Corporate Governance Diverse Characteristics and Performance of Quoted Non-Financial Firms in Nigeria

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Abstract

This study investigates if there is any relationship between certain board characteristics and financial performance of listed firms in Nigeria. It uses secondarily sourced panel data over the period from 2005 to 2020 of 76 firms listed on the floor of the Nigerian Exchange Group (NXG). The generalized method of moments (GMM) results reveal that while board foreign directors(BFD), board members' education level(BED) and age diversity(AGD) are positively significant with performance; board tribal diversity(BTD), board gender diversity(BGD), board financial expertise (BFE), audit committee gender diversity.(ACGD) and CEO gender diversity(CEOGD) are negatively significant with performance while board national diversity(BND) and Audit committee financial expertise(ACFE) are insignificant. For the control variables, while leverage (LEV) and market–to-book ratio (MTB) are insignificant; firm size (SIZE) is positively significant but firm age (FAGE) is negatively and statistically significant. This study concludes with some recommendations.

Keywords: *Corporate, Ownership Structure, Firm Performance, Quoted Non-Financial Firms, GMM, NXG.*

1.0 Introduction

Financial performance has long been a popular subject of study in corporate governance due to a variety of variables. Improving performance has long been a major concern for corporations. In an increasingly financialized market, creating value has emerged as a critical factor for business appraisal (Ghardallou et al., 2020). A company's ability to manage its resources and obligations in order to consistently produce revenue is demonstrated by its financial performance. It provides details about a company's financial situation, including whether it can be liquidated or continue to turn a profit. That is, the financial performance of a corporation at any particular time determines its financial health. In other words, it's a financial success attained by improved sales, profit, and the company's value to shareholders as a consequence of prudent financial management. Therefore, management must make a conscious effort to improve the company's financial performance because it is a reasonable concern for all stakeholders as robust financial outcomes

indicate a rise in the wealth of shareholders (Adegboyegun & Igbekoyi, 2022). Although there are various ways to measure a company's financial health, Egbadju (2023) stated that a range of metrics, including TobinsQ, ROI (return on investments), ROA (return on assets), RI (residual income), EVA (economic value added), and others, have been used to evaluate performance.

Global corporate failures have become one of the main problems facing large corporations in the 21st century. The aforementioned corporations, namely: Enron (2001), WorldCom (2002), Tyco (2002), HealthSouth (2003), Freddie Mac (2003), Parmalat (2003), American International Group (AIG) (2005), Lehman Brothers (2008), Bernie Madoff (2008), Satyam (2009), Olympus (2011), Tesco (2014), to mention but a few have all failed due to unprecedented corporate fraud and corruption which invariably have reinforced the demand for increased scrutiny of corporate ethics (Adegboyegun & Igbekoyi, 2022; Egbadju & Kunemoemi, 2019). Tugman and Leka (2022), in the same vein, posited that recent scandals and corporate failures across countries which include the collapses of South African Airways and Transnet, Eskom which are two state-owned South Africa's entities as well as in the United Kingdom of London Capital & Finance and Carillion, Patisserie Valerie attest to corporate governance failures

To resolve the issues raised by these well-publicized financial scandals and business collapses, the importance of board diversity (BD) as a strategy for improving boardroom effectiveness has been acknowledged. Due to the fact that corporate governance constantly addresses diversity, BD in terms of demographic characteristics has become a significant topic in the literature on corporate governance. Prominent research has demonstrated that BD can improve financial decision-making, creativity, competitiveness, and monitoring, among other things (Bagh et al., 2023). Again, Bagh et al. (2023) reported that research in Asia and Africa has shown that including directors with a wide range of educational and professional backgrounds result in new perspectives that can improve performance. Therefore, encouraging diversity among board members is essential to enhancing performance and the decision-making process. Due to the availability of superior peers and colleagues, a demographically diverse board is expected to exercise greater caution in their decision-making, supervision, advice, and monitoring (Dong et al., 2023). As a result, they are likely to make better decisions because their board is more qualified and experienced. Businesses in Nigeria are under a great deal of pressure to maintain diversity in their boardrooms. According to Kabara et al. (2022), the Society for Corporate Governance Nigeria (SCGN), stated that too homogeneous boards are a sign of governance failures, which inevitably cause significant losses or a decline in profitability. Even with the growing rate of research on the advantages of diversified boards, Nigerian businesses still have very low levels of board diversity as compared to other neighboring countries, particularly when it comes to gender diversity. Men still make most decisions in underdeveloped countries, particularly those in Sub-Saharan Africa like Nigeria, both at the local and organizational levels. With the exception of a few Sub-Saharan African countries like South Africa and Kenya, legal institutions genuinely don't often support women in the workplace. This may be the cause of Africa's low ranking in the World Economic Forum's global gender index (Kabara et al., 2022). Following Norway which legalized female gender quota on the board in 2003, many developed countries (Iceland, Finland, France, Germany, The Netherlands, Australia, Belgium, Canada, Italy, to mention but a few) and developing countries

(South Africa, Kenya) have mandatory gender quota or stimulate gender balance by means of codes (Dam, 2018).

