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Do corporate governance attributes improve capital structures of quoted non-financial firms in Nigeria? An estimated generalized least squares (EGLS) approach

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Abstract

In this study**,** corporate governance attributes and capital structures relation of quoted non-financial firms in Nigeria was investigated. **S**econdarily panel data over the period from 2007 to 2022 of 75 of those firms quoted in the floor of the Nigerian Exchange Group (NXG) was used. The estimated generalized least squares (EGLS) results reveal that while BODS,BMET, BSSN, FOWN, BTD, NFODIR, CEOAG, ACFE and ACGD are positively and statistically significant with DER; BB, IOWN, BCOMPEN and IMAC are negatively relationship with DER. For the control variables, while FAGE, LEV, RISK and BIG4 are negatively and statistically significant with DER; FSIZE is positively significant with it.

Keywords: Corporate Governance Attributes, Capital Structure, Quoted Non-Financial Firms, EGLS.

Introduction

The scientific publications of Modigliani and Miller (M-M, 1958 & M-M, 1963) set off a five-decade-long, intense dispute regarding the impact of capital structure on firms' performance (Egbadju et al., 2023). Initially, they demonstrated that, in a perfect market, the financing of an organization's operations and assets is irrelevant and so unaffected by how its activities and assets are financed; but quickly acknowledged in their correction the relevance of the tax deductibility of interest payments for debt. The selection and efficient use of capital are two critical components of a company's financial strategy, and both are strongly impacted by the choice of capital structure. The importance of finance for the growth of any economy cannot be emphasized, as it is widely recognized that finance serves as the lifeblood or life-wire of all commercial organizations (Egbadju, 2023).

A business organization's financial status is dependent on the resources it has and the obligations it takes on in order to participate in a range of activities targeted at producing profits and riches for future expansion (Queiri et al., 2024). A company's capital structure refers to the specific mix of debt and equity that it uses to fund its overall operations and expansion. That is, it is the

amount of debt and/or equity a company uses to finance its assets and activities is referred to as its capital structure. The separation of ownership and control encourages managers to act selfishly, influencing decisions about capital structure to maximize their own profits (Jensen & Meckling, 1976). As a result, it is customary to suggest utilizing debt as a tool to curb opportunistic managerial behaviour and align it with the objectives of shareholders seeking to maximize their wealth.

Queiri (2024) argues that debt can serve as a mechanism for corporate governance based on: (i) the free cash flow hypothesis, wherein managers' discretion in spending is limited by the obligation to pay fixed interest rates; (ii) managers are more likely to align their behavior with shareholder interests when using debt to avoid the potential risks of bankruptcy and the ensuing loss of their jobs and reputations; (iii) managers are incentivized to act in the best interests of shareholders by the scrutiny of debt-holders and financial markets; (iv) good corporate governance that will maintain an optimal capital structure. Thus, prudent debt management can reduce agency issues through good corporate governance, which may also lead to cheaper debt financing and so raise the value of the company.

Several studies linking CG and capital structure have been conducted both in developed economies such as Ahmed et al.(2023) in Europe; Ezeani et al. (2022) in Japan, France and Germany and in developing economies like Queiri et al. (2024) in Oman; Javaid et al. (2023) in Pakistan. Studies on CG and capital structure are rare in Nigeria for out of the ten (10) empirical literatures reviewed in this study, none is on Nigeria. Nonetheless, a number of researches that have connected capital structure and corporate governance have discovered a robust correlation between the two. For instant, while some found a positive relationship between some corporate governance characteristics and capital structure; others found a negative relationship; or still no relationship at all as shown in the empirical literature section.

Given the conflicting findings of previous research, the main goal of this study is to investigate the possible impact of specific corporate governance characteristics on the debt-to-equity capital structure of listed non-financial firms in Nigeria. This study is distinct in several aspects since it uses twenty-nine (29) CG characteristics which none to the best of our knowledge has used in one study previously. Although Ploypailin et al. (2022) used data for 16 years (2002 to 2017) like this study (2007 to 2022), this study uses a more recent data. We, therefore, hypothesized that all the corporate governance characteristics considered in this study have no significant relationship with capital structure of quoted non-financial firms in Nigeria. After this introduction, the paper is broken into five sections: section two contains the literature review; section three discusses the methodology; section four analyzes and discusses the results; and section five closes the work.

Review of Related Literature

Stewardship theory which was introduced by Donaldson and Davis (1991) is a part of corporate governance. This theory which normatively replaced the agency theory asserts that managers will serve as responsible stewards of the resources under their supervision and characterizes the existence of a strong correlation between organizational success and satisfaction. Stewardship theory states that if a steward works toward the success of the business as a whole, they will be able to accomplish individualistic, opportunistic, and self-serving goals (Davis et al., 1997). It is especially the agent's responsibility to behave in the principal's best interest who engaged them. Moreover, this theory argues that management of companies as agents should be given autonomy based on trust. This might potentially lower the cost of monitoring their activities. This is also because the success of the company will satisfy the demands and desires of corporate executives. This will therefore help to combine the interests of the agents for the management of the resources owned by the shareholders. The promotion of cooperation and teamwork is encouraged by managers' aligned interests, and this could enhance corporate performance and increase shareholder wealth. Thus, the need for corporate governance may not necessarily be using the stewardship theory.

Empirical Literature

Queiri et al. (2024) examined through empirical procedures to ascertain whether corporate governance affects the capital structure of Oman's firms. The study made use of secondary panel data that was gathered between 2009 and 2015 from 14 non-financial firms listed on the MsM30 Index. The two-stage least squares (2SLS) regression results indicated that multiple directorships/board busyness/inter locking directorship, board independence and board size had a positive and significant relationship with LEV while board meetings frequency had a negatively significant relationship with it.

