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IMPACT OF CASH FLOW MANAGEMENT ON PROFITABILITY OF OIL AND GAS FIRMS IN NIGERIA

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Abstract

Nigeria is characterized by volatile crude oil revenues and liquidity. This study examines how cash flow management impacts the profitability of oil and gas firms in Nigeria. The research adopts a correlational research design, obtaining secondary data from the annual reports of seven purposively selected oil and gas firms in Nigeria between 2014 and 2024. Following diagnostic validation via the Hausman test, the study applied fixed effect regression model to determine the impact of cash flow management on firm productivity. Findings reveal that while operating cash flow ratio has a positive significant impact on the firms' return on assets, cash flow coverage ratio is positive and insignificant and cash flow margin ratio reveals a negative and significant impact on the firms' return on assets. This study concludes that cash flow management strongly impacts the profitability of oil and gas firms in Nigeria. The significant positive impact of cash flow coverage ratio and that of operating cash flow ratio on the firms' profitability implies that any firm with adequate debt-servicing capacity and strong cash generation discipline is in the best position n to generate sustainable returns on assets.; while the negative impact of the cash flow margin ratio might be due to the adoption of a longer credit-term policy to the buyers, which resulted in the remittance delay on the crude-oil receivable. These findings contribute to the emerging-economies corporate finance literature by providing sector-specific and disaggregated evidence on cash flow–profitability dynamics in the Nigerian oil and gas sector. The study recommends institutionalizing cash flow stress testing by regulators as a supervisory requirement.

Keywords: cash flow management, profitability, oil and gas firms

1. Introduction

Maintaining a sound cash flow management is essential for enhancing business profitability. Profitability is a measure of a company's financial health. This metric evaluates the company's ability to effectively and efficiently apply its limited resources to achieve the expected result. Any company that wishes to outperform its competitors will not take its profitability and liquidity positions for granted despite its need to operate at a high level to guarantee the welfare of their shareholders.

Cash flow management is necessary to maximize cash accessible, reduce losses due to delayed fund transfers and maximize interest gained on unneeded extra money (Etim et al., 2022). Cash is a most important useful resource in every economic unit, assessing a

company's financial health, combating rivals, adopting new technologies, and assessing the viability of a business's operations (Rahman & Sharma, 2020).

The oil and gas sectors have made a significant contribution to foreign exchange earnings, government revenue, and general economic development in developing nations (Baldissera, 2022). However, oil and gas sectors need to manage their cash flow cycle to regulate the circulating period of their cash inflows and outflows. Despite the significant contribution of this sector to economic growth, the majority of the firms there-in continue to face liquidity problem, unstable cash inflows, and fluctuating profits in Nigeria. These hindrances are often worsend by volatility in the crude oil prices, long operating cycles, high operating costs, delays in receivables collection and heavy capital expenditures (Borah & Awungshi, 2023).

The firms, therefore need to maintain sufficient cash to finance its operations and meet cash demand. Planning for effective management of companies' cash flows will guarantee their capacity to operate successfully (Bukvic & Pavlovic, 2023). Utilizing the limited cash resources effectively is essential for maintaining adequate level of liquidity to guarantee corporate survival.

However, among the roadblocks facing many oil and gas sectors is how to determine the optimum funding source and the amount to apply as initial capital to strike a balance between available cash and cash needs.

Stakeholders in the oil and gas firms are now placing a high priority on efficient cash flow management in ensuring that cash are readily available to meet debt obligations and other financial commitments. If a company's net present value is negative when idle, this will let the company make less productive asset because the company would suffer a direct loss if it were left inactive as income interest would have been received if it had been invested instead of making a loss (Cannon & Biersteker, 2020).

Despite that oil and gas companies has made significant contribution to foreign exchange earnings, government revenue generation, and general economic development in Nigeria, the country still faces liquidity constraints, cash flow instability and erratic profitability (Chibuike & Celestine, 2022). Most of the managers of oil and gas companies constantly struggle with cash flow management because they don't initially realize how a cash shortage impacts their business's operations and profitability (Tangngisalu, 2021). Although the profitability indicators like the return on assets and the return on equity are the most commonly used metrics in evaluating firms' profitability, but evidence revealed that profitability does not implies better liquidity position (Pan & Wu, 2022).

