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# Impact of Corporate Governance on the Financial Performance of Selected Commercial Banks in Nigeria

**Adeniyi OYABAMBI[1], Akeem Adewale BAKARE [2], Saji GEORGE [3], Friday Iyaji ISAH[4], EDIUKU Ekanem[5]**

[1,2,3,4,5]Department of Business Administration, Nile University of Nigeria. Abuja, Nigeria

**Abstract**

*Global concerns about non-compliance and lack of full compliance with corporate governance have resulted in global corporate scandals and failures, resulting in poor financial performance of businesses as there have been high-profile corporate disappointments. These require absolute attention, which is why this study examines the impact of corporate governance on the financial performance of selected banks in Nigeria between 2012 and 2022. The ex-post facto design was used, and data on board gender diversity, board composition, and board size were used as proxies of corporate governance while the Return of Assets was used to measure the financial performance of the selected deposit money bank from 2012 to 2022. The collected data were analyzed using the panel regression data analysis to test for the extent of a causal relationship between specific corporate governance variables and financial performance measured by ROA. Findings revealed board gender diversity ($\beta=0.187$, $p<0.05$) positively and statistically impacts financial performance, as measured by ROA. Also, Board Composition ($\beta=0.139$, $p>0.05$) is positive, with marginal impact on financial performance measured by ROA. In contrast, the Board Size ($\beta=0.010$, $p<0.05$) had a negative and statistically significant impact on impacts financial performance, as measured by ROA. The study concludes that corporate governance impacted the financial performance of Nigerian deposit money banks. The study recommends that organizations consider policies and initiatives promoting gender diversity on corporate boards. Management should consider evaluating and reducing board sizes to streamline decision-making and enhance governance effectiveness.*

**Keywords:** *Corporate Governance; Financial Performance; Return of Asset; Board Composition; Gender Diversity; Board Size.*

## 1. Introduction

Global concerns about non-compliance and lack of full compliance with corporate governance have resulted in global corporate scandals and corporate failures over time (Affes & Jarboui, 2023). Studies (Arachchi, 2024; Ayeni-Agbaje et al., 2024) linked incidences of business corruption and sharp practices to abuses of corporate governance codes. This has been committed along with inappropriate board composition, size and lack of gender inclusiveness (Nwankwo & Amasiatu, 2024; Adetula & Oyedeko, 2023). This must have been having effects on the financial performance of businesses as there are high-profile corporate disappointments linked to corporate governance abuses (Wang et al., 2024). One of the expected checks of corporate governance to forestall unimpressive financial performance in listed businesses is to have an adequately composed board (Pucheta-Martínez & Gallego-Álvarez, 2020). Although progress has been made on board mix-members on-board composition in developed countries, mismatch of board members is still rampant in developing countries (Ayeni-Agbaje et al., 2024; Adetula & Oyedeko, 2023). Observed mismatch of executive, non-executive, and independent non-executive members have caused some businesses fortunes which do tell on their financial performance such as return on assets. This justifies the need to examine board composition and return on assets in the Nigerian deposit money banks. Furthermore, there are views that the number of members that are on the board of many of these businesses is inadequate and fails to meet statutorily required numbers (Odiwo et al., 2020). For instance, non-executive Directors have characterised the board of many Nigerian businesses (Adetula & Oyedeko, 2023). Aside from this, many of these businesses are underrepresented on corporate boards and have a proxy presence to make up numbers (Brown & Caylor, 2020). With the board size challenge, businesses have been confronted with harnessing rich business views that would improve their

performance. For this reason, it is germane to consider board size against return on assets on banks in Nigeria to contribute to empirical studies. Similarly, there is a board gender combination issue called 'board gender diversity'. The absence of diversity among board members kills a wider means of reaching detailed decisions for the benefit of the business and its stakeholders (Belaounia et al., 2020). Whilst in developed countries, a gradual increase in board gender diversity has happened (Fleitas-Castillo et al., 2024); insignificant board gender diversity has happened in developing countries along sectors, with some sectors showing more progress than others (Wang et al., 2024; El-feky, 2023). This suggests that there is a pressing need to accelerate progress towards gender parity on boards to unlock the full potential of businesses. Therefore, it is imperative to consider board gender diversity and return on assets in Nigerian deposit money banks.

Based on the problem statement, the following research questions were developed to drive the study:

i. What is the impact of Board Gender Diversity (BGD) on the Return on Assets of selected banks in Nigeria between 2012 and 2022?
ii. How does the Board Size impact the Return on Assets of selected Nigerian deposit money banks between 2012 and 2022?
iii. To what extent does the Board Composition impact the Return on Assets of selected Nigerian deposit money banks between 2012 and 2022?

## 2. Literature Review

### 2.1 Conceptual Review

#### 2.1.1 Corporate Governance

Corporate governance refers to the system by which companies are directed and controlled, encompassing the rules, practices, and processes that determine how a company is governed. According to Kumara and Walakumbura (2023), corporate governance is the framework that guides how the management of an organization is structured, and its responsibilities managed. The Organization for Economic Cooperation and Development (OECD, 2019) defines corporate governance as the way in which companies are run and managed, providing the structure through which company goals are set and achieved. It also outlines the distribution of rights and responsibilities among different stakeholders, including the board of directors, executives, shareholders, and other key stakeholders. This system ensures that corporate objectives are established, implemented, and performance is regularly monitored. The concept of corporate governance, as highlighted by Tukur and Bilkisu (2019), emphasizes the legal mechanisms by which an organization's financial resources are optimally allocated to achieve its strategic goals. It underlines the importance of adherence to regulations, transparency, accountability, and ethical practices. Effective governance is essential for businesses to operate legally and ethically, ensuring responsible management of resources and positive engagement with stakeholders. Moreover, good corporate governance practices ensure that the company respects the rule of law, maintains ethical standards in financial reporting, and prioritizes corporate social responsibility. The quality of corporate governance is influenced not only by the organization's internal practices but also by the institutional context within which it operates. For instance, the Nigerian Code of Corporate Governance (2018) stresses the importance of having a balance in skills and diversity within the board, including gender diversity, to ensure effective decision-making without compromising integrity and competence.

***Board Size***

Board size refers to the total number of directors, both executive and non-executive—on a company's board. The ideal board size has been a subject of debate among scholars. Some researchers, such as Zabri et al. (2019), assert that board size can vary significantly based on cultural and geographical factors, with no universal standard for the optimal number of directors. While larger boards may benefit from a broader pool of knowledge and expertise, there is also the risk of reduced effectiveness, as large boards may face challenges in coordination and decision-making.

