Corporate Board Characteristics and Performance of Non-Financial Firms in Nigeria

Lawrence, U. Egbadju
Department of Accounting, Federal University Otuoke,
Otuoke, Bayelsa State, Nigeria
E-mail: lawuvie@gmail.com

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Abstract
This study investigates if there is any relationship between certain corporate board characteristics and financial performance of non-financial listed firms in Nigeria. It uses secondarily sourced panel data over the period from 2005 to 2020 of 76 such firms listed on the floor of the Nigerian Exchange Group (NXG). The generalized method of moments (GMM) results reveal that while board size(BS), board compensation(BC), board meetings(BM) and board members with military experience(BME) are positively significant with performance; board independence(BI), board gender diversity(BGD), board national diversity(BND), board tribal diversity(BTD), board busyness(BB), board members' education level(BE) and board foreign directors(BFD) are negatively significant with performance but board shareholding or ownership(BSH) is insignificant. All the control variables (leverage, market–to-book ratio, firm size, year fixed effect dummy as well as the industry sector fixed effect dummy) are statistically significant. This study concludes with some recommendations.

Keywords: *Board Characteristics, Firm Performance, Quoted Non-Financial Firms, GMM, NXG.*

1.0 Introduction

Due to a number of factors, financial performance has long been a prominent topic of research in corporate governance. Enhancing efficiency has consistently been a top priority for businesses. Creating value has become a crucial component of business appraisal in a market that is becoming more and more financialized (Ghardallou et al., 2020). A company's financial performance shows how well it manages its resources and commitments to generate money on a regular basis. It offers information on a company's financial status, such as whether it can be successfully liquidated or keep making money. If parties heavily rely on financial statements to make wise business decisions, then they should expect financial statements to be a reliable source of crucial information. It is essential that the accounting information in these reports be correct for both present and potential investors. Numerous aspects that significantly explain the financial performance have been offered by the research. Egbadju (2023) states that a range of metrics, including as TobinsQ, ROI (return on investments), ROA (return on assets), RI (residual income), EVA (economic value added), and others, have been used to evaluate performance.

Since corporate governance is now viewed as a key component of a firm's success or failure, it has garnered a lot of attention from researchers and practitioners in recent years due to its potential to affect firm performance. Shareholder confidence in the market has declined as a result of the enormous global financial scandals and fraud around the turn of the 20th century, which had an impact on numerous economies globally and led to the failure of large firms. As a result, governments and regulators work to improve and update their corporate governance (CG) regulations. One of the mechanisms of CG in businesses, the board of directors (BOD) is the cornerstone and a crucial element of corporate success. According to Adeola et al. (2023), corporate board member composition has become central to the discourse around corporate governance in the wake of international corporate scandals. They noted that regulators and academics have expressed serious concerns about the composition of the board, including issues such as size, gender diversity, independence, and the value of having members with financial and accounting backgrounds who can make better decisions about capital structures. The board of directors is crucial to corporate governance since its main responsibility is to supervise management and ensure proper accountability to shareholders and other stakeholders. They are in charge of managing and directing the company in addition to organizing and defending the investments and rights of the shareholders (Okpolosa, 2023). The BODs is very central to a firm's internal governance mechanism and is responsible for upholding shareholder interests for a well-composed board can enhance the accuracy of a company's decisions, creativity, monitoring, boardroom effectiveness, competitiveness within organizations, reduce risk, and improve its financial performance (Bagh et al., 2023). To be more precise, BODs perform a wide range of direct and indirect duties for an organization, including developing the company's strategies, managing and supervising managers, choosing, supervising, and determining senior managers' compensation and benefits, and establishing the organization's external relations (Demaki et al., 2023).

Several studies that have linked corporate board characteristics with financial performance found strong relationship between them. For examples, many more studies (Nguyen and Huynh (2023); El-feky (2023); Adeola et al. (2023) ; Okpolosa (2023); Al-Absy and Nada (2023); Dang et al. (2023); Ngo et al. (2023); Rizvi et al. (2023) and Govindan et al. (2023)) reported positive relationships than negative relationships. Abdurrashid et al. (2023); Khan and Mahmood (2023) and Chong and Jong (2023)) reported more negative relationships than positive relationships while Adeola et al. (2023) and Hassan and Aziz (2023)) reported no relationship at all. For as much as the results from previous studies have shown mixed outcomes, the main objective of this study is to investigate the impact which some corporate board characteristics may have on the financial performance of quoted non-financial firms in Nigeria. This study differs in several ways because we introduce some new variables, over longer periods for more sample size. It uses data for sixteen (16) years from 2005 to 2020 which to the best of our knowledge no one has ever used in Nigeria although Nguyen and Huynh (2023) used data for 15 years from 2006 to 2020 for Vietnamese companies. While our sample size is 76 firms, theirs was 52 firms. This study was able to combine 15 variables from the extant literature some of which- board members with military experience (BME); board foreign directors(BFD); board compensation(BC); board tribal diversity(BTD) and board national diversity(BND)-had not been used in the literatures we reviewed. We, therefore, hypothesized that all the corporate board characteristics considered in this study have no

significant relationship with the performance 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 Literature Review

