COMMUNITY ENGAGEMENT, HEALTH AND SAFETY COSTS AND FINANCIAL PERFORMANCE OF LISTED NATURAL RESOURCE AND DOWNSTREAM OIL AND GAS FIRMS IN NIGERIA

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Abstract

This study examined the effect of community engagement and health and safety costs on the financial performance of listed natural resource and downstream oil and gas firms in Nigeria for the period spanning 2012 to 2024. Financial performance was measured using return on assets (ROA). Community engagement was proxied by corporate social responsibility (CSR) expenditure, while health and safety costs (HSE) captured the environmental disaster dimension. Firm age served as the control variable. Data were sourced from the annual reports and financial statements of thirteen firms listed on the Nigerian Exchange Group. The study adopted the ex post facto research design and employed the census sampling technique. Analytical tools included descriptive statistics, correlation analysis, variance inflation factor tests, the Hausman specification test, the likelihood ratio test, and fixed effect regression. Findings revealed that community engagement did not exert a statistically significant effect on return on assets, with a coefficient of –0.0015 and a probability value of 0.4332. Similarly, health and safety costs showed no significant individual effect on return on assets, recording a coefficient of –0.0216 and a probability value of 0.1787. However, the overall model was jointly significant, as indicated by an F statistic of 7.94 and a probability value of 0.0000, with an R squared of 0.4615. The study concluded that although community engagement and health and safety costs did not individually influence financial performance in a statistically significant manner, their combined effects were meaningful. Firms are therefore encouraged to adopt integrated strategies that align community engagement initiatives with health and safety management practices to foster long term financial sustainability.

Keywords: *Community engagement; Health and safety costs; Financial performance; Return on assets; Corporate social responsibility; Oil and gas; Nigeria*

1. Introduction

Financial performance remains a principal determinant of a firm's growth trajectory and its capacity to operate as a going concern. In the context of downstream oil and gas companies and natural resource firms listed on the Nigerian Exchange, financial performance encompasses an array of metrics, most notably return on assets (ROA), return on equity, and earnings per share. These indicators reflect the efficiency with which a firm utilises its resources to generate profits, manage costs, and create value for diverse stakeholders (Ude, Uche and Nwabuisi, 2023). Over the past two decades, increasing attention has been directed towards the role that corporate social responsibility expenditure, commonly conceptualised as community engagement costs, and health and safety expenditure play in shaping the financial fortunes of firms operating in environmentally sensitive sectors (Padhi, 2024).

The Nigerian downstream oil and gas sector has encountered formidable challenges that have undermined its financial stability. Macroeconomic instability, which has persisted over six decades, continues to erode investor confidence and constrain revenue growth. Regulatory pressures, escalating compliance costs, operational inefficiencies, and intense competition have compounded these difficulties. The severity of these challenges is underscored by the series of delistings that reduced the number of listed firms in the sector from twelve to nine within the past three years (Eke, Ataisi and Chicka, 2024). As firms struggle to meet the twin demands of economic sustainability and regulatory compliance, financial performance has emerged as a central concern for industry analysts, policymakers, and corporate managers alike.

Community engagement refers to the deliberate strategies and activities that firms adopt to cultivate meaningful relationships with the communities within which they operate. Such initiatives include local development projects, social donations, employment generation, and environmental stewardship programmes designed to foster goodwill and enhance societal welfare (Sornaganesh and Veronica, 2023). While studies such as Joseph (2023) and Padhi (2024) have highlighted the role of community engagement in strengthening brand reputation and stakeholder trust, the degree to which these activities translate into measurable financial gains remains a matter of scholarly debate. Some empirical investigations have reported neutral or statistically insignificant effects (Solanke *et al.*, 2022), raising important questions about the financial rationale for sustained community investment.

Health and safety costs encompass the direct and indirect financial outlays that organisations incur to ensure workplace safety, employee wellbeing, and compliance with occupational health regulations. In the oil and gas industry, where high risk operations demand stringent safety protocols, these costs include expenditure on personal protective equipment, employee health insurance, safety training, and remediation following environmental incidents (Adeniyi and Adebayo, 2020). Environmental disasters, such as oil spills, gas flaring incidents, pipeline ruptures, and equipment failures, impose both direct costs through fines, litigation, and clean up expenses and indirect costs through reputational damage and diminished operational efficiency (Eke *et al.*, 2024).

