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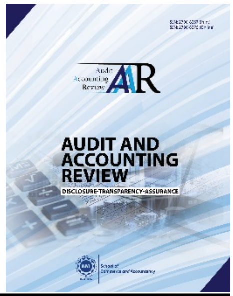


**Title:** **Board Diversity and Earnings Management in Publicly Listed Oil and Gas Firms in Nigeria**

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# Board Diversity and Earnings Management in Publicly Listed Oil and Gas Firms in Nigeria

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## Abstract

This research examines how board diversity influence earnings management for the publicly listed oil and gas firms in Nigeria. Furthermore, this study measures female and foreign directors, as a proxy of board diversity, taken as an independent variable. While dependent variable is discretionary accruals of Nigerian publicly traded oil and gas firms which is a proxy of earnings management. Eleven listed Nigerian oil and gas businesses, which regularly issued audited yearly financial reports from 2009-2019 were used to achieve the study's objectives. Therefore, regression models with fixed and random effects were applied to conduct the analysis. The findings showed that female directors and foreign directors of Nigerian-listed oil and gas companies have a significant negative impact on earnings management. Thereby, this study recommends that a certain proportion of female directors is required for the Nigerian-listed oil and gas firms.

***Keywords*:** board diversity, earnings management, female director, foreign director, oil and gas companies

## Introduction

Nigeria is the continent's biggest oil and gas producer, because petroleum industry is the nation's primary source of income. About 90% of Nigeria's foreign exchange revenues are produced by oil and gas firms (Central Bank of Nigeria [CBN], 2016). As a result, Nigeria's economy heavily relies on the oil and gas sectors, which also significantly increases the federal government earnings. Oil sales accounted for 40% of the Nigeria's total revenue in 2019. (Samuel & Jason, 2019). The oil business in Nigeria has been linked to claims of unethical financial practices despite having a

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strategic relevance. Tyokoso (2017) highlighted the specificities of a case in which money was not transferred to the Federation Account and Nigeria National Petrol grossly blew through oil income. Africa's petroleum case (now Ardova Plc), in which the company's financial statement failed to disclose a credit facility worth 24 billion nairas, supported similar claims against thelisted oil and gas businesses in Nigeria (Samaila, 2014). These improper accounting practices are classified as earnings management and are known as earnings manipulations.

According to Healy and Wahlen (1999), earnings management comprises the alteration of financial reports and deception of stakeholders, either rigging of contractual results based on stated accounting statistics or the corporation's financial performance. This was only accomplished by applying judgment to financial reporting and transaction structuring. Companies must have an effective board of directors in order to guarantee that management's revised earnings would be liable to fulfill the goals of different owners and other stakeholders. By doing so, companies would be able to provide accurate financial statements and manage their earnings less (Enofe et al., 2017). Various racial, ethnic, and gender backgrounds are represented to company's boards of directors.

According to Firoozi et al. (2016), the inclusion of women in the board demonstrates gender diversity and offers investors' confidence in the validity of the business. As a result, there is typically an improvement in the board's communication, general management style, and social and environmental responsibilities, which promote financial performance and shareholder value. Therefore, happiness among employees and customers rises by growing investor's confidence and market knowledge. The addition of foreign directors in the board, according to Makhlour et al. (2018), would facilitate the decision-making process since they bring a variety of viewpoints, experiences, cultures, and behavioural norms to the table. According to Resource Dependence Theory, the value of the board and the capital of the company are increased by having foreign directors on it by bringing a variety of perspectives to the table (Alqatan, 2019). Similarly, the upper- echelon concept contended that adding foreign personnel may assist a company in obtaining the capital required for the expansion (Alqatan, 2019).