Research has produced mixed findings on the relationship between board size and company performance. For instance, Ahmed and Hamdan (2021) argue that boards with around 12 members may strike a balance between power and efficiency, while other studies, such as Effiok et al. (2019), suggest that boards larger than 12 members might not have a significant impact on decision-making. Conversely, scholars like Yermack (2019) have found that companies with smaller boards tend to perform better, as smaller groups often facilitate quicker decision-making and reduce the likelihood of free riding by individual members. The impact of board size on performance also ties into the agency theory, which posits that larger boards may face agency problems, such as reduced accountability or less effective monitoring. Jensen and Meckling (2018) note that as the board size increases, the potential for free riding among directors also increases, weakening the board's ability to effectively oversee management.

***Board Composition***

The composition of a board, whether it consists predominantly of executive or non-executive directors, affects the board's ability to govern effectively. Non-executive directors are critical for ensuring independence and objectivity in decision-making. As noted by Rimon et al. (2019), non-executive directors are not involved in the day-to-day management of the company but contribute significantly to strategic planning and policy development. These directors represent the interests of shareholders and bring an outside perspective to the decision-making process. Board composition is closely related to the concept of board independence. Independent directors, who have no material interests in the company and are not involved in its daily operations, are crucial for preventing conflicts of interest and ensuring transparent governance. According to Dalton and Dalton (2021), independent directors provide a necessary check on executive power, enhancing the board's ability to act in the best interests of shareholders. However, the ideal balance of executive versus non-executive directors remains debated, with some scholars advocating for a larger presence of executive directors for more informed decision-making, while others, like Xavier et al. (2020), argue for most non-executive directors to safeguard independence.

***Gender Diversity on Boards***

In recent years, gender diversity has emerged as an important factor in corporate governance. Board gender diversity refers to the inclusion and retention of women in boardrooms, not only to meet regulatory requirements but also to improve decision-making and company performance. Adetula & Oyedeko (2023) argue that gender diversity on boards enhances egalitarian participation in decision-making, ensuring that diverse perspectives are considered in the strategic direction of the company. Gender diversity can be measured by the proportion of female directors relative to the total number of directors on the board (Darmawan, 2024). Scholars like Fleitas-Castillo et al. (2024) suggest that diverse boards are better equipped to address a range of issues and challenges that may arise, bringing different viewpoints and experiences to the table. The inclusion of women can contribute to more comprehensive risk management and innovation strategies, as diverse teams are often more creative and capable of solving complex problems.

***Financial Performance***

Financial performance is a key indicator of a company’s success and sustainability. It reflects how well the company utilizes its resources to generate value, with common metrics including profitability, sales, and return on assets (ROA). According to Carton (2019), financial performance is often evaluated using monetary measures such as profit and sales, but non-financial indicators like customer satisfaction and employee turnover are also important for assessing overall performance. While financial metrics provide valuable insights, they may not fully capture a company’s long-term value or competitive position. As noted by Bucklin & Sengupta (2018), financial data can be retrospective and may not fully reflect the company’s prospects. A more holistic approach, which combines both financial and non-financial indicators, provides a more comprehensive view of performance (Sandberg et al., 2017).

***Return on Assets***

ROA is a widely used financial performance metric that measures how efficiently a company utilizes its assets to generate profits. ROA is calculated by dividing a company's net income by its total assets. As stated by Affes & Jarboui (2023), ROA is a key indicator of management's effectiveness in utilizing company resources, with a higher ROA signaling better asset efficiency. This metric is commonly used in banking and financial sectors to assess operational performance, as it indicates how well a company has leveraged its assets to generate returns (Choiriyah et al., 2021). ROA serves as a benchmark for investors and analysts, helping them evaluate the efficiency of a company's operations and its potential for long-term growth. Companies with higher ROA are typically seen as more efficient in using their assets, which can increase investor confidence and positively impact stock prices and company valuation.

**2.2 Theoretical Framework**

This study uses agency theory to investigate the relationship between corporate governance and the financial performance of selected banks in Nigeria. Introduced by Jensen and Meckling in 1976, agency theory highlights the conflict of interest between shareholders (principals) and managers (agents). Managers may prioritize their self-interests over maximizing shareholder wealth, leading to diverging objectives. Effective corporate governance, as suggested by agency theory, involves implementing measures that align stakeholder interests. Key practices include appointing independent boards, linking executive compensation to performance, and ensuring transparency. Such mechanisms can reduce conflicts of interest and enhance financial performance. Importantly, board gender diversity contributes to diverse perspectives, improving decision-making and oversight. Agency theory argues that gender-diverse boards can reduce agency costs by fostering accountability. Similarly, board size affects decision-making; larger boards offer varied expertise but may face coordination challenges, while smaller boards may lack diversity. Board composition, particularly the ratio of independent to executive directors, is also critical. A higher proportion of independent directors strengthens oversight and reduces agency costs, which can further enhance financial performance. Ultimately, board gender diversity, size, and composition collectively influence a firm's financial outcomes.

**2.3 Empirical Review**

In the study of Bui and Krajcsák (2024) which explored the nexus between corporate governance and financial performance in Vietnam's publicly listed companies between 2019 to 2021. The research uses generalized system methods of moments to address dynamic endogeneity in CG research. Financial performance is measured using Tobin's Q, return on equity (ROE), and return on assets (ROA). The study found a positive correlation between transparency disclosure and financial performance and CG and company size. However, the COVID-19 pandemic caused a decrease in transparency and information index scores. In related study conducted by Nwankwo and Amasiatu (2024) investigated the nexus between corporate governance and financial performance in listed Nigerian non-financial firms between 2007 and 2016 with *Ex-post facto* research design that involved one hundred and twenty-four non-financial firms and used multiple regression. The study revealed a significant positive relationship between corporate governance and return on assets, return on equity and earnings per share; however, a non-significant negative relationship between corporate governance and dividend per share. Affes and Jarboui (2023) study examined the impact of effective corporate governance on the financial performance of 160 UK companies between 2005 and 2018. Using multivariate regressions and FGLS models, they found that good corporate governance improved company returns on equity. This study is significant for future comparative studies on sectoral and temporal levels, allowing for comparisons before and after Brexit and COVID-19, and offers potential for future research on different UK sectors. In the 2021 study of Guluma on corporate governance and firm performance in a Chinese listed firm. The study used internal and external CG measures, including independent board, dual board leadership, ownership concentration, debt financing, and product market competition. The results showed that ownership concentration and product market competition positively influenced firm performance, while dual leadership negatively impacted performance. Managerial overconfidence negatively influenced board independence, dual leadership, and ownership concentration.