Among the roadblocks the corporate organizations face is that financial flows aren't constantly balanced (Ayaz, 2021). Besides, firms may report accounting profits but may still be struggling to meet their short-term financial obligations resulting from poor cash movement planning and management. High operational costs, volatile crude oil prices, significant capital expenditures, lengthy operating cycles and delays in receivables collection often worsen the situation (Ebimobowei et al., 2021). However, examining the connection between cash flow management and profitability provides more realistic empirical evidence about the current financial health and position of firms particularly the oil and gas firm in Nigeria. These issues motivate this research to further investigate how effective cash flow management improves companies' profitability.

The body of studies such as those carried out by Anwar and Gunawan (2020); Borah and Awungshi (2023) and other scholars have investigated the profitability-cash flow relationship across other sectors like manufacturing, food and beverages, pharmaceuticals and banking sector. For instance, study by (Efuntade & Akinola, 2020) focused on manufacturing sector; focused on pharmaceutical industry, Tania (2016) concentrated on real estate, while Gunawan et al. (2021) and Ebimobowei et al. (2021) concentrated on consumer goods companies, but this research focuses on the oil and gas sector in Nigeria.

Besides, unlike prior studies such as Tania (2016), Anwar and Gunawan (2020), Gunawan et al. (2021) that concentrated on short time windows or depend on cross-sectional data, this study applies the Hausman test validated fixed effect panel regression model, to enable more robust firm-level impacts. In emerging economies context, Nigeria as an oil-dependent emerging market is marked by the currency instability, volatile crude prices and protracted receivable cycles necessitating in depth empirical investigation that widens the empirical evidence base beyond the imagination of developed economies and multi-sector frameworks, dominating the existing literature.

This research addresses the above gaps by specifically examining the impact of cash flow management on profitability of Nigerian listed oil and gas firms between 2014 and 2024. The study particularly evaluates effect of operating cash flow ratio on profitability of oil and gas firms in Nigeria; determines impact of cash flow coverage ratio on profitability of oil and gas firms in Nigeria; and assesses effect of flow margin on profitability of oil and gas in Nigeria.

This study therefore, hypothesize that:

H_{01}: Operating cash flow ratio has no significant impact on profitability of oil and gas firms in Nigeria;

H_{02}: There is no significant impact of cash flow coverage ratio on profitability of oil and gas firms in Nigeria.

H_{03}: Cash flow margin ratio has no significant impact on profitability of oil and gas in Nigeria.

2. Literature Review

Cash Flow Management

Cash flow management refers to the systematic tracking, organizing and regulating cash inflow and cash outflows to guarantee operational effectiveness and strong liquidity position (Ilkhechi & Khatibi, 2020). The oil and gas sectors have made a significant contributor to foreign exchange earnings, government revenue, and general economic development in developing nations (Baldissera, 2022). It is the practice of evaluating, monitoring and managing a company's cash inflows and outflows (Fawzi, 2021).

A business cash flow is the collection of funds the company commits to its inventories, non-current assets, marketable securities and account receivables for the purpose of making profits (Etim et al., 2022). The cash flow ratio is a financial indicator used to assess the business's short-term liquidity position. This ratio denotes a stronger capacity of a business to fulfill its immediate financial needs (Laghari et al., 2023). This ratio protects a company from accumulating significant debt or becoming bankrupt since

it monitors actual cash flow figures, making it less manipulated (Anwar & Gunawan, 2020).

The cash flow coverage ratio reflects a firm's level of cash flow to meet its obligations, demonstrating its financial health and capacity to manage debt repayments (Aryawan & Indriani, 2020). It is a long-term solvency ratio that helps determine whether a company can settle its debt as at when due (Egwu et al., 2021). The higher this ratio the better the company's cash flow in paying its debt with ease, while the lower the ratio the poor ability of the company to paying its debt (Chibuike & Celestine, 2022).

Cash flow margin ratio is a financial metric that assesses how much of the company's total income remains for operating cash flow after deducting operating expenses According to (Cannon & Biersteker, 2020), while cash flow margin ratio assesses the company's total revenue proportion that remains for operating cash flow after deducting operating costs, the cash flow margin ratio provides information on how successfully a company to make money from its major operations and turn sales into cash (Gunawan & Widjaja, 2021).