Numerous studies on board diversity have been conducted but no definitive findings have emerged from them but have yielded conflicting results. For example, research results indicate that board diversity and firm success are positively correlated (Bagh et al., 2023), negatively correlated (Adetula & Oyedeko, 2023), or not correlated at all (Sidki et al., 2023). This disparity has been linked in the literature to a range of theoretical underpinnings, analytical techniques, sample sizes, and historical eras (Kabara et al., 2022). The above necessitate the reason for this study. This study differs in several ways because we introduce some new variables, over longer periods for more sample size. This study was able to combine 10 variables from the extant literature some of which-board foreign directors (BFD); age diversity(AGD), audit committee gender diversity(ACGD); audit committee financial expertise (ACFE) and CEO gender diversity (CEOGD) -had not been used in the literatures we reviewed. This study also covers a longer time periods (2005 to 2020) than the other studies. With respect to the number of firms, it uses more firms (76). We, therefore, hypothesized that all the corporate governance diverse characteristics considered in this study have no significant relationship with firm performance represented by return on assets of quoted non-financial firms in Nigeria. Following this introduction, the rest of the paper is divided into five sections with the literature review in section two, methodology in section three, discuss of results in section four and the fifth section concludes this paper.

2.0 Review of Related Literature.

2.1 Theoretical Underpinning.

2.1.1 Social Network Theory (SNT):

One scientific approach that highlights the importance of social relationships is social network theory. This is a multifaceted, intricate field that heavily incorporates ideas from political science, psychology, and sociology. The concept was first proposed as a social structure research in the 1890s. Since it was first popularized in the 1930s by academics like Jacob Moreno, social network theory has been used in many fields, including political science, economics, sociology, communications, finance, and marketing (Hong, 2014). According to the theory, social actors are shaped by the relationships they have within their personal networks. The structure of organizational networks and the connections between social entities that can be modeled by pertinent stakeholders are both examined by social network analysis. Social aspects make up the nodes, which might be individuals, groups, companies, countries, organizations, blogs, and so forth (Athianos & Kydros, 2018). The use of (social) networks often serves as an explanation for the actions of communities, just as offices seem to be strongly interconnected groups within the social network as a result (Visconti, 2019). Again, Athianos and Kydros (2018) noted that one fundamental technique in the social sciences that places a strong emphasis on interpreting human interaction is the social network analysis. According to them, the main objective of the social network analysis approach is to identify the relevant characteristics or factors such as: age, sex, education, and socioeconomic position, as well as the roles and connections that exist within the network and the information flow within it. Thus, this study considers the interactions between

employees of the same company with diverse characteristics which are fundamental to the growth of the company's value.

2.2 Empirical Literature

Adetula and Oyedeko (2023) empirically tested the impact of board gender diversity on financial performance of firms in Nigeria. The study made use of sampled 13 deposit money banks (DMBs) for 11 years staring from 2009 to 2019 financial years making a total of 143 firm-year observations. The results of the ordinary least squares (OLS) showed that while Indexes of Herfindal-Hirschman and Shannon positively and significantly influenced Tobin's Q, the Blau Index negatively and significantly influenced it.

Magoma and Ernest (2023) attempted an empirical study of how board gender diversity enhanced the performance of firms in Tanzania. The study used secondary panel data over the period from 2016 to 2021 obtained from 15 firms listed on the Dar es Salaam Stock Exchange (DSE). The OLS regression results indicated that board gender diversity was statistically insignificant with both return on assets (ROA) and return on equity (ROE).

Bagh et al. (2023) investigated empirically whether boardroom diversity has affected corporate performance of firms in four emerging markets of Pakistan, India, Russia and China. The study used secondary panel data over a 13-year study period between 2008 and 2020 obtained from the Top 100 companies from each of the four Stock Exchanges in Karachi, Moscow, Shanghai and Bombay. The OLS regression results indicated that boardroom diversity index was positively significant with performance for all the countries.

Dong et al. (2023) undertook a research to determine if there is any relationship between board diversity and firm performance in China. The study used secondary panel data over the period from 2014 to 2019 obtained from 248 firms listed on the China Stock Market and Accounting Research Database (CSMAR) database. The two-step system generalized method of moments (2Sym-GMM) results revealed that a positive and statistically significant relationship between board diversity index and performance.

Elsayed (2023) studied whether there is any relationship between board gender diversity and the performance of firms in Egypt. The researchers used annually sourced panel data collected over the period from 2017 to 2021 on 54 non-financial firms listed among EGX 100 Index. The results of both the OLS and the two-stage least squares (2SLS) regression revealed that board gender diversity was positively and significantly related with firm performance.

Riyanti et al. (2023) researched on ascertain the extent to which board gender diversity have affected the performance of firms in Indonesia and Pakistan. Secondary data collected from annual reports of 100 firms quoted on the floor of the Philippines and Indonesia Stock Exchanges over some years was used. The OLS regression results showed that board gender diversity positively and significantly influenced Tobin's Q for Indonesia while for the Philippines, it was insignificant.

Sidki et al. (2023), in this research, investigated the effect which certain corporate board diversity has had on the performance in Germany. Secondarily sourced panel data over the period from 2011 to 2016 obtained on 58 state-owned utility firms making a total of 348 firm-year observations was used. The results of the OLS showed that all the variables of interests- financial expertise diversity, management skill diversity and education diversity-were statistically insignificant.