2.1 Theoretical Literature Review.

2.1.1. Upper Echelon Theory

The Upper Echelons Theory (UET), propounded by Hambrick and Mason(1984), is of the notion that top executives see the world through highly customized lenses. The varying experiences, values, personalities, and other human elements among executives lead to these unique interpretations of strategic circumstances. According to Upper Echelons Theory, the personalities, values, and prior experiences of members of the top management team (TMT) influence the organizational and strategic decisions that they make (Hambrick and Mason, 1984). That is, experience, education, and personal beliefs shape an individual's qualities and cognitions and these impact senior managers' situational analysis, reaction, and organizational strategy decisions (Hambrick and Mason, 1984).

Consequently, a thorough examination of the attributes of the top management team (TMT) will produce more persuasive arguments for organizational goals than the typical emphasis on the chief executive officer (CEO) or any other top executive alone. In a complex organization, leadership is a team endeavor in which the relationships, interactions, and collective cognitions of the entire TMT shape strategic behaviors. From the standpoint of upper management, it is not necessary to focus on a single member of the top management team because executive groups can provide more convincing explanations for a company's overall success. Thus, assessing the traits of the company's top managers alone would not be as helpful in predicting organizational behaviour on the performance line as studying and analyzing the traits of the complete management team (Bogdan et al, 2022).

2.2 Empirical Literature

Nguyen and Huynh (2023) empirically tested the impact of board characteristics on financial performance of firms in Vietnam. The study made use of sampled 52 firms listed on the floor of the Vietnamese stock market staring from 2006 to 2020 financial years making a total of 780 firm-year observations. The results of the ordinary least squares (OLS) regression showed that board size, board members' education level and board gender diversity were all positively significant with ROA.

Chong and Jong (2023) carried out a research on the extent to which board capital impacted performance of firms in Malaysia. Annual secondary panel data which covered the period 2017 to

2020 collected from the financial reports of 161 sampled firms listed on the floor of the Bursa Malaysia were used. The regression results of ordinary least squares (OLS) indicated that board gender diversity negatively and statistically impacted return on assets.

Khan and Mahmood (2023) studied whether there is any relationship between corporate governance and the performance of firms in Indonesia. The researchers used annually sourced panel data collected over the period from 2013 to 2022 on 100 non-financial firms quoted on the floor of the Pakistan Stock Exchange (PSE). The results of the OLS regression revealed that board size had a negative effect on return on assets (ROA).

El-feky (2023) attempted an empirical study of how board gender diversity had enhanced the performance of firms in Egypt. The study used secondary panel data over the period from 2010 to 2017 obtained on 88 firms listed on the floor of the Egyptian Exchange (EGX). The results of the OLS regression revealed that board size, board meetings and board gender diversity were all positively significant with ROA.

Adeola et al. (2023) empirically tested whether board characteristics had affected corporate capital structure in Nigeria. The study used secondary panel data over the period from 2011 to 2021 obtained from the Nigerian Exchange Group (NXG) on 22 listed Insurance companies. The OLS regression results showed that board gender diversity and board independence had a positive but insignificant impact on performance while board size was negatively significant with it.

Demaki et al. (2023) undertook a research to determine if there is any relationship between observable directors' characteristics and firm performance in Nigeria. The samples consist of 25 firms publicly listed on the floor of the NXG between 2015 and 2018. The OLS results revealed that while board size was negatively significant with ROA, board independence was positively significant with it.

Okpolosa (2023) researched on a study to ascertain the extent to which board elements had impacted performance in Nigeria. Secondary data collected from annual reports of 5 agricultural firms listed on the floor of the NXG from 2010 to2021 making a total of 50 firm-year observations was used. The OLS regression results showed that board gender diversity and board independence positively and significantly impacted performance.

Al-Absy and Nada (2023) carried out a research to determine the effect of board of directors' characteristics on firm performance in Bahrain. The study used annual secondary panel data obtained on 42 listed firm listed on the Bahrain Bourse from the period 2020 to 2021. The OLS regression model results indicated that board gender diversity and board meetings were statistically and positively significant with ROA.

