



ABSTRACT

This study is aimed at ascertaining the effects of managerial ownership, board independence and gender diversity on corporate fraud. The study focused on selected quoted firms in Nigeria. Judgemental sampling technique was employed to select thirty-two (32) quoted firms for a period of five

B OARD CHARACTERISTICS AND CORPORATE FRAUD: A STUDY OF SELECTED COMPANIES LISTED IN THE NIGERIAN STOCK EXCHANGE.

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Introduction

Corporate organizations are constantly threatened by fraud from both internal and external sources. Despite the fact that frauds committed by outside sources can be quite serious, the majority of notable frauds in organizations are usually the work of the organization's members. Corporate fraud is defined as any illegal, unethical, or deceptive behaviour by a company or an individual acting in their capacity as a company employee. Corporate fraud schemes are frequently extremely complex, making detection difficult. A team of forensic accountants can spend months investigating a corporate fraud scheme.

According to Ashamu (2014) and Nwude (2006), corporate fraud is the number one threat to business



years (2015-2019). Least square method was employed for analysing the data. The results showed that board independence has positive effect on corporate fraud while managerial ownership has negative effect on corporate fraud of listed firms in Nigeria. It further shows that gender diversity has no significant effect on corporate fraud. The study at the end recommended that the independence of the board should be in line with the complexities and scale of operation of corporate entities laid down by the Nigerian Code of Corporate Governance issued.

Keywords: Board Characteristics, Board Independence, Board Gender, Managerial Ownership Corporate Fraud.

organizations, and it reflects the ability (or lack thereof) of its managers and/or deficiencies in the corporate mechanism. By extension, fraud by an organization's management reflects a failure in its corporate governance structure, because the mechanisms to check an organization's top management's excesses are vested primarily in its corporate governance. Owolabi and Dada (2011) define corporate governance as the system by which business corporations are directed and controlled. Consequently, Stephen and Benjamin (2018) describe oversight function as the manner in which power is exercised in the management of a company's social and economic resources for development. Academics frequently discuss it in the context of controlling communications and reducing agency costs, where corporate executives and directors have influence over the company but the shareholders are diversified and generally inactive. As a result, a good oversight function provides for a balance between the actions of officers and directors and the desires of shareholders. The word suggests that managers are adequately motivated to work for shareholders' interests, and that shareholders are properly informed about managers' activities. The governance structures clearly show how rights and obligations inside an organization are distributed among the various stakeholders with an interest in the entity's activities (Zvavahera & Ndoda, 2014). According to



Miring'u and Mouria (2011), a well-governed company performs better, which is an indicator of strong corporate governance, but Kyerbaah and Biekpe (2006) contend that bad corporate governance causes firms to collapse. They claim that poor corporate governance causes a slew of issues, including unreliable services, mismanagement, pilferage, wasting, red tape, and inefficiency (Kyerbaah & Biekpe, 2006).

Though the oversight function cannot completely eliminate corporate fraud, it can significantly reduce it by utilizing in-built mechanisms such as internal control systems and audit committees, among others. The ownership structure is the percentage of shares owned by the firm's management, which includes members of the corporate board, the CEO, and top management (Demsetz & Lebn, 1983). Sahut and Gharbi (2010) defined Ownership structure as the combination of ownership concentration, managerial ownership, foreign ownership, government ownership, ownership concentration and institutional ownership.

Ownership structure can also be a mechanism to deter or encourage corporate fraud.

The board of directors of an organization, as the highest governing body, is tasked with exercising leadership, enterprise, integrity, and judgments of its oversight function and control in order to ensure the company's continued survival and prosperity. However, based on recent events in the corporate world, this responsibility is far from being met, as a result of the board's lack of independence, Ownership Structure and Board Gender in their day-to-day monitoring and control functions. These flaws pose a serious threat to an organization's survival, leading to corporate fraud. Corporate fraud has both financial and non-financial consequences for businesses. The consequences of corporate fraud affect not only the companies and their shareholders, but also employment, social stability, and the general public. Among those that suffer from corporate fraud are those that rely on published information to assess company performance and make investment decisions, such as stockholders and the general public. The serious consequences of corporate fraud have prompted strong control and monitoring mechanisms to be enacted, with the goal of overseeing



corporate and management activities. This current study was motivated by a couple of gaps found in literature. First, there exist inconsistent findings on the nexus between, board independence and corporate fraud; ownership structure and corporate fraud; and board gender and corporate frauds. Secondly, there is paucity in empirical literature on the nexus between board gender and corporate fraud in Nigeria listed firm.