Previously, it has been observed that board diversity affects companies' management towards their earnings. By diversifying its board claims, a company can uphold moral norms (Kam, 2007). Like in other nations, diversity on boards has become a significant factor in maintaining the country's economy. Oceanic Bank Plc, Intercontinental Bank Plc, and Cadbury Plc are a few recent Nigerian businesses, which have failed. As a result, the data points towards the boards' management deficiencies, which is the primary cause of failures (Hussaini, 2014). Despite the fact, some boards in Nigeria are being diverse, however, there were a lot of businesses, which also failed. As an illustration, Oceanic Bank Plc was purchased in 2010 as a result of the executive directors' corporate negligence in collecting depositors' money, while the business was being run by a female CEO, which made the shareholders question the accuracy and legality of the financial reports (Ekadah & Kiweu, 2012). Furthermore, Cadbury Plc continued to manipulate its financial accounts despite having foreign directors in its board. The CEO and finance director of the corporation left their jobs as soon as the company revealed in 2006 that adjustments had been made to their earlier annual reports. These challenges served as a motivation for this study.

Additionally, using various diversity components, such as gender and foreign directors, as a starting point, many empirical researches have looked into the connection between board diversity and earnings management. These discoveries lead towards contradicting results. Studies have discovered a negative link between gender diversity and earnings management (Abubakar et al., 2017; Arioglu, 2020; Mikael & Johan, 2016; Musyoka, 2015; Nyoka, 2018; Damagum et al., 2014). However, research by Hussaini and Gugong (2015) revealed a positive connection between gender diversity and earnings management. Few researches have tend to look at the role of foreign directors and its effects on earnings management (Enofe et al., 2017; Nyoka, 2018; Hooghiemstra et al., 2015). In contrast to Nyoka (2018), who discovered a negative relationship between foreign directors and earnings management, Hooghiemstra et al. (2015) discovered a positive relationship among these variables. These conflicting results might be the result of faulty, sample selection, and inconsistent methodology. For example, Sophie-van-der (2015) used a sample size of 826 businesses drawn from Wharton Research data, Musyoka (2015) used a sample size of sixty four (64) Nairobi Securities exchange-listed companies in December 31, 2014, and Abubakar et al. (2017) used a sample size of forty-five (45) Nigerian businesses. Ishak et al. (2016) examined public companies that were listed on Bursa Malaysia using a sample of 1597 firms. These conflicting findings also served as a motivation to conduct this study.

Moreover, previous research findings might not be applicable to the oil and gas firms in Nigeria due to the noticed differences in methods used to estimate discretionary accruals. For instance, Qaiser and Abdullahi (2016) evaluated discretionary accrual using the Dechow et al. (2011) model, and Habbash (2010) measured earnings management using the estimate of discretionary accrual developed by Kothari et al. (2005). Furthermore, Abubakar et al. (2017) quantified discretionary accruals using Roychowdhury's (2006) real earnings management technique, while Isa and Adeize (2018) assessed discretionary accruals using Chang et al. (2011) discretionary loan loss provision model. However, this study has employed the modified Jones (1995) model, since it has been thoroughly examined and is widely regarded as the best model for accurately estimating discretionary accruals (Idris, 2015; Tyokoso, 2017).

In the light of previous studies, the current study's goal is to determine the effects of board diversity on earnings management by examining publicly traded oil and gas firms in Nigeria. The proposed research questions are as follows:

i. What effect do female directors have on earnings management in Nigerian publicly traded oil and gas companies?

ii. How do foreign directors affect the Nigerian listed oil and gas companies' management regarding earnings?

The following null hypotheses are proposed that relate to the current study questions:

$H_{o1}$: The presence of female directors has no significant impact on earnings management.

$H_{o2}$: The presence of foreign directors has no significant effect on earnings management.

## Literature Review

### The Concept of Board Diversity

Diversity on a board can be defined in a variety of ways. In simple words, diversity is the existence of a large variety of people who are unique from one another. Iwora and Lesley (2014) claimed that each board member's gender, age, experience, ethnicity, and other demographic traits have an impact on the diversity of the board. Board diversity, according to Chandrasekharan and Tijjani (2018), is a difference in the board's ethnicity, nationality, and gender composition. In the past, consideration might have been given to the directors' regarding age, race, gender, educational background, and credentials in order to reduce the board's homogeneity (Isa & Adeize, 2018). Based on the past theories, this study described board diversity as a difference in the board's gender composition.