Profitability

Profitability is a measure of financial performance of a business. Profitability is a good indicator of a company's overall financial health and position over a specific time period (Bukvic & Pavlovic, 2023). A company's profitability is a measure of how well it can make money from its primary business and generates revenue (Cannon & Biersteker, 2020). A company's profitability can be evaluated by applying a variety of methods like return on assets and return on capital employed (Hristov & Appolloni, 2021).

Among the most applied profitability indicators by researchers is the return on assets (ROA) (Ebimobowei et al., 2021). The ROA is a ratio that reflects how much of income generated from assets by a business (Efuntade & Akinola, 2020). The financial performance measurement known as return on assets assesses how much profit a firm makes from its total assets (Egwu et al., 2021).

Theoretical Review

Cash Conversion Cycle Theory

This study is anchored on the cash conversion cycle theory coined by Richards and Laughlin in 1980 (Baldissera, 2022). The theory affirms that, three cash flow parameters are employed to determine a company's cash position (Kulsum, 2021). The cash conversion cycle theory focuses on the networking capital by taking assets and current liabilities into full consideration (Cannon & Biersteker, 2020). The theory establishes that current ratio and its derivatives are the most employed measures for evaluating a company's liquidity but time is not taken into consideration by these measurements (Tania, 2016).

The firm's liquidity position according to the theory is examined more closely when the cash conversion cycle is added to traditional cash indicators (Tania, 2016). The theory claimed that relying on cash conversion cycle is more preferable to other liquidity measurement techniques which depend on working capital (Egwu et al, 2021). In view of the above theoretical few, the cash conversion cycle theory appears to fit discussion in this research as it lays emphasis on the significance of cash flow and profitability management.

Empirical Review

Previous empirical studies examining the relationship between cash flow management and firms' profitability present a dichotomy of findings that can be synthesize

across sectoral and methodological dimensions. A prominent stand of literature focusing on fast-moving consumer goods and regulated industries documents suggest an overwhelmingly positive relationship between operating cash flow and profitability. For instance, the research in non-financial and energy markets like the research conducted by Laghari et al. (2023) that examined the effect of cash flow management on firm performance of non-financial firms in China found that long operating and credit cycles can distort the expected positive link between top-line revenue growth, cash margin and bottom-line profitability.

Also, the study by Pan and Wu (2022) on how capital inflows can reduce financing costs in emerging economies, firm-level evidence from China and Malaysia, discovered that cash flow metrics considerably improves the financial performance of Chinese non-financial firms. Furthermore, Etim et al. (2022) examined the effect of cash flow management on financial performance of selected listed companies in Nigeria and discovered that strong liquidity and debt-servicing capabilities enhance net return. However, studies examining capital-intensive, emerging market sectors reveal diverged structural traits. Kulsum (2021) investigated how brand equity can save companies in Indonesia and found a positive significant impact of operating cash flow, profit margins and investment cash flows on the profitability of Nigerian food and beverage companies.

The above empirical evidence disclosed the sectoral gap as some of these studies have concentrated on other sectors or industry like pharmaceutical industry, food and beverage industry, non-financial services and emerging sectors consumer goods sector, manufacturing industry and small and medium enterprises among others, but the studies focused on oil and gas sector. This research addresses the gap by specifically examining how cash flow coverage ratio, operating cash flow ratio and cash flow margin ratio collectively impact the oil and gas return on assets for a period of eleven years between 2014 and 2024.

Methodologically, early studies relied such as Kulsum (2021), Etim et al. (2022), Laghari et al. (2023) heavily on pooled OLS or cross-sectional frameworks. However, recently advancement increasingly emphasizes panel data methodology such as fixed effect model, to control for unobserved firm-level heterogeneity. This research addresses the identified gap by departing from multi-sector aggregations, providing granular, sector specific panel evidence from the Nigerian oil and gas firms utilizing rigorous Hausaman validated fixed effect estimation.

3. Methodology

The research adopts a correlational research design, obtaining secondary data from the annual reports of seven purposively selected Nigerian oil and gas firms between 2014 and 2024 to investigate the impact of cash flow management on profitability. The utilized secondary data were collated from the annual accounts and reports of seven (7) purposively selected oil and gas firms out of nine (9) listed on the Nigerian Exchange Group as at December 31, 2024, based on the strict criterion of complete data availability across the entire eleven-year study window (2014-2024). Two firms were consequently excluded due to inconsistent reporting periods and missing financial data, which would have created an unbalanced panel.