Against the above backdrop, there exists a knowledge gap which this study intends to fill. Sequel to the introduction which is concluded in this section, the remainder of this paper is structured as follows: Section two focuses on the review of the extant literature; Section three addresses the methodology; Section four present the estimation, results and discussions while section five focuses on conclusion and recommendations.

Review of Related Literature

Concept of Corporate Fraud

Corporate Fraud is defined as any illegal or unethical activity carried out by a company or individual in order to gain a competitive advantage over other corporations in the industry. This may also be done to demonstrate the company's improved market identity in order to attract more investors.

White collar crimes are illegal acts committed by high-ranking members of society in order to profit in an unethical manner. This can take many forms, including ad hoc crimes, bribery, embezzlement, counterfeiting, forgery, tax evasion, professional crime, fraud, and so on.

This aims to go beyond an employee's scope of authority, resulting in a complex and economic impact not only on the business but also on employees and other third parties. Such dishonest activities result in revenue loss through asset theft, false expenses, corruption, and information theft, fraudulent applications and asset misuse, dishonest business partners, and fraudulent billings.

Types of Corporate Fraud

There are various types of corporate frauds that can be committed through various means. Financial fraud, asset misappropriation, employee fraud,



vendor fraud, customer fraud, and investment scams are the most common types.

Other types of fraud include payment, false accounting, procurement, information, insolvency and Insolvency and bankruptcy-related frauds, false employment credentials, theft of cash, physical assets, or confidential information, procurement fraud, payroll fraud, account mismanagement, financial accounting misstatements, inappropriate journal vouchers, suspense accounting fraud, fraudulent expense claims, bribery, and corruption.

Board Independence and Corporate Fraud

Moses (2019) investigated the relationship between corporate governance and the commission of corporate fraud among Nigerian listed companies. The study used a sample of eighteen (18) companies, with data gathered through content analyses based on information available in annual reports and other media reports. A binary logit multiple regression analysis method was used to analyze the study's data. According to the study's findings, there is a negative relationship between board independence and corporate fraud. According to the study's findings, increasing the number of independent members on the board of directors will improve the board's ability to checkmate fraud commission. However, board members' ability to prevent corporate fraud falls short of the ideal level.

Chen, Firth, Daniel, Gao, and Rui (2006) used bivariate and multivariate analyses to investigate the relationship between boardroom characteristics and corporate fraud in China. The multivariate analyses revealed that board characteristics play an important role in explaining fraud. Using a bivariate probit model, they demonstrated that boardroom characteristics are important, but the type of owner is less so. The proportion of independent directors, the number of board meetings, and the length of the board chairman's fraud corrective control are all associated with the incidence of fraud.

Matoussi and Gharbi (2011) examined the link between corporate financial statement fraud and the board of directors in a sample of 64 Tunisian



enterprises, with 32 fraud firms matched with 32 non-fraud identical (control) firms. The findings reveal that the governance characteristics of fraudulent and control firms differ significantly. As a result, the importance of governance characteristics in explaining the risk of fraud has been confirmed, as enterprises with a board of directors controlled by family members and fraud corrective control provided by outside directors are more likely to conduct financial statement fraud.

MohdSalleh and Othman (2016) discovered that the frequency of board meetings could be used to monitor the company in a study on board attributes as a deterrent to corporate fraud in Malaysia. According to the study, the more frequently the board meets, the better control there will be over the company's activities. Therefore, this study leads to the first hypothesis:

H₀₁: *board independence has no significant impact on corporate fraud*

Managerial Ownership and Corporate Fraud

Moses (2019) investigated the link between the corporate governance and the commission of corporate fraud among Nigerian public businesses. The study used a sample of eighteen (18) companies, whose data was gathered through content analysis based on information available in annual reports and other media publications. A binary logit multiple regression analysis method was used to analyze the data for the investigation. Finally, the data suggest that the ownership structure – managerial ownership – and the occurrence of corporate fraud in firms have a positive association.

Chen, Firth, Daniel, Gao, and Rui (2006) who examined the effect of ownership structure and corporate fraud in China using bi-variate and multivariate analyses. The results of the multivariate analyses showed that managerial ownership is important in explaining fraud. However, Institutional ownership, on the other hand, is negatively associated with earning management and lowers the probability of financial misreporting and fraud (Lee & Jin, 2012).