### *The Diversity of Gender*

Female to male board director ratio was heavily emphasized in majority of the definitions of gender diversity. Gender diversity was defined by Carter et al. (2003) as the percentage of women directors on the boards. The proportion of women directors to men can be used to gauge gender diversity, as claimed by Jhunjhunwala and Mishra (2012). According to Handoko (2014), gender diversity has been indicated by the proportion of women directors. As the culture of an organization shifts from being more masculine to being more gender-equitable in the hiring practices and from promoting structure-task behaviour towards consideration behaviour, gender equity is now viewed as a critical component of developing organizational culture. According to Jhunjhunwala and Mishra (2012), the female directors' percentage has served the standard of gender diversity for the current study.

### *Nationality (Foreign) Diversity*

Due to previous studies, there are as many diverse ways to interpret foreign directors. The majority of foreign board members, according to Oxelheim and Randoy (2003), are not citizens of the nation where the parent firm is headquartered. According to Sulaiman and Oche (2015), the term foreign directors refers to all foreigners who sit on the boards of Nigerian companies. Alternative interpretations include the ratio of minority directors to all directors. According to Osiregbmhe (2017), nationality (foreign) diversity also refers to a company board including members from several countries. More specifically, the percentage of foreign directors relative to all board members, according to Alina (2018), acts as a proxy for nationality (foreign) diversity. Asians, Hispanics, and African Americans are all considered minorities. In accordance with Sulaiman and Oche's

(2015) definition of foreign directors, this analysis took into account a number of foreign directors on the boards of Nigerian firms.

### Concept of Earnings Management

Other terms for controlling earnings include the accounting numbers game, income smoothing, and creative accounting (Mulford & Comiskey, 2002). Earnings management, according to Habib et al. (2013), is the act of creating financial records and statements using accounting principles that aesthetically overstate an organization's operations and financial status. Utilizing particular accounting techniques or procedures, recognizing one-time, non-current items, and reducing or increasing revenue or cost transactions are all examples of this practice. Rahman et al. (2013) stated that Earnings Management (EM) is a term used to describe a method through which a company's management manipulates its earnings in order to raise the figures over a predetermined objective. Therefore, earnings management in this study refers to a deliberate and accidental management actions that alter reported earnings and deceive shareholders and the broader public.

### Empirical Review on Diversity on the Board and Earnings Management

The association between board diversity and earnings management has been studied in the past on a national and international level, which is summarized in this section. The prime goal of this research is to fill the gap in the previous researches by providing a thorough literature review.

The effects of board features on the six-year management of earnings of listed food and beverage firms in Nigeria were examined by Hussaini and Gugong (2015) for the period 2009-2014. This study used board size, meeting frequency, board composition, financial acumen, and the proportion of women on the board as proxy measures. Financial management was simulated using Dechow et al. (1995) modified Jones model (1995). Regression analysis utilizing multiple least squares (MLS) was used to examine the data from yearly reports. Women holding directorships were positively and significantly correlated with Nigerian listed companies' concerning earnings management. Instead of focusing on board diversity, this study concentrated on board characteristics.

Additionally, Rokiah et al. (2016) used 1597 firms' observations from public firms that were listed on Bursa Malaysia between 2009-2012 to investigate the effects of COE dualism, women directors, and the big 4 audit firms on real profit manipulations in Malaysia. Actual earnings management was replaced with residuals from the Roychowdhury (2006) model. The data was gathered via Thomson Data Stream and annual reports. Female directors and effective earnings management are related to the regression analysis. In other words, the issue of profit manipulation is not helped by the proportion of female directors on corporate boards. In contrast, Mikael and Johan (2016) looked at the association between board gender diversity and earnings management in Norway during the years of 2006-2010, using information from 370 non-financial service companies registered on the Oslo Stock Exchange. The modified Jones model was utilized to describe earnings management, and the data were analyzed using ordinary least square regression (OLS). The results of the study demonstrated a significant negative association between board gender diversity and earnings management. In other words, when the percentage of women on board rises, the discretionary accrual anticipated using modified Jones models—which were employed to imitate earnings management decreases.