However, overconfidence positively moderated debt financing's impact on firm performance. The study contributes to the theoretical perspective by examining how managerial behavior influences CG practices and firm performance in emerging markets. Wang et al. (2024) examined board gender diversity and firm performance with one thousand, nine hundred and ninety publicly listed companies in Japan from 2006 to 2023. The study revealed a significant negative impact of board gender diversity on firm performance. Specifically, the study's analysis does not reveal a U-shaped nonlinear relationship between board gender diversity and firm performance.

Adetula and Oyedeko (2023) explored how board gender diversity affects the corporate performance in Nigeria. The study was conducted within the context of deposit money banks and data were gathered from the financial statement of listed DMBs in Nigeria for eleven years spanning from 2009 to 2019. The study employed regression analysis. The result found that Blau index as a measure of board gender diversity shows a negative and insignificant effect on performance of the deposit money banks while Shannon and Herfindal-Hirschman indices reveal positive but insignificant effect on performance of deposit money banks. El-feky (2023) assessed board gender diversity and firm's financial performance in Egypt. The study used regression analysis and it was found that there is a positive and significant impact of organizational learning levels on the dimensions of sensing opportunities and threats, and risk management and reconfiguration. The study concluded that board gender diversity lead to positive and significant impact firm performance. Palaniappan's (2021) research goal was to investigate how specific board attributes affect the financial performance of Indian manufacturing companies. A various backslide model was used, and the survey draws on data from 275 firms kept in NSE from 2015 to 2021. The ongoing survey reviews board characteristics, for instance, board size, President duality, opportunity, and board development devoted to the suitability of an organization's presentation with respect to the market and accounting-based money related execution measures. As per the discoveries, there is a negative connection between the organizations' exhibition marker and the degree of board qualities. There is also a statistically significant negative correlation between board size and Tobin's Q, ROA, and ROE. By enhancing these actions among corporate administration components, the evidence also demonstrates that the board's freedom and meeting recurrence moderate the connection between return on value and return on resources. Isaac et al. (2024) examine the effect of compliance with national governance frameworks on the relationship between corporate governance and the performance of publicly traded companies in Ghana. A sample of 31 companies listed on the Ghana Stock Exchange was drawn for the study based on their annual reports spanning from 2013 to 2022. A new national governance quality index composed of items drawn from world governance indicators and a corporate governance index was developed by principal component analysis. The study used the Huber M-estimation Robust Least Squares (HMRLS) regression method. The findings of our study reveal that corporate governance practices adversely affect the level of firm performance. However, our results demonstrate that compliance with national governance and institutional frameworks plays a significant moderating role in the relationship between corporate governance and firm performance.

Ayeni-Agbaje et al. (2024) examined corporate governance mechanisms and firm performance in Nigerian firms. The study adopted an ex-post facto research design, extracting secondary data from the annual reports of 153 companies listed on the Nigerian Exchange Group (NGX) that made up the study's population. Using a purposive sampling approach, 10 firms were chosen across different industries as the sample size. The scope spanned from 2013 to 2021, a period of nine years, and data underwent descriptive and inferential statistical analyses. The empirical investigations found that board size had a positive significant effect on return on assets, while the number of non-executive directors had a negative significant effect on return on assets. The overall results demonstrated that corporate governance had a significant effect on the firm performance. The literature on corporate governance and financial performance in Nigerian deposit money banks is limited (Arachchi, 2024; Ayeni-Agbaje et al., 2024; Adetula & Oyedeko, 2023; Affes & Jarboui, 2023). Most existing studies (Nwafor et al., 2024; Oshim & Igwe, 2024; Sotonye et al., 2024) have focused on sectors like manufacturing and state-owned enterprises rather than banking. Authors like Bui and Krajcsák (2024) and Nwankwo and Amasiatu (2024) emphasize that corporate governance positively affects organizational performance. However, some studies, such as those by Vakilifard et al. (2021) and Jaradat (2018), found no significant

impact. This study will specifically examine Return on Assets (ROA) in Nigerian banks, addressing gaps in existing research. Additionally, aspects like board composition, size, and gender diversity in these banks remain underexplored (Ayeni-Agbaje et al., 2024; Adetula & Oyedeko, 2023). The current study aims to investigate these less-covered areas and their relationship with financial performance, thus contributing valuable insights to the field.

**3. Methodology**

The survey method is useful in presenting facts concerning the relationship between experiential diversity and employee commitment in this study. The population of this study includes 16,000 workers from six public organizations within the federal ministry, as sourced from their Human Resource Units as of August 2024. The study organizations include the Nigerian Communications Commission (NCC), the National Information Technology Development Agency (NITDA), Nigerian Communication Satellite Limited (NigComSat), Nigerian Postal Service (NIPOST), Galaxy Backbone, and the National Identity Management Commission (NIMC). The study sample size was determined to be 426 using the Cochran formula. One of the justifications for using the Cochran formula is that it is applicable for heterogeneous populations and provides actual precision with an appropriate confidence level, which is suitable for this study. Primary data were collected through a structured questionnaire. Section A covers the demographic profile of the six MDAs staff under the Ministry of Communication and Digital Economy. Section B consists of a five-item scale measuring experiential diversity (Strongly Agree, Agree, Indifferent, Disagree, Strongly Disagree), while Section C focuses on items relating to employee commitment, also comprising a five-item scale (Strongly Agree, Agree, Indifferent, Disagree, Strongly Disagree). A combination of descriptive and inferential methods will be utilized. Descriptive and quantitative techniques were adopted to present demographic and quantitative data, while inferential methods were used for organizational clarity and hypothesis testing using linear regression.

**3.1 Model Specification**

This study utilises the theoretical framework of agency theory to adapt and modify the empirical models of various researchers, such as Bhatt and Bhatt (2017), Bhagat and Bolton (2019), Hermuningsih et al. (2020), Khatib and Nour (2021), Farooq et al. (2022), and Alodat et al. (2022), among others. Agency theory posits that a higher proportion of independent directors strengthens board oversight, leading to more effective monitoring of management actions. Independent directors are less likely to be influenced by the CEO, which can reduce agency costs and improve firm performance.

Each of these corporate governance mechanisms i.e. board gender diversity, board size, and board composition, interacts to influence the overall financial performance of a firm. The following equation captures the combined effect of these governance variables on ROA:

$$roa_{i,t} = \pi_0 + \pi_1 bgd_{i,t} + \pi_2 board\_comp_{i,t} + \pi_3 board\_size_{i,t} \quad (3.1)$$

Where: *roa* is return on assets; *bgd* denotes board gender diversity; *board_comp* represents board composition; *board_size* is board size; $\pi_0, \pi_{1-3}$ are parameters; *i* is banks; and *t* denotes time.

