



Effect of Corporate Leadership Diversity on Financial Distress of Selected Manufacturing Firms in Nigeria

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ABSTRACT

This study examined the effect of corporate leadership diversity on financial distress of selected manufacturing companies in Nigeria from (2011-2020). Two research questions and corresponding three hypotheses were formulated for the study. Ex-post facto research design was employed in the study. The population of the study included all manufacturing firms quoted on the Nigerian Exchange Group (NXG) as at 31st December 2021 with a sample size of Fifty-five (55) manufacturing companies selected from the population sector. The panel least square regression analysis was done in validating the hypotheses. The study revealed that Racial diversity and gender diversity have no significant effect on Altman's z-score of quoted manufacturing firms in Nigeria. Consequent on the findings emanating from the study, the study upheld that the strong positive effect of racial diversity on Altman's z-score of quoted manufacturing firms is a strong pointer to the need to diversify the board of companies with due consideration to race in other to bring balance to the policies formulated by the board of directors.

Key words: Racial diversity, and gender diversity and Financial distress

INTRODUCTION

Board of directors play multiple roles ranging from making key financial and strategic decisions (Ferreira, 2010), to monitoring and controlling managers, and also assessing Chief Executive Officer's performance, and provide a link between the corporation and environment (Mallin, 2004). The corporate boardroom subject is presently composed mainly of issues on diversity. Russell Reynolds (2018) stated that this reoccurring subject is essential giving the complex and dynamic issues companies are presently facing. Thus, it became widely necessary to tackle the 'inherent risk of insularity and hindrance brought by leadership homogeneity'.

Scholars have opined that board leadership diversity lends itself as one way of enhancing corporate governance (ACCA, 2015). There are several views on corporate leadership diversity; while some opine that it entails demographics (such as age, gender, and ethnicity); others, view it as a structural phenomenon (Hoang, Abeysekera, & Ma, 2016). Although, a vast literature indicates that multiplicity related parameters are such like, gender, age, ethnicity, nationality, educational background, industrial experience and organizational membership ultimately determine the effectiveness of the leadership composition (Alfiero, Cane, De Bernardi, & Venuti, 2015).

In Nigeria, the practical situation is characterized with sexual stereotyping of social roles (Lincoln & Adedoyin, 2012), which places 'men as the leaders of the society' and therefore limits female participation in top leadership positions (Şener & Karaye, 2014). Studies have also shown that female directors are sensitive to soft issues and unpalatable issues than male directors boards (McInerney-Lacombe, Billimoria, & Salipante, 2008; Huse & Solberg, 2006) and avoid groupthink (Adams, Gray, & Nowland, 2010). With a greater proportion of female leaders, a company would most likely appear ethical and demonstrate good corporate citizenship (Landry, Bernardi, & Bosco, 2016).

Despite the urgency of board related issues as a subject of empirical discussion, the entire manufacturing sector which is supposed to be the main economic driver of the nation's economy had not been adequately explored with emphasis on corporate leadership diversity as an explanatory variable to financial distress. Existing studies; such as, Onyali and Okafor (2018), Salaudeen and Ejeh (2018) focused on only consumer and industrial goods firms; while, Oyenike, Olayinka, and Emeni (2016) and Olaoti (2016) focused on listed banks. There is need to explore the aggregate manufacturing sector of Nigeria as it concerns the effect of board diversity on financial distress.

Harjoto, Laksmana, and Yang (2018) research on corporate diversity, has focused on gender diversity, leaving corporate leadership diversity beyond gender largely unexplored. A recent study by Osiregbmhe (2017) addressed ethnic and nationality diversity, but focused on its effect on financial performance. Also, Opusunju and Ajayi (2016) focused on nationality diversity and corporate social responsibility. There is hardly any study on corporate leadership diversity and financial distress which considers diversity as gender, racial and non-executive diversity.

Several studies have been conducted on corporate leadership diversity locally and internationally like, Nigeria, Iran, U.S., Netherlands and Denmark, etc. However, the majority of prior study on corporate leadership diversity only covered dependent variables such as corporate tax aggressiveness among firms in several countries (Hoseini & Gerayli, 2018; Hoseini, Gerayli, & Valiyan, 2018; Jalali, Jalali, Moridi, Garshasbi, & Foroodi, 2013). It was also discovered that studies on board diversity that were conducted in Nigeria only focused on corporate tax avoidance (Obiora, Onuora, & Mayah, 2022) and financial performance Osiregbmhe (2017). There is a crying need to extend the body of knowledge to include the risk factor. Against these backdrops the current study therefore investigated the effect of board leadership diversity on financial distress of selected manufacturing companies in Nigeria.