Between 2011-2016, Abubakar et al. (2017) did a similar study on the association between board features and real profit management in 45 listed Nigerian financial institutions. The residual of Roychowdhury's (2006) model was used to proxy real earnings management. Among the proxy measures for board characteristics, were the proportion of female directors, the size of the board, the frequency of its meetings, and the level of expertise of its members. Panel Corrected Standard Errors (PCSE) regression was used in the current study. The results demonstrated that having female directors has a significant negative effect on the real earnings management. Instead of focusing on the oil and gas firms, the study concentrated on the financial institutions. Enofe et al. (2017) looked into the effects of foreign directorship, female gender, board size, board independence, and firm size on earnings management. The modified Jones (1995) model was the dependent variable. The study employed a quantitative and cross-sectional survey to gather data regarding non-financial institutions publicly traded on the Nigerian Stock Exchange in 2014. The data were analyzed using multiple least squares (MLS) regression, correlation, and descriptive statistics. It was shown that there was a negative correlation between earnings management and female board members, as well as, international board members.

In order to determine the effects of board diversity on earnings management from 2011–2017, Nyoka (2018) examined nine industrial companies being listed on the Nairobi Securities Exchange. Gender, age, board independence, and foreign director diversity were used as proxy metrics for board diversity. Discretionary accrual used as the dependent variable for earnings management. Descriptive and regression analysis were used to analyze the data and the study found a significant and negative association between gender diversity and earnings management. However, it was demonstrated that foreign directors and earnings management had a beneficial link. Similar research was conducted by Arioglu (2020), who used information from all 2279 publicly traded non-financial firms in Turkey between 2009-2017, in order to research the connection between female directors and earnings management. Discretionary accruals which serve as the dependent variable was estimated using the modified Jones' (1995) model. The data were analyze using the Generalized Method of Moment (GMM) regression and a positive relationship between board gender diversity and earnings management was uncovered. This result disapproved the notion that gender diversity would increase productivity and oversight, raising the living standards.

However, Hosam et al. (2019) examined the effects of board characteristics on earnings management across 71 worldwide oil and gas companies. Board diversity, size, independence, and CEO duality were substituted for actual board characteristics. Utilizing discretionary accruals representing earnings management, a dependent variable, was measured using modified cross sectional Jones (1995) model. One of the methods used for data analysis was partial least squares (PLS). It was found that gender diversity significantly affected the earnings management. As of December 31, 2015, there were just 9 companies listed on the Nigerian Stock Exchange, their findings cannot be extrapolated to Nigeria's oil and gas sector, which is still in its early stages.

The impact of board gender diversity and other board features on earnings management practices of firms listed in Kazakhstan from 2010-2016 is examined by Orazalin (2020). The outcome demonstrated that firms with more board gender diversity effectively restrained earnings management. Additionally, Miladi and Chouaibi (2021) used data spanning from 2009-2018 to examine the effects of women directors on earnings management in the US listed banks. Data analysis methods employed in the study included descriptive statistics, correlation, and regression. It was found that women directors are more likely to cut the earnings management of US banks. The study was done in the banking industry, not in the oil and gas industry and it was done in the US, not in Nigeria. Additionally, Emmanuel et al. (2022) studied the effect of board diversity on earnings management of listed conglomerates firms in Nigeria for the years 2014–2021. The investigation was conducted using multiple linear regression and the results showed that while gender diversity has no significant impact on earnings management, board nationality lowers the amount of earnings management in a firm. Instead of oil and gas firms, conglomerates were the setting for this investigation.

This empirical study aims to study the effect of board diversity on earnings management, which raises doubts regarding the validity of the statistical findings. The majority of empirical researches found no significant correlation between board diversity and earnings management, despite various arguments in favour of the idea that gender diversity and foreign directors aid to restrain earnings management. Numerous studies have shown a direct connection between board diversity and earnings management. Evidences from publicly traded Nigerian oil and gas businesses are used in this study to support claim made internationally in favour of board diversity and earnings management.