The objective is to establish the relationship between corporate governance and financial performance by examining the quoted banks on the Nigerian Exchange as a case study. The model is expressed in a functional form as:

$$roa_{i.t} = f(bgd_{i.t}, board\_comp_{i.t}, board\_size_{i.t}) \quad (3.2)$$

Where: *roa* is return on assets; *bgd* denotes board gender diversity; *board_comp* represents board composition; *board_size* is board size; *i* is selected banks; and *t* denotes time. In an implicit form, the model can be rewritten as:

$$roa_{i,t} = \pi_0 + \pi_1 bgd_{i,t} + \pi_2 board\_comp_{i,t} + \pi_3 board\_size_{i,t} \quad \text{[Note: } \pi_0, \pi_{1-3} \text{ are parameters]} \qquad (3.3)$$

Additionally, it is crucial to incorporate a stochastic term into equation (3.3) to account for the unpredictable fluctuations in financial performance. Equation (3.3) is reformulated in a stochastic manner.

$$roa_{i,t} = \pi_0 + \pi_1 bgd_{i,t} + \pi_2 board\_comp_{i,t} + \pi_3 board\_size_{i,t} + \mu_{i,t} \qquad (3.4)$$

Where: *roa* is return on assets; *bgd* denotes board gender diversity; *board_comp* represents board composition; *board_size* is board size; *i* is selected banks; *t* denotes time; and $\mu$ is stochastic term. Equation (3.4) serves as the fundamental model employed in developing the empirical models for our specified objectives 1-3.

**Table 1:** A'priori Expectation

| S/N | Variable | Expected signs | Measurements |
|---|---|---|---|
| | Return on assets (*roa*) | | |
| | **Independent variables** | | |
| 1. | Board gender diversity (*bgd*) | + | Ratio of female directors on the board. |
| 2. | Board composition (*board_comp*) | + | Total number of executives over non-executives on a bank's board. |
| 3. | Board size (*board_size*) | + | Total number of members serving on a bank's board. |

**Source:** Author (2024).

### 3.2 Estimation Techniques and Procedures

The study employs descriptive statistics to explain the characteristics of the data sets, whereas, appropriate econometric techniques (such as panel fixed and random tests) were used to achieve the objectives of the study.

**A) Panel Unit Root Test**

The study conducts the unit root test of the variables in the study. This is to test whether the series is stationary at levels or first difference not to produce a spurious regression result. Whether all the cross-sectional units have the same unit root, the panel unit root test methods can be divided into common root test and individual root test. Therefore, following the study of Wang *et al*. (2016), the LLC test for common roots and the ADF-Fisher test for individual roots were utilized in this paper. The LLC test can be expressed as follows (Levin *et al*., 2002):

$$\Delta y_{it} = \rho y_{it-1} + \sum_{j=1}^{p_i} b_{ij} \Delta y_{it-1} + Z_{it}^{'} \phi + e_{it} \qquad (3.5)$$

The autoregressive coefficient is $\rho$ ; $Z_{it}^{'}$ s the column vector of the exogenous variables; $\phi$ denotes the column vector of the regression coefficients; and $e_{it}$ stands for the white noise. For the null hypotheses, $H_0$: $\rho = 0$, it means that there is a unit root; whereas, the alternative hypothesis, $H_1$: $\rho < 0$, implies that there is no unit root. Maddala (1999) and Choi (2001) noted that the augmented Dickey Fuller (ADF)-Fisher test was proposed based on the Fisher-type tests. Under the null hypothesis, each unit root test forms an I-distribution, the ADF-Fisher test is expressed as:

ADF-Fisher $$I = -2\sum_{i=1}^{N} \log(\rho_i) \rightarrow \chi_{2N}^2 \qquad (3.6)$$

Also, Choi (2001) revealed that:

$$Z = \frac{1}{\sqrt{N_{i=1}}} \sum_{i=1}^{N} \psi^{-1}(\rho_i) \rightarrow N(0,1)$$

ADF-Choi (3.7)

The inverse of the standard normal cumulative distribution function is denoted by $\psi^{-1}$. Thus, the corresponding null hypotheses and alternative hypothesis is expressed as:

$$H_0 : \rho = 0, \quad \text{for all } i \tag{3.8}$$

$$H_1 : \begin{cases} \rho = 0, & for\ \ i = 1,2,..., Ni \\ \rho < 0, & for\ \ i = N+1, N+2,..., N \end{cases} \tag{3.9}$$

**B) Panel Pedroni Cointegration test**

After testing the unit root tests of the study and if the series are found to be integrated of order one, the study would further employ the panel Pedroni cointegration test proposed by Pedroni (1999) to examine if the cointegrating relationship existed between the variables or not. And if there are mixed results in the stationarity test at levels or first difference, the panel autoregressive distributed lag (ARDL) is appropriate. The equation of Pedroni cointegration test is expressed as:

$$y_{it} = \theta_i + \vartheta_{it} + \varpi_{1i} x_{1it} + \varpi_{2i} x_{2it} + ... + \varpi_{ki} x_{kit} + ... + \varpi_{Ki} x_{Kit} + v_{it} \tag{3.10}$$

Where: *K* denotes the number of exogenous variables; $(x_{kit}).\theta_i$ represents the intercept term; $\varpi_{ki}$ is the slope coefficients. In the test equation, the null hypothesis is that there is no cointegration relationship between the variables. Under the null hypothesis, the disturbance term $v_{it}$ should be integrated of order one. The following auxiliary regression analysis can be used to examine whether $v_{it}$ satisfied the *I*(1) distribution:

$$v_{it} = \sigma_i v_{it-1} + \lambda_{it} \tag{3.11}$$

$$v_{it} = \sigma_i v_{it-1} + \sum_{j=1}^{\sigma_i} \kappa_{ij} \Delta v_{it-j} + \upsilon_{it}$$

or (3.12)

When $\sigma_i = 1$, there is no cointegration relationship among variables. Taking into account the common and individual autoregressive coefficients for the countries understudy, there are two alternative hypotheses based on the null hypothesis: heterogeneity alternative hypothesis $(\sigma_i < 1$ for all *i*) and homogeneity alternative hypothesis $(\sigma_i = \sigma < 1$ for all *i*). The respective tests contain panel statistics tests: common autoregressive coefficients (within-dimension); and group statistics tests: individual autoregressive coefficients (between-dimension).