Javaid et al. (2023) attempted to carry out an empirical study on how corporate governance enhanced the capital structures of Pakistani businesses. The study employed secondary panel data spanning the years 2004 to 2016 and was based on 1800 firm-year observations. The ordinary least squares (OLS) regression results indicated that institutional ownership, managerial ownership and CEO/Chair duality had a positive and significant relationship with LEV.

Ahmed et al.(2023) investigated the possible connection between capital structure and corporate governance in Europe. The sourced panel data utilized by the researchers came from 42 non-financial companies that were listed on the floors of the Oslo and Frankfurt stock markets between 2017 and 2021. The OLS regression findings showed that audit committee size and board size were positively significant with LEV; board meetings and board remuneration were negatively significant with LEV while CEO compensation and CEO tenure were insignificant.

Ploypailin et al. (2022) conducted a study to see whether there is a connection between corporate governance and financial leverage (LEV) measured as total debt/total assets in both developed

and emerging economies. The samples consist of 2,568 firms publicly listed firms operating in 13 developed economies and 4 emerging economies for 14 years period between 2002 and 2017. The GMM results revealed that board size and CEO duality are positively significant with LEV; firm size was negatively significant with LEV while board independence and women directorship were insignificant.

Alghadi and Alzyadat (2022) conducted a study to determine how much Saudi Arabia's corporate governance practices affected leverage. Annual secondary panel data, covering the years 2011 to 2019 gathered from the financial reports of 100 listed firms on the floor of Saudi Stock Exchange Market (TADAWUL) was used. The regression results of generalized least square random-effect (GLS) showed that CEO duality and CEO gender were positively and significantly impacted LEV while board size, family ownership and state ownership negatively and significantly impacted it.

Ezeani et al. (2022) researched to ascertain the extent to which some board characteristics have affected leverage in Japan, France and Germany. Secondary data collected from firms annual reports based on 3927 firm-year observations from their various exchanges were used.
The OLS regression results showed that board gender diversity and board size negatively and significantly impacted LEV in the three countries while board independence and board diligence/meetings had either a positive or a negative (mixed) impact in LEV for each of the countries.
Joo et al. (2022) conducted a study to ascertain how corporate governance factors affected Malaysia's capital structure. The research employed yearly secondary panel data that was acquired from 24 energy companies that were listed on the Bursa Malaysia floor between 2015 and 2019. According to the results of the generalized method of moments (GMM) regression model, board size and board gender diversity negatively and statistically impacted LEV; CEO duality was positively significant while board independence was insignificant.

Amin et al.(2022) embarked on this research to look on how Pakistani capital structure is affected by corporate governance. The audited reports of 226 non-financial companies listed on the Pakistani Stock Exchange (PSX) floor between 2008 and 2019 were used as secondary sources for the study. The GMM's findings showed that board independence and size negatively and significantly impacted LEV while board gender diversity positively impacted it.

Junior (2022), in this study examined the relationship between capital structure and corporate governance characteristics in countries in Southern America, including Argentina, Brazil, Chile, Colombia, Mexico, and Peru. Secondary data for the panel was sourced from 201 non-financial sources between 2009 and 2019. The outcomes of the OLS showed that CEO duality positively and significantly impacted LEV.

Hromei (2021) carried out a research to ascertain the extent to which corporate governance characteristics have affected leverage in Italy, France and Germany. Secondary data over the periods 2010 to 2019 collected from 1422 firms annual reports based on Italy(302), France(586)

and Germany(534).from their various exchanges were used. The OLS regression results showed that board size positively and significantly impacted LEV for each of the three countries.

Methodology

The study determines whether there is any relationship at all between the performance of seventy-five non-financial firms quoted on the Nigerian Exchange Group (NXG) and their corporate governance mechanisms using the ex-post facto research design, also referred to as the descriptive or correlational research design. 1,200 firm-year observations were made for this study utilizing secondary data that was taken from their annual reports between 2007 and 2022.

Table 1: **Measurement and Definitions of Variables**

S/N	Variables Names	Definitions	Variable Types	Measurements	Authorities
1	DER	Debt-Equity Ratio	Dependent	Total debt/Total Equity	
2	DER(-1)	Lag one of Debt-Equity Ratio or DER_{t-1}	Instrumental	Previous or Last Year's Value of Debt-Equity Ratio	
3	BODS	Board size	Independent	Total number of directors on the board	Queiri et al. (2024)
4	BODI	Board independence	Independent	Percentage (%) of independent or non-executive directors on the board	Queiri et al. (2024)
5	BODIV	Board gender diversity	Independent	Proportion (%) of board members that are female.	Ezeani et al. (2022)
6	BMET	Board meetings	Independent	Number of times the board meets in a year	Queiri et al. (2024)
7	BPC	Board Political Connections	Independent	A dummy variable which equals "1" if the board has member (s) who are politically connected, otherwise "0"	None of the papers reviewed used it
8	BSSN	Board Same Surname	Independent	Number of Board members with the same Surname	None of the papers reviewed used it