The interplay between community engagement, health and safety costs, and financial performance is multifaceted and context dependent. On one hand, community engagement initiatives can strengthen stakeholder relationships, mitigate conflicts, and enhance a firm's social licence to operate, potentially yielding favourable financial outcomes. On the other hand, environmental disasters can erode trust, escalate operational costs, and undermine profitability (Santhanakrishnan, Mukeshbalaji and Arunprakash, 2024). Navigating these dynamics requires a strategic approach that integrates community and environmental considerations into the core fabric of business operations.

Notwithstanding the recognised importance of community engagement and environmental management, there exists limited empirical evidence on their combined effects on the financial performance of firms within Nigeria's natural resource and downstream oil and gas sectors. Most existing studies have examined these variables in isolation (Solanke *et al.*, 2022; Eke *et al.*, 2024) or have relied on outdated data and narrow time scopes. Methodological gaps are also evident, with some investigations depending on qualitative or literature based approaches that may lack the rigour of empirical validation (Joseph, 2023). Furthermore, a notable locational gap exists, as many studies focus on non Nigerian contexts (Padhi, 2024), leaving the unique dynamics of Nigeria's oil dependent economy underexplored. To fill these gaps, the study formulated the following hypotheses:

H_{01}: Community engagement does not have a significant effect on the return on assets of listed natural resource and downstream oil and gas firms in Nigeria.

H_{02}: Health and safety costs do not have a significant effect on the return on assets of listed natural resource and downstream oil and gas firms in Nigeria.

2. Literature Review

2.1 Community Engagement

Community engagement is the process of involving community members and stakeholders in addressing environmental issues

and promoting sustainability goals (Sornaganesh and Veronica, 2023). It encompasses the practice of collaborating with diverse groups of people who are affected by or can influence environmental decisions and actions (Solanke *et al.*, 2022). More broadly, community engagement entails empowering communities to participate in environmental justice and sustainability initiatives through information sharing, capacity building, and the fostering of dialogue (Sunday, 2022). Kalu (2020) describes it as the strategy of engaging with local communities and other relevant actors to identify, understand, and respond to environmental challenges and opportunities.

2.2 Corporate Social Responsibility Costs

Corporate social responsibility (CSR) costs are the expenditures organisations incur in their efforts to address the social, environmental, and economic impacts of their operations. These outlays reflect a company's commitment to ethical practices, sustainability, and stakeholder engagement. Padhi (2024) defines CSR costs as financial outlays associated with initiatives designed to improve the welfare of stakeholders, including employees, communities, and the environment. Izevbekhai and Mansur (2024) conceptualise CSR costs as expenses related to disclosures and activities that align business objectives with societal expectations. Joseph (2023) broadens the scope by defining CSR costs as expenditures incurred in implementing sustainable practices, such as emissions reduction, diversity promotion, and ethical sourcing.

2.3 Health and Safety Costs

Health and safety costs refer to the expenses incurred by organisations to ensure workplace safety, employee wellbeing, and compliance with health and safety regulations. These costs encompass a wide range of activities, from preventive measures to addressing the consequences of workplace incidents. Eke *et al.* (2024) highlight that firms view these expenditures as both a regulatory necessity and an investment in employee welfare and productivity. Adeniyi and Adebayo (2020) describe health and safety costs as expenditures incurred to mitigate environmental and workplace risks, including safety equipment procurement, employee health insurance, and remediation measures following environmental incidents.

2.4 Financial Performance

Financial performance refers to the process of measuring and evaluating an organisation's financial outcomes and capabilities, including profitability, liquidity, solvency, and efficiency (Naser and Mokhtar, 2004). It demonstrates the ability of a company to generate profits and maintain financial stability over a specified period through indicators such as revenue growth, return on investment, and asset utilisation (Ilesanmi, 2011). Return on assets (ROA) is particularly relevant for industries with high capital requirements, such as the downstream oil and gas sector, as it illustrates the effectiveness of asset utilisation in generating returns (Nwaorgu and Abiahu, 2020). Kurawa and Saidu (2018) express ROA as a financial ratio that assesses a company's ability to generate profits from its investments in assets. A higher ROA indicates that the company is effectively leveraging its asset base to produce earnings.