Kabara et al. (2022) carried out a research to determine the effect of board gender diversity and educational on the financial performance in Nigeria. The study used annual secondary panel data obtained from 67 firms listed on the Nigerian Exchange Group (NXG) covering the period 2012 to 2019. The GMM regression model results indicated that both gender diversity and education positively and statistically impacted performance.

Adegboyegun and Igbekoyi (2022) carried out a research on the extent to which board composition impacted banks' performance in Nigeria. Annual secondary panel data which covered the period 2011 to 2020 collected from the financial reports of 20 manufacturing firms listed on the NXG was used. The regression results of the OLS regression indicated that while board financial expertise was positively and statistically significant with earnings per share (EPS), board ethnicity diversity, board educational background diversity and board gender diversity were insignificant.

Ujunwa et al. (2012) embarked on this research to investigate the effect of corporate board diversity on firm performance in Nigeria. The study used of secondarily sourced audited reports of 122 firms quoted on the Nigerian Exchange Group (NXG) over the period 1991 to 2008. The results of the generalized least square regression (GLS) revealed that while board tribal diversity and board nationality diversity were positively significant with firm performance; gender diversity was negatively significant.

3.0 Methodology

3.1 Research Design

The study uses the ex-post facto research design, otherwise called the descriptive or correlational research design, to investigate the relationship, if any, between the corporate governance diverse characteristics and financial performance of 76 non-financial firms quoted on the floor of the Nigerian Exchange Group (NXG). This study uses secondarily sourced data obtained from their annual reports over the period 2005 to 2020, making a total number of 1,216 firm-year observations.

3.2 Measurement and Definitions of Variables.

Table1

S/N	Variables Names	Definitions	Variable Types	Measurements	Authorities
1	ROA	Return On Assets	Dependent	Net Income or Profit Before Tax /Total Assets	Dong et al. (2023); Kabara et al. (2022)
2	ROA(-1)	One year lag of Return On Assets	Instrumental	Preceding or Last year ROA or ROA_{t-1}	Dong et al. (2023); Kabara et al. (2022)
3	Tobin'sQ	Tobin'sQ	Dependent	(Market value of equity + Book value of equity)/Total Assets	Dong et al. (2023); Kabara et al. (2022)
4	Tobin'sQ(-1)	One year lag of Tobin'sQ	Instrumental	Preceding or Last year Tobin'sQ or $Tobin'sQ_{t-1}$	Dong et al. (2023); Kabara et al. (2022)
5	BTD	Board tribal diversity	Independent	A dummy variable which takes the value 1, 2, 3, etc for each Nigerian director based on tribe, and zero for non-Nigerian directors.	Ujunwa et al. (2012)
6	BND	Board national diversity	Independent	A dummy variable which takes the value 1, 2, 3, etc for each director from each country represented.	Ujunwa et al. (2012)
7	BGD	Board gender diversity	Independent	Proportion (%) of board members that are female.	Adetula and Oyedeko (2023)
8	BFE	Board financial expertise.	Independent	Number of board members with degrees/professional qualifications in	Adegboyegun and Igbekoyi (2022)

				accounting and finance	
9	BFD	Board foreign directors	Independent	Total number of directors on the board that are non-Nigerian	None used it of the literature reviewed in this study
10	BED	Board members' education level	Independent	Number of board members holding various degrees/professional qualifications.	Kabara et al. (2022)
11	AGD	Age diversity	Independent		None used it of the literature reviewed in this study
12	ACGD	Audit committee gender diversity.	Independent	Proportion (%) of audit committee members that are female.	None used it of the literature reviewed in this study
13	ACFE	Audit committee financial expertise.	Independent	Number of audit committee members with degrees/professional qualifications in accounting and finance	None used it of the literature reviewed in this study
14	CEOGD	CEO gender diversity.	Independent	A dummy variable which takes the value "1" if CEO is a female; and "0" otherwise.	None used it of the literature reviewed in this study
15	FAGE	Firm age	Control	Number of years since incorporation	
16	LEV	Leverage	Control	Total debts/Total assets	
17	MTB	Market-To-Book	Control	Market value of equity/Book value of equity	
18	SIZE	Firm size	Control	Log of total assets	

Source: Author's Compilation from the Reviewed Literatures.

3.3 Model Specification

The functional equations of firm performance to test the ten (10) hypotheses specified is stated as:

ROA = f (BTD, BND, BGD, BFE, BFD, BED, AGD, ACGD, ACFE, CEOGD) (1a)

TOBINSQ = f (BTD, BND, BGD, BFE, BFD, BED, AGD, ACGD, ACFE, CEOGD) (1b)

The functional testable models will be derived as:

$ROA = \beta o + \beta_1 BTD + \beta_2 BND + \beta_3 BGD + \beta_4 BFE + \beta_5 BFD + \beta_6 BED + \beta_7 AGD + \beta_8 ACGD + \beta_9 ACFE + \beta_{10} CEOGD + \varepsilon$ (2a).

$TOBIN'SQ = \beta o + \beta_1 BTD + \beta_2 BND + \beta_3 BGD + \beta_4 BFE + \beta_5 BFD + \beta_6 BED + \beta_7 AGD + \beta_8 ACGD + \beta_9 ACFE + \beta_{10} CEOGD + \varepsilon$ (2b).