## Theoretical Framework

This study looked at the relationship between board diversity and earnings management using the agency theory. Jensen and Meckling (1976) refer to the relationship between the principal and the agent as the "agency hypothesis". The investors are the business's principals and the management is its representative. The relationship between the principal and the agent is supported by current contracts. According to agency theory, each party acts in their own best interest. If the agent is able to optimize earnings and allocations to dividend sharing, the principals would recognize the agent's strong performance. The agent receives a significant incentive because their performance improves with increased earnings and share prices. The agent can change the terms of the contract if the principal is not watching. The informational imbalance between the principal and the agent is the major cause of this change. Agents may have possibilities to perform earnings management due to information asymmetry. According to agency theory, a more diversified board would be able to better oversee management's operations.

Furthermore, a board with directors of all genders would be more adept at avoiding the practice of earnings management and, as a result, would be able to provide shareholders with financial reporting that is more accurate (Gallego-Álvarez et al., 2010). Agency theory also supports the idea that corporate boards meeting regularly can enhance their ability to effectively advise, supervise, and discipline management, hence improving the firm's performance (Ntim & Osei, 2011). According to Gull (2018) thesis based on agency theory, female directors can increase the efficacy of the board in supervising management. Board diversity should function as an effective tool to oversee management because women directors are more likely than men to start discussions about contentious issues and to challenge the CEO's viewpoints.

From the aforementioned, agency theory clarifies and adequately analyzes the unethical accounting and financial difficulties like earnings management (EM). This study applies agency theory to examine the connection between board diversity and the incidence of earnings management in publicly traded oil and gas firms in Nigeria.

## Methodology

Descriptive statistics were used to report and summarize the results and the statistical relationship between the study's variables and the data was described using correlation research. The study covers 11 publicly traded Nigerian oil and gas businesses that were operating as of December 31, 2019, had data accessible for the study's time frame ranging from 2009-2019, which were publicly traded as of that date. There are 121 observations in all for a firm's year. The annual reports and financial statements of the chosen companies were used as a secondary source of data during the study period. Descriptive statistics, correlation, and multiple regression were used for data analysis. However, since panel data analysis was used in this study, the system of pooled OLS regression is subject to heterogeneity bias and therefore the fixed effect and random effect regression were carried out as well.

The modified Jones (1995) model, created by Jones (1991) and enhanced by Dechow et al. (1995), was used to recover discretionary accruals for the assessment of the dependent variable (earnings management) (Enofe et al. 2017; Idris, 2015; Salleh & Haat, 2013). The impact of sale-based manipulation cannot be taken into account by the original Jones (1991) model, according to Dechow et al. (1995), because account receivables should not be regarded as non-discretionary accruals. Therefore, they suggested changing the original Jones model, which they called the modified Jones model (1995). In this study, the Jones (1995) model was applied because it has undergone in-depth analysis and is widely recognized as the best model for accurately estimating discretionary accruals (Idris, 2015; Tyokoso, 2017).

Here is how the model is displayed:

$$DAC_{it} = (TAC_{it} / TA_{it-1}) - \beta_1 (1 / TA_{it-1}) - \beta_2 (\nabla REV_{it} - \nabla REC_{it}) / TA_{it-1} - \beta_3 (PPE_{it} / TA_{it-1} + \varepsilon_{it} - (I)$$

$TA_{it-1}$ = Total assets for firm I in year t-1

$DAC_{it}$ = Discretionary accrual

$TAC_{it}$ = Total accruals for firm i in year t

$DAC_{it}$ = Discretionary accrual

$TAC_{it}$ = Total accruals for firm i in year t

$TA_{it-1}$ = Total assets for firm i in year t-1

$REV_{it}$ = Variation in the firm's net revenues for year t

$REC_{it}$ = Modification of the firm's accounts receivable for the year t

$PPE_{it}$ = Gross property, plant, and equipment for company I in year t

eit = error term (discretionary accruals for firm i in year t)

$\beta_1$, $\beta_2$ and $\beta_3$ = the parameters to be estimated

Women in leadership were measured using the percentage of female board members, as in previous studies (Jhunjhunwala et al., 2012; Miladi & Chouaibi, 2021; Orazalin, 2020) foreign directors were measured using the percentage of board members from other nations, as in Alina's (2018) study; and return on assets were measured using the ratio of earnings before interest and tax to total assets, as in Abubakar et al. (2017), firm size was determined by calculating the natural logarithm of the total assets (Abdullahi, 2015; Eze, 2017; Makhlour et al., 2018), and leverage was determined by calculating the ratio of total debt to total assets (Ogboi et al., 2018).