2.5 Empirical Review

Santhanakrishnan *et al.* (2024) explored the impact of community engagement on corporate financial performance by examining various dimensions of community engagement activities and their influence on financial metrics. The study blended quantitative analysis of financial data with qualitative evaluations of community engagement practices and concluded that community engagement activities have positive, neutral, or negative impacts on financial performance depending on various contextual factors. Padhi (2024) investigated the community engagement initiatives of Tata Capital and concluded that community engagement fosters stakeholder trust, improves brand reputation, and contributes to long term organisational success.

Izevbekhai and Mansur (2024) investigated the relationship between community engagement and firm financial performance among listed deposit money banks in Nigeria. Employing ordinary least squares regression analysis, they found that while employee relation disclosure did not significantly affect firm performance, local community relation disclosure had a substantial positive effect on financial performance. Sornaganesh and Veronica (2023) analysed the influence of community engagement on the financial performance of companies in India between 2018 and 2022 using a multiple regression approach. The study found a significant positive relationship between community engagement and ROA, ROE, and ROCE.

Eke *et al.* (2024) examined the effect of environmental disasters on the profitability of Nigerian oil and gas firms for a ten year period spanning from 2013 to 2022. The findings revealed no evidence that environmental disasters exerted a significant effect on financial performance. Similarly, Adeniyi and Adebayo (2020) found that expenditures on environmental protection and safety measures did not significantly affect financial outcomes in Nigeria's oil industry. In contrast, Ezenwaka, Nwaorgu and Ifurueze (2022) found that environmental disasters positively influenced revenue and profit after tax by enhancing firms' reputations and operational efficiencies.

2.6 Theoretical Framework: Dynamic Capabilities Theory

Dynamic Capabilities Theory, introduced by Teece, Pisano and Shuen (1997), emphasises a firm's ability to adapt, integrate, and reconfigure its resources and competencies to respond to rapidly changing environments. The theory extends the Resource Based View by addressing the limitations of static capabilities in dynamic markets. Teece (2007) argues that firms operating in unpredictable and volatile environments must develop dynamic capabilities to sense opportunities and threats, seize them, and reconfigure their resource base accordingly.

In the context of this study, Dynamic Capabilities Theory is highly relevant. Nigerian natural resource and downstream oil and gas firms operate in volatile environments influenced by fluctuating global energy prices, stringent regulations, and socio political instability (Ademola, 2021). Health and safety costs, viewed as part of a firm's dynamic capabilities, enable firms to adapt to environmental challenges, ensuring compliance and reducing risks. Similarly, community engagement initiatives require firms to sense societal expectations, seize opportunities for goodwill, and reconfigure strategies to align with stakeholder needs. However, critics such as Williamson (1999) contend that the theory is abstract and difficult to operationalise, while Winter (2003) highlights the high costs and complexities of reconfiguring resources in capital intensive industries.

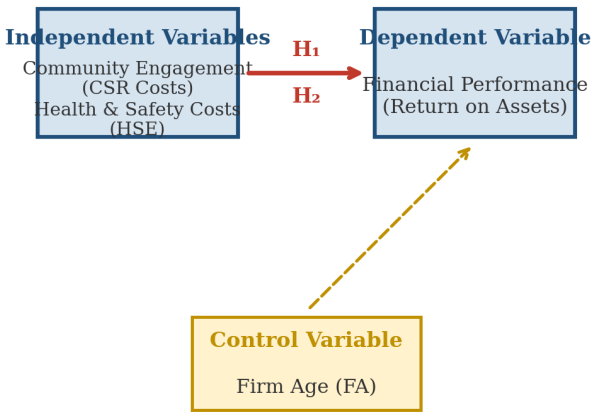

Figure 1: *Conceptual framework depicting the relationship among community engagement, health and safety costs, firm age, and financial performance (ROA).*

3. Methodology

This research adopted the ex post facto research design, which relies on the analysis of historical data without manipulation of independent variables. The population of the study comprised thirteen natural resource and downstream oil and gas firms listed on the Nigerian Exchange Group for a period of thirteen years spanning from 2012 to 2024. The census sampling technique was employed, meaning all thirteen firms in the population were included as the sample. Data were sourced from the audited annual reports and financial statements of the sampled firms.

The analytical tools employed include descriptive statistics, variance inflation factor (VIF) tests, correlation analysis, the Hausman specification test, the likelihood ratio test, and fixed effect regression. The regression model used to test the hypotheses was adopted from Bumin and Ayranci (2024) and is specified as follows:

$$ROA_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 HSE_{it} + \beta_3 FA_{it} + \varepsilon_{it} \qquad (1)$$

where ROA represents return on assets, CSR denotes corporate social responsibility costs (proxy for community engagement), HSE represents health and safety costs, FA denotes firm age (control variable), β_0 is the intercept, β_1 to β_3 are the coefficients of the parameter estimates, and ε is the error term.