Since we are using panel data, the model will be specified in the appropriate form as:

$ROA_{it} = \beta o + \beta_1 BTD_{it} + \beta_2 BND_{it} + \beta_3 BGD_{it} + \beta_4 BFE_{it} + \beta_5 BFD_{it} + \beta_6 BED_{it} + \beta_7 AGD_{it} + \beta_8 ACGD_{it} + \beta_9 ACFE_{it} + \beta_{10} CEOGD_{it} + \varepsilon_{it}$ (3a).

$TOBIN'SQ_{it} = \beta o + \beta_1 BTD_{it} + \beta_2 BND_{it} + \beta_3 BGD_{it} + \beta_4 BFE_{it} + \beta_5 BFD_{it} + \beta_6 BED_{it} + \beta_7 AGD_{it} + \beta_8 ACGD_{it} + \beta_9 ACFE_{it} + \beta_{10} CEOGD_{it} + \varepsilon_{it}$ (3b).

3.4 Description of the Estimation Technique Used.

3.5 Dynamic Data Analysis using Generalized Method of Moments (GMM):

Generalized Method of Moments (GMM) regression estimation technique is a generic method for the estimation of statistical model parameters. The essence of using GMM for a dynamic panel data is to practically solve the problem of endogeneity bias which simultaneously tackles unobserved heterogeneity (Chung et al.,2018). GMM is designed to handle the problems of multicollinearity, heteroscedasticity and autocorrelation but especially second order correlation. Many studies in corporate finance which tries to explain causal-effect relationships often encounter difficulties in dealing with endogeneity and this can lead to inconsistent and biased parameter estimates (Wintoki et al., 2012) or we may not even get the right coefficient sign-positive or negative (Ketokivi & McIntosh, 2017), thereby resulting in misleading inferences, conclusions and interpretations (Li et al., 2021). If a regression estimator can still be reliable in the presence of outliers and its standard error consistent when the regression errors have outliers, autocorrelation and heteroskedasticity, then it is adjudged to be robust (Ismail et al., 2021). GMM is one of the dynamically robust estimation techniques which make use of the lagged dependent variable as one of its instrument to control for endogeneity problems. The use of lagged dependent variable is, first, to eliminate autocorrelation in the residuals and, secondly, to capture the dynamism in panel data by controlling for endogeneity bias. By including the lagged value of the dependent variable, that is, ROA_{it-1}, due to unobserved heterogeneity transforms the static model to a dynamic one.

Including the lagged dependent variable to equation 3, we have:

$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_2 BTD_{it} + \beta_3 BND_{it} + \beta_4 BGD_{it} + \beta_5 BFE_{it} + \beta_6 BFD_{it} + \beta_7 BED_{it} + \beta_8 AGD_{it} + \beta_9 ACGD_{it} + \beta_{10} ACFE_{it} + \beta_{11} CEOGD_{it} + \varepsilon_{it}$ (4a).

$$TOBIN'SQ_{it} = \beta o + \beta_1 TOBIN'SQ_{it-1} + \beta_2 BTD_{it} + \beta_3 BND_{it} + \beta_4 BGD_{it} + \beta_5 BFE_{it} + \beta_6 BFD_{it} + \beta_7 BED_{it} + \beta_8 AGD_{it} + \beta_9 ACGD_{it} + \beta_{10} ACFE_{it} + \beta_{11} CEOGD_{it} + \varepsilon_{it} \quad (4b).$$

3.6 Universal Usage of Control Variables in Published Scholarly Articles From High Quality Journals.

Traditionally, control variables (CVs) are used in research models that have causal relationship. The two main ways of controlling for variables are by experimental design (before gathering the data) where the samples are manipulated or by statistical control (after gathering the data) where the researcher just includes relevant variables in the model. Some of the reasons for controlling are to eliminate omitted variables biases thereby reducing the error term which in turn increase statistical power by improving the estimated coefficients precision (De Battisti & Siletti, 2018).Cinelli et al. (2022) was of the opinion that while some data analysts, students as well as empirical social scientists have discussed the problem of omitting certain relevant variables, they have not provided a means of deciding which variables could improve or worsen existing biases in a regression model. According to Becker (2005), CVs are just as important as the predictors (independent) variable and the criterion (dependent) variable because one author's CV could be another author's predictor's or criterion variable such that including improperly any CV can produce misleading results. Hunermund and Louw (2020) noted that over 47 percent of scholarly papers published the previous five years in top management journals made use of CVs. They pointed out that they were specifically as authors asked to hypothesized and interpret CV coefficients as though these CVs were focal main variables for as much as the CVs could give valuable information to other researchers. Again, Nielsen and Raswant (2018) opined that if there is no adequate attention given to CVs, there will be a serious threat to cause and effect inferences validation and so statistical controls can be made to determine relationship between the other variables and this helps to reduce the risk of committing Type II errors. Becker (2005) as well as Becker et al (2016) gave ten points recommendations which both authors and reviewers must imbibed as guides for the inclusion of control variables in regression models. Thus, De Battisti and Siletti (2018) advised that researchers should run the regression with the CVs and without the CVs and observe the pattern of the results to know which of the models to report. Non-inclusion of these variables may lead to omitted variables biasness in our estimation results and thereby draw erroneous conclusions on which managerial and policy decisions are based (Hunermund & Louw, 2020).