The main objective of the study was centred on ascertaining the effect of board leadership diversity on financial distress of selected manufacturing companies in Nigerian. The specific objectives of the study are as follows:

- i. To evaluate the effect of racial diversity on Altmans z-score of quoted manufacturing firms in Nigeria.
- ii. To ascertain the effect of gender diversity on Altmans z-score of quoted manufacturing firms in Nigeria.

REVIEW OF RELATED LITERATURE

Corporate Leadership Diversity

Corporate leadership diversity otherwise known as board multiplicity refers to ‘differences. That is, a wide range of people different from each other. Differences “can be associated with age, physical appearance, culture, job function or experience, disability, ethnicity, personal style, gender, and religion (Turgut & Hafsi, 2008). It refers to “differences between individuals on any personal attributes that determine how people perceive one another” (Gonzales & Denisi, 2009). According to Gomez-mejia, Balkin and Cardy (2007) diversity is a human characteristic that differentiates one person from another. This includes biological characteristics of race, gender, age, colour, national origin as well as family and society in which they were born into. There is no consensus on the definition of board diversity (Rose, 2015). Kang, Cheng, and Gray (2007) defined board multiplicity as the “variety in the composition of the board of directors”. Board multiplicity can be defined as variety amongst the members of boards of directors with regard to characteristics such as kinds of expertise, managerial background, personality, learning style, age, gender, education and values (Swartz & Firer, 2005). It relates to the “board composition and the varied combination of attributes, characteristics and expertise contributed by individual board members in relation to board process and decision making” (van der Walt & Ingley, 2003).

Corporate leadership diversity thus refers to the disparity of the characteristics presented by members of the Board of Directors (Robinson & Dechant, 1997). Board diversity is of two forms, these are: observable diversity and less visible diversity. Observable diversity includes diversity in race/nationality, ethnic background, gender and age. On the other hand, less visible diversity include diversity in industry experience, education, functional and occupational backgrounds, organizational membership (Kang, Cheng, & Gray, 2007).

Racial/Nationality Diversity

Board member nationality refers to the country of origin of members of the Board of Directors. This is crucial for two reasons: first, with foreigners on the board, a large stock of qualified candidates would be available for the board (with broader industry experience). With the presence of foreign independent directors on a board, their international experience and background, brings with it value add to the firm (Masulis, Wand, & Xie, 2012). Second, because of their different backgrounds, foreign members can add valuable and diverse expertise which domestic members do not possess (Lee & Farh, 2004). From an agency perspective, foreign board members can also help assure foreign minority investors that the company is managed professionally in their best interests (Oxelheim & Randøy, 2001). The inclusion of foreign board members increases the independence of the board, resulting in reduced CEO entrenchment (Randøy, Thomsen, & Oxelheim, 2006).

The presence of foreign nationals is expected to bring competitive advantages to the firm, namely international networks, commitment to shareholder rights, and managerial entrenchment avoidance (Oxelheim & Randøy, 2003). On the other hand, opponents to this view argue that foreign board members may be less informed about domestic affairs and therefore, less effective. Also, changing the board language to fit foreign members may be costly and add to adjustments problems (Hassan, Samian, & Silong, 2006). Studies have proven that nationality determines cultural values and is a critical factor in determining individual’s value and belief systems (Huijsmans, 2017; Thanetsunthorn, 2015). According to Omoye and Eriki (2013) though cultural heterogeneity in organisations may result in conflicts; however, it is linked positively to improved problem-solving options. Zhang (2012) on a sample of publicly traded firms in Fortune 500 showed that racial diversity of the board is positively related to institutional strength rating.

The literature presents mixed findings on the relationship between foreign directors and firms’ performance. While some document a significant positive relationship between the presence of foreign directors and firms’ financial performance (Tornyeva & Wereko, 2012b; Oxelheim & Randøy, 2001), others find a significant negative relationship between foreign directors and firms’ financial performance (Schwizer, Soana, & Cucinelli, 2012).