Table 1. Summary of variables, proxies, and measurement.

Variable	Type	Proxy	Measurement
ROA	Dependent	Return on Assets	Net Income / Total Assets
CSR	Independent	Community Engagement	CSR Expenditure (■'M)
HSE	Independent	Health & Safety Costs	HSE Expenditure (■'M)
FA	Control	Firm Age	Years since incorporation

4. Results and Discussion

4.1 Descriptive Statistics

Descriptive statistics provide a summary of the central tendency, dispersion, and distribution of the data for the variables under study. The summary statistics presented in Table 2 include the mean, median, maximum, minimum, standard deviation, skewness, kurtosis, and the Jarque Bera test for normality.

Table 2. Descriptive statistics of study variables.

Statistic	ROA	CSR	HSE	FA
Mean	3.894	232.079	37.389	49.665
Median	4.962	59.800	10.945	44.000
Maximum	22.634	3823.000	384.370	156.000
Minimum	–32.176	0.000	0.250	10.000
Std. Dev.	8.561	628.472	64.456	32.449
Skewness	–0.953	3.606	2.794	2.179
Kurtosis	4.705	15.789	11.614	7.538
Jarque–Bera	42.209	1392.373	680.910	255.692
Probability	0.000	0.000	0.000	0.000
Observations	155	155	155	155

The results indicate that the mean value of ROA is 3.894 per cent, with a standard deviation of 8.561, highlighting considerable variability in asset returns across the sampled firms. The minimum value of –32.176 indicates that some firms recorded significant losses during the study period, while the maximum of 22.634 reflects relatively strong performance in certain years. The negative skewness of –0.953 indicates a distribution tilted towards lower values, while a kurtosis value of 4.705 suggests a leptokurtic distribution with a higher frequency of extreme values than in a normal distribution.

For CSR, the mean expenditure is ■232.079 million, but the high standard deviation of ■628.472 million and the significant skewness of 3.606 reveal the presence of substantial outliers, indicating that a few firms spend disproportionately more on community engagement than their peers. Health and safety costs have a mean of ■37.389 million, with a maximum of ■384.370 million and a positive skewness of 2.794, confirming that the distribution is right skewed. Firm age shows a mean of 49.665 years, suggesting that the sampled firms have been in operation for nearly half a century on average. The Jarque Bera test probabilities of zero for all variables lead to the rejection of the null hypothesis of normality, indicating that none of the variables follow a normal distribution.

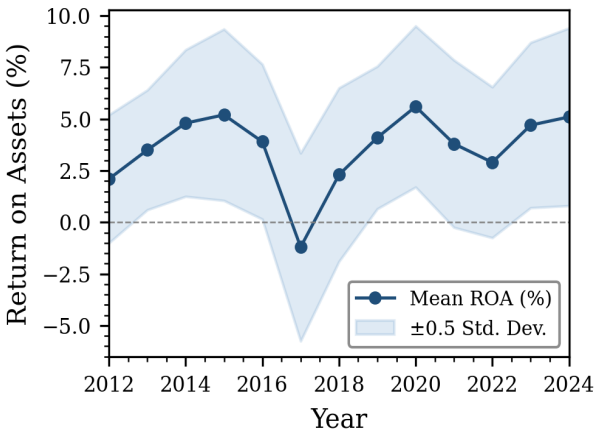

Figure 2: *Trend of mean return on assets (ROA) for sampled natural resource and downstream oil and gas firms in Nigeria (2012–2024).*

Figure 2 illustrates the trend of mean ROA over the study period. The pronounced dip in 2017 likely reflects the residual effects of the economic recession that engulfed Nigeria in 2016, during which the economy contracted by 1.6 per cent (Ademola, 2021). Recovery is observable from 2018 onwards, with a peak around 2020 before a slight moderation in subsequent years. The shaded band representing half a standard deviation underscores the wide dispersion of individual firm performance around the mean, consistent with the heterogeneity observed in the descriptive statistics.

