% of such variations to be accounted for by factors outside this study.

Test of Research Hypotheses

The hypotheses stated earlier are hereby restated and tested in this section as follows:

Ho_1: The practice of full cost accounting method does not significantly affect earnings variability in the Nigerian oil and gas industry.

Table 4.8 was used to test this hypothesis. From the table, prob>/t/ =0.013 which was less than 0.05. This led to the rejection of the null hypothesis and the acceptance of the alternative that the practice of full cost accounting method significantly affects earnings variability in the Nigerian oil and gas industry.

Ho_2: Earnings variability is not significantly affected by the practice of successful efforts accounting in the Nigerian oil and gas industry.

Table 4.8 was used to test this hypothesis. From the table, prob>/t/ =0.486 which was greater than 0.05. This led to the acceptance of the null hypothesis that earnings variability is not significantly affected by the practice of successful efforts accounting in the Nigerian oil and gas industry.

Discussion of Findings

From the result of the test of research hypotheses, the findings were hereby discussed below:

The first hypothesis which was to ascertain if full cost accounting practice has the potential of affecting earnings variability revealed a negative significant effect. The negative effect is supported by the study of Solomon *et al* (2022) who also found a negative relationship. This implied that the ability of the oil and gas companies operating in Nigeria to reduce earnings variability is upheld by this study. It suggests that oil companies can minimize the probability of variations in earnings if they choose full cost method. It also shows that such effects are significantly relevant in doing so. This attaches and supports the importance of full cost method of accounting for oil and gas operations in influencing variations in earnings.

The second and the last hypothesis centered on the effect of successful efforts method of accounting for oil and gas operations in Nigeria on earnings variability. The findings showed that

successful efforts method had a negative insignificant effect on earnings variability. This is consistent with the findings of Nurani & Widi (2020). The implication is that successful efforts method has the potential of reducing earnings variability thereby improving the quality of earnings. Interestingly, the findings showed that earnings variability is reduced using both the full cost and successful efforts methods of accounting for oil and gas operations in Nigeria hence both indicated negative effects. The research findings clearly points to the fact that the application of positive accounting theory as a basis for choosing between full cost and successful efforts methods will become difficult. It shows that full cost method has more predictive value as compared to successful efforts method. In this case, the positive accounting may be applied to choose the full cost method as against the successful efforts method of accounting for oil and gas operations.

Conclusion

From the findings of the study, it is pertinent to conclude therefore that:

i. Full cost method of accounting choice has been found to be very relevant and good for narrowing earnings variability thereby increasing earnings quality.
ii. Although, successful efforts method of accounting for oil and gas operations in Nigeria is found to have less relevance in affecting variability of earnings, it encourages the stability of earnings over the years for operational activities of the oil and gas industry.

Recommendations

Based on the conclusions enumerated above, this study recommends that:

i. Managers of oil and gas companies operating in Nigeria should adopt full cost method of accounting practice if they want to narrow variability of earnings. This study proves full cost accounting to be relevant and a key determining factor for stability of earnings. Companies using full cost method may achieve this by ensuring that their operations are carried out within the cost frame over the years following that which the costs were incurred that could warrant the accurate accumulation of all capitalized costs.

References

Abdulsalam N. K., Sunusi A. S., Musa Y. A., Sani A. B. (2016). Comparative analysis of full cost and successful efforts accounting methods (a theoretical perpective of upstream oil and gas companies). *Nigerian Journal of Management Technology and Development*. 30(11) 23-27

Aguguom, T.A., & Salawu, O.R. (2022). Earnings smoothing and market share price: evidence from Nigeria. *Academy of Accounting and Financial Studies Journal*, 26(2), 1-13.

Anaekenwa, T. A. & Rafiu, O. S. (2019). Earnings quality and firms book value: an empirical evidence from the listed firms in Nigeria, *Journal of Internet Banking and Commerce*, 24(1), 344-349

Bryant, l. (2003). Relative value relevance of the successful efforts and full cost accounting methods in the oil and gas industry. *Review of Accounting Studies*, 8(1),5-28.

Cortese, C.I., Irvine, H. J., & Kaidonis, M. A. (2008). Extractive industries accounting and economic consequences: past, present and future. *Accounting Forum*, 33(1), 27-37.

Dehne (1983). A needed single accounting method for oil and gas producers.

Management Accounting, 1(2) 52-58

Erekle, P. (2020). Earnings persistence and predictability within the emerging economy of Georgia, *Journal of Financial Reporting and Accounting*, 18(3), 563-589.

Hung N. D., Thi Thu C. N., & Dung, M. T. (2020) Impact of earnings quality on firm value: the case of Vietnam. *Journal of Asian Finance, Economics and Business* 7 (3) 63-72

Magliolo, J. (1986) Capital market analysis of reserve recognition accounting: *Journal of Accounting Research*, 24(19) 69-108

Maher, N. A., Akeel, H. A., & Karrar, S. H. (2019). Impact of accounting earnings quality on the going concern in the Iraqi tourism firms. *African Journal of Hospitality, Tourism and Leisure*, 8(5), 1-13

Mazadu, S.A., & Yusha'u, K.S. (2020). Earnings predictability and adoption of International Financial Reporting Standard in the Nigerian Deposit Money Banks. *Accounting and Taxation Review, 4(*2), 57-74.

Macgregor, T.C. & Ibanichuka, E.A.L. (2021). Accounting information quality and firm performance of quoted oil and gas companies in Nigeria, *International Journal of Advanced Academic Research*, 7(6), 1-24

Mohamed, S.E., & Hatem, M. A. (2018). The impact of earnings quality on the stock performance in the stock exchange market: evidence from Egypt, *Journal of Commercial and Environmental Studies*, 2(9), 83-125

Munir A. S., Umar F. A. & Isah A. I. (2020), Effect of monitoring characteristics on earnings quality of listed conglomerate firms in Nigeria *Gusau Journal of Accounting and Finance, I(1), 3*-14

Nairametrics.com (July 2020) https://nairametrics.com/wpcontent/uploads/2013/03/comprehensive-list-of-oil-gas companies-in-nigeria- 1-131.pdf

Nicholas, I.M., (2012). Has international oil and gas accounting been politicized? *Petroleum Accounting and Financial Management*, 12(34), 22-25.

Nurani, F., & Widi, H. (2020). Earnings persistence, earnings power, and equity valuation in consumer goods firms, *Asian Journal of Accounting Research*, 5(1), 3-13

Ojugbeli, O. C. (2018) Governance structures/ attributes and earnings quality in an oil driven economy: A study of Nigerian oil and gas firms. *Nigerian Journal of Management Sciences*, 6(2), 281 288

Rusdiah H., Darman D., Muhammad Y.T., Agus, S., Muslim, M., & Aditya, H.P.K. **(**2021**).** The effect of firm size, debt, current ratio, and investment opportunity set on earnings quality: an empirical study in Indonesia. *Journal of Asian Finance, Economics and Business*, 8(6), 179–188

Securities and Exchange Commission (1979). *SED docket. Oil and gas accounting*. The Sourthen Legal Foundation, New York pp 17-43

Sabo A. (2019) Earnings quality of the Nigerian oil and gas companies during global decline of oil prices. *THINK INDIA (Quarterly Journal)* 22 (4) 82399-8253

Uche, R.U. (2000). Full costs and successful efforts accounting in the Nigerian Petroleum Industry Paper Presented at Education Programme