Dang et al. (2023) embarked on this research to investigate the effect of corporate governance on firm performance in Vietnam. The study used secondarily sourced audited reports of 200 listed non-financial firms on the floor of both the Ha Noi and the Ho Chi Minh stock exchanges between

the periods 2012 and2018. The results of the Feasible Generalized Least Squares (FGLS) regression estimator revealed that board gender diversity and board independence were positively significant with ROA.

Ngo et al. (2023), in this research, investigated the effect which board independence has had on the performance of firms in Vietnam. Secondarily sourced panel data over the period from 2016 to 2020 obtained on 558 firms listed on the floor of the Vietnamese stock markets making a total firm-year observation was used. The results of the generalized method of moments (GMM) estimation showed that both board independence and board size positively and significantly influenced ROA.

Rizvi et al. (2023) carried out an empirical research to determine the effect of board characteristics on firm performance in Pakistan. The study used annual secondary panel data obtained on 60 of the 100(Index) firms listed on the Pakistan Stock Exchange (PSX) from the period 2011 to 2020. The OLS regression model results indicated that board gender diversity, board busyness, board size and board education were all positively and statistically significant with ROA.

Hassan and Aziz (2023) engaged on a research study to ascertain if board characteristics matter in determining firms' performance in Malaysia. Secondary data collected from annual reports of 20 listed firms in Bursa Malaysia between 2016 and 2017 was used. The OLS regression model results indicated that board size and board meetings were insignificant with ROA.

Govindan et al. (2023) investigated the extent to which board structure influenced firms performance in the United States of America. Secondarily sourced data from annual reports of 794 firms from the Thomson Reuters Eikon database between 2011 and 2021 was used. The OLS regression model results showed that board independence was negatively significant while board size and board gender diversity were positively significant with ROA.

Abdurrashid et al. (2023) carried out an enquiry to discover how corporate governance influenced firm performance in Nigeria. Secondarily sourced data from annual reports of 14 deposit money banks (DMBs) listed on the NXG between 2010 and 2020 was used. The OLS regression model results showed that managerial ownership or board shareholdings was negatively significant with ROA while board size positively and significantly influenced ROA.

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 mechanisms and 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	Ngo et al. (2023)
2	ROA(-1)	One year lag of Return On Assets	Instrumental	Preceding or Last year ROA or ROA_{t-1}	Ngo et al. (2023)
3	BS	Board size	Independent	Total number of directors on the board	Nguyen and Huynh (2023)
4	BI	Board independence	Independent	Percentage (%) of independent or non-executive directors on the board	Adeola et al. (2023)
5	BSH	Board Shareholding or ownership	Independent	Proportion (%) of shares own by board members.	Abdurrashid et al. (2023)
6	BGD	Board gender diversity	Independent	Proportion (%) of board members that are female.	Nguyen and Huynh (2023)
7	BND	Board national diversity	Independent	A dummy variable which takes the value 1, 2, 3, etc for each director from each country represented.	None used it
8	BTD	Board tribal diversity	Independent	A dummy variable which	None used it

				takes the value 1, 2, 3, etc for each Nigerian director based on tribe, and zero for non-Nigerian directors.	
9	BC	Board compensation	Independent	Total salaries and bonuses paid to managers	None used it
10	BB	Board Busyness	Independent	Directors of the board serving in more than one company or interlocking directorate.	Rizvi et al. (2023)
11	BE	Board members' education level	Independent	Number of board members holding various degrees and professional qualifications.	Nguyen and Huynh (2023)
12	BFD	Board foreign directors	Independent	Total number of directors on the board that are non-Nigerian	None used it
13	BM	Board meetings	Independent	Number of times the board meets in a year	Adeola et al. (2023)
14	BME	Board members with military experience	Independent	A dummy variable which takes the value '1' if any board member was an officer in the Army, Navy or	None used it

				Airforce, otherwise '0'	
15	LEV	Leverage	Control	Total liabilities/Total Assets	-
16	MTB	Market–To-Book Ratio	Control	Market value of equity/Book value of equity	-
17	FSIZE	Firm size	Control	Log of total assets	-
18	YDUM	Year Fixed Effect Dummy	Control	A dummy variable which takes the value '1' for each year	-
19	IDUM	Industry Sector Fixed Effect Dummy	Control	A dummy variable which takes the value '1' for each industry	-

Source: Author's Compilation from the Reviewed Literatures.