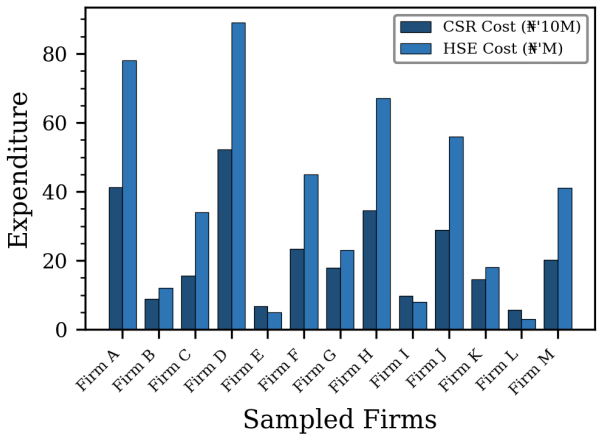

Figure 3: *Distribution of CSR and health and safety expenditure across sampled firms.*

Figure 3 reveals the considerable disparity in CSR and HSE expenditure among the sampled firms. A small number of firms account for a disproportionately large share of total CSR expenditure, which is consistent with the high skewness and standard deviation reported in the descriptive statistics. This pattern suggests that community engagement spending in the Nigerian oil and gas sector is concentrated among a few large operators, while smaller firms allocate relatively modest budgets to such activities (Solanke *et al.*, 2022).

4.2 Correlation Analysis

Correlation analysis evaluates the strength and direction of linear relationships between variables. The results, presented in Table 3, reveal that ROA has a weak positive correlation with CSR (coefficient = 0.0736, p = 0.3631), indicating no statistically significant linear association between community engagement spending and financial performance. Health and safety costs exhibit a positive correlation with ROA (coefficient = 0.1920, p = 0.0167), which is statistically significant at the five per cent level. The strongest relationship is between ROA and firm age (coefficient = 0.4254, p = 0.0000), indicating that older firms tend to perform better in terms of asset returns.

Table 3. Pairwise correlation matrix.

	ROA	CSR	HSE	FA
ROA	1.000			
CSR	0.074 (0.363)	1.000		
HSE	0.192* (0.017)	–0.154 (0.056)	1.000	
FA	0.425** (0.000)	–0.093 (0.249)	0.067 (0.410)	1.000

*Note: * significant at 5%; ** significant at 1%. Probability values in parentheses.*

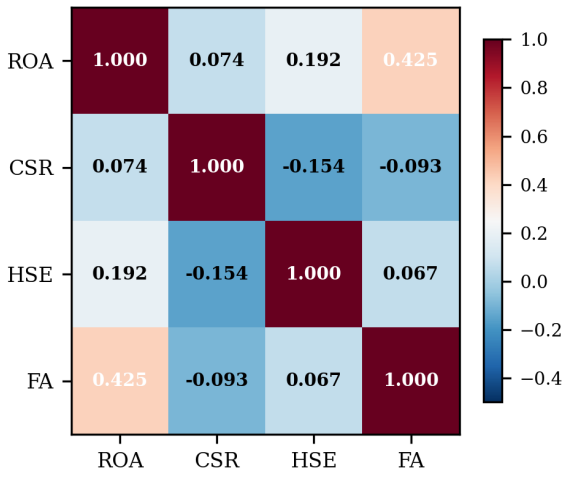

Figure 4: *Correlation heatmap of study variables.*

The correlation heatmap in Figure 4 provides a visual representation of the pairwise relationships among the study variables. The moderately strong positive association between firm age and ROA is visually prominent, suggesting that accumulated experience, market knowledge, and established stakeholder networks contribute to improved financial outcomes over time (Pervan, Pervan and Curak, 2017). The weak and statistically insignificant correlation between CSR and ROA provides preliminary evidence that community engagement expenditure does not translate directly into improved asset returns in this sector.

4.3 Variance Inflation Factor

The variance inflation factor (VIF) test was conducted to detect multicollinearity among the independent variables. The results, presented in Table 4, show that all centred VIF values are well below the threshold of 10, with CSR recording the highest value of 1.032 and FA the lowest at 1.012. These findings confirm the absence of significant multicollinearity, thereby validating the reliability of the regression estimates.

Table 4. Variance inflation factor test results.

Variable	Coefficient Variance	Centred VIF
CSR	9.79E–07	1.032
HSE	9.27E–05	1.027
FA	3.60E–04	1.012

4.4 Hausman Specification Test

The Hausman test was conducted to choose between fixed effects and random effects models for the panel data analysis. The test statistic of 8.784 and a probability value of 0.0323 lead to the rejection of the null hypothesis that the random effects model is appropriate. This result supports the adoption of the fixed effects model, which accounts for unobserved heterogeneity across entities that could influence the dependent variable.