**Table 1**
*Measurement of Variables*

| Variable Acronym | Name of the Variable | Measurement | Source |
|---|---|---|---|
| Dependent (DAC) | Earnings Management | Discretionary Accruals | Modified Jones Model (1995) |
| Independent | Board Diversity | | |
| WDIR | Women in Leadership | % of female directors on the board of directors | Jhunjhunwala et al. (2012); Orazalin (2020); Miladi and Chouaibi (2021) |
| FDIR | Foreign Directors | % of board members from other countries | Alina (2018) |
| Control | | | |
| ROA | Return on Assets | Earnings before interest and tax to total assets | Abubakar (2017) |
| FSIZE | Firm Size | The entire assets' natural logarithm | Abdullahi (2015); Eze (2017); Makhlour et al. (2018) |
| LEV | Leverage | total debt to total assets | Ogboi, Aderimiki, & Enilolobo (2018) |

***Note.*** Source: Compilation of Authors, 2019 from the Literature

The following presentation of the model explores the study's hypotheses:

$$EM_{it} = \beta_0 + \beta_1 WDIR_{it} + \beta_2 FDIR_{it} + \beta_3 ROA_{it} + \beta_4 FSIZE_{it} + \beta_5 LEV_{it} + \varepsilon_{it} - (II)$$

WDIR = Female Directors

FDIR = Foreign Directors

ROA = Returns on Asset

FSIZE = Firm Size

LEV = Leverage

$\beta_1$ = Coefficient of the constant

$\beta_1$ - $\beta_5$ = the parameters to be estimated

$i$ = Firm

$t$ = Time

## Results and Discussion

This section covers the presentation, interpretation, and discussion of the current study's findings. The descriptive statistics for each variable and the outcomes of the regression and conclusions are all shown and discussed in this part of study. There is an inferred conclusion in this section.

**Table 2**

*Descriptive Statistics*

| Variable | Mean | Std Dev | Minimum | Maximum |
|---|---|---|---|---|
| DAC | 0.1269 | 0.0578 | 0.0223 | 0.2442 |
| WDIR | 0.1320 | 0.8578 | 0.0000 | 0.3356 |
| FDIR | 0.1163 | 0.1269 | 0.0000 | 0.5000 |
| ROA | 0.0854 | 0.2644 | -0.6935 | 0.9540 |
| FSIZE | 17.280 | 1.9229 | 14.846 | 19.351 |
| LEV | 0.7293 | 0.1370 | 0.5017 | 1.1296 |

### Descriptive Statistics

According to Table 2, absolute discretionary accruals for the publicly traded Nigerian oil and gas firms range from a low of 0.022 to a high of 0.24. The average percentage of female directors in Nigeria's publicly listed oil and gas businesses was 13%. The fact that the amount of female representation on a board can range from 0% to 34% demonstrates that there cannot be female participation in some businesses. As a result, men are more likely to hold influential positions on the boards than women, in the publicly traded Nigerian oil and gas firms. Additionally, the average percentage of foreign directors was 13%, implying that on average, there were 13% foreigners on the boards of the companies under evaluation. On publicly traded Nigerian oil and gas firms, a minimum of zero (0) and a maximum of fifty percent (50%) of the board may be made up of foreign directors. According to the survey, although other companies in the same sector had up to 50% foreign ownership, several listed Nigerian oil and gas companies had no foreign directors on their corporate boards.