Thereafter, we included some firm-specific control variables to arrive at equation 5 below

$$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_2 BTD_{it} + \beta_3 BND_{it} + \beta_4 BGD_{it} + \beta_5 BFE_{it} + \beta_6 BFD_{it} + \beta_7 BED_{it} + \beta_8 AGD_{it} + \beta_9 ACGD_{it} + \beta_{10} ACFE_{it} + \beta_{11} CEOGD_{it} + \beta_{12} FAGE_{it} + \beta_{13} LEV_{it} + \beta_{14} MTB_{it} + \beta_{15} SIZE_{it} + \varepsilon_{it} \quad (5a)$$

$$TOBIN'SQ_{it} = \beta o + \beta_1 TOBIN'SQ_{it-1} + \beta_2 BTD_{it} + \beta_3 BND_{it} + \beta_4 BGD_{it} + \beta_5 BFE_{it} + \beta_6 BFD_{it} + \beta_7 BED_{it} + \beta_8 AGD_{it} + \beta_9 ACGD_{it} + \beta_{10} ACFE_{it} + \beta_{11} CEOGD_{it} + \beta_{12} FAGE_{it} + \beta_{13} LEV_{it} + \beta_{14} MTB_{it} + \beta_{15} SIZE_{it} + \varepsilon_{it} \quad (5b)$$

β1, β2, β3, β4, β5, β6, β7, β8, β9, β10, β11, β12, β13, β14, β15 = Beta coefficients of the independent and control variables. From this study, we expect β1 to β15 to be greater than zero. εit = Stochastic White Noise or Error Term.

This study adapted the model previously used by Dong et al. (2023) in China and Kabara et al. (2022) in Nigeria who used a dynamic generalized method of moments (GMM).

4.0. Method of Data Analysis

4.1 Univariate Data Analyses (Descriptive Statistics)

Table 2

	BTD	BND	BGD	BFE	BFD	BED	AGD	ACGD	ACFE	CEOGD	FAGE	LEV	MTB	SIZE
Mean	1.7151	1.9849	0.9134	0.7628	1.1292	0.5683	59.806	0.0627	5.2333	0.9033	38.792	0.1096	4364 20.	9.5315
Median	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	58.000	0.0000	6.0000	1.0000	39.000	0.0013	8939. 99	9.4576
Maximum	6.0000	66.000	5.0000	1.0000	8.0000	3.0000	88.000	0.4444	6.0000	1.0000	80.000	17.657	4.90E+	12.620
Minimum	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	2.0000	0.0000	4.0000	0.0000	1.0000	0.0000	0.3309	5.6989
Std. Dev.	1.1714	3.0204	0.9943	0.4255	1.7770	0.7630	9.3607	0.0844	0.9580	0.2956	17.277	0.7688	4065 0703	1.0691
Skewness	1.5520	12.587	1.4541	-1.236 03	1.7720	1.1776	-0.258 78	1.1198	-0.479 82	-2.730 86	0.0211 8	17.237	9.7571 2	-0.438 30
Kurtosis	4.8260	255.10	5.8823	2.5277	5.5622	3.6239	5.9055	3.6502	1.2635	8.4575	2.1586	363.97	99.061 48	5.1441
Jarque-Bera	430.70	2131 6.	557.09	210.34	635.13	197.14	289.23	180.62	130.71	1979. 7	23.564	4366 3.	3191 07.	178.18
Probability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sum	1367.0	1582.0	728.00	608.00	900.00	453.00	4766 6.	50.007	4171.0	720.00	3091 8.	87.377	3.48E+	7596.6
Sum Sq. Dev.	1092.346	7261 819	787.02 63	144.18 07	2513. 689	463.52 32	6974 8.24	5.6777 49	730.59 22	69.560 85	2376 16.8	470.55 68	1.32E +18	909.81 97

Observations	1216	1216	1216	1216	1216	1216	1216	1216	1216	1216	1216	1216	1216	1216

Source: Researcher's Computations (2023) Using EViews13 Software

The statistics in Table 2 show that the mean values of the variables as well as the maximum values. Since the mean values are lower than the maximum values, it confirms that there are no outliers in our data.

4.2a Bivariate Data Analysis (Correlation Analysis)

The correlation analyses among the variables are meant to first determine the association between each pair of the dependent and independent variables as well as among the explanatory variables. The degree of association may be weak (0.00 to 0.5), moderate (0.51 to 0.8) or high (0.81 and above). A very high association among the regressors poses a problem of multi-collinearity (Gujarati, 2003). Hence, Table 3 below is meant to check whether the problem of multicollinearity is embedded in the variables correlation coefficient in the model. The results show that all the variables have weak associations and this attest to the fact that there is no problem of multicollinearity among the variables.