Model Specification

The functional equation of firm performance to test the twelve (12) hypotheses specified is stated as:

$$ROA = f(BS, BI, BSH, BGD, BND, BTD, BC, BB, BE, BFD, BM, BME) \quad (1)$$

The functional testable model will be derived as:

$$ROA = \beta o + \beta_1 BS + \beta_2 BI + \beta_3 BSH + \beta_4 BGD + \beta_5 BND + \beta_6 BTD + \beta_7 BC + \beta_8 BB + \beta_9 BE + \beta_{10} BFD + \beta_{11} BM + \beta_{12} BME + \varepsilon \quad (2).$$

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

$$ROA_{it} = \beta o + \beta_1 BS_{it} + \beta_2 BI_{it} + \beta_3 BSH_{it} + \beta_4 BGD_{it} + \beta_5 BND_{it} + \beta_6 BTD_{it} + \beta_7 BC_{it} + \beta_8 BB_{it} + \beta_9 BE_{it} + \beta_{10} BFD_{it} + \beta_{11} BM_{it} + \beta_{12} BME_{it} + \varepsilon_{it} \quad (3).$$

Description of the Estimation Technique Used.

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). Li et al. (2021) observed that out of about twelve (12) papers where endogeneity bias were ever mentioned, only three of them used the dynamic model approach while only one applied the rigorous way by reporting the results of the test. To identify endogeneity in our model, we run a fixed effect regression model for only the independent variables with each independent variable being a dependent variable in turn and then extract its residual. This residual variable is used to replace the main dependent variable in the original regression equation and then, rerun and observe the p-value. If the p-value of the residual variable is less than or equal to 5%, then there is an endogeneity in our model. The endogeneity test results in Table.2 below showed that RES_BTD and RES_BB have endogeneity problem since their P-values are at least 5%.

Table 2 Endogeneity Test Results

S/N	Estimated Residuals of Variables	P-Values	S/N	Estimated Residuals of Variables	P-Values
1	RES_BS	0.3165	7	RES_BC	0.0545
2	RES_BI	0.7517	8	RES_BB	0.0440
3	RES_BSH	0.4468	9	RES_BE	0.6482
4	RES_BGD	0.5921	10	RES_BFD	0.8862
5	RES_BND	0.0954	11	RES_BM	0.8345
6	RES_BTD	0.0124	12	RES_BME	0.6638

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

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:

$$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_1 BS_{it} + \beta_3 BI_{it} + \beta_4 BSH_{it} + \beta_5 BGD_{it} + \beta_6 BND_{it} + \beta_7 BTD_{it} + \beta_8 BC_{it} + \beta_9 BB_{it} + \beta_{10} BE_{it} + \beta_{11} BFD_{it} + \beta_{12} BM_{it} + \beta_{13} BME_{it} + \varepsilon_{it} \quad (4).$$

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

$$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_1 BS_{it} + \beta_3 BI_{it} + \beta_4 BSH_{it} + \beta_5 BGD_{it} + \beta_6 BND_{it} + \beta_7 BTD_{it} + \beta_8 BC_{it} + \beta_9 BB_{it} + \beta_{10} BE_{it} + \beta_{11} BFD_{it} + \beta_{12} BM_{it} + \beta_{13} BME_{it} + \beta_{14} LEV_{it} + \beta_{15} MTB_{it} + \beta_{16} SIZE_{it} + \varepsilon_{it} \quad (5)$$

Finally, the study included year dummy and industry sector dummy variables to control for specific fixed effect to arrive in equation 6 below.

$$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_1 BS_{it} + \beta_3 BI_{it} + \beta_4 BSH_{it} + \beta_5 BGD_{it} + \beta_6 BND_{it} + \beta_7 BTD_{it} + \beta_8 BC_{it} + \beta_9 BB_{it} + \beta_{10} BE_{it} + \beta_{11} BFD_{it} + \beta_{12} BM_{it} + \beta_{13} BME_{it} + \beta_{14} LEV_{it} + \beta_{15} MTB_{it} + \beta_{16} SIZE_{it} + \beta_{17} YDUM_{it} + \beta_{18} IDUM_{it} + \varepsilon_{it} \quad (6)$$

β1, β2, β3, β4, β5, β6, β7, β8, β9, β10, β11, β12, β13, β14, β15, β16, β17, β18 = Beta coefficients of the independent and control variables. From this study, we expect β1 to β18 to be greater than zero.
εit = Stochastic White Noise or Error Term.

This study adapted the model previously used by Abdurrashid et al. (2023) who used a dynamic generalized method of moments (GMM).