Darmadi (2011) using a sample of 169 listed firms in Indonesia Stock Exchange, finds that nationality diversity had no influence on firm performance (for both accounting and market-based performance measures). Ruigrok and Kaczmarek (2008) find that nationality diversity of the board and management team members is positively related to financial performance proxied as net income. Using a sample of Norwegian and Swedish firms, Oxelheim and Randøy (2003) find significantly higher Tobin’s q for firms with Anglo-American nationals in their boardrooms.

In the Nigerian context, the study by Osiregbmhe on a sample of quoted non-financial firms documented that ethnic diversity and board nationality had no significant influence on profitability (ROA and ROE) and growth measure (Tobin’s Q).

Female Gender Diversity

Studies have shown that women are more ethically sensitive and empathetic to soft issues (Webb, 2004; Williams, 2003). Women may be particularly sensitive “to - and may exercise influence on - decisions pertaining to certain organizational practices”, such as corporate social responsibility, control policies and due diligence, among others (Nielsen & Huse, 2010). According to gender socialization theory, men and women are different in their orientation toward moral principle, largely because women have better internalized ethical and communal values through their social roles (Hyun, Yang, Jung, & Hong, 2016). Females bring different characteristics to boards (Eagly, Johannsen-Schmidt, & Van Engen, 2003), which may lead to improved board effectiveness as a result of the improved quality of board deliberations and better supervision of the firm’s disclosures (Gul, Srinidhi, & Ng, 2011). Females bring a host of different soft-skills to their jobs which could manifest in the form of leadership competencies (Zenger & Folkman, 2012). Women through forming alliance, prepare and involve themselves in board matters, and take part of vital decision making (Huse & Solberg, 2006). Groysberg and Bell (2013) found from a survey, that 90% of female and 56% of male directors agreed that women bring fresh perspectives and thought diversity to boards of directors.

Women are perceived to be more civic oriented than men (Orviska & Hudson, 2003). Croson and Gneezy (2009) observed that gender differences existed in risky behaviour and tax compliance. Studies have shown that females usually do not participate in tax evasion strategies (Kastlunger, Dressler, Kirchlner, Mittone, & Voracek, 2010). This is linked to a gender related set of characteristics when compared with male counterparts (the feminine traits: the socially desirable behavior, kindness; the masculine traits: the dominance, the competitiveness and aggressiveness).

The literature also documents gender differences in risk attitudes between males and females. Scholars posit that corporate decisions made by female executives differ significantly from that of their male counterparts (Francis, Hasan, Park, & Wu, 2015). As such, existing studies present mixed findings on the effect of gender diversity on tax aggressiveness and accruals management. Faccio, Marchica, and Mura (2016) found that more reliance on female CEOs leads to a reduction in corporate risk-taking, lower leverage and lower volatility of earnings.

Francis, Hasan, Park, and Wu (2015) found that female CFOs are more conservative in financial reporting decision-making. Huang and Kisgen (2013) reported that female executives were less likely to make significant acquisitions and issue debt. Abbott, Parker, and Presley (2012) hypothesized and found a negative relation between female board presence (defined as whether or not a board has at least one female director) and a lower likelihood of financial restatement. Barua, Davidson, Rama, and Thiruvadi (2010) and Peni and Vahamaa (2010) found that firms with female CFOs had lower absolute discretionary accruals and absolute accrual estimation errors.

Financial Distress

Financial distress refers to the situation in which the debtor company becomes unable to repay its debts and can be considered to be the consequence of a company’s inability to survive market competition, reflected in terms of job losses, the destruction of assets, and in a low productivity (Aleksanyan & Huiban 2016). The risk of bankruptcy or insolvency risk shows the possibility that a company will be unable to meet its debt obligations, respectively the probability of a company to go bankrupt in the next few years. Assessing of bankruptcy risk is important especially for investors in making equity or bond investment decisions, but also for managers in financial decision making of funding, investments and distribution policy. Hence, the distress prediction models are important tools also for bankers, rating agencies, and even distressed firms themselves (Altman et al. 2017).

Thus, companies’ financial managers should develop the financial performance analysis and problem-solving skills (Burns & Balvinsdottir 2005; Scapens 2006), without limiting their duties in verifying accounting data (Diakomihalis 2012) in order to maintain the firm attractiveness for investors. Studying the efficacy of Altman’s z-score model in predicting financial distress of specialty retail firms doing business in contemporary times, Chaitanya (2005) found that all but two of the bankruptcies (94%) would have been accurately predicted if properly investigated. The current study therefore considers Altman’s Z-score as a measure of financial distress.