**C) Panel Least Square, Fixed and Random Fixed Effects Estimators**

The main objective of these estimators is to estimate the effect of corporate governance on financial performance of selected quoted banks in Nigeria. The panel regression analysis shows the extent of causal relationship between specific corporate governance variables and financial performance measured by ROA.

Moreover, some of the benefits that can be derived from a panel model that include firms' differences are: (a) it enables the study to account for country heterogeneity (Tiwari and Mutascu, 2011). (b) the result may likely be biased if individual heterogeneity is not considered even with a large sample size. Therefore, taking the heterogeneity factor into consideration will give a robust and unbiased result. Incorporating unobserved firms' effects, the panel fixed effect equation is rewritten as:

$$y_{i.t} = \alpha_0 + \alpha_1 X_{i.t} + v_{i.t} + \varepsilon_{i.t} \quad (3.13)$$

Where: *y* is dependent variables; *X* is independent variables; $\alpha_0, \alpha_1$ are parameters; $v$ represents the unobserved countries' individual effect which indicates the differences between pooled OLS regression model and a panel model with country heterogeneity. If $v$ is independent of the determinants of corporate governance (independent variables), it implies that $v$ has zero mean, constant variances ($\sigma_\varepsilon^2$), independent of the observed individual stochastic term. In this case, the random effects model is appropriate indicating no correlation between firm heterogeneity and the variable determinants of independent variables. In contrast, if relationship exists between unobserved countries' individual effects and independent variables, the most appropriate estimation techniques to use is fixed effects model. The Hausman statistic's value is used to test for the possible existence of level of association between country heterogeneity and independent variables at the conventional levels. The null hypothesis of no correlation is specified against the alternative hypothesis indicating the existence of correlation. If the study fails to reject the null hypothesis implying no correlation, the random effect model is appropriate for estimating the parameters. However, if the alternative hypothesis was not rejected indicating the relevance of correlation, it implies that the fixed effects model is appropriate for estimating the relationship between corporate governance and financial performance.

**4. Results and Discussions**

The summary statistics presented in Table 2 for Board Gender Diversity (BGD) show a mean of 21.94%, with a standard deviation of 10.52%, indicating low variability around the average. The skewness of 0.015 reveals a nearly symmetric distribution, and the kurtosis of 2.93 indicates a shape close to normal. For Board Composition, the mean is 15.92%, with a standard deviation of 8.46%, reflecting moderate variability. The distribution is slightly left-skewed with a skewness of -0.23, and the kurtosis of 2.78 is close to normality. Board Size averages 14 members, with a standard deviation of 3.14, showing considerable variability. The skewness of -0.17 indicates a slightly left-skewed distribution, and the kurtosis of 2.77 suggests near-normality. Finally, Return on Assets (ROA) has a mean of 4.36% and a higher standard deviation of 7.54%, showing high variability. The ROA distribution is highly right skewed with a skewness of 3.60 and an extremely high kurtosis of 19.80, indicating a leptokurtic shape with heavy tails and potential outliers.

**Table 2:** Descriptive Statistics

| | BGD | BOARD_COMP | BOARD_SIZE | ROA |
|---|---|---|---|---|
| Mean | 0.219373 | 0.159200 | 14.36364 | 0.043573 |
| Maximum | 0.500000 | 0.357000 | 21.00000 | 0.540000 |
| Minimum | 0.000000 | 0.000000 | 6.000000 | -0.021000 |
| Std. Dev. | 0.105155 | 0.084576 | 3.135260 | 0.075384 |
| Skewness | 0.014802 | -0.229241 | -0.168706 | 3.601911 |
| Kurtosis | 2.926950 | 2.779506 | 2.772058 | 19.80308 |
| Jarque-Bera | 0.028475 | 1.186274 | 0.759935 | 1531.926 |
| Probability | 0.985863 | 0.552591 | 0.683884 | 0.000000 |
| Observations | 110 | 110 | 110 | 110 |

**Source:** Author's computation using e-views 10

The covariance analysis results in Table 3 provides insights into the relationships between the variables: BGD (Board Gender Diversity), Board Composition, Board Size, and ROA (Return on Assets). The results include correlation coefficients, t-statistics, and p-values (probabilities). BGD and ROA: There is a statistically significant moderate positive correlation, indicating that higher board gender diversity is associated with higher return on assets. Board Composition and Board Size: There is a statistically significant moderate negative correlation, suggesting that higher Board Composition is associated with smaller board sizes. Board Composition and ROA: There is a statistically significant moderate positive correlation, indicating that higher Board Composition is associated with higher return on assets. Board Size and ROA: There is a statistically significant strong negative correlation, indicating that larger board sizes are associated with lower return on assets. These correlations suggest that diversity and compensation policies might impact financial performance, while larger boards might hinder efficiency or profitability.

**Table 3:** Covariance Analysis using Correlation, t-statistics, and Probability

| Correlation<br>t-Statistic<br>Probability | **BGD** | **BOARD_COMP** | **BOARD_SIZE** | **ROA** |
|---|---|---|---|---|
| BGD | 1.000000 | | | |
| | ----- | | | |
| | ----- | | | |
| BOARD_COMP | 0.110267 | 1.000000 | | |
| | 1.152955 | ----- | | |
| | 0.2515 | ----- | | |
| BOARD_SIZE | -0.135627 | -0.230527 | 1.000000 | |
| | -1.422625 | -2.462021 | ----- | |
| | 0.1577 | 0.0154 | ----- | |
| ROA | 0.335522 | 0.282579 | -0.492039 | 1.000000 |
| | 3.701413 | 3.061418 | -5.873620 | ----- |
| | 0.0003 | 0.0028 | 0.0000 | ----- |

**Source:** Author's computation using e-views 10

Table 4 shows the results of stationarity tests (likely unit root tests) for the variables: Board Composition (D(BOARD_COMP)), Board Size, ROA, and BGD. The results include test statistics, probability values, orders of integration, and remarks on stationarity. The results show that board size, board gender diversity are stationary at levels, but only the board composition is stationary at first difference.