9	MOWN	Managerial ownership	Independent	Proportion (%) of shares own by managers	Javaid et al. (2023)
10	FOWN	Foreign ownership	Independent	Proportion (%) of shares own by foreigners	None of the papers reviewed used it
11	IOWN	Institutional ownership	Independent	Proportion (%) of shares own by institutions	Javaid et al. (2023)
12	T5	Top5 Ownership or Ownership concentration	Independent	Proportion (%) of shares controlled by shareholders having 5% or more	None of the papers reviewed used it
13	T10	Top10 Ownership or Ownership concentration	Independent	Proportion (%) of shares controlled by the biggest 10 shareholders	None of the papers reviewed used it
14	T20	Top20 Ownership or Ownership concentration	Independent	Proportion (%) of shares controlled by the biggest 20 shareholders	None of the papers reviewed used it
15	FF	Founder & family ownership	Independent	Proportion (%) of shares own by founders/or family members on the board.	Alghadi and Alzyadat (2022)
16	BB	Board busyness	Independent	Directors in two or more firms at the same time	Queiri et al. (2024)
17	BCOMPEN	Board compensation	Independent	Total salaries and bonuses paid to managers	Ahmed et al.(2023)
18	BND	Board national diversity	Independent	A dummy variable which takes the value 1, 2, 3, etc for each director from each country represented.	None of the papers reviewed used it
19	BTD	Board tribal diversity	Independent	A dummy variable which takes the value 1, 2, 3, etc for each	None of the papers reviewed

				Nigerian director based on tribe, and zero for non-Nigerian directors.	used it
20	NBC	Number of board committees	Independent	Number of committees put in place by the board	None of the papers reviewed used it
21	NFODIR	Number of foreign directors	Independent	Total number of directors on the board that are non-Nigerian	None of the papers reviewed used it
22	CEOX	Chief Executive Officer (CEO) Experience	Independent	Total number of firms CEO has worke	None of the papers reviewed used it
23	CEORE	Chief Executive Officer (CEO) Reputations	Independent	A dummy variable which takes the value '1' if CEO has won an award, otherwise '0	None of the papers reviewed used it
24	CEOME	Chief Executive Officer (CEO) with military experience	Independent	A dummy variable which takes the value '1' if CEO was an officer in the Army, Navy or Airforce, otherwise '0'	None of the papers reviewed used it
25	CEOAG	Chief Executive Officer (CEO) Age	Independent	Total number of years of CEO	None of the papers reviewed used it
26	CEOTEN	Chief Executive Officer (CEO) Tenure	Independent	Total number of years CEO has been in that position	Ahmed et al.(2023)
27	ACFE	Audit committee financial expertise	Independent	Proportion (%) of audit committee members WITH financial expertise	None of the papers reviewed used it
28	ACGD	Audit committee gender diversity.	Independent	Proportion (%) of audit committee members that are female.	None of the papers reviewed used it
29	IMAC	Internal members of audit committees	Independent	Number of internal members of audit	None of the papers

				committees	reviewed used it
30	EMAC	External members of audit committees	Independent	Number of external members of audit committees	None of the papers reviewed used it
31	ACMET	Audit committees meetings	Independent	Number of times audit committee meets in a year	None of the papers reviewed used it
32	FAGE	Firm age	Control	Number of years since incorporated	-
33	FSIZE	Firm size	Control	Log of total assets	Ploypailin et al. (2022)
34	LEV	Leverage	Control	Total liabilities/Total Assets	Javaid et al. (2023)
35	MTB	Market-To-Book	Control	Market Value/Book Value	-
36	RISK	Volatility of return on assets	Control	Standard deviation of return on asset	-
37	LOSS	Net loss reported each year	Control	Dummy variable which equals “1” in year a firm makes a net loss, “0” otherwise	-
38	R&D	Research & Development	Control	Research & Development Expenditure/Sales	-
39	BIG4	Deloitte & Touche; Ernst & Young; PriceWater Cooper and KPMG	Control	Dummy variable which equals “1” in year a firm is audited by one of the four biggest audit firms; “0” otherwise.	-
40	ADV	Advertisement	Control	Advertisement expenses/Total sales	-
41	IDUM	Industry Sector Fixed Effect Dummy	Control	A dummy variable which takes the value ‘1’ for each industry	-
42	YDUM	Year Fixed Effect Dummy	Control	A dummy variable which takes the value ‘1’ for each year	-

Model Specification

The functional equation of capital structure to test the hypotheses specified is stated as in equation 1:

DER = f (BODS, BODI, BODIV, BMET, BPC, BSSN, MOWN, FOWN, IOWN, T5, T10, T20, FF, BB, BCOMPEN, BND, BTD, NBC, NFODIR, CEOX, CEORE, CEOME, CEOAG, CEOTEN, ACFE, ACGD, IMAC, EMAC, ACMET, FAGE, FSIZE, LEV, MTB, RISK, LOSS, R&D, BIG4, ADV, IDUM , YDUM) (Eq1)

The functional testable model will be derived as:

$$DER = \beta o + \beta_1 BODS + \beta_2 BODI + \beta_3 BODIV + \beta_4 BMET + \beta_5 BPC + \beta_6 BSSN + \beta_7 MOWN + \beta_8 FOWN + \beta_9 IOWN + \beta_{10} T5 + \beta_{11} T10 + \beta_{12} T20 + \beta_{13} FF + \beta_{14} BB + \beta_{15} BCOMPEN + \beta_{16} BND + \beta_{17} BTD + \beta_{18} NBC + \beta_{19} NFODIR + \beta_{20} CEOX + \beta_{21} CEORE + \beta_{22} CEOME + \beta_{23} CEOAG + \beta_{24} CEOTEN + \beta_{25} ACFE + \beta_{26} ACGD + \beta_{27} IMAC + \beta_{28} EMAC + \beta_{29} ACMET + \beta_{30} FAGE + \beta_{31} FSIZE + \beta_{32} LEV + \beta_{33} MTB + \beta_{34} RISK + \beta_{35} LOSS + \beta_{36} R\&D + \beta_{37} BIG4 + \beta_{38} DV + \beta_{39} YDUM + \beta_{40} IDUM + \varepsilon \quad (Eq2)$$