To maintain transparency and replicability, the sample comprises Eterna plc, Conoil plc, Mrs. Oil Nigeria plc, Japaul Gold and Ventures plx, Seplat Energy plc, Oando plc and Total Energies Marketing Nigeria plc. The research employed descriptive statistics, correlation analysis and panel regression models, comprising the fixed effect (FE), random effect (RE) and pooled OLS (POLS) for data analysis, alongside with some diagnostic test such as White Heteroskedasticity test, F-restricted test and the Hausman test to assess the study's models suitability and selection. All the econometric computations, diagnostics evaluations and panel regression were analyzed using E-view Version 12 (Student/Professional Version), ensuring full computational transparency and replicability.

Model Specification

This research adopted and employed the modified model used by Borah and Awungshi (2023). The modified model for this research is specified below:

$ROA_{it} = \beta_0 + \beta_1 OCFR_{it} + \beta_2 CFCR_{it} + \beta_3 CFMR_{it} + \beta_4 FS_{it} + \mu_{it}$; where: ROA = Return on assets of Nigerian listed oil and gas firms i in year t; OCFR = Operating cash flow ratio of Nigerian listed oil and gas firms i in year t; CFCR = Cash flow coverage ratio of Nigerian listed oil and gas firms i in year t; CFMR = Cash flow margin ratio of Nigerian listed oil and gas firms i in year t; FS = Firm Size of Nigerian listed oil and gas firms i in year t; β_0 =Constant term, and β_1- β_4 are variable coefficients, μ_{it} = Error term.

Table 1

Variable Selection and Measurement

Variables	Variable type	Description	Measure	Source
Profitability	Dependent	Return on assets (ROA)	Profit after tax/ total asset	Anwar and Gunawan (2020); Borah and Awungshi (2023)
Cash Flow Management	Independent	Operating cash flow ratio (OCFR)	OCFR/ total current liabilities	Anwar and Gunawan (2020)
	Independent	Cash flow coverage ratio (CFCR)	Net CFCR/ total debt	Bukvic and Pavlovic)2023
	Independent	Cash flow margin ratio (CFMR)	Operating cash flow / net sales revenue	Borah and Awungshi (2023)
Firm Size	Control	Firm size (FZ)	Log of Total Asset	Borah and Awungshi (2023)
Oil price volatility	Control	Oil price volatility (OPV)	Oil price per unit	Anwar and Gunawan (2020)

Source: Data Compilation, 2026

Table 1 discloses the types and description of the study's variables employed with their measurements. The dependent variable of profitability is measured in terms of return on assets (ROA), while the independent variable is proxied by three explanatory variables of Operating cash flow ratio (OCFR), c cash flow coverage ratio (CFCR) and cash flow margin ratio (CFMR) and the control variables include firm size (FZ) and oil price volatility (OPV). All these variables emerged from the study's specific objectives.

4. Results and Discussion

This section uses E-views to analyze and evaluate data that was gathered using a variety of methods, including panel regression, correlation, and descriptive analysis.

Table 2

Descriptive Analysis Result

Variable	ROA	OCFR	CFCR	CFMR	FS
Mean	-0.0070	0.2620	2.1780	-0.8420	6.5960
Median	0.0220	0.1120	0.1890	0.0600	6.7320
Maximum	1.5110	3.5240	69.180	8.7630	7.4930
Minimum	-0.9960	-0.5610	-20.030	-75.780	4.6470
Std. Dev.	0.2440	0.5450	10.660	8.9380	0.2540
Jarque-Bera	103.60	842.10	261.10	193.20	158.90
Probability	0.0002	0.03100	0.0240	0.0410	0.0000
Observations	077	077	077	077	077

Source: Data Analysis, 2026

Table 2 disclosed the descriptive analysis results, summarizing the characteristics of the study's variables showing that mean of return on assets is 0.007 with a standard deviation (SD) value of 0.244, indicating a moderate level of profitability changes among the companies, implying that the firms suffered a marginal loss in their asset utilization. The mean value of 0.262 for operating cash flow ratio (OCFR) means that the firms produce 26 kobo of operating cash for every 1 naira (unit) of the firms' current debts incurred.