**Table 4:** Summary of Unit Root Tests using Im, Pesaran, and Shin

| **Variables** | **Statistics** | **Probability** | **Order of Integration** | **Remark** |
|---|---|---|---|---|
| D(BOARD_COMP) | -4.05940 | 0.0000 | I(1) | Stationarity at 1st Difference |
| BOARD_SIZE | -1.7279 | 0.0149 | I(0) | Stationarity at Level |
| ROA | -9.24802 | 0.0000 | I(0) | Stationarity at Level |
| BGD | -2.10427 | 0.0177 | I(0) | Stationarity at Level |

**Source:** Author's computation using e-views 10

The Pedroni Residual Cointegration Test in Table 5 is used to examine whether there is a long-term equilibrium relationship (cointegration) between the variables: BGD (Board Gender Diversity), Board Composition, Board Size, and ROA (Return on Assets). The test includes several statistics under the null hypothesis of no cointegration. The Pedroni Residual Cointegration Test results provide mixed evidence regarding the long-term equilibrium relationship between BGD (Board Gender Diversity), Board Composition, Board Size, and ROA (Return on Assets) over the period 2012-2022. While the Group PP-Statistic (with a p-value of 0.0002) strongly suggests cointegration, indicating that these variables share a common stochastic trend, most other panel and group statistics (such as Panel v-Statistic, Panel rho-Statistic, and Group rho-Statistic) have high p-values, failing to reject the null hypothesis of no cointegration.

**Table 5:** Panel Cointegration Result

| | | | | |
|---|---|---|---|---|
| Null Hypothesis: No cointegration | | | | |
| Trend assumption: No deterministic trend | | | | |
| User-specified lag length: 2 | | | | |
| Alternative hypothesis: common AR coefs. (within-dimension) Weighted | | | | |
| | Statistic | Prob. | Statistic | Prob. |
| Panel v-Statistic | -1.250706 | 0.8945 | -1.454384 | 0.9271 |
| Panel rho-Statistic | 1.965800 | 0.9753 | 1.704249 | 0.9558 |
| Panel PP-Statistic | -0.369402 | 0.3559 | -2.322850 | 0.0101 |
| Panel ADF-Statistic | 2.117450 | 0.9829 | 1.662030 | 0.9517 |
| Alternative hypothesis: individual AR coefs. (between-dimension) | | | | |
| | Statistic | Prob. | | |
| Group rho-Statistic | 3.115026 | 0.9991 | | |
| Group PP-Statistic | -3.528519 | 0.0002 | | |
| Group ADF-Statistic | 0.044090 | 0.5176 | | |

Source: Author's computation using e-views 10

Table 6 presents the results of a panel least squares regression where the dependent variable is ROA (Return on Assets). The regression aims to determine the impact of BGD (Board Gender Diversity), Board Composition, and Board Size on ROA. The C (Constant term) with a coefficient of 0.125446 and probability value 0.0008 is positive and statistically significant at the 1% level, indicating that when all independent variables are zero, the expected ROA is approximately 0.125. BGD (Board Gender Diversity) has a coefficient of 0.187252 and probability of 0.0015 has positive and statistically significant effect on ROA at the 1% level. A one-unit increase in BGD is associated with an increase in ROA by approximately 18.7%, holding other factors constant. Board Composition has a coefficient of 0.139804 and a probability: 0.0568 also has a positive effect on ROA, with a p-value close to the 5% significance threshold. A one-unit increase in Board Composition is associated with an increase in ROA by approximately 14%, holding other factors constant. This result is marginally significant. Board Size (0.010109) and probability: 0.0000 has a negative and statistically significant effect on ROA at the 1% level. A one-unit increase in Board Size is associated with a decrease in ROA by approximately 1%, holding other factors constant.

**Table 6:** Result of Panel Least Square Regression Estimation

| | | | | |
|---|---|---|---|---|
| Dependent Variable: ROA | | | | |
| Method: Panel Least Squares | | | | |
| Date: 06/09/24 Time: 07:05 | | | | |
| Sample: 2012 2022 | | | | |
| Periods included: 11 | | | | |
| Cross-sections included: 10 | | | | |
| Total panel (balanced) observations: 110 | | | | |
| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| C | 0.125446 | 0.036369 | 3.449227 | 0.0008 |
| BGD | 0.187252 | 0.057338 | 3.265742 | 0.0015 |
| BOARD_COMP | 0.139804 | 0.072586 | 1.926047 | 0.0568 |
| BOARD_SIZE | -0.010109 | 0.001964 | -5.146630 | 0.0000 |
| R-squared | 0.338842 | Mean dependent var | | 0.043573 |
| Adjusted R-squared | 0.320130 | S.D. dependent var | | 0.075384 |
| S.E. of regression | 0.062157 | Akaike info criterion | | -2.682608 |
| Sum squared resid | 0.409535 | Schwarz criterion | | -2.584409 |
| Log likelihood | 151.5435 | Hannan-Quinn criter. | | -2.642778 |
| F-statistic | 18.10823 | Durbin-Watson stat | | 0.858099 |
| Prob(F-statistic) | 0.000000 | | | |

**Source:** Author's computation using e-views 10

The R-squared value of 0.338842, indicates that about 33.88% of the variability in ROA is explained by the independent variables BGD, Board Composition, and Board Size. The standard error of the regression indicates the average distance that the observed values fall from the regression line. F-statistic value (18.10823) and the Prob(F-statistic): 0.000000 shows the overall model is statistically significant at the 1% level, indicating that the independent variables jointly have a significant effect on ROA. Durbin-Watson stat: 0.858099, this statistic is quite low, indicating potential positive autocorrelation in the residuals. Overall, (BGD) Board Gender Diversity has a strong positive effect on ROA, and this relationship is statistically significant. Board Composition has a positive effect on ROA, with marginal statistical significance. The Board Size has a strong negative effect on ROA, and this relationship is statistically significant. The model explains about 34% of the variation in ROA, which is reasonable for cross-sectional data, but there is potential autocorrelation in the residuals. These results suggest that increasing board gender diversity and Board Composition can improve financial performance as measured by ROA, while increasing board size may have a detrimental effect. Table 7 presents the results of a panel regression with cross-section fixed effects, where the dependent variable is ROA (Return on Assets). This regression examines the impact of BGD (Board Gender Diversity), Board Composition, and Board Size on ROA, controlling for unobserved heterogeneity across different cross-sections.