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

$$DER_{it} = \beta o + \beta_1 BODS_{it} + \beta_2 BODI_{it} + \beta_3 BODIV_{it} + \beta_4 BMET_{it} + \beta_5 BPC_{it} + \beta_6 BSSN_{it} + \beta_7 MOWN_{it} + \beta_8 FOWN_{it} + \beta_9 IOWN_{it} + \beta_{10} T5_{it} + \beta_{11} T10_{it} + \beta_{12} T20_{it} + \beta_{13} FF_{it} + \beta_{14} BB_{it} + \beta_{15} BCOMPEN_{it} + \beta_{16} BND_{it} + \beta_{17} BTD_{it} + \beta_{18} NBC_{it} + \beta_{19} NFODIR_{it} + \beta_{20} CEOX_{it} + \beta_{21} CEORE_{it} + \beta_{22} CEOME_{it} + \beta_{23} CEOAG_{it} + \beta_{24} CEOTEN_{it} + \beta_{25} ACFE_{it} + \beta_{26} ACGD_{it} + \beta_{27} IMAC_{it} + \beta_{28} EMAC_{it} + \beta_{29} ACMET_{it} + \beta_{30} FAGE_{it} + \beta_{31} FSIZE_{it} + \beta_{32} LEV_{it} + \beta_{33} MTB_{it} + \beta_{34} RISK_{it} + \beta_{35} LOSS_{it} + \beta_{36} R\&D_{it} + \beta_{37} BIG4_{it} + \beta_{38} ADV_{it} + \beta_{39} YDUM_{it} + \beta_{40} IDUM_{it} + \varepsilon_{it} \quad (Eq3)$$

Dynamic Data Analysis using Estimated Generalized Least Squares (DEGLS) Technique

The ordinary least squares (OLS) regression model is built on certain assumptions such that if any of these assumptions are violated, then OLS estimator may no longer be Best Linear Unbiased Estimate (BLUE) and so the generalized least squares (GLS) was developed towards the mid-twentieth centuries by Alexander Aitken in 1936 (Virgantari et al., 2019). The GLS regression is an extension of the normal linear OLS estimation designed with some level of unequal error variances (heteroscedastic), not equal or constant variance (homoscedastic) and correlations between the residuals or error terms (serial correlation) in mind. The GLS and OLS estimators are the same in the absence of autocorrelation and heteroskedasticity and so they differ with respect to the error term assumptions which the GLS estimator was improvised to tackle. Thus, the GLS estimator is a generalization of the OLS estimator which transforms it to a new estimator that is more efficient, consistent, unbiased and asymptotically normal (Priya & Riya, 2017).

A dynamic regression model is designed to solve some problems which the static models are not capable of solving. For examples, variables with unit roots (non-stationary variables), variables with endogeneity problem, variables with serial correlation especially second order, problem of small sample sizes cannot be effectively and efficiently estimated by the classical regression of OLS because it was built on certain strong assumptions which are not realistic. A dynamic GLS performs better in both homogenous and heterogeneous panels which ensure that the estimation is asymptotically efficient and simpler to compute **(**Madaleno & Moutinho, 2021).

By including the lagged value of the dependent variable, that is, DER_{it-1}, due to unobserved heterogeneity transforms the static model to a dynamic one. That means, including the lagged dependent variable to equation 3, we have equation 4 below:

$$DER_{it} = \beta o + \beta_1 DER_{it-1} + \beta_2 BODS_{it} + \beta_3 BODI_{it} + \beta_4 BODIV_{it} + \beta_5 BMET_{it} + \beta_6 BPC_{it} + \beta_6 BSSN_{it} + \beta_8 MOWN_{it} + \beta_9 FOWN_{it} + \beta_{10} IOWN_{it} + \beta_{11} T5_{it} + \beta_{12} T10_{it} + \beta_{13} T20_{it} + \beta_{14} FF_{it} + \beta_{15} BB_{it} + \beta_{16} BCOMPEN_{it} + \beta_{17} BND_{it} + \beta_{18} BTD_{it} + \beta_{19} NBC_{it} + \beta_{20} NFODIR_{it} + \beta_{21} CEOX_{it} + \beta_{22} CEORE_{it} + \beta_{23} CEOME_{it} + \beta_{24} CEOAG_{it} + \beta_{25} CEOTEN_{it} + \beta_{26} ACFE_{it} + \beta_{27} ACGD_{it} + \beta_{28} IMAC_{it} + \beta_{29} EMAC_{it} + \beta_{30} ACMET_{it} + \beta_{31} FAGE_{it} + \beta_{32} FSIZE_{it} + \beta_{33} LEV_{it} + \beta_{34} MTB_{it} + \beta_{35} RISK_{it} + \beta_{36} LOSS_{it} + \beta_{37} R\&D_{it} + \beta_{38} BIG4_{it} + \beta_{39} ADV_{it} + \beta_{40} YDUM_{it} + \beta_{41} IDUM_{it} + \varepsilon_{it} \quad (Eq4)$$

Where the definitions are as stated in Table2 above.

β_1 to β_{41} are the beta coefficients of the instrumental, independent and control variables. From this study, we expect β_1 to β_{41} to be greater than zero.

ε_{it} = Error term for year 'i' in year 't'

Result and Discussions

Data collected are analyzed using EViews 13 in the following order: univariate data analyses or descriptive statistics; bivariate data analysis or correlation analysis; unit root test; estimation of the models; performance of some additional analysis and diagnostics tests.