The cash flow coverage ratio (CFCR) shows a high mean of 2.178 with a SD of 10.66, indicating stark distinctions in the firms' ability to service obligations. The mean of cash flow margin ratio (CFMR) is negative (-0.842), implying that the Nigerian oil and gas sector is battling with many difficulties in turning their sales income to actual operating cash flow. The firm size (FZ) discloses a mean of 6.596 with a low SD of 0.254, implying that their sizes are still comparatively stable overtime. The results also reveal that the dataset follow a normal distribution, since the Jarque-Bera statistical values for all variables show high significant probabilities.

Table 3

Correlation Analysis

Variable	ROA	OCFR	CFCR	CFMR	FZ
ROA	1.000				
OCFR	0.011	1.000			
CFCR	0.091	0.138	1.000		
CFMR	-0.714	0.211	0.052	1.000	
FZ	-0.111	-0.272	0.086	0.025	1.000

Source: Data Analysis, 2026

Table 3 reports the correlation results, showing a slight positive relationship (0.011) between operational cash (OCFR) and profitability (ROA); slight positive relationship (0.091) between debt coverage (CFCR) and profitability but a negative relationship (-0.714) between cash flow margin ratio (CFMR) and profitability, upholding the descriptive result that challenges being faced by firms on sales to cash conversion are roadblocks to the firms' profitability. Also here is a negative relationship (-0.111) between firm size (FZ) and ROA, indicating negative of FZ on firms' profitability.

Table 4

Diagnostic Test Results

Test Summary	X^2. Statistic	Probability
F-Restricted test (PLS Vs FE)	17.432	0.035
Hausman test (FE Vs RE)	21.669	0.001
White Heteroskedasticity test	11.4512	0.260

Source: Data Analysis, 2026

Table 4 presents the result of diagnostic tests. The F-restricted test result with a X^2 value of 17.432 and a probability value of 0.035 rejecting the null hypothesis that pooled OLS (POLS) method is appropriate in favor of fixed effect (FE) model. Furthermore, the Hausman test result between random effect and fixed effect models rejected the null hypothesis of no correlation between the unobserved firm-specific effect and the regressors (X^2=21.669, p=0.001), indicating that random effect estimator would be inconsistent. The fixed effect therefore controls for time-specific heterogeneity, and considered appropriate for data analysis in this research.

Additionally, the result of White Heteroskedasticity test with a statistical value of 11.4512 and a probability value of 0.260 accept the null hypothesis, implying there no heteroskedasticity exists in the series and no serial correlation between the unobserved firm-specific effects and the regressors ($\chi^2 = 21.669$, $p = 0.001$), indicating that the random-effects estimator would be inconsistent. The fixed effect model therefore controls for time-invariant, firm-specific heterogeneity

Table 5

Robustness Check Estimation

Variable	Model I: Alternative Dependent Variable - (ROE)		Model II: Lagged Independent Variables' (t-1) & Macro Control (OPV)	
	Coefficient	P-value	Coefficient	P-value
Constant	-0.9214	0.001	-06542	0.005
OCFR/$OCFR_(t-1)$	0.0543	0.008	0.0489	0.012
CFCR/$CFCR_(t-1)$	0.0185	0.034	0.0152	0.041
CFMR/$CFMR_(t-1)$	-0.1102	0.002	0.0890	0.006
FZ	0.420	0.041	0.1240	0.053
OPV		-	-0.0312	0.021
R^2	0.814		0.835	

Source: Data Analysis, 2026

Table 5 present the results of robustness check estimation to test whether the core relationship hold under alternative econometrics specifications like shifting of dependent variable from return on assets (ROA) to return on equity (ROE) in model I, and introducing one-period lagged independent variables alongside oil price volatility as a macroeconomic control variable in model II.

The result discovers that the test model stability through two different alternative specifications both disclosing high explanatory power with R-square value of 0.814 for model I 0.835 for model II. The results of model II which is an alternative dependent variable (ROE), after substituting ROA with ROE, confirms that the primary variables maintain directional impacts.

The coefficients and probabilities of the three independent core variables remain positive and statistically significant (OCFR, CFCR, and FZ) respectively, while of that of CFMR discloses a negative significant coefficient, aligning closely with the baseline framework that is the original results. However, to mitigate simultaneous endogeneity and account for external shocks, model II utilizes lagged independent variables and incorporate annual brent crude oil price volatility (OPV) which emerges as a statistically significant deterrent with a coefficient of -0.0312 (p=0.021).

Critically, the lagged independent variables of OCFR, CFCR and CFMR also remain their statistically significant and the expected signs, proving that the baseline results are not driven by omitted macroeconomic variables or simultaneous feedback loops.