Table 3. Covariance
Analysis: Ordinary
Date: 12/12/23
Time: 22:39
Sample: 1 808
Included observations: 1216
Balanced sample (listwise missing value deletion)

Covariance Correlation	BTD	BND	BGD	BFE	BFD	BED	AGD	ACGD	ACFE	CEOGD	FAGE	LEV	MTB	SIZE
BTD	1.3705 1.0000													
BND	0.1199 0.0339	9.1114 1.0000												

BGD	-0.0208	0.0476	0.9874					
	-0.0179	0.0158	1.0000					
BFE	-0.0365	0.0666	-0.0882	0.1809				
	-0.0735	0.0519	-0.2088	1.0000				
BFD	0.1685	2.0998	0.0663	0.0143	3.1539			
	0.0810	0.3917	0.0376	0.0189	1.0000			
BED	-0.0689	-0.1307	-0.1056	-0.0772	-0.1210	0.5815		
	-0.0772	-0.0567	-0.1394	-0.2381	-0.0893	1.0000		
AGD	0.3991	-1.7316	0.2116	-0.0257	-0.3865	0.3896	87.513	
	-0.0364	-0.0612	-0.0227	-0.0064	-0.0232	-0.0546	1.0000	
ACGD	-0.0006	0.0064	-0.0385	-0.0033	0.0102	0.0051	-0.0053	0.0071
	-0.0066	-0.0252	-0.4597	-0.0923	-0.0684	-0.0805	-0.0068	1.0000
ACFE	-0.0381	0.3661	0.0816	-0.0310	-0.4290	0.0756	-0.2088	0.0098	0.9166

	9			2			3						
	-			-			-						
	0.0347	0.1266	0.0858	0.0766	0.2523	0.1035	0.0232	0.1215	1.0000				
			-			-		-					
CEOGD	0.0389	0.0851	0.0409	0.0147	0.0890	0.0316	0.0741	0.0013	0.0087	0.0872			
			-			-		-					
	0.1127	0.0954	0.1396	0.1172	0.1696	0.1405	0.0268	0.0560	0.0309	1.0000			
				-		-							
	3.9046	3.0332	1.8766	0.8207	6.6779	1.9450	29.223	0.3074	2.5514	0.3927	298.13		
FAGE				-		-							
	0.1931	0.0581	0.1093	0.1117	0.2177	0.1477	0.1809	0.2109	0.1543	0.0770	1.0000		
	-	-			-		-	-	-				
	0.0181	0.0865	0.0116	0.0113	0.1067	0.0258	0.5129	0.0032	0.0896	0.0325	0.4765	0.0410	
LEV	-	-			-		-	-	-				
	0.0201	0.0373	0.0152	0.0346	0.0782	0.0440	0.0713	0.0501	0.1218	0.1434	0.0359	1.0000	
	-	-	-			-	-	-				-	
	306213	817539	122101	78391	392456	832812	700333	216			1.34E	47797	1.65E
MTB	.	.	.	.	.	.	.	.	.	42040	+	7	+
	-	-	-			-	-	-				-	
	0.0644	0.0311	0.0969	0.0589	0.0542	0.0792	0.0219	0.0787	0.0853	0.0350	0.1907	0.0153	1.0000
	-			-		-	-					-	
	0.0555	0.3654	0.1066	0.0035	0.4692	0.0499	0.2789	0.0065	0.2176	0.0667	1.3611	0.1459	128951	1.1415
SIZE	-			-		-	-					-		
	0.044441	0.113316	0.100480	0.007726	0.247316	0.061249	0.027912	0.072814	0.212802	0.211616	0.073780	0.177813	0.297084	1.000000

Source: Researcher's Computations (2023) Using EViews13 Software

4.2b Bivariate Data Analysis (Variance Inflation Factor)

Variance Inflation Factors (VIFs) is a statistical technique used for the detection of multicollinearity or collinearity among independent variables. A high VIFs reflect the fact there is collinearity among the independent variables meaning th**e** standard errors and the variances of the regression coefficient estimates will increase leading to a very low *t*-statistics (Murray et al, 2012). Table 4 shows the results of the variance inflation factor(VIF) and the corresponding tolerance column. A VIF of any variable less than 10 with its tolerance level greater than 0.2 is free of multicollinearity for VIF that ranges between 5 to 10 is adjudged to have highly correlated variables (Shrestha, 2020). All the variables have a VIF less than 10 with a tolerance greater than 0.2. Thus, Table 3 and Table 4 show that our model has no issue with multicollinearity. There is no one single solution to eliminating multicollinearity in a model, and so what to consider is to either: do nothing; drop a redundant variable; transform the multicollinear variables or increase the sample size. Belsley et al. (1980) as cited in Murray et al.(2012) was of the opinion that researchers should take caution in treating VIFs threshold of 5 or 10 or 30 when taking decisions to eliminate or reduce collinearity since other factors like sample size which influence regression coefficients variability should also be considered.

Table 4

S/N	Variables	Variance Inflation Factor (VIF)	Tolerance
1	BTD	1.207547	0.826446
2	BND	1.369019	0.729927
3	BGD	1.145225	0.869565
4	BFE	1.394566	0.719424
5	BFD	1.197764	0.833333
6	BED	1.064609	0.943396
7	AGD	1.343918	0.746269
8	ACGD	1.146104	0.869565
9	ACFE	1.139488	0.877193
10	CEOGD	1.309486	0.763359
11	FAGE	1.074531	0.934579
12	LEV	1.194613	0.840336
13	MTB	1.300333	0.769231
14	SIZE	1.207547	0.826446

Source: Researcher's Computations (2023) Using EViews13 Software.