Empirical Review

Several studies globally and locally were reviewed, they are briefly stated and summarised below as follows: Obiora, Onuora, and Mayah, (2022) investigated the effect of board diversity on corporate tax avoidance of quoted healthcare manufacturing companies in Nigeria from (2010-2019). Two research questions and two hypotheses were formulated for the study. Ex-post facto research design was employed in the study. The population of the study included all manufacturing firms quoted on the Nigerian Exchange Group (NXG) as at 31st December 2021 with a sample size of Six (6) healthcare manufacturing companies selected from the population sector. The study relied on secondary sources of data which was obtained from Annual reports of sampled companies as provided by individual companies and Nigerian Exchange Group (NXG) website. The Robust least square regression analysis was employed in validating the hypotheses. The study revealed a significant positive significant effect of racial multiplicity on corporate tax avoidance. Gender multiplicity was not significant.

Emad, Eldeen, Elbayoumi, Basuony, and Mohamed (2021) examined the effect of board composition specially board multiplicity on firm performance using cross-sectional data from London Stock Exchange (FTSE 350) of non-financial companies with a total observations 3961 companies for the years 2000-2016. The study decomposed board multiplicity into age, gender, education, and nationality while considering FTSE 100 and FTSE 250 firms. The result of the study indicated that age multiplicity has a negative effect on firm performance, meaning that young board members enhance and increase firm performance. Furthermore, the study also found that education multiplicity has a negative effect on firm performance. The study also, found that, gender multiplicity has positive effect on firm performance, hence, if companies increase the number of females in the board of directors, firm performance is expected to increase. Finally, the study found that nationality multiplicity has a positive effect on firm performance.

Anazonwu, Egbunike, and Gunardi (2018) investigated the influence of corporate board diversity on sustainability reporting in Nigeria. They studied all companies in the conglomerates, consumer goods, and industrial goods sector and used secondary data, extracted from annual financial reports.

They used a fixed effects panel regression to test the hypotheses. The study found a significant positive influence of proportion of women directors on sustainability reporting.

Ilaboya and Ashafoke, (2017) examined the relationship between board multiplicity and firm performance in Nigeria. The study adopted the cross-sectional research design using data from all the banks quoted on the Nigerian Stock Exchange from 2010-2015. The multiple regression technique was the basis of the data analysis employed in the study, specifically the study adopted the ordinary least square regression (OLS) technique to estimate the coefficients of the variables in the model specified. The study found a negative and insignificant relationship between ethnic multiplicity and firm performance; in the same vein, a negative and insignificant relationship was observed between nationality multiplicity and firm performance; Gender multiplicity exhibit a negative and significant relationship with firm performance.

Nekhili, Nagati, Chtioui, and Nekhili (2017) examined the influence of a gender-diverse board on voluntary CSR reporting in France. The sample comprised listed companies in the SBF 120 index from 2001 to 2011. They controlled for differences in firm characteristics between firms with and without female board members using propensity score matching. They find that engaging an external assurance provider for CSR reporting is value relevant for firms without female directors but not value relevant for firms with female directors.

Modiba and Ngwakwe (2017) examined the relationship between greater female participation in the board of directors and sustainability disclosure. The sample comprised five companies selected from the Socially Responsible Investing Index (SRI) of the Johannesburg Stock Exchange (JSE) 2010 to 2014. They used panel regression to test the hypotheses. The study found a significant positive effect for women in the board and energy disclosure, social investment disclosure at the 0.05 significance level.

Rahimipour (2017) conducted a study titled 'Investigation of the impact of women's representation and participation on board of directors on tax avoidance in listed companies on the Tehran Stock Exchange (TSE)'. The study used the correlational research design. The sample comprised ninety-seven companies listed on Tehran Stock Exchange. The study relied on secondary data; obtained for the period 2010 to 2015. The data was analysed using multiple regression model technique. The results showed a positive association between presence of women on board of directors and the effective tax rate (higher ETR means lower tax avoidance in companies).

Richardson, Taylor, and Lanis (2016) conducted a study titled 'Women on the board of directors and corporate tax aggressiveness in Australia: An empirical analysis' The sample comprised publicly listed Australian firms. The used secondary data; obtained from annual reports and accounts of the companies. They used multivariate regression analysis and the two-stage Heckman procedure. The results showed that presence of more than one female board member reduces the likelihood of tax aggressiveness.