Table 5. Hausman specification test results.

Test Summary	Chi-Sq. Statistic	d.f.	Prob.
Cross-section random	8.784	3	0.032

4.5 Likelihood Ratio Test

The likelihood ratio test evaluates whether fixed effects significantly improve the model's fit. The cross section F statistic of 5.038 and a probability value of 0.0000, along with a Chi square statistic of 55.975 and a probability value of 0.0000, confirm the significance of fixed effects. These results justify the inclusion of firm specific intercepts in the regression model.

4.6 Fixed Effect Regression (Test of Hypotheses)

The fixed effects regression model examines the influence of CSR, HSE, and FA on ROA. The results are presented in Table 6.

Table 6. Fixed effect regression results (Dependent variable: ROA).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CSR	–0.0015	0.0019	–0.786	0.433
HSE	–0.0216	0.0160	–1.352	0.179
FA	0.0091	0.1542	0.059	0.953
Constant	4.5891	7.6720	0.598	0.551

Table 7. Summary of model diagnostics.

Diagnostic	Value
R-squared	0.4615
Adjusted R-squared	0.4034
F-statistic	7.943
Prob(F-statistic)	0.0000
Durbin-Watson stat	1.496
Observations	155

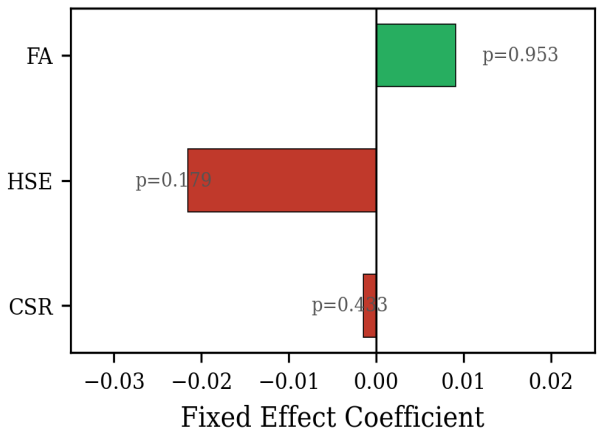

Figure 5: *Fixed effect regression coefficients with corresponding probability values.*

Hypothesis One: Community engagement (CSR) recorded a coefficient of −0.0015 with a probability value of 0.4332, indicating a negative but statistically insignificant relationship between community engagement expenditure and ROA. Since the probability value exceeds the 0.05 threshold, the null hypothesis that community engagement does not have a significant effect on return on assets cannot be rejected. This finding implies that increases in CSR spending do not correspond to measurable improvements in asset returns within the study period.

Hypothesis Two: Health and safety costs (HSE) recorded a coefficient of −0.0216 with a probability value of 0.1787, also indicating a negative but statistically insignificant relationship with ROA. The null hypothesis that health and safety costs do not have a significant effect on return on assets cannot be rejected. This result suggests that while firms invest in workplace safety and environmental remediation, these outlays do not translate into immediate financial gains.

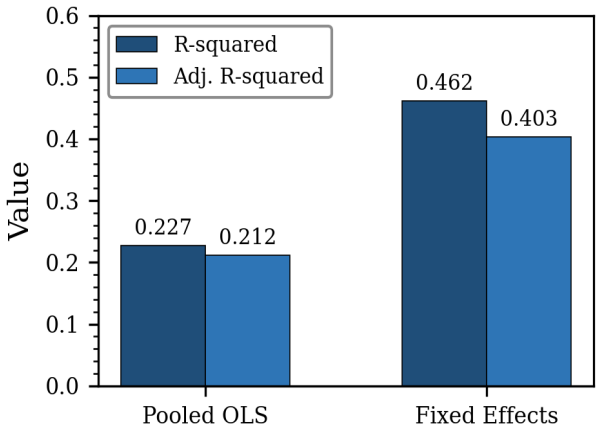

Figure 6: *Comparison of R-squared values between pooled OLS and fixed effects models.*

The R squared value of 0.4615 indicates that approximately 46.15 per cent of the variation in ROA is explained by the independent variables and fixed effects. The adjusted R squared of 0.4034 accounts for the number of predictors and confirms a reasonable explanatory power. The improvement from the pooled OLS R squared of 0.2273 to the fixed effects R squared of 0.4615, illustrated in Figure 6, underscores the importance of controlling for unobserved firm specific heterogeneity. The Durbin Watson statistic of 1.496 lies within the acceptable range of 1.3 to 2.3, confirming the absence of significant autocorrelation in the residuals. While individual coefficients are not statistically significant, the F statistic of 7.943 with a probability value of 0.0000 confirms the overall significance of the model, indicating that the combined effects of the variables and fixed effects explain meaningful variations in ROA.