Abdullah, Yusof, and Nor (2010), a Malaysian study on financial restatement and corporate governance, managerial ownership and CEO duality had no significant effect on the likelihood of financial misstatement. The study revealed that the higher the percentage of institutional ownership, the



lower the likelihood of financial misstatement. Malaysian companies are highly concentrated because the majority of Malaysian companies are family-owned, and having outsiders owning these companies could increase control and monitoring of their activities. More so, this study is hypnotized as:

H₀₂: *managerial ownership has no significant impact on corporate fraud*

Gender Diversity and Corporate Fraud

The link between board female gender and corporate fraud of firms has attracted the attention of researchers around the world. Corporate boards are included in the flow because they bring a wealth of knowledge, experience, ideas, and professional contacts (Carpenter, Geletkanyez & Sanders, 2004).

Krishnan and Parsons (2008) find that earnings quality is positively associated with gender diversity in senior management; and in the same vein, Srinidhi, Gul, and Tsui (2011) find that greater female participation on their boards exhibited higher earnings quality for a sample of US firms. Gavius, Segev, and Yosef (2012) also discovered evidence of a negative relationship between the presence of female directors and earnings management. They conclude that the gender of directors has value implications for analysts and investors, implying that the proportion of female directors has a positive relationship with firm value. These findings are supported by the fact that, as previously discussed, women have unique characteristics in business ethics and risk aversion, as well as findings regarding women's motivation and achievement, moral values, social stereotypes, and the relationship between task performance and self-confidence (Gull, Nekhili, Nagati & Tawhid, 2018)

Some studies that have explored the relation between board diversity and financial reporting quality are: Barua, Davidson, Rama, & Thiruvadi., 2010; D'onza & Lamboglia, 2014; Ho, Li, Tam & Zhang, 2015; Klai & Omori, 2011; Makhoulf, Al-Surf, & Almubaideen, 2018; Pen & Vahamaa, 2010; Pulungan & Sadat, 2014; Yunos, 2011), they all found a positive and significant relation between board diversity and financial reporting quality. The third hypothesis is formulated from the above study as:

H₀₃: *that gender diversity has no significant effect on corporate fraud is rejected.*



Theoretical review

Agency Theory

This theory's origin is in the works of Berle and Means (1932) on separation between ownership and control as a common characteristic of the modern corporation. Jensen and Meckling (1976) developed a theory of the firm known as agency theory. This theory refers to the agency problem, where the principal faces the problem of motivating the agent to act on his behalf. In order to reduce the agency problem, Jensen and Meckling (1976, p. 308) defined an agency relationship as: “ a contract under which one or more persons (the principal(s) engage another person (the agent) to perform some services on their behalf which involve delegating some decision – making authority to the agent. If both parties to the relationship are utility maximisers, there is good reason to believe that the agent will not always act in the best interest of the principal”. The agency theory states that in the presence of information asymmetry, the agent is likely to pursue interests that may be detrimental to the Principal (Sanda, Mikailu, & Garba, 2005). The reason for this is because the pay-off structure of the claims of different classes of stakeholders (including board of directors) is fundamentally different. The process of aligning these interests and claims gives rise to potential conflicts among the stakeholders. Left alone, each class of stakeholder will pursue its own interest which may be at the expense of other stakeholders and hence the need for a moderating instrument- oversight function in a modern firm (Kama & Chuku, 2009).

In analyzing the function of a corporation, one can assume that managers will behave in a way to maximize their own profit and reputation, even at the expense of shareholders. One might even understand the manager role as one of institutionalized deceit, where the asymmetry of knowledge permits managers to operate with almost total independence (Obasan, 2014).

In light of the above, auditors are thus crucial agents in the web of relationship existence or establishment in an organization.