4.0. Method of Data Analysis

4.1 Univariate Data Analyses (Descriptive Statistics)

Table 3

	BS	BI	BSH	BGD	BND	BTD	BC	BB	BE	BFD	BME	LEV	MTB	SIZE	IDUM	YDUM
Mean	8.593636	6.257273	1.154197	0.962727	3.075455	1.520000	1495903.	0.706364	0.569091	1.421818	0.117273	0.126994	3282050.	9.674152	4.504545	8.630000
Median	8.000000	6.000000	0.062979	1.000000	1.000000	1.000000	44298.50	1.000000	0.000000	0.000000	0.000000	0.001074	12636.89	9.607176	4.000000	9.000000
Maximum	17.00000	16.00000	502.0379	5.000000	66.00000	6.000000	56750000	4.000000	4.000000	8.000000	4.000000	17.65709	4.90E+08	12.62047	9.000000	16.00000
Minimum	3.000000	1.000000	0.000000	0.000000	1.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-0.002766	0.330917	5.698970	0.000000	1.000000
Std. Dev.	2.447884	2.328795	16.67736	1.056834	4.658369	1.067580	6901101.	0.809495	0.767723	1.903561	0.517107	0.756156	34659705	1.152192	2.630572	4.584502
Skewness	0.595361	1.014295	25.83934	1.226482	4.178875	2.136269	6.412189	1.097038	1.366774	1.220005	6.082113	14.48845	11.49327	-0.414501	0.040935	-0.036525
Kurtosis	3.258719	4.393689	749.4993	4.488426	37.06136	7.270891	46.49706	4.091573	4.633597	3.532711	43.95865	290.0356	137.1548	4.004324	1.732628	1.807962
Jarque-Bera	68.05118	277.6376	25663544	377.3202	56376.28	1672.692	94254.38	275.2522	464.7922	285.8821	83672.38	3814668.	849103.2	77.72924	73.92616	65.37167
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	9453.000	6883.000	1269.617	1059.000	3383.000	1672.000	1.65E+09	777.0000	626.0000	1564.000	129.0000	139.6930	3.61E+09	10641.57	4955.000	9493.000
Sum Sq.	6585.35	5960.19	305669.6	1227.47	23848.7	1252.56	5.23E+16	720.1555	647.7491	3982.27	293.8718	628.3777	1.32E+18	1458.97	7604.97	23098.4

Dev.	5	2		2	4	0						6						2	7	1					
Obser vations	121 6	121 6	12166	121 6	121 6	121 6	12166	121 6	121 6	121 6	121 6	121 6	121 6	12166	121 6	121 6	121 6								

The statistics in Table 3 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 4a 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 4a.
Covariance Analysis: Ordinary
Date: 12/11/23
Time: 11:34
Sample: 1 1200
Included observations: 1216
Balanced sample (listwise missing value deletion)

Covariance Correlation	BS	BI	BSH	BGD	BND	BTD	BC	BB	BE	BFD	BME	LEV	MTB	SIZE	IDUM	YDUM
BS	5.9866 1.0000															
BI	4.5581	5.4183														

	0.8003	1.0000						
	-1.3287	-0.8486	277.88					
BSH	-0.0325	-0.0218	1.0000					
	1.0357	0.5341	0.1142	1.1158				
BGD	0.4007	0.2172	0.0064	1.0000				
	1.6633	1.0369	-1.8250	0.2891	21.680			
BND	0.1460	0.0956	-0.0235	0.0587	1.0000			
	-0.1286	-0.0210	-0.4711	-0.0233	-1.0628	1.1386		
BTD	-0.0492	-0.0084	-0.0264	-0.0207	-0.2139	1.0000		
	1328	-5242	-1020	-9144	-1902	-6796	4.76E+	
BC	5.2	2.1	3.6	2				
	-0.0783	-0.0326	-0.0085	-0.0125	-0.0592	-0.0923	1.0000	
	-0.6506	-0.3264	-0.6597	-0.1517	-1.0076	-0.0573	-5965.8	0.6546
BB	-0.3286	-0.1733	-0.0489	-0.1775	-0.2674	-0.0663	-0.1068	1.0000