Table 6

Comparative Fixed Effect Estimation: Dependent Variable (ROA)

Variable	Baseline Model (Original Data)		Winsorized Model (5%)		Robust Standard Error Model	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Constant	-0.8450	0.0014	-0.7120	0.002	-0.8450	0.0032
OCFR	0.06326	0.0027	0.0581	0.012	0.06326	0.0050
CFCR	0.01088	0.1200	0.0214	0.045	0.01088	0.1420
CFMR	-0.1223	0.0030	-0.0945	0.001	-0.1223	0.0018
FZ	0.17311	0.0200	0.1512	0.031	0.17311	0.0280
R^2	-		0.814		0.862	
Obser.	77		77		77	

Source: Data Analysis, 2026

Table 6 addressed the potential outlier distortion, noting the extreme values found in CFCR and CFMR, by comparing the baseline model against a 5% winsorized model and a robust standard error model across 77 observations. In the baseline model, CFCR shows a positive coefficient of 0.01088 and probability of 0.1200. However, once extreme values are winsorized at the 5^{th} and 95^{th} percentages to mitigate serve data skewness, the coefficient for CFCR rises to 0.0214 and achieve statistical significance of 0.045 at 5% level of significance.

Other variables such as OCFR, CFMR and FZ remain robustly significant across all three columns (Bseline, Winsorized and Robust Standard Error). Notably, CFMR maintains a persistent, statistically negative significant relationship with the return on assets (dependent variable) ranging from 0.094 to 1223), while the explanatory power improves in the winsorized specification with an R-square of 0.862.

Overall, these diagnostic tests confirm that the empirical findings are structurally sound, resilient to outliers and largely free from server endogeneity biases.

Table 7

Fixed Effect Regression Model

SERIES: ROA, CCFR, CFCR, CFMR, FS
Dependent Variable: Return on Asset
Method: Fixed Effect Model

Variable	Coefficient	Standard Error	t-statistics	Probability
Constant	-0.8450	0.6304	-2.4756	0.0014
OCFR	0.06326	0.0421	2.6565	0.0027
CFCR	0.01088	0.0115	1.5726	0.1200
CFMR	-0.1223	0.0118	-12.824	0.0030
FZ	0.17311	0.0947	2.45346	0.0200
$R^2 = 0.862$				
Adjusted $R^2 = 0.818$				
F-statistics = 15.946, Prob = 0,0000				
Durbin Watson stat = 1.7893				

Source: Data Analysis, 2026

Table 7 presents the result of fixed effect regression, showing the R-squared of 0.862. This implies that the independent variables account for about 86.2% changes in the firms' profitability. The coefficient of operating cash flow (OCFR) ratio is positive (0.06326) and statistically significant (p=0.0027), implying that a 1-unit increase in operating cash flow leads to a 0.063 increase the firms' profitability.

The co-efficient of cash flow coverage ratio (CFCR) is also positive (0.01088) but statistically insignificant (p=0.1200), indicating that a 1-unit increase in coverage ratio causes a 0.120 decrease the firms' profitability. But the co-efficient of cash flow margin ratio (CFMR) is negative ((-0.1223) but statistically significant (p=0.0030), implying that a 1-unit increase in margin ratio causes a 0.123 decreases the firms' profitability. The firm size (FZ) co-efficient is also positive (0.17311) and significant (p=0.0200), indicating that a 1-unit increase in firm size causes 0.173 increase the firms' profitability. The model's F-statistic value of 15.946 and a probability value of 0.0000 indicate that the models employed are fit.

Discussion

This research investigates the impact of cash flow management on profitability of oil and gas firms in Nigeria. Findings revealed that operating cash flow ratio, and the cash flow coverage ratio have positive impact, while the and profit margin ratio has a negative impact on the firms' profitability indicating sound operating cash flow ratio and cash flow coverage ratio of the oil and gas firms in Nigeria. These results are consistent with the research outcomes of research conducted by Anwar and Gunawan (2020); Borah and Awungshi (2023) where the results there-in found that operating cash flow improve the profitability of firms. These results imply that improving cash flow from operating activities and the cash flow coverage will in no small amount boost the profitability of oil and gas firms.