Kartikaningdyah and Putri (2017) carried out a study titled (Pengaruh Tax Avoidance dan Board Diversity terhadap Kinerja Perusahaan dalam Perspektif Corporate Governance). The objective of the study was to analyse the impact of tax avoidance and board diversity on corporate performance. The sample comprised two hundred and eighty-four (284) non-financial firms listed on the Indonesia Stock Exchange. The study relied on secondary data; obtained from the period 2010 to 2013. The data was analysed using multiple regression technique (fixed effects model). The results of the study showed that Cash Effective Tax Rate (CETR) had a significant negative effect on Tobin's Q and board diversity.

Oyenike, Olayinka, and Emeni (2016) conducted a study titled 'Female directors and tax aggressiveness of listed banks in Nigeria'. The study used a cross sectional time-series research design. The sample comprised eleven (11) listed banks. The study relied on secondary data obtained from 2012 to 2014. The hypotheses were tested using panel regression analysis. The results showed that there was a positive non-significant effect of female directors on tax aggressiveness. The interaction of board size with female directors was positive and significantly associated with reduced level of tax aggressiveness. Board size had a negative effect; while independent board members were positive and significant.

Lanis, Richardson, and Taylor (2015) conducted a study titled 'Board of director gender and corporate tax aggressiveness: An empirical analysis. The sample comprised a total of four hundred and eighteen (418) U. S. firms. The study relied on secondary data covering the period 2006 to 2009. They employed ordinary least squares to validate the hypothesis. The results showed a negative significant association between female representation on the board and tax aggressiveness.

Jalali, Jalali, Moridi, Garshasbi, and Foroodi (2013) conducted a study titled 'The impact of the board of directors' structure on tax avoidance in the companies listed in Tehran Stock Exchange'. The sample comprised eighty-five (85) firms listed on the Tehran Stock Exchange. The study relied on secondary data; obtained from the period 2010 to 2012. They employed a binary logistic regression (forward method) to test the hypotheses. The results showed that board non-executive members and board change ratio had non-significant effect on tax aggressive policy. However, CEO duality had a significant effect on tax aggressive policy.

The existing studies have used panel regression techniques; such as, fixed or random effects regression. However, prior studies have pointed out the issue of *endogeneity* in corporate governance studies (Zheka, 2006). In other words, the inconsistent finding in the governance-performance literature is symptomatic of inadequacies in econometric techniques employed.

METHODOLOGY

Research Design

The current study employed the *ex-post facto* research design. *Ex-post facto* means after the event, meaning that the events under investigation had already taken place and data already exist. The choice of *ex-post facto* research design is based on the fact that the study relied on historical accounting data obtained from annual reports and accounts.

Population of the Study

The population of the study comprised of quoted non-financial firms on the Nigerian Exchange Group (NXG) as at end of 2023 financial year. The number of firms in the various sectors that constitute the population of the study is shown in the table below:

Table 1: Number of firms by sector

S/No	Sector	Number of firms
1	Agriculture	5
2	Conglomerates	5
3	Construction/Real Estate	9
4	Consumer Goods	20
6	Health Care	6
7	ICT	5
8	Industrial Goods	13
9	Natural Resources	4
10	Oil & Gas	12
11	Services	16
	Total	95

Source: The Nigerian Exchange Group Website (2023)

Sample Size of the Study

The study was limited to only Fifty-five (55) manufacturing companies selected using purposive sampling technique; the decision was premised on the classification of the firms as manufacturing (based on the nature and description of activities) as shown on the Nigerian exchange group (NXG) website. The sample selection criteria are shown in the table below. The full list of the companies used for the data analysis is shown in Appendix A.

Table 2: Sample selection

Sector/criteria	Number of firms
No of firms	95
Less: Construction/Real Estate	7
Less: Agric	1
Less: ICT	5
Less: Consumer goods	4
Less: Industrial goods	3
Less: Oil & Gas	4
Less: Services	16
Total sample size	55

Source: The Nigerian Exchange Group Website (2023)

The exclusion of the sectors was consistent with prior studies; firms from the financial sector are mainly excluded because of different regulatory environment, and it is also challenging to estimate discretionary accruals for these firms (Abid, Shaique, & Anwar-ul-Haq, 2018; Tsipouridou & Spathis, 2012). To arrive at the total sample size employed in the study, any company whose required data are incomplete or unavailable was eliminated from the sample. The final sample percentage with respect to the population is approximately 57.89% of the entire quoted non-finance companies on the trading floor of Nigerian exchange group.