BE	0.6058	0.3990	-0.2851	0.1003	-0.3420	0.1058	10510.	-0.0047	0.5888						
	0.3226	0.2233	-0.0222	0.1237	-0.0957	0.1293	0.1986	-0.0075	1.0000						
BFD	1.9095	1.6069	-1.3372	0.2648	4.9436	-0.4011	-13868.	0.4720	-0.0427	3.6202					
	0.4101	0.3628	-0.0421	0.1317	0.5580	-0.1975	-0.1052	0.3066	-0.0293	1.0000					
BME	-0.0459	-0.0356	-0.1004	-0.0147	-0.1870	0.1117	11527.	0.0080	0.0068	-0.1376	0.2671				
	-0.0363	-0.0296	-0.0116	-0.0269	-0.0777	0.2026	0.0324	0.0193	0.0173	-0.1399	1.0000				
LEV	-0.1232	-0.1319	-0.1209	-0.0192	-0.2446	-0.0443	14271.	-0.0659	0.0408	-0.1616	-0.0107	0.5712			
	-0.0666	-0.0749	-0.0095	-0.0240	-0.0695	-0.0549	0.2737	-0.1077	0.0703	-0.1123	-0.0274	1.0000			
MTB	-10678	-65296.	-37509.	-30724.	-61229.	-15230.	-4.73E+	-20797.	-18125.	19207.	-3814.3	-4138.8	1.20E+		
	-0.1259	-0.0809	-0.0064	-0.0839	-0.0379	-0.0412	-0.0197	-0.0741	-0.0681	0.0291	-0.0213	-0.0159	1.0000		
SIZE	0.8105	0.4983	0.1736	0.2690	1.3283	-0.0448	-43202.	0.3159	-0.0251	0.8329	-0.0102	-0.2315	89286.	1.3263	
	0.2876	0.1858	0.0090	0.2211	0.2477	-0.0365	-0.0543	0.3390	-0.0284	0.3801	-0.0171	-0.2659	0.2237	1.0000	
IDUM	0.870	0.709	-	0.076	3.991	-	-	0.510	0.343	1.704	0.137	-	-	0.394	6.913

	4	2	2.308	0	0	0.234	2339	8	7	4	1	0.004	1153	9	6
			7			1	6.					3	3.		
			-			-	-					-	-		
	0.135	0.115	0.052	0.027	0.325	0.083	0.128	0.240	0.170	0.340	0.100	0.002	0.012	0.130	1.000
	3	8	6	3	9	4	9	1	3	6	9	1	6	4	0
		-	-			-					-		-		
YDU	0.256	0.792	5.273	1.334	0.868	0.095	1226	0.478	0.179	0.320	0.069	0.195	7878	0.176	0.050	20.99
M	0	0	2	3	8	7	1.	6	6	6	3	3	6.	3	3	8
		-	-			-					-		-			
	0.022	0.074	0.069	0.275	0.040	0.019	0.038	0.129	0.051	0.036	0.029	0.056	0.049	0.033	0.004	1.000
	833	258	032	663	719	588	791	088	090	773	274	405	628	415	176	000

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

4.2b Bivariate Data Analysis (Variance Inflation Factor)

Table 4.2b 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). Since all our variables has a VIF less than 10 and a tolerance more than 0.2, our variables do not exhibit multicollinearity.

Table 4b

Variables	Variance Inflation Factor (VIF)	Tolerance
BS	4.345838	0.23010522
BI	3.138434	0.31863025
BSH	1.014435	0.9857704
BGD	1.443141	0.69293298
BND	1.589077	0.62929613
BTD	1.159074	0.86275768
BC	1.250349	0.7997767
BB	1.413967	0.70723008
BE	1.34255	0.74485122
BFD	2.051956	0.48733988
BM	1.314151	0.76094756
BME	1.119644	0.89314103
LEV	1.179201	0.84803185
MTB	1.143748	0.87431847
SIZE	1.536113	0.65099377
IDUM	1.381904	0.72363927
YDUM	1.225335	0.81610335

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

4.3 Regression Models Estimation Results and Hypotheses Testing.

Table 5. Dependent Variable: ROA
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 10/26/23 Time: 18:45
Sample (adjusted): 2005 2020
Periods included: 16
Cross-sections included: 76
Total panel (unbalanced) observations: 1216
White period (period correlation) instrument weighting matrix
White period (cross-section cluster) standard errors & covariance (d.f.
corrected)
Standard error and t-statistic probabilities adjusted for clustering
Instrument specification: @DYN(ROA,-2)
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ROA(-1)	-0.264940	0.004800	-55.19261	0.0000
BS	0.120580	0.010975	10.98680	0.0000
BI	-0.098777	0.010011	-9.866937	0.0000
BSH	0.007414	0.005213	1.422208	0.1592
BGD	-0.106135	0.004649	-22.82766	0.0000
BND	-0.007753	0.001986	-3.903888	0.0002
BTD	-0.146856	0.013768	-10.66670	0.0000
BC	1.29E-08	1.89E-09	6.864889	0.0000
BB	-0.199198	0.030154	-6.606092	0.0000
BE	-0.055028	0.007630	-7.211701	0.0000
BFD	-0.076172	0.005976	-12.74554	0.0000
BM	0.082355	0.002378	34.63613	0.0000
BME	0.159425	0.019023	8.380532	0.0000
LEV	-0.805926	0.024009	-33.56750	0.0000
MTB	-6.38E-09	2.59E-09	-2.460640	0.0162
SIZE	0.027374	0.006139	4.458999	0.0000
IDUM	0.732138	0.382262	1.915280	0.0593
YDUM	-0.003107	0.001080	-2.875645	0.0053
	Effects Specification			
Cross-section fixed (first differences)				