4.3 Regression Models Estimation Results and Hypotheses Testing.

Table 5. Panel Generalized Method of Moments with Orthogonal Deviations Transformation

ROA Results with Firm-Specific Control variables			**Tobin'sQ Results with Firm-Specific Control variables**		
VARIABLES	t-Statistics ROA	p-Values ROA	VARIABLES	t-Statistics Tobin'sQ	p-Values Tobin'sQ
ROA(-1)	12.30763	0.0000	ROA(-1)	8.107604	0.0000
BTD	-8.288572	0.0000	BTD	-4.667574	0.0000
BND	1.357083	0.1808	BND	0.533614	0.5960
BGD	-15.61697	0.0000	BGD	2.580426	0.0129
BFE	-2.168975	0.0349	BFE	-1.903276	0.0628
BFD	15.57630	0.0000	BFD	4.185163	0.0001
BED	5.041739	0.0000	BED	-5.857426	0.0000
AGD	5.000851	0.0000	AGD	-1.425682	0.1602
ACGD	-8.636538	0.0000	ACGD	4.622389	0.0000
ACFE	0.447330	0.6566	ACFE	1.761997	0.0842
CEOGD	-21.24200	0.0000	CEOGD	-7.218413	0.0000
FAGE	10.64769	0.0000	FAGE	-5.976635	0.0000
LEV	-0.590608	0.5574	LEV	3.851558	0.0003
MTB	0.992045	0.3260	MTB	0.884504	0.3807
SIZE	-9.383235	0.0000	SIZE	7.273371	0.0000
J-statistic	37.37792		J-statistic	30.43599	
Prob(J-statistic)	0.405636		Prob(J-statistic)	0.730127	

Source: Researcher's Computations (2023) Using EViews13 Software

Table 5 above shows the regression results for the ROA model as well as for the Tobin'sQ model. The results of the two models exhibit the pattern in that BND, ACFE and MTB are not significant at the 5% level of significance. However, this study reports the results of the ROA because it has more significant variables with a lower Prob(J-statistic) of 40.5% as compared to that of Tobin's model which is 73% due to the problem of instruments proliferation.

A look at the ROA model shows that it has an ROA (-1) coefficient which is positively significant with a t-Statistics of 12.30763and a p-Value of 0.0000 at the 1% levels of significance. This result confirms the position from the extant literature that the dependent variable and its lag move in the same direction and must be significant (Egbadju & Jacob, 2022). The positive coefficient means that the current year profit is directly affected by previous period profit and this is a good sign. Again, since the p-value of Sargon statistic or J-Statistic (0.405636) is higher than the threshold of 5% and 10% or even the 25% or more suggested by Roodman (2009), our model is free from the problem of instruments proliferation.

From the result above, all the board characteristics (BTD, BGD, BFE, BFD, BED, AGD, ACGD, CEOGD) statistically and significantly impacted performance apart from BND and ACFE which are not significant.

In particular, BTD relationship with ROA is negatively significant with a t-Statistic of -8.288572 and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in BTD will reduce ROA. That is, the more tribally diverse the board is, the less profitable the firm will be. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between BTD and firm performance. This result is not in agreement with any previous study reviewed but contradicts that of Ujunwa et al. (2012) which was positively significant

BGD relationship with ROA is negatively significant with a t-Statistic of -15.61697 and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in BGD will reduce ROA. That is, the more female are appointed to the board, the less profitable the firm will be. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between BGD and firm performance. This result confirms that of Adetula and Oyedeko (2023) but contradicts that of Bagh et al. (2023) which was positively significant.

BFE relationship with ROA is negatively significant with a t-Statistic of -2.168975
and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in BFE will reduce ROA. That is, the more members with financial expertise that are engaged on the board, the less profitable the firm will be. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between BFE and firm performance. This result is not in agreement with any previous study reviewed but contradicts that of Adegboyegun and Igbekoyi (2022) which was positively significant

BFD relationship with ROA is positively significant with a t-Statistic of 15.57630 and a p-value of 0.0000 at the 1% levels of significance.. This suggests that an increase in BFD will increase ROA. That is, the more the number of foreign directors on the board, the more profitable the firms become. The sign or direction as well as the size or magnitudes are in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between BFD and firm performance. No previous study made used of this variable.

BED relationship with ROA is positively significant with a t-Statistic of 5.041739 and a p-value of 0.0000 at the 1% levels of significance.. This suggests that an increase in BED will increase ROA. That is, the more the number of directors on with various higher degrees on the board, the more profitable the firms become. The sign or direction as well as the size or magnitudes are in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between BED and firm

performance. This result confirms that of Kabara et al. (2022) but contradicts that of Sidki et al. (2023) which was insignificant

AGD relationship with ROA is positively significant with a t-Statistic of 5.000851 and a p-value of 0.0000 at the 1% levels of significance.. This suggests that an increase in ADG will increase ROA. That is, the more diverse the age of the directors on the board, the more profitable the firms become. The sign or direction as well as the size or magnitudes are in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between AGD and firm performance. No previous study made used of this variable.

ACGD relationship with ROA is negatively significant with a t-Statistic of -8.636538 and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in ACGD will reduce ROA. That is, the more female members are appointed into the audit committee, the less profitable the firm will be. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between ACGD and firm performance. No previous study made used of this variable.

CEOGD relationship with ROA is negatively significant with a t-Statistic of -21.24200 and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in CEOGD will reduce ROA. That is, the more female members are appointed as CEOs, the less profitable the firm will be. The sign or direction is contrary to our expectations but the size or magnitude is in line with our expectations. We, therefore, reject the null hypothesis of no significant relationship and accept the alternative hypothesis that there is a significant relationship between CEOGD and firm performance. No previous study made used of this variable.