Estimation of Altman's Z-Score

The current study described financial distress from the standpoint of Altman's Z score model which was developed by Professor Edward Altman in 1968; the model was developed using Multivariate Discriminant Analysis (MDA). MDA combines information from multivariate independent variables (e.g., ratios) into a single score that is used to classify an observation into either of two a-priori and mutually exclusive groups (Hair, Anderson, Tatham, & Black, 1992). In this respect, an advantage of MDA over univariate analysis is its ability to consider multiple variables as well as the interaction among these variables. The MDA is a linear combination of discriminatory variables of the following form:

$$Z = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \dots + \beta_n X_n$$

Where Z is a transformed value (score) used to classify the object, α is a constant, β_n are discriminant coefficients, and X_n are values of independent discriminatory variables. The discriminant score allows for classification between two or more groups (Fejer-Kiraly, 2015). MDA suffers from a number of limitations, because it relies on the following restrictive assumptions: (i) the independent variables (e.g. ratios) are multivariate normally distributed, (ii) the dataset consists of two a-priori chosen mutually exclusive groups, (iii) the two groups have equal population variances and (iv) the researcher just need to select the optimal cut-off point a-priori (Mamo, 2011; Hair, Anderson, Tatham, & Black, 1992).

The Altman's Z-score model was developed from a sample of 66 manufacturing firms; subdivided into 33 firms each in the two matched-pair groups. The bankrupt group consisted of companies that filed a bankruptcy petition under Chapter X of the United States Bankruptcy Act from 1946 through 1965. The model predicted a company's health status based on a discriminant function of the form:

$$Z = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.998X_5$$

Where:

X_1 = working capital/total assets

X_2 = retained earnings/total assets

X_3 = earnings before interest and taxes/total assets

X_4 = market value of equity/book value of total liabilities

X_5 = sales/total assets

Z = Overall index or Z-score

Key Indicator: Bankrupt $< 1.81 \leq$ Grey Area $\leq 2.99 >$ Safe Zone (Non-Bankrupt)

Sources of Data

Data collection is a crucial stage of dissertation that entails gathering all the necessary and required information from essential sources to be used for the analysis (Kumar, 2011). The data for this study was obtained from secondary sources. Secondary data is information or data that has previously been collected and recorded for other purposes (Blumberg, Cooper, & Schindler, 2008). One major advantage of secondary data is that analysis time can be saved (Blumberg, Cooper, & Schindler, 2008). The data were extracted from the annual reports and accounts of the selected companies. Specifically, the Statement of Financial Position and Statement of Profit or Loss and Comprehensive Income will provide data in computing the selected ratios; and the Statement of Cash Flows.

Reliability of Data

Annual reports and accounts are widely used document in secondary data analysis. The reliability of the data was ensured because annual reports are standardized and produced regularly (Buhr, 1998). They are also widely available to a larger audience (Deegan & Rankin, 1996), have a high degree of credibility and reliability due to audit verification (Tilt, 1994).

Method of Data Analyses

The study employed both *descriptive* and *inferential* statistical techniques to analyse the dataset under study. The following descriptive statistics was computed such as the mean, median, standard deviation, minimum, maximum values, and Skewness-Kurtosis statistics, etc. The correlation matrix was also constructed to identify the correlation between the dependent and independent variables. Lastly, Fixed or Random effect and Pooled OLS regression was used to validate the hypotheses. Other preliminary diagnoses test was also carried out such as Variance Inflation Factor (VIF) to test for Multicollinearity test, Jarque-Bera normality test, Hausman's test serial correlation test, Ramsey RESET test for fitness and heteroskedasticity test. These tests helped to determine the most appropriate model to employ. The goodness of fit of the model was tested using the Coefficient of Determination (R-squared) and analysis was done via E-Views statistical software. In view of the dependent, independent and control variables of the study, the following model was developed to examine the relationship between board multiplicity, risk and performance of sampled manufacturing firms. This approach is in line with Hair, Black, Babin, Anderson, and Tatham (2006).

$$Z = f(rm, gm, fsize) \dots \dots \dots (1)$$

Equations 1 can be written econometrically as presented in equations 2 as follows:

$$Z_{it} = \eta_0 + \eta_1 rm_{it} + \eta_2 gm_{it} + \eta_3 nem_{it} + \eta_4 fsize_{it} + \eta_5 flev_{it} + \dots \dots \dots (2)$$

Where:

Z = Altman's Z-score

$fsize$ = Firm size

rm = Racial diversity

gm = Gender diversity

t = Time dimension of the variables

η_0 = Constant or Intercept.