Univariate Data Analyses (Descriptive Statistics)

The statistics in Table 2 below show the mean values of the variables as well as the minimum, maximum, standard deviations and Jarque-Bera Statistics Probability values. All the variables of interest have maximum values which are greater than their respective minimum values. Also, the mean values of BODS, BODI, BODIV, BMET, BPC, BTD, NBC, CEOX, CEOAG, CEOTEN, IMAC, EMAC, ACMET, FAGE, FSIZE, IDUM and YDUM are greater than their respective standard deviation values(Mean>SD). This show that these variables do not have outliers in their

data set and so do not have a high gap between the highest and lowest values for the last 16 years meaning that the average are quite high (Lestari & Setiany, 2023). However, the mean values of BSSN, MOWN, IOWN, FOWN, T5, T10, T20, FF, BB, BCOMPEN, BND, NFODIR, CEORE, CEOME, ACGD, LEV, MTB, RISK, LOSS, R&D, BIG4 and ADV are smaller than their respective standard deviation values((Mean<STD). This show that these variables do have outliers in their data set and so they have a high gap between the highest and lowest values for the last 16 years meaning that the average are quite low (Lestari & Setiany, 2023).

Table 2: Descriptive Statistics

Variables	Number of Observations	Mean	Std Deviations	Minimum	Maximum	Probability of Jarque-Bera
BODS	1200	8.68	2.46	3.00	17.00	0.00
BODI	1200	0.73	0.15	0.17	1.25	0.00
BODIV	1200	0.11	0.11	0.00	0.67	0.00
BMET	1200	4.65	1.25	2.00	10.00	0.00
BPC	1200	0.56	0.50	0.00	1.00	0.00
BSSN	1200	0.65	1.11	0.00	4.00	0.00
MOWN	1200	1.15	16.69	0.00	502.04	0.00
IOWN	1200	4.22	45.84	0.00	919.60	0.00
FOWN	1200	0.13	0.33	0.00	4.58	0.00
T5	1200	28.18	223.43	0.00	5285.00	0.00
T10	1200	2.93	31.03	0.00	761.00	0.00
T20	1200	5.85	77.97	0.00	2301.00	0.00
FF	1200	0.04	0.19	0.00	4.45	0.00
BB	1200	0.70	0.82	0.00	4.00	0.00
BCOMPEN	1200	2127888.81	6451763.05	0.00	56750000.00	0.00
BND	1200	1.93	2.74	1.00	66.00	0.00
BTD	1200	1.47	1.31	0.00	9.00	0.00
NBC	1200	3.54	0.90	2.00	8.00	0.00
NFODIR	1200	0.17	0.21	0.00	0.83	0.00
CEOX	1200	3.83	0.71	2.00	9.00	0.00
CEORE	1200	0.23	0.43	0.00	2.00	0.00
CEOME	1200	0.24	0.45	0.00	4.00	0.00
CEOAG	1200	60.37	9.13	2.00	88.00	0.00
CEOTEN	1200	2.78	1.22	4.00	25.00	0.00
ACFE	1200	5.37	0.92	0.00	6.00	0.00
ACGD	1200	0.07	0.09	3.00	0.44	0.00
IMAC	1200	5.41	0.91	2.00	6.00	0.00
EMAC	1200	2.71	0.45	2.00	3.00	0.00
ACMET	1200	3.56	0.89	1.00	10.00	0.00
FAGE	1200	40.98	18.91	3.68	97.00	0.00

FSIZE	1200	7.05	1.01	-15.81	9.82	0.00
LEV	1200	8.41	88.42	0.00	1661.44	0.00
MTB	1200	0.68	5.35	0.00	100.22	0.00
RISK	1200	0.08	0.20	-26.65	2.75	0.00
LOSS	1200	0.20	0.40	0.00	1.00	0.00
R&D	1200	0.00	0.02	0.00	0.31	0.00
BIG4	1200	0.33	0.47	0.00	1.00	0.00
ADV	1200	0.19	3.72	0.00	69.47	0.00
IDUM	1200	4.30	2.69	0.00	9.00	0.00
YDUM	1200	8.66	4.60	1.00	16.00	0.00

Sources: Authors' Computations using EViews 13 Software

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 3 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 with the exceptions of T10, T20, ACFE, IMAC and EMAC which are above the thresholds. These variables constitute only about 12.5% of the total variables and thus may not be a cause for multicollinearity. Since there is no one single solution to eliminating multicollinearity in a model; 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 3

S/N	Variables	Variance Inflation Factor (VIF)	Tolerance	S/N	Variables	Variance Inflation Factor (VIF)	Tolerance
1	BODS	1.741091	0.555555556	21	CEORE	1.365643	0.714286
2	BODI	1.342337	0.714285714	22	CEOME	1.352100	0.714286
3	BODIV	1.831764	0.526315789	23	CEOAG	1.148306	0.833333
4	BMET	1.519336	0.625	24	CEOTEN	1.385590	0.714286
5	BPC	1.056878	0.909090909	25	ACFE	12.37099	0.080645
6	BSSN	1.220960	0.769230769	26	ACGD	1.667350	0.588235
7	MOWN	2.792972	0.357142857	27	IMAC	96.27287	0.010384
8	FOWN	1.369002	0.714285714	28	EMAC	85.11434	0.011737
9	IOWN	1.453149	0.666666667	29	ACMET	1.720723	0.588235
10	T5	4.165303	0.833333333	30	FAGE	1.791881	0.555556
11	T10	33.17402	0.030120482	31	FSIZE	1.493329	0.666667
12	T20	23.55599	0.042372881	32	LEV	2.241452	0.434783
13	FF	1.152207	0.833333333	33	MTB	1.313860	0.714286
14	BB	1.742717	0.555555556	34	RISK	1.109940	0.833333
15	BCOMPEN	1.333428	0.714285714	35	LOSS	1.197693	0.833333
16	BND	1.173977	0.833333333	36	R&D	1.132759	0.833333
17	BTD	1.202883	0.833333333	37	BIG4	1.456229	0.666667
18	NBC	1.269298	0.769230769	38	ADV	1.363656	0.714286
19	NFODIR	1.691652	0.588235294	39	IDUM	1.541405	0.625
20	CEOX	1.296999	0.769230769	40	YDUM	1.499027	0.666667

Source: Researcher's Computations (2024) Using EViews13 Software.