For the control variables, while FAGE and SIZE are statistically significant; LEV and MTB are insignificant with ROA.

4.4 Additional Tests of Robustness Comparing two Models.

To test the robustness of our base regression results above, we excludes the firm-specific control variables from both the ROA model and the Tobin'sQ model and observe the outcome.

$$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_2 BTD_{it} + \beta_3 BND_{it} + \beta_4 BGD_{it} + \beta_5 BFE_{it} + \beta_6 BFD_{it} + \beta_7 BED_{it} + \beta_8 AGD_{it} + \beta_9 ACGD_{it} + \beta_{10} ACFE_{it} + \beta_{11} CEOGD_{it} + \varepsilon_{it} \quad (6a)$$

$$TOBIN'SQ_{it} = \beta o + \beta_1 TOBIN'SQ_{it-1} + \beta_2 BTD_{it} + \beta_3 BND_{it} + \beta_4 BGD_{it} + \beta_5 BFE_{it} + \beta_6 BFD_{it} + \beta_7 BED_{it} + \beta_8 AGD_{it} + \beta_9 ACGD_{it} + \beta_{10} ACFE_{it} + \beta_{11} CEOGD_{it} + \varepsilon_{it} \quad (6b)$$

The regression results in Table 6 below did not significantly differ from that of Table 5 above which includes the firm-specific control variables.

It should be observed that while only BND is not significant in the ROA model, only BED that is not significant in the tobin'sQ model. All the other variables are statistically significant with respect to the both the ROA and the Tobin'sQ models. This attest to the robustness of the fact that corporate governance diversity considered in this study has helped the firms to achieve profitability for the period under consideration..

Table 6. Panel Generalized Method of Moments with Orthogonal Deviations Transformation

ROA Results without Firm-Specific Control variables			**Tobin'sQ Results without Firm-Specific Control variables**		
VARIABLES	t-Statistics ROA	p-Values ROA	VARIABLES	t-Statistics Tobin'sQ	p-Values Tobin'sQ
ROA(-1)	37.67562	0.0000	ROA(-1)	38.84150	0.0000
BTD	-22.97588	0.0000	BTD	-16.88407	0.0000
BND	0.582092	0.5631	BND	5.761645	0.0000
BGD	-21.49493	0.0000	BGD	-15.41747	0.0000
BFE	2.496291	0.0159	BFE	2.315935	0.0247
BFD	28.88058	0.0000	BFD	-11.34467	0.0000
BED	5.397460	0.0000	BED	-1.648447	0.1055
AGD	6.171870	0.0000	AGD	-23.42379	0.0000
ACGD	-9.353773	0.0000	ACGD	11.04740	0.0000
ACFE	-2.497675	0.0158	ACFE	10.90057	0.0000
CEOGD	-5.484770	0.0000	CEOGD	-18.20462	0.0000
J-statistic	39.56436		J-statistic	39.50027	
Prob(J-statistic)	0.489706		Prob(J-statistic)	0.492582	

Source: Researcher's Computations (2023) Using EViews13 Software

4.5 Regression Diagnostics Test

Table 7. Arellano-Bond Serial Correlation Test
Equation: Untitled
Date: 11/19/23 Time: 14:34
Sample: 2005 2020
Included observations: 1216

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-2.284013	-	34687703.	0.0224

		79227149.74		
		-85632253.6	61145443.18	
AR(2)	-1.400468			0.1614

Source: Researcher's Computations (2023) Using EViews13 Software

4.5.1 Arellano and Bond Serial Correlation Diagnostic Tests of AR (1) and AR (2).
When an estimator uses lags as instruments with the assumption that the disturbance or error term is white noise, such an estimator would produce inconsistent results if the disturbance terms are indeed serially correlated (Arellano & Bond, 1991). Thus, it is very necessary to be sure of no autocorrelation by carrying out test statistics of no serial correlation by validating the instrumental variables through a second-order residual serial correlation test (Arellano & Bond, 1991). The AR (1) may be or may not be significant but AR (2) must never be insignificant at all. AR (2) is more important in evaluating our results as it shows whether there is second-order serial correlation. If AR (2) is significant, it indicates that some of the lagged dependent variables which might be used as instrumental variables are bad instrument and thus endogenous. Since the p-value of AR (1) = 0.0224 which is less than 0.05 but the p-value of AR (2) = 0.1614 in Table 7 above is greater than 0.05, we then accept the null hypothesis that there is no serial correlation.

Conclusion and Recommendations

This study investigates if there is any relationship between certain board characteristics and financial performance of listed firms in Nigeria. It uses secondarily sourced panel data over the period from 2005 to 2020 of 76 firms listed on the floor of the Nigerian Exchange Group (NXG). The generalized method of moments (GMM) results reveals that while BFD, BED and AGD are positively significant with performance; BTD, BGD, BFE, ACGD and CEOGD are negatively significant with performance while BND and ACFE are insignificant.

Based on the results above, the study recommends the followings:

- Management should maintain or increase the present level of board foreign directors, board education diversity and age diversity since these variables increase profitability.
- Investigate the reason board tribal diversity, board gender diversity, board financial expertise, audit committee gender diversity and CEO gender diversity could decrease profitability.
- Increase the number of board national diversity as well as audit committee financial expertise and observe if this could lead to increase in profitability since they are not significant with profitability.

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