η_{1-3} = Coefficients to be estimated or the Coefficients of slope parameters.

The expected signs of the coefficients (a priori expectations) are such that $\eta_2, \eta_3, \eta_4 > 0$; while, η_1 and $\eta_5 < 0$

Decision rule

The decision rule is based on the sign and significance of the computed *t-statistic* from the regression output. The level of significance was set at $p < 0.05$. Hence, if the *p* value of the *t statistic* < 0.05 (the chosen alpha level) the null hypothesis is rejected; and the variable is postulated to have a significant effect.

DATA ANALYSIS AND RESULTS**Descriptive Statistics**

The descriptive statistics of the variables utilised in the study were presented in Tables 4.2a-b. The table below shows the mean, median, standard

deviation, observations, minimum and maximum values of each selected variable. The description helps in showing the nature of the data and normality of the dataset.

Table 3: Descriptive statistics of variables

	Z_SCORE	RM	GM	FIRM_SIZE
Mean	0.968006	0.126650	0.115761	7.221018
Median	0.801730	0.117647	0.111111	7.310000
Maximum	8.023894	0.500000	0.666667	9.310000
Minimum	-0.010462	0.000000	0.000000	0.000000
Std. Dev.	0.810647	0.088085	0.119231	1.024665
Skewness	2.862048	0.796910	0.959167	-1.896918
Kurtosis	18.74707	4.241224	4.077807	14.74467
Jarque-Bera	6433.521	93.52055	110.9550	3490.908
Probability	0.000000	0.000000	0.000000	0.000000
Sum	532.4035	69.65758	63.66870	3971.560
Sum Sq. Dev.	360.7748	4.259646	7.804652	576.4156
Observations	550	550	550	550

Source: E-Views 9.0

The observations row shows the number of cases included in each analysis of the variables of the study as five hundred and fifty for the dependent and independent variables. From the table above, the average of each variable shows the measure of central tendency which represents the mean value of the variables; while, the standard deviation is the measure of the average distance between the values of the data in the set and the mean. A low standard deviation ($SD < 1$) indicates that the data points tend to be very close to the mean; while a high standard deviation ($SD > 1$) indicates that the data points are spread out over a large range of values. A high standard deviation points to the presence of bias and abnormality in the dataset.

The summary statistics also depict the skewness and kurtosis for all variables which reports on the normality of the data. The skewness revealed a value of 0.7969, 0.9591, -0.9052, -22.9282 and -1.89699 for RM, GM, and Firm size respectively while and kurtosis revealed a value of 4.2412, 4.077, 14.7446 for RM, GM, and Firm size respectively. The skewness and kurtosis threshold upholds that those values between -2 to +2 and -7 to +7 are reported as normal distribution (George & Millery, 2010; Bryne, 2010). The skewness and kurtosis value is therefore indicative that the independent variables are fairly normally distributed as they cluster towards the centre and are also peaked.

Test of Hypotheses

Table 4: Fixed Effect Regression

Dependent Variable: Z_SCORE

Method: Panel Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.942101	0.288750	3.262685	0.0012
RM	-1.869722	0.878624	-2.128011	0.0338
GM	0.081754	0.288990	0.282896	0.7774
FIRM_SIZE	0.011618	0.044545	0.260811	0.7944
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.670658	Mean dependent var		0.968006
Adjusted R-squared	0.624098	S.D. dependent var		0.810647
S.E. of regression	0.497015	Akaike info criterion		1.556464
Sum squared resid	118.8184	Schwarz criterion		2.097163
Log likelihood	-359.0277	Hannan-Quinn criter.		1.767761
F-statistic	14.40421	Durbin-Watson stat		1.729927
Prob(F-statistic)	0.000000			

Source: E-views 9.0

Interpretation:

The regression model showed in table 4 with three independent variables (IV) and two control variables (CVs), as follows: racial diversity, gender diversity, non-executive diversity, log of total asset, debt to equity ratio. The model validation considered the following: F-statistics and the overall R² are used. The overall R-squared is 0.6707 (67.07%) and the adjusted R-squared, 0.6241 (62.40%). The *p*-value of the F-statistics is (0.0000). That is, less than .05 which confirms the statistical significance of the model.