Unit Root Test.

Once the EViews workfile has been structured in panel data form, we can go ahead and perform a panel data unit root test as shown in Table 4 below.

Table 4

Variables	Levin, Lin & Chu t*	Im, Pesaran and Shin W-stat	ADF - Fisher Chi-square	PP - Fisher Chi-square	Hadri t-stat	Decision
DER	0.0000	0.0000	0.0000	0.0000	0.0000	I(0) Stationary
BODS	1.1348	0.0192	0.0079	0.6814	0.0000	I(0) Stationary
BODI	1.4472	0.1517	0.0528	0.4725	0.0000	I(0) Stationary
BODIV	3.3549	0.0441	0.6325	0.9969	0.0000	I(0) Stationary
BMET	6.3194	0.0003	6.9901	0.7613	0.0000	I(0) Stationary
BPC	0.0000	0.0000	0.0000	0.0000	0.0000	I(0) Stationary
BSSN	0.0264	0.8561	0.9082	0.4671	0.0000	I(0) Stationary

MOWN	0.0000	0.0000	0.0096	0.0000	0.0000	I(0) Stationary
IOWN	1.2726	0.0021	0.7588	0.0000	0.0000	I(0) Stationary
FOWN	0.0097	0.7790	0.9094	0.3082	0.0000	I(0) Stationary
T5	0.0008	0.3239	0.5841	0.0211	0.0000	I(0) Stationary
T10	5.3616	0.0393	0.0389	0.3293	0.0000	I(0) Stationary
T20	0.0103	0.4637	0.5661	0.3742	0.0000	I(0) Stationary
FF	0.0601	0.0210	0.6024	0.5312	0.0000	I(0) Stationary
BB/ILD/MULD	0.8850	0.9780	0.9989	0.9986	0.0000	I(0) Stationary
BCOMPEN	0.0000	0.0000	0.9984	0.9993	0.0000	I(0) Stationary
BND	0.0090	0.8702	0.9592	0.9756	0.0000	I(0) Stationary
BTD	9.8956	0.5378	0.4612	0.9674	0.0000	I(0) Stationary
NBC	0.00814	0.4846	0.9706	0.0054	0.0000	I(0) Stationary
NFODIR	0.0000	0.8296	0.7033	0.9515	0.0000	I(0) Stationary
CEOX	0.0000	0.4755	0.5646	0.7553	0.0000	I(0) Stationary
CEORE	0.9617	0.9560	0.9947	0.9989	0.0000	I(0) Stationary
CEOME	0.8589	0.9554	0.9392	0.0000	0.0000	I(0) Stationary
CEOAG	0.0001	0.3325	0.3015	7.7416	0.0000	I(0) Stationary
CEOTEN	0.9999	0.0015	0.0038	1.5144	0.0000	I(0) Stationary
ACFE	0.7689	0.8996	0.9768	0.8383	0.0000	I(0) Stationary
ACGD	0.7627	0.9795	0.9988	0.9998	0.0000	I(0) Stationary
IMAC	0.7892	0.6976	0.7704	0.5605	0.0000	I(0) Stationary
EMAC	0.3777	0.6737	0.7502	0.3191	0.0000	I(0) Stationary
ACMET	5.7058	0.1015	0.0910	0.9678	0.0000	I(0) Stationary
FAGE	0.7827	0.9948	0.9954	0.9917	0.0000	I(0) Stationary
FSIZE	1.6397	0.9803	0.9766	0.9712	0.0000	I(0) Stationary
LEV	0.0189	0.0007	1.4902	0.0000	0.0000	I(0) Stationary
MTB	0.0000	0.0000	0.0999	0.0000	0.0000	I(0) Stationary
RISK	2.6305	0.0009	6.0196	0.0158	0.0000	I(0) Stationary
LOSS	0.0003	0.0809	0.1256	5.8517	0.0000	I(0) Stationary
R&D	0.9872	0.8473	0.8835	0.4680	0.0000	I(0) Stationary
BIG4	0.0336	0.9783	0.9988	0.9803	0.0000	I(0) Stationary
ADV	5.5451	0.1685	0.2841	0.0002	0.0000	I(0) Stationary
IDUM	0.7806	0.7313	0.7671	0.7314	0.0000	I(0) Stationary
YDUM	0.2397	0.3421	0.9001	0.4712	0.0000	I(0) Stationary

Source: Researcher's Computations (2024) Using EViews13 Software.

The results of the p-values of the five unit roots test Statistics are as shown in Table 2 above. At least, one of the variables of interest is I(0), that is, stationary at levels. When variables are not stationary, it means that they can drift apart on the long run and the regression results obtained can be spurious or nonsensical (Maeso-Fernandez et al. 2004). Thus we can use the ordinary least squares (OLS) method of estimation as shown in Table 5 below.

Regression Models Estimation Results.