**Table 7:** Result of Fixed Effect Estimation

Dependent Variable: ROA
Method: Panel Least Squares
Date: 06/09/24 Time: 07:08
Sample: 2012 2022
Periods included: 11
Cross-sections included: 10
Total panel (balanced) observations: 110

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.145820 | 0.050781 | 2.871515 | 0.0050 |
| BGD | -0.033316 | 0.077058 | -0.432345 | 0.6664 |
| BOARD_COMP | 0.190660 | 0.078301 | 2.434975 | 0.0167 |
| BOARD_SIZE | -0.008723 | 0.002813 | -3.100909 | 0.0025 |

Effects Specification

Cross-section fixed (dummy variables)

| | | | |
|---|---|---|---|
| R-squared | 0.627351 | Mean dependent var | 0.043573 |
| Adjusted R-squared | 0.581250 | S.D. dependent var | 0.075384 |
| S.E. of regression | 0.048782 | Akaike info criterion | -3.092329 |
| Sum squared resid | 0.230826 | Schwarz criterion | -2.773181 |
| Log likelihood | 183.0781 | Hannan-Quinn criter. | -2.962881 |
| F-statistic | 13.60823 | Durbin-Watson stat | 1.377966 |
| Prob(F-statistic) | 0.000000 | | |

**Source:** Author's computation using e-views 10

The constant term is positive and statistically significant at the 1% level, indicating that when all independent variables are zero, the expected ROA is approximately 0.146. BGD has a negative but statistically insignificant effect on ROA, indicating that changes in board gender diversity do not significantly impact ROA in this model. Board Composition has a positive and statistically significant effect on ROA at the 5% level. A one-unit increase in Board Composition is associated with an increase in ROA by approximately 0.191, holding other factors constant. Board Size has a negative and statistically significant effect on ROA at the 1% level. A one-unit increase in Board Size is associated with a decrease in ROA by approximately 0.009, holding other factors constant. The R-squared value of 0.627351 shows that about 62.74% of the variability in ROA is explained by the independent variables and the fixed effects. The standard error of the regression indicates the average distance that the observed values fall from the regression line, suggesting a good fit of the model. F-statistic: 13.60823 and Prob(F-statistic): 0.000000 indicates the overall

model is statistically significant at the 1% level, indicating that the independent variables and fixed effects jointly have a significant effect on ROA. Durbin-Watson statistics of 1.377966 is closer to 2, indicating that there is no strong evidence of autocorrelation in the residuals. The effects specification indicated by cross-section fixed (dummy variables) reveals the inclusion of cross-section fixed effects controls for time-invariant unobserved heterogeneity across different cross-sections (e.g., different firms or entities). Overall, Board Gender Diversity does not have a statistically significant impact on ROA in this model. Board Composition has a positive and statistically significant impact on ROA, suggesting that higher Board Composition is associated with better financial performance. Board Size has a negative and statistically significant impact on ROA, indicating that larger board sizes are associated with lower financial performance. The Model is fit as it explains a substantial portion of the variability in ROA (62.74%) and is statistically significant overall. These results highlight that while Board Composition positively influences financial performance, larger board sizes may detract from it. Board gender diversity, however, does not show a significant impact on financial performance within the sample period and context of this study. The inclusion of fixed effects improves the model by accounting for unobserved heterogeneity across different entities. Table 8 presents the results of a panel Estimated Generalized Least Squares (EGLS) regression with cross-section random effects, where the dependent variable is ROA (Return on Assets). This method accounts for potential heteroscedasticity and serial correlation within the data. The constant term is positive and statistically significant at the 1% level, indicating that when all independent variables are zero, the expected ROA is approximately 0.139. BGD has a positive but statistically insignificant effect on ROA, indicating that changes in board gender diversity do not significantly impact ROA in this model. Board Composition has a positive and statistically significant effect on ROA at the 5% level. A one-unit increase in Board Composition is associated with an increase in ROA by approximately 0.167, holding other factors constant. Board Size has a negative and statistically significant effect on ROA at the 1% level. A one-unit increase in Board Size is associated with a decrease in ROA by approximately 0.009, holding other factors constant.

**Table 8:** Result of Random Effect Estimation

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 06/09/24 Time: 07:09
Sample: 2012 2022
Periods included: 11
Cross-sections included: 10
Total panel (balanced) observations: 110
Swamy and Arora estimator of component variances

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| C | 0.139064 | 0.046981 | 2.959993 | 0.0038 |
| BGD | 0.023125 | 0.069206 | 0.334148 | 0.7389 |
| BOARD_COMP | 0.167371 | 0.074087 | 2.259126 | 0.0259 |
| BOARD_SIZE | -0.008856 | 0.002497 | -3.547477 | 0.0006 |
| Effects Specification | | | | |
| | | | S.D. | Rho |
| Cross-section random | | | 0.041332 | 0.4179 |
| Idiosyncratic random | | | 0.048782 | 0.5821 |
| Weighted Statistics | | | | |
| R-squared | 0.208310 | Mean dependent var | | 0.014608 |
| Adjusted R-squared | 0.185904 | S.D. dependent var | | 0.054485 |
| S.E. of regression | 0.049161 | Sum squared resid | | 0.256176 |
| F-statistic | 9.296957 | Durbin-Watson stat | | 1.248321 |
| Prob(F-statistic) | 0.000016 | | | |
| Unweighted Statistics | | | | |
| R-squared | 0.281822 | Mean dependent var | | 0.043573 |
| Sum squared resid | 0.444854 | Durbin-Watson stat | | 0.718865 |

**Source:** Author's computation using e-views 10

The standard error of the regression indicates the average distance that the observed values fall from the regression line. F-statistic: 9.296957 and Prob(F-statistic): 0.000016 show the overall model is statistically significant at the 1% level, indicating that the independent variables jointly have a significant effect on ROA. Durbin-Watson statistics 1.248321 is closer to 2, indicating that there is no strong evidence of autocorrelation in the residuals.

The overall summary indicates that Board Gender Diversity does not have a statistically significant impact on ROA in this model. Board composition has a positive and statistically significant impact on ROA, suggesting that higher Board Composition is associated with better financial performance. Board size has a negative and statistically significant impact on ROA, indicating that larger board sizes are associated with lower financial performance. The model explains about 20.83% of the variation in ROA when considering random effects and is statistically significant overall. However, there is some evidence of positive autocorrelation in the residuals. These results suggest that while Board Composition positively influences financial performance, larger board sizes may detract from it. Board gender diversity, however, does not show a significant impact on financial performance within the sample period and context of this study. The inclusion of random effects helps account for unobserved heterogeneity across different entities.

The Hausman test in Table 9 is used to determine whether a random effects model is appropriate compared to a fixed effects model for panel data analysis. Specifically, it tests if the unique errors (random effects) are correlated with the regressors. If they are not correlated, a random effects model is more efficient, otherwise, a fixed effects model is preferred.