An indicator for return on assets (ROA) showed a minimum value of -69% and a maximum value of 95%., indicating that during the study period, one firm among the publicly traded Nigerian oil and gas firms experienced a loss of around 69%, while the highest return on assets was 95%. The average return on assets throughout the course of this study was 9%, suggesting that an organization's whole asset base, typically contributed 9% in determining its overall profit. Due to the scale of their total assets, the listed Nigerian oil and gas businesses occasionally have different ROA fluctuations. The second control variable's total assets' natural logarithms are utilized as a stand-in for the second control variable's business size. The mean was 17.41, with a standard deviation of 1.19, ranging between 14.85 and 19.35. The total debt to total asset ratio, which ranges from 0.50-1.29 and has an average mean value of 0.72.

## Correlation Matrix

The correlation matrix is used to assess the strength of the relationship between independent and dependent variables, in order to determine a multicollinearity issue. Table 3 displays the correlation between the independent and dependent variables separately.

**Table 3**

*Correlation Matrix*

| Variables | DAC | WDIR | FDIR | ROA | SIZE | LEV |
|---|---|---|---|---|---|---|
| DAC | 1.0000 | | | | | |
| WDIR | -0.3262 | 1.0000 | | | | |
| FDIR | -0.2841 | 0.1049 | 1.0000 | | | |
| ROA | -0.0286 | -0.1449 | 0.1690 | 1.0000 | | |
| SIZE | -0.5309 | 0.3142 | -0.0083 | -0.0997 | 1.0000 | |
| LEV | 0.1906 | 0.1833 | 0.0222 | 0.0846 | -0.1348 | 1.0000 |

Discretionary accruals are thought to have a negative relationship with business size, return on assets, foreign directors, and female directors. The correlation coefficients of -0.3262, -0.2811, -0.0286, and -0.5309, in that order, indicated a negative correlation. This means that the proportion of female directors, foreign directors, returns on assets, firm size, and profit management of Nigerian listed oil and gas companies are all negatively correlated. Similarly, the correlation coefficient of 0.1906 between discretionary accruals and leverage indicated that the two variables are positively correlated.

### Robustness Test

**Table 4**
*Robustness Test*

| | |
|---|---|
| Mean VIF | 1.12 |
| Hettest $\chi^2$ | 1.47 |
| Hettest Sig. | 0.2249 |
| Hausman $\chi^2$ | 1507.23 |
| Hausman Sig | 0.0000 |

To ascertain, whether or not there was a relationship between the independent variables that could distort the results of the investigation, multicollinearity was examined. For determining multicollinearity, the variance inflation factor and the tolerance levels were useful indicators. There was no excessive correlation, given that all of the components are more than 1.0 and all of the tolerance values are lower than 10, as demonstrated by the multicollinearity test's variance inflation factor (VIF). At that time, the VIF average was 1.12. The results demonstrated that there was no evidence of heteroscedasticity because the test's hottest chi2 value had a probability of 0.2249 and 1.47. Since this study deals with panel data analysis, the Hausman specification test was used to compare regression models with fixed and random effects. The findings of the test for the relationship between board diversity and earnings management of publicly traded oil and gas companies in Nigeria, which produced a Chi2 value of 1507.23 was statistically significant at 1%. These results also demonstrated the suitability and efficiency of the fixed effect model.

### Regression Result

This section discusses how publicly traded Nigerian oil and gas firms manage their earnings in regard to board diversity. Despite the fact that both the findings for the fixed effect and the random effect were shown, the interpretation was based on the fixed effect, as demonstrated by the Hausman Test.

**Table 5**

*GLS (Fixed Effect and Random Effect) Regression Results for all the Models*

| Variables | GLS (Fixed Effect) | | | | GLS (Random Effect) | | | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient | Std Err | *t* | *p* | Coefficient | Std Err | *t* | *p* |
| Intercept | 1.1357 | 0.1472 | 7.72 | 0.000 | 0.8252 | 0.1185 | 6.97 | 0.000 |
| WDIR | -0.1055 | 0.0425 | -2.48 | 0.015 | -0.1163 | 0.0437 | -2.66 | 0.008 |
| FDIR | -0.0643 | 0.0294 | -2.06 | 0.042 | -0.0656 | 0.0299 | -2.19 | 0.0028 |
| ROA | 0.0038 | 0.0161 | 0.24 | 0.814 | 0.0035 | 0.0066 | 0.22 | 0.827 |
| SIZE | -0.0605 | 0.0083 | -7.26 | 0.000 | -0.0425 | 0.0066 | -6.43 | 0.000 |
| LEV | 0.0918 | 0.0268 | 3.43 | 0.001 | 0.0909 | 0.0277 | 3.29 | 0.001 |
| $R^2$ Within | | 0.4559 | | | | 0.4435 | | |
| *F* | | 11.34 | | | | 76.62 | | |
| Prob. | | 0.000 | | | | 0.000 | | |