Auto-Correlation

The presence of auto-correlation is reflected in the Durbin-Waston statistics of our model. For a Durbin-Waston statistics to be accepted and free from auto-correlation, the value must lie between 1.5 and 2.0. Our Durbin-Waston showed a value of 1.7. Hence, we conclude that our model one is free from auto-correlation.

Hypothesis one

H₀₁: Racial diversity has no significant effect on Altmans z-score of quoted manufacturing firms in Nigeria.

Table 5: Fixed Effect Regression

Dependent Variable: Z_SCORE

Method: Panel Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.942101	0.288750	3.262685	0.0012
RM	-1.869722	0.878624	-2.128011	0.0338
FIRM_SIZE	0.011618	0.044545	0.260811	0.7944
Effects Specification				
Cross-section fixed (dummy variables)				
Period fixed (dummy variables)				
R-squared	0.670658	Mean dependent var		0.968006
Adjusted R-squared	0.624098	S.D. dependent var		0.810647
S.E. of regression	0.497015	Akaike info criterion		1.556464
Sum squared resid	118.8184	Schwarz criterion		2.097163
Log likelihood	-359.0277	Hannan-Quinn criter.		1.767761
F-statistic	14.40421	Durbin-Watson stat		1.729927
Prob(F-statistic)	0.000000			

Source: E-views 9.0

Specifically, racial diversity (RM) is the variable of interest for hypothesis four. The *coefficient* of the variable of interest: RM was (-1.8687) and *t-statistic* (0.8786) negative and statistically significant as P-value = 0.0338 (*p*-value < 0.05). Therefore, the null hypothesis is rejected and alternative, accepted. We therefore conclude that racial diversity has a significant effect on Altmans z-score of quoted manufacturing firms in Nigeria.

Hypothesis two

H₀₂: There is no significant effect of gender diversity on Altmans z-score of quoted manufacturing firms in Nigeria.

Table 6: Fixed Effect Regression

Dependent Variable: Z_SCORE

Method: Panel Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.942101	0.288750	3.262685	0.0012
GM	0.081754	0.288990	0.282896	0.7774
FIRM_SIZE	0.011618	0.044545	0.260811	0.7944
Effects Specification				
Cross-section fixed (dummy variables)				

Period fixed (dummy variables)			
R-squared	0.670658	Mean dependent var	0.968006
Adjusted R-squared	0.624098	S.D. dependent var	0.810647
S.E. of regression	0.497015	Akaike info criterion	1.556464
Sum squared resid	118.8184	Schwarz criterion	2.097163
Log likelihood	-359.0277	Hannan-Quinn criter.	1.767761
F-statistic	14.40421	Durbin-Watson stat	1.729927
Prob(F-statistic)	0.000000		

Source: E-views 9.0

The model also revealed result specifically for gender diversity (GM) which is the variable of interest for hypothesis five. The *coefficient* of the variable of interest: GM was (0.0817) and *t-statistic* (0.2829) positive but not statistically significant as P-value = 0.7774 (*p*-value >.05). Therefore, the alternate hypothesis is rejected and null accepted. We conclude therefore that there is no significant effect of gender diversity on Altman's z-score of quoted manufacturing firms in Nigeria.

CONCLUSION AND RECOMMENDATIONS

The issue of corporate leadership diversity has raged on in local and international business scenario as governments, policymakers and managers offer reasons against or for it. More so, the aftermath of several corporate scandals has spurred academic research into corporate governance issues and several firm performance indices in order to establish causality.

This study examined board multiplicity, risk and performance of quoted manufacturing firms in Nigeria. A number of such studies have been undertaken in the context of a few developed economies. Hence, this study makes a contribution to the literature by addressing the issue in a developing economy that has different economic, legal, and cultural environments. Three demographic characteristics of the board members—gender, race and non-executive status were addressed in this study. The study employed the proportion of women, and foreign nationals. The study conducted a Fixed effect least square regression analysis using a sample comprising 55 firms listed on the Nigerian exchange group.

Recommendations

The study makes the following recommendations for policy, business managers, and shareholders:

1. Despite the non-significant result, it is yet recommended that there should be a reasonable mix of the board of directors to recognize female directors as this will have direct impact on the firms' image and goodwill.
2. The strong positive effect of racial diversity on Altman's z-score of quoted manufacturing firms is a strong pointer to the need to diversify the board of companies with due consideration to race in order to bring balance to the policies formulated by the board of directors. Hence, mitigating the risk of bankruptcy.

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