**Table 9:** Result of Hausman's Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

| **Test Summary** | **Chi-Sq. Statistic** | **Chi-Sq. d.f.** | **Prob.** |
|---|---|---|---|
| Cross-section random | 4.652727 | 3 | 0.1991 |

Cross-section random effects test comparisons:

| **Variable** | **Fixed** | **Random** | **Var(Diff.)** | **Prob.** |
|---|---|---|---|---|
| BGD | -0.033316 | 0.023125 | 0.001148 | 0.0958 |
| BOARD_COMP | 0.190660 | 0.167371 | 0.000642 | 0.3581 |
| BOARD_SIZE | -0.008723 | -0.008856 | 0.000002 | 0.9179 |

**Source:** Author's computation using e-views 10

The comparison of coefficients between the fixed and random effects models shows no significant differences for the variables BGD (Board Gender Diversity), Board Composition, and Board Size. The probabilities associated with these differences (0.0958, 0.3581, and 0.9179, respectively) further support the appropriateness of the random effects model. Consequently, the random effects model is considered more efficient for analyzing the relationship between ROA and the independent variables in this panel data, as it accounts for both the within and between variations across the cross-sections without significant bias from correlated errors.

The histogram in Figure 1 represents the distribution of standardized residuals for the sample period 2012-2022, with 110 observations. The residuals are a measure of the deviation of observed values from the values predicted by the model. The Jarque-Bera test statistic is 809.4853 with a probability of 0.000000. This extremely low p-value indicates that the null hypothesis of normally distributed residuals is rejected. The residuals do not follow a normal distribution.

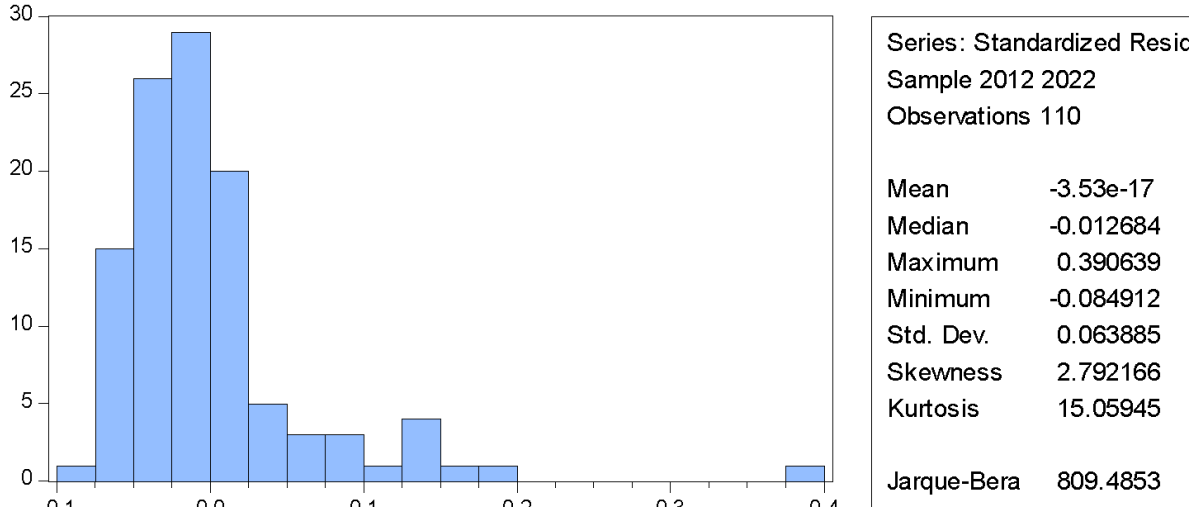


**Figure 1:** Normality Test

**Source:** Author's computation using e-views 10 version

The Residual Cross-Section Dependence Test in Table 10 is conducted to determine whether there is cross-sectional dependence (correlation) in the residuals of a panel data model. This is important because cross-sectional dependence can affect the efficiency and consistency of the estimators in panel data models.

**Table 10:** Residual Cross –Sectional Dependency Test

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: Untitled
Periods included: 11
Cross-sections included: 10
Total panel observations: 110
Note: non-zero cross-section means detected in data
Cross-section means were removed during computation of correlations

| Test | Statistic | d.f. | Prob. |
|---|---|---|---|
| Breusch-Pagan LM | 75.95077 | 45 | 0.0027 |
| Pesaran scaled LM | 3.262497 | | 0.0011 |
| Pesaran CD | 0.766060 | | 0.4436 |

**Source:** Author's computation using e-views 10 version

The Breusch-Pagan LM test checks for the presence of cross-sectional dependence by examining the sum of squared correlation coefficients among cross-sectional units. The low p-value (0.0027) indicates that we reject the null hypothesis of no cross-sectional dependence. This suggests that there is significant correlation among the residuals across different cross-sections. The Pesaran scaled LM test is an adjusted version of the Breusch-Pagan LM test, suitable for large panels. The p-value of 0.0011 is also very low, leading to the rejection of the null hypothesis. This again indicates significant cross-sectional dependence in the residuals. The Pesaran CD (Cross-Dependence) test directly tests for residual cross-sectional dependence by averaging pairwise correlation coefficients. The high p-value (0.4436) suggests that we fail to reject the null hypothesis of no cross-sectional dependence according to this test. This indicates that there is no significant evidence of cross-sectional dependence based on this specific test. The results of the Residual Cross-Section Dependence Test are somewhat mixed, while both the Breusch-Pagan LM and Pesaran

scaled LM tests strongly suggest the presence of cross-sectional dependence, given their low p-values. The Pesaran CD test does not find significant evidence of cross-sectional dependence, as indicated by its high p-value.

**5. Conclusion**

Based on the extensive analysis, the study concludes that corporate governance has significant effect on the financial performance of Nigeria banking sector. The results indicate that board gender diversity and board compensation positively impact financial performance, as measured by ROA. Conversely, larger board sizes are associated with lower financial performance. The study also found that the random effects model is more efficient for analysing the relationship between ROA and the independent variables in the panel data, as it accounts for both within and between variations across the cross-sections without significant bias from correlated errors.

Based on the findings of the study, several policy recommendations can be derived:

i. Emphasize Board Gender Diversity: The study indicates that increasing board gender diversity can positively impact financial performance, as measured by Return on Assets (ROA). Therefore, organisations should consider policies and initiatives promoting gender diversity on corporate boards.

ii. Optimize Board Composition: The study suggests that higher board compensation is associated with better financial performance. Therefore, organisations may consider revisiting their board compensation policies to ensure they are aligned with performance incentives and contribute to improved financial outcomes.

iii. Streamline Board Size: The study highlights a negative correlation between board size and financial performance, indicating that larger board sizes may detract from efficiency or profitability. Organisations should consider evaluating and reducing board sizes to streamline decision-making processes and enhance governance effectiveness.

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