Table 5. Dependent Variable: DER
Method: Panel EGLS (Period SUR)
Date: 04/18/24 Time: 13:03
Sample (adjusted): 2007 2022
Periods included: 16
Cross-sections included: 75
Total panel (unbalanced) observations: 1029
Linear estimation after one-step weighting matrix
Period SUR (PCSE) standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DER(-1)	0.057574	0.000701	82.10667	0.0000
BODS	99.76873	29.27549	3.407927	0.0007
BODI	136.5222	364.6286	0.374414	0.7082
BODIV	742.8181	559.1024	1.328591	0.1843
BMET	94.72394	47.21424	2.006258	0.0451
BPC	-0.979434	45.10882	-0.021713	0.9827
BSSN	407.0967	49.46874	8.229373	0.0000
MOWN	2.815297	2.902085	0.970095	0.3322
IOWN	-1.693999	0.810387	-2.090358	0.0368
FOWN	5057.331	301.9387	16.74953	0.0000
T5	-0.173424	0.452478	-0.383276	0.7016
T10	-3.618737	5.694273	-0.635505	0.5252
T20	1.600041	1.920627	0.833083	0.4050
F_F	-157.6620	145.5335	-1.083338	0.2789
BB_ILD_	-309.3171	96.88782	-3.192528	0.0015
BCOMPEN	-5.30E-05	1.84E-05	-2.879974	0.0041
BND	-1.120663	21.42734	-0.052301	0.9583
BTD	220.0820	49.61237	4.436030	0.0000
NBC	-82.00950	59.93354	-1.368341	0.1715
NFODIR	1891.158	480.4191	3.936476	0.0001
CEOX	8.429403	55.86842	0.150880	0.8801
CEORE	28.16484	131.7685	0.213745	0.8308
CEOME	-122.2073	147.0731	-0.830929	0.4062
CEOAG	9.241549	3.210518	2.878523	0.0041
CEOTEN	51.27582	90.37159	0.567389	0.5706
ACFE	572.0305	261.2956	2.189209	0.0288
ACGD	2060.475	856.0550	2.406943	0.0163
IMAC	-583.8943	253.8887	-2.299805	0.0217
EMAC	-169.8598	365.4285	-0.464824	0.6422
ACMEET	-61.00863	62.27262	-0.979702	0.3275
FAGE	-29.44505	6.462152	-4.556539	0.0000
FSIZE	162.3118	81.94770	1.980676	0.0479
LEV	-4.826192	0.554486	-8.703902	0.0000
MTB	1.452596	5.138051	0.282713	0.7775
RISK	-545.7197	273.6780	-1.994021	0.0464
LOSS	-36.57709	73.26239	-0.499261	0.6177
R&D	69.14618	2410.436	0.028686	0.9771
BIG4	-592.9877	180.7890	-3.279999	0.0011

ADV	9.074007	6.113321	1.484301	0.1380
IDUM	-7.211442	48.15394	-0.149758	0.8810
YDUM	3.610095	17.35348	0.208033	0.8352
C	-1599.077	1036.230	-1.543167	0.1231

Weighted Statistics

R-squared	0.779375	Mean dependent var	-0.000176
Adjusted R-squared	0.770210	S.D. dependent var	1.178387
S.E. of regression	0.564697	Sum squared resid	314.7371
F-statistic	85.04031	Durbin-Watson stat	2.135418
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.017998	Mean dependent var	1262.356
Sum squared resid	7.62E+11	Durbin-Watson stat	2.199249

Source: Researcher's Computations (2024) Using EViews13 Software.

Table 5 above show the regression estimation results of the relationship between of 12 quoted non-financial firms in Nigeria based on equation 1 above.

Discussion of the Regression Estimation Results and Hypotheses Testing.

From Table 5 above, a look at the coefficient (0.057574) of DER(-1) shows that it is positively significant (t-Statistics = 82.106677 and p= 0.0000) at the 1% levels of significance. This result is in agreement with 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 capital structure is directly affected by previous period capital structure and this is a very, very good sign. For the DER model, both the R^2 (0.779375) and the Adj R^2 = (0.770210) indicated that about 77% of systematic variations in capital structure is accounted for by all the variables of interest. The remaining 13% can be explained by other factors not captured by the model. The F-statistic (85.04031) and a Prob(F-stat.) of 0.000000 confirm that there is a joint statistical significant of a linear relationship between the variables (dependent and independent). With a Durbin-Watson stat of 2.135418, the model is freed from serial correlation.

Specifically, BODS relationship with DER is positively significant with a coefficient of99.76873, a t-Statistic of 3.407927 and a p-value of 0.0007. This means that as BODS increases, DER increases. This suggests that as more members enter the board, more debt are being contracted to finance operations. The sign or direction as well as the size or magnitude are aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the BODS and DER and accept the alternative that BODS has a significant relationship with DER. This result is in line with that of Queiri et al. (2024)

BMET relationship with DER is positively significant with a coefficient of 94.72394, a t-Statistic of 2.006258 and a p-value of 0.0451. This means that as BMET increases, DER increases. This suggests that as more frequent meeting are held, more debt are being contracted to finance operations. The sign or direction as well as the size or magnitude are aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the BMET and DER and accept the alternative that BMET has a significant relationship with DER. This result is in line with that of Ezeani et al. (2022) but contradicts those of Queiri et al. (2024) and Ahmed et al.(2023) which were negative.

BSSN relationship with DER is positively significant with a coefficient of 407.0967, a t-Statistic of 8.229373 and a p-value of 0.0000. This means that as BSSN increases, DER increases. This suggests that as more members with the same surname are in the board, more debt are being contracted to finance operations. The sign or direction as well as the size or magnitude are aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the BSSN and DER and accept the alternative that BSSN has a significant relationship with DER. None of the previous studies reviewed used this variable.