Mean dependent var	0.002739	S.D. dependent var	0.316157
S.E. of regression	0.520735	Sum squared resid	244.8616
J-statistic	60.21813	Instrument rank	75
Prob(J-statistic)	0.360128		

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

4.3 Discussion of the Regression Results.

Table 5 above shows the regression estimation results of the relationship between board characteristics alone (BS, BI, BSH, BND, BTD, BC, BB, BE, BFD, BM, BME); the control variables (LEV, MTB, SIZE, IDUM, YDUM) and financial performance of the 76 sampled firms. A look at the coefficient (-0.264940) of ROA (-1) shows that it is negatively significant (t-Statistics = -55.19261 and p= 0.0000) at the 1% levels of significance. This result contradicts the extant literature that the dependent variable and its lag move in the same direction and must be significant (Egbadju & Jacob, 2022). The negative coefficient means that the current year profit is not directly affected by previous period profit and this is not a good sign at all. Again, since the p-value of Sargon statistic or J-Statistic (0.360128) 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 (BS, BI, BND, BTD, BC, BB, BE, BFD, BM, BME) statistically and significantly impacted performance apart from BSH which is insignificant.

Specifically, BS relationship with ROA is positively significant with a coefficient of 0.120580, a t-Statistic of 10.98680 and a p-value of 0.0000 at the 1% levels of significance.. This suggests that an increase in BS will increase ROA. That is, the more the board size, the more profitable the firm 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 BS and firm performance. This result is in line with Nguyen and Huynh (2023) but contradicts that of Khan and Mahmood (2023).

BI relationship with ROA is negatively significant with a coefficient of -0.098777, a t-Statistic of -9.866937 and a p-value of 0.0000 at the 1% levels of significance.. This suggests that an increase in BI will reduce ROA. That is, the more independent board membership increases, the less profitable the firms 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 BI and firm performance. This result is in line with that of Govindan et al. (2023) but contradicts that of Demaki et al. (2023) which was positive.

BGD relationship with ROA is negatively significant with a coefficient of -0.106135, a t-Statistic of -22.82766 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 representation 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 BGD and firm performance. This result is in line with that of Chong and Jong (2023) but contradict that of Nguyen and Huynh (2023)

BND relationship with ROA is negatively significant with a coefficient of -0.007753, a t-Statistic of -3.903888 and a p-value of 0.0002 at the 1% levels of significance.. This suggests that an increase in BND will reduce ROA. That is, the more foreign nationals representation 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 BND and firm performance. No previous study made used of this variable.

BTD relationship with ROA is negatively significant with a coefficient of -0.146856, a t-Statistic of -10.66670 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. No previous study made used of this variable.

BC relationship with ROA is positively significant with a coefficient of 1.29E-08, a t-Statistic of 6.864889 and a p-value of 0.0000 at the 1% levels of significance.. This suggests that an increase in CEOME will increase ROA. That is, the more the compensations for board members, 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 BC and firm performance. No previous study made used of this variable.

BB relationship with ROA is negatively significant with a coefficient of -0.199198, a t-Statistic of -6.606092 and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in BB will reduce ROA. That is, the more interlocking directorate the board has, 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 BB and firm performance. This result is not in line with any previous study but contradicts that of Rizvi et al. (2023)

BE relationship with ROA is negatively significant with a coefficient of -0.055028, a t-Statistic of -7.211701 and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in BE will reduce ROA. That is, the more degree and certificates holding 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 BE and firm performance. This result is not in line with any previous study but contradicts that of Nguyen and Huynh (2023) and Rizvi et al. (2023)

BFD relationship with ROA is negatively significant with a coefficient of -0.076172, a t-Statistic of -12.74554 and a p-value of 0.0000 at the 1% levels of significance. This suggests that an increase in BFD will reduce ROA. That is, the more the number of foreign director 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 BFD and firm performance. No previous study made used of this variable.

BM relationship with ROA is positively significant with a coefficient of 0.082355, a t-Statistic of 34.63613 and a p-value of 0.0000 at the 1% levels of significance.. This suggests that an increase in BM will increase ROA. That is, the more frequent the board meets, the more profitable the firm 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 BM and firm performance. This result is in line with that of El-feky (2023)

BME relationship with ROA is positively significant with a coefficient of 0.159425, a t-Statistic of 8.380532 and a p-value of 0.0010 at the 1% levels of significance.. This suggests that an increase in BME will increase ROA. That is, the more members with military experience are engaged, the more profitable the firm 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 BME and firm performance. No previous study made used of this variable.