The negative and significant effects of female directors regarding earnings management of publicly traded oil and gas firms in Nigeria are shown in Table 5. The correlation coefficient, which is significant at 5%, and the p-value, which is 0.009, provided required proofs. This suggests that having female directors have a negative impact on Nigerian oil and gas businesses, in managing their earnings. Furthermore, the model also shows the large and unfavorable impact of foreign directors on Nigerian listed oil and gas businesses, regarding managing their profits. The coefficient of -0.0612 and the p-value of 0.037 at the 10% level of significance supported the above results.

According to this study, in order to reduce earnings management, there should be more female directors on the boards of publicly traded oil and gas firms in Nigeria. In other words, the addition of one female director to the board would result in 10.96% less effective management of earnings by the publicly traded Nigerian oil and gas firms. The findings confirmed the earlier research conducted by Abubakar et al. (2017), Enofe et al. (2017), Hosam et al. (2019), Idris (2015), and Nyoka (2018), which demonstrated that female directors negatively, statistically, and significantly affect the management of earnings. Thus, the findings support the agency's theory, which suggested that a diverse board would be better off abstaining from the practice of earnings management. This is because women are more prone than males to question administrative decisions and have greater faith in leadership, both of which would help to produce more accurate financial reporting for shareholders. The results, however, are in opposition to those of Hussaini and Gugong (2015), Rokiah et al. (2016), and Arioglu (2020), who discovered a strong and positive correlation between having female directors and effective earnings managment. The results provided significant evidences to refute the initial null hypothesis, which held that in Nigeria's publicly traded oil and gas companies, female directors have less impact on managing the profitability of firms.

Moreover, foreign directors, as one of the proxies for board diversity, mitigated the negative impact of profit management in Nigerian listed oil and gas enterprises, which has a negative impact on firms. In a likewise manner, similar conclusions were reached earlier by Enofe et al. (2017), who showed the adverse impact of management of earnings by foreign directors. However, the findings do not match with those of Hooghiemstra et al. (2015), and Nyoka (2018), who discovered that foreign directors positively affect the management of earnings. The data refutes the second null hypothesis, which claimed that foreign directors of Nigerian publicly traded oil and gas firms have no significant influence on earnings management.

## Conclusion

Considering the above data analysis and study results, it has been determined that female directors have a significant negative impact on earnings management. Furthermore, it was concluded that earning management would change as the percentage of female board members would increases in the Nigerian oil and gas firms. Given that female directors frequently challenge management decisions and consistently have more faith in leadership than their male counterparts, this is plausible. As a result, when there are more women on boards, there is less earnings management. The significant negative impact that foreign directors had on the earnings management of publicly traded oil and gas enterprises in Nigeria is another indicator that earnings management diminishes with an increase in the number of foreign directors. The variety of viewpoints makes this idea feasible that individuals from other cultures have to share their unique life experiences, cultural customs, and behavioral oddities that aid the decision-making process. The findings supported the agency's theory, which suggested that a diverse board would be better off abstaining from the practice of earnings management. This is because women are more inclined than men to challenge managerial choices and develop a higher level of trust in leadership, both of which would help to produce a more accurate financial reporting for the shareholders.

## Recommendations

According to the study's findings and conclusion, it was recommended that a gender quota for female directors should be provided on the board of listed corporations in Nigeria, comparable to those in Norway, France, Spain, and Malaysia. Since earnings management decreased every time the percentage of women directors increased. The percentage of foreign board members should also increase, since they offer the potential for cross-ideological engagement, which may favour or discourage the adoption of earnings management practices.

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