4.7 Discussion of Findings

The insignificant impact of community engagement on ROA aligns with several prior studies. Solanke *et al.* (2022) found no significant relationship between community engagement proxies and financial performance indicators for Nigerian oil and gas firms. Similarly, Sunday (2022) reported that economic and donation responsibilities under community engagement did not significantly contribute to profitability despite their perceived relevance for regulatory compliance. These studies highlight that while community engagement may serve broader societal goals, its direct impact on financial performance is often muted in the Nigerian context.

Conversely, studies such as Izevbekhai and Mansur (2024) and Sulaiman, Ahmadu and Mijinyawa (2018) identified significant positive effects of community engagement on financial performance. In the banking sector, Izevbekhai and Mansur demonstrated that local community relations enhanced financial outcomes, emphasising the moral and strategic importance of community engagement. The contrasting findings suggest that the financial benefits of community engagement may depend on the industry context, the measurement approach adopted, and the quality of implementation strategies.

The insignificant effect of health and safety costs on ROA is consistent with findings by Eke *et al.* (2024), who observed no significant influence of employee health and safety costs on profitability over a ten year period. Adeniyi and Adebayo (2020) also found that safety expenditures did not significantly affect financial outcomes. These results suggest that while firms may invest in addressing environmental risks, such investments do not necessarily translate into immediate financial gains. This may reflect the long gestation period required for safety investments to yield tangible returns, or it may indicate that the costs of compliance and remediation offset any productivity

gains achieved through improved safety conditions.

However, other studies have reported contrasting results. Ezenwaka *et al.* (2022) found that environmental disaster management positively influenced revenue and profit after tax by enhancing firms' reputations and operational efficiencies. The joint significance of the model, despite the insignificance of individual coefficients, aligns with Santhanakrishnan *et al.* (2024), who emphasised the interplay between community engagement practices and other corporate strategies in influencing financial outcomes. The finding that these variables are jointly significant suggests that community engagement and health and safety costs work in concert with other firm specific factors to shape financial performance. This holistic perspective is consistent with Dynamic Capabilities Theory, which posits that firms must integrate multiple capabilities, including community relations and safety management, to achieve sustained competitive advantage (Teece, 2014).

5. Conclusion and Recommendations

This study assessed the effect of community engagement and health and safety costs on the financial performance of listed natural resource and downstream oil and gas firms in Nigeria over a thirteen year period from 2012 to 2024. The findings revealed that neither community engagement nor health and safety costs individually exerted a statistically significant effect on return on assets. However, the overall model was jointly significant, suggesting that the combined influence of these variables, together with firm specific fixed effects, meaningfully explains variations in financial performance.

On this basis, the study concludes that the environmental dynamics of community engagement and health and safety costs were not individually significant in affecting the financial performance of natural resource and downstream oil and gas firms in Nigeria, but their combined effects were meaningful. In line with these conclusions, the study makes the following recommendations:

First, firms should adopt integrated strategies for community engagement and health and safety management. Since neither variable was individually significant but both were jointly meaningful, companies in the natural resource and oil and gas sectors should align community engagement initiatives with robust environmental management practices. This integration can enhance overall stakeholder trust and improve long term financial sustainability.

Second, firms should leverage joint efforts for stakeholder engagement. The joint significance of the independent variables underscores the importance of collaborative efforts. Firms should actively engage stakeholders, including local communities, environmental agencies, and policymakers, in designing and implementing community and environmental management programmes. Partnerships with local communities to address environmental concerns such as pollution and disaster response can create shared value and foster stronger relationships.

Third, future research should explore additional variables and longitudinal data to uncover the nuanced impacts of community engagement and health and safety activities on firm performance. Expanding the scope to include qualitative interviews with community stakeholders and adopting mixed methods approaches could provide richer insights into the mechanisms through which these expenditures influence financial outcomes.

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