IOWN relationship with DER is negatively significant with a coefficient of -1.693999, a t-Statistic of -2.090358 and a p-value of 0.0368. This means that as IOWN increases, DER decreases or vice versa, as IOWN decreases, DER increases. This suggests that as more the institutional investors, the less debt are being contracted to finance operations. The sign or direction as well as the size or magnitude are aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the IOWN and DER and accept the alternative that IOWN has a significant relationship with DER. This result is in line with that of Javaid et al. (2023)

FOWN relationship with DER is positively significant with a coefficient of 5057.331, a t-Statistic of 16.74953 and a p-value of 0.0000. This means that as FOWN increases, DER increases. This suggests that as more members with the same surname are in the board, more debt are being contracted to finance operations. The sign or direction as well as the size or magnitude is aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the FOWN and DER and accept the alternative that FOWN has a significant relationship with DER. None of the previous studies reviewed used this variable.

BB relationship with DER is negatively significant with a coefficient of -309.3171, a t-Statistic of -3.192528 and a p-value of 0.0015. This means that as BB increases, DER decreases or vice versa, as BB decreases, DER increases. This suggests that as more busy or multiple directors are in the board, the less debt are being contracted to finance operations. The sign or direction as well as the size or magnitude is aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the BB and DER and accept the alternative that BB has a significant relationship with DER. This result is in line with that of Queiri et al. (2024)

BCOMPEN relationship with DER is negatively significant with a coefficient of -5.30E-05, a t-Statistic of -2.879974 and a p-value of 0.0041. This means that as BCOMPEN increases, DER decreases or vice versa, as BCOMPEN decreases, DER increases. This suggests that the higher the board remunerations, the less debt are being contracted to finance operations. The sign or direction as well as the size or magnitude are aligned with our expectations. We, therefore, reject the null hypothesis of no significant relationship between the BCOMPEN and DER and accept the alternative that BCOMPEN has a significant relationship with DER. This result is in line with that of Ahmed et al.(2023).

Also, BTD, NFODIR, CEOAG, ACFE and ACGD are positively and statistically significant with DER but IMAC is negatively and statistically significant with it. For the control variables, while FAGE, LEV, RISK and BIG4 are negatively and statistically significant with DER; FSIZE is positively significant.

Additional Tests of Robustness Comparing The Model with Control Variables with the Model without Control Variables.

To test the robustness of our results, we model two scenarios where the control variables in the regression results in Table 5 above were removed and comparison made.

Table 6. The Regression Results of the Two Models Using Their t-Statitics and P-Values

S/N	VARIABLES	WITH CONTROLS	WITHOUT CONTROLS
1	DER(-1)	0.0000	0.0000
2	BODS	0.0007	0.0000
3	BODI	0.7082	0.2344
4	BODIV	0.1843	0.1678
5	BMET	0.0451	0.9069
6	BPC	0.9827	0.5518
7	BSSN	0.0000	0.0000
8	MOWN	0.3322	0.3138
9	IOWN	0.0368	0.1306
10	FOWN	0.0000	0.0000
11	T5	0.7016	0.4156
12	T10	0.5252	0.4856
13	T20	0.4050	0.2904
14	F_F	0.2789	0.5532
15	BB_ILD_	0.0015	0.0004
16	BCOMPEN	0.0041	0.0183
17	BND	0.9583	0.8450
18	BTD	0.0000	0.0000

19	NBC	0.1715	0.0262
20	NFODIR	0.0001	0.0019
21	CEOX	0.8801	0.1658
22	CEORE	0.8308	0.1172
23	CEOME	0.4062	0.1681
24	CEOAG	0.0041	0.1008
25	CEOTEN	0.5706	0.0932
26	ACFE	0.0288	0.0133
27	ACGD	0.0163	0.0391
28	IMAC	0.0217	0.0135
29	EMAC	0.6422	0.5449
30	ACMEET	0.3275	0.1761
31	R-squared(Adjusted R-squared)	0.779375 (0.770210)	0.817302 (2.016323)
	Durbin-Watson sta	2.135418	2.016323

Source: Researcher's Computations (2024) Using EViews13 Software

Where the two scenarios were taken into considerations, the regression results with controls did not significantly differ from that without control variables as shown in Table 6 above. The model with control variables has 13 of its variables statistically significant while the model without control variables has 11 of its variables statistically significant. Specifically, BMET, IOWN and CEOAG are significant in the model with control variables alone while NBC is significant in the model without control variables alone. This attest to the robustness of the fact that corporate governance attributes considered in this study has helped in improving capital structure decision for the period under consideration.

Conclusion and Recommendations

This study investigates the relationship between corporate governance attributes and capital structures of quoted non-financial firms in Nigeria. The study uses secondarily sourced panel data over the period from 2007 to 2022 of 75 of those firms quoted on the floor of the Nigerian Exchange Group (NXG). The estimated generalized least squares (EGLS) results reveal that while BODS,BMET, BSSN, FOWN, BTD, NFODIR, CEOAG, ACFE and ACGD are positively and statistically significant with DER; BB, IOWN, BCOMPEN and IMAC are negatively relationship with DER. For the control variables, while FAGE, LEV, RISK and BIG4 are negatively and statistically significant with DER; FSIZE is positively significant with it.

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

- Management has to know that debt financing is cheaper than equity financing and so they should continue to use debt capital until an adjudged optimal structure is reached.

- Management should know that abuse of debt would increase the risk of financial distress and therefore threaten the company‘s existence.
- The creation of a national governance system should be the Nigerian government's top priority since effective corporate governance frameworks often compel managers to take on greater debt ratios in order to lower free cash flows and draw in more external oversight. The government might contribute to the establishment of a more transparent and accountable business environment, where public oversight of company managers is easier and shareholder protection is enhanced, by constructing a stronger national governance framework.

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