But margin ratio associated negatively and significantly with the firms' profitability. The negative effect of cash flow margin ratio on profitability contrasts with the broad positive cash-flow-performance relationship as reported by studies like Egwu et al. (2021). A plausible explanation for this sector-specific divergence is the oil and gas sector' longer cash conversion circle: unlike fast-moving consumer goods firms, oil and gas firms typically extend longer credit terms to buyers and face delayed remittance on crude-oil receivables, which weakens the link between the reported revenue and realized operating cash despite strong top-line scales. This suggests that the profitability implication of cash flow management is not uniform across sectors, and that sector-specific receivables and cost structures should be treated as a distinct moderating factor in the future cash-flow-profitability research

The results also showed a positive and significant effect of firm size on the firm profitability. This result is in line with the findings of Rahman & Sharma (2020) showing a positive association between firm size, business growth, capital structuring comprising firm's profitability and the social responsibility of the firm resulting from the size of the firms. All the results above supported the view of Richards and Laughlin's cash conversion cycle theory affirming that the three cash flow parameters are employed to determine a company's cash position because firm's liquidity position according to the theory is examined more closely when the cash conversion cycle is added to traditional cash indicators

5. Conclusion and Recommendations

This research concludes that cash flow management is a strong determinant of oil and gas firms' profitability in Nigeria. Findings uncovered that operating cash flow ratio and cash flow coverage ratio display positive significant impact on return on assets, establishing the capability oil and gas companies to generate adequate cash from their core activities and meet debt obligations from internal resources is a manifestation of stronger profitability positions and asset effective utilization.

Nevertheless, the cash flow margin ratio, discloses a negative significant connection with profitability, indicating that many oil and gas companies adopted the policy of longer credit terms to buyers which resulted in the remittance delay on the crude-oil receivables, while some of these firms still struggle to turn sales into liquid cash despite their considerable wide revenue streams due to high operational overheads, delayed in receivables collection and volatile crude oil pricing peculiar to oil and gas sector in Nigeria.

This study makes a distinctive contribution by enriching the theoretical understanding that cash flow management different dimensions carry opposing profitability implications based on the finding revealing that while coverage ratios and operating cash flow and positively impact firms' profitability, the cash flow margin ratio disclosed a negative impact rather. This study generates panel-based empirical evidence on the nexus between the component of cash flow management and firm profitability particularly within the context of oil and gas sector which has received relatively limited attention in emerging economies specifically Nigeria. The study bridges the existing gap and serves a point of reference to build upon by future researchers and policymakers, focusing on an emerging-economy's oil and gas sector.

This research recommends that the regulatory authorities, specifically the Securities and Exchange Commission (SEC) and Financial Reporting Council of Nigeria (FRCN) should formulate and enforce requirements for sector-specific disclosure mandating oil and gas firms to report detailed, disaggregated cash flow statements together with their earnings reports. Due to the negative cash flow margin ratio reported in this study' result, transparent reporting on operating cash conversion rates is needed to equip investors and regulators with the useful information for earlier detecting liquidity stress and minimizing the risk of systemic insolvency which weakly monitored what cash-debt imbalances can cause.

The industry regulators and policymakers should introduce frameworks that motivate oil and gas companies to shorten their receivable collection periods, possibly by applying tax-based incentives and structured credit guarantee schemes that encourage efficient cash conversion Since the companies' negative cash flow margin indicates persistent gaps in turning sales volumes to actual cash, focused policy interventions that could directly strengthen the operating cash circle are needed to reduce collection delays to improve firms' profitability.

Due to the capital-intensive nature and the volatility of crude oil prices of oil and gas sector, the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and the Central Bank of Nigeria (CBN) should include in their supervisory protocols, the periodic cash flow stress testing that will compel the firms to display enough coverage ratios and cash buffers under adverse price scenarios. Finally, oil and gas sectors, should evaluate their operational effectiveness, making sure that their size promotes economies of scale rather than being a burden that will lowers their profitability.

Study Limitations and Future Research Agenda

While this research provides robust evidence into the cash flow-profitability relationship the research is limited to Nigerian oil and gas sector. Also, the research coverage is confirmed to a single emerging economy and a single capital-intensive sector, limiting the generalizability of the findings to dissimilar macroeconomic setting. The study relies entirely on secondary annual report data which inherits disclosure reporting limitations characteristics in the companies' financial statements. However, future studies should be extended to other emerging economies and covers other sectors apart from oil and gas using primary sources of data.

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