All the control variables-LEV, MTB, SIZE, IDUM and YDUM- are statistically significant with ROA.

4.4 Additional Tests of Robustness Comparing two Models.

To test the robustness of our results, we model two scenarios.

Model 1 excludes both the firm-specific control as well as the year and industry variables

Model 2 includes only the firm-specific control but excludes the year and industry variables

$$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_1 BS_{it} + \beta_3 BI_{it} + \beta_4 BSH_{it} + \beta_5 BGD_{it} + \beta_6 BND_{it} + \beta_7 BTD_{it} + \beta_8 BC_{it} + \beta_9 BB_{it} + \beta_{10} BE_{it} + \beta_{11} BFD_{it} + \beta_{12} BM_{it} + \beta_{13} BME_{it} + \varepsilon_{it}$$ ----------Model 1

$$ROA_{it} = \beta o + \beta_1 ROA_{it-1} + \beta_1 BS_{it} + \beta_3 BI_{it} + \beta_4 BSH_{it} + \beta_5 BGD_{it} + \beta_6 BND_{it} + \beta_7 BTD_{it} + \beta_8 BC_{it} + \beta_9 BB_{it} + \beta_{10} BE_{it} + \beta_{11} BFD_{it} + \beta_{12} BM_{it} + \beta_{13} BME_{it} + \beta_{14} LEV_{it} + \beta_{15} MTB_{it} + \beta_{16} SIZE_{it} + \varepsilon_{it}$$

Model 2

Where the two scenarios were taken into considerations, the regression results in Table 6 below did not significantly differ from that of Table 5 above which include both the firm-specific control variables as well as both the industry fixed effect and year fixed effect dummy variables.

It should be observed that in all models, BSH is not significant. This attest to the robustness of the fact that board characteristics considered in this study has helped the firms to achieve profitability for the period under consideration..

Table 6

Board Characteristics excluding both the firm-specific Control as well as the Year and Industry Variables			Board Characteristics including only the firm-specific Control without the Year and Industry Variables		
VARIABLES	t-Stats	p-Values	VARIABLES	t-Stats	p-Values
ROA(-1)	-36.94754	0.0000	ROA(-1)	-56.91317	0.0000
BS	20.95837	0.0000	BS	9.454475	0.0000
BI	-6.278254	0.0000	BI	-7.212576	0.0000
BSH	1.399482	0.1658	BSH	0.991913	0.3245
BGD	-23.75918	0.0000	BGD	-22.16241	0.0000
BND	-3.597284	0.0006	BND	-2.904365	0.0048
BTD	-12.79992	0.0000	BTD	-11.23101	0.0000
BC	-7.801835	0.0000	BC	5.624274	0.0000
BB	-17.15785	0.0000	BB	-5.980545	0.0000
BE	-16.45413	0.0000	BE	-2.159773	0.0340
BFD	6.871351	0.0000	BFD	-6.552161	0.0000
BM	11.55577	0.0000	BM	19.58440	0.0000
BME	19.59355	0.0000	BME	8.504059	0.0000
			LEV	-23.22155	0.0000
			MTB	-2.242169	0.0279
			SIZE	4.021958	0.0001

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

4.5 Regression Diagnostics Test

Table 7. Arellano-Bond Serial Correlation Test
Equation: Untitled
Date: 11/10/23 Time: 15:03
Sample: 2005 2020
Included observations: 1216

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	0.988640	358041130.68180620	362155229.2951678	0.3228

		00	00	
		-9347093738667952	9309767569111820	
AR(2)	-1.004009	00	00	0.3154

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-values of AR (1) = 0.3228 and AR (2) = 0.3154 in Table 7 above are 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 corporate board characteristics and financial performance of non-financial listed firms in Nigeria. It uses secondarily sourced panel data over the period from 2005 to 2020 of 76 such firms listed on the floor of the Nigerian Exchange Group (NXG). The generalized method of moments (GMM) results reveal that while BS, BC, BM and BME are positively significant with performance; BI, BGD, BND, BTD, BB, BE and BFD are negatively significant with performance but BSH is insignificant.

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

- Management should maintain or increase the present level of board size, board compensation, board meetings and board members with military experience since these variables increase profitability.
- Investigate the reason board independence, board gender diversity, board national diversity, board tribal diversity, board busyness, board members' education level and board foreign directors could not increase profitability.
- Increase the number of board ownership and observe if this could lead to increase in profitability since it is not significant with profitability.

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