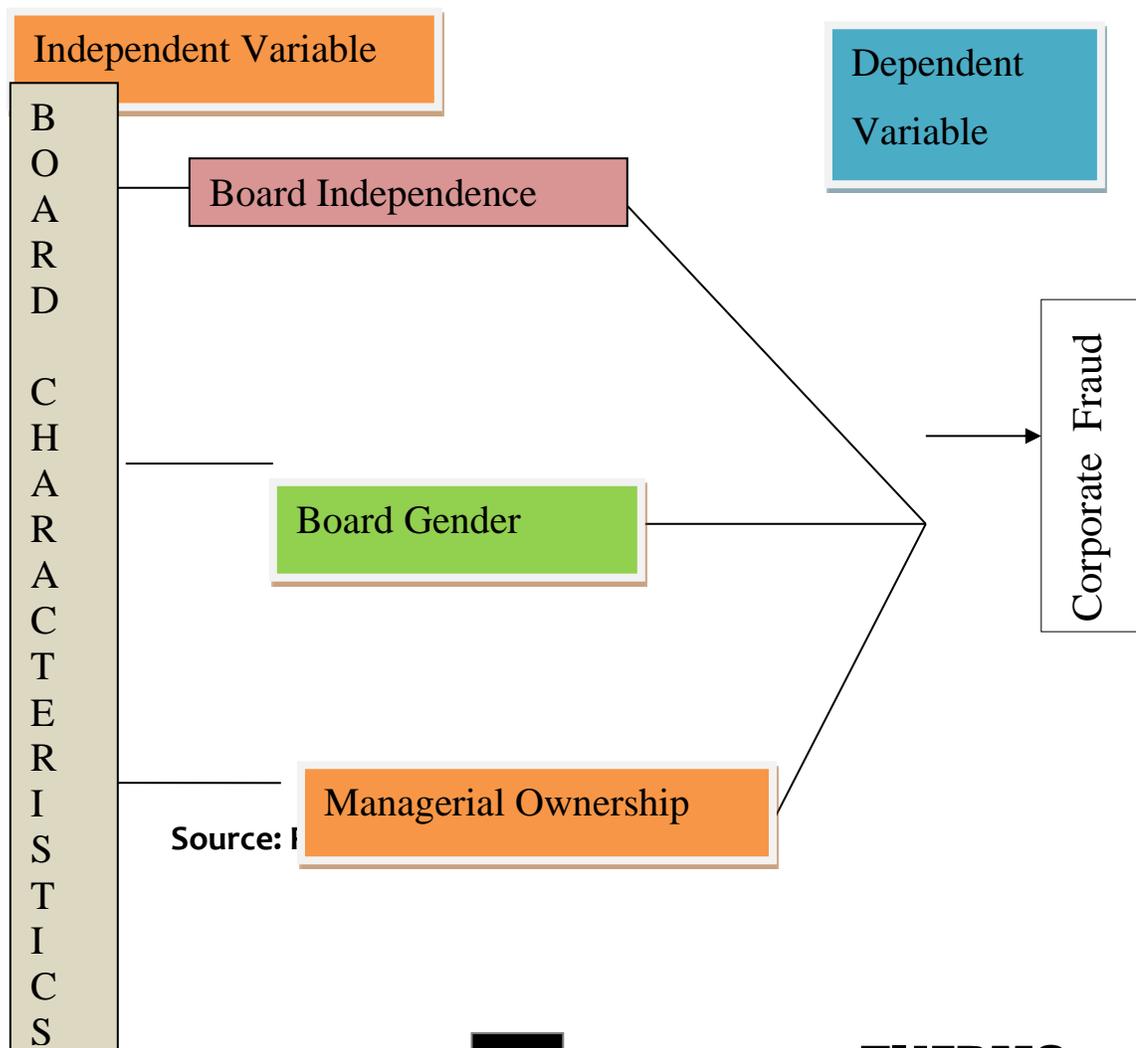
Fraud Box Key Model

The Fraud Box Key Model (FBKM) was propounded by Okoye and Onodi in 2014 being immediate response to the long lasted lapses of Fraud Triangle Theory (FTT) and Fraud Diamond Theory (FDT). It is also an expanded version of the FDT. FBKM added a fifth perspective which is corporate



governance. FTT and FDT address reasons and ways of committing fraud without reliable corresponding response to how to put an end to the fraud. Whereas, the Fraud Box Key Model (FBKM), does not only suggest reasons and ways for fraud acts but also recommended corporate governance as a panacea to the menace of corporate fraud. The FBKM believes that irrespective of how strong the pressure may be, how accessible the opportunity is and the rationale and capacity of the intending fraudster, if an effective corporate governance instituted, the whole intentions will amount to nothing because it will not translate to corporate fraud. Due to its peculiarity and direct relevance, this study is anchored on the Fraud Box Key Model

Schematic Diagram





Methodology

The study used a longitudinal research design. A longitudinal design involves repeated observations of the same variables over long periods of time. The choice of the design is because the nature of the variables involves repeated observations of the same variables over periods. Therefore, the design is suitable for this study. The population of the study comprises of thirty-four (32) quoted firms listed in the Nigerian Stock Exchange (NSE) as at 31st December, 2019. However, those that have undergone merger or acquisition or that have not maintained same name within the time frame of this study will be filtered away from the samples. The time frame for the study is five (5) years (2015 to 2019). Secondary data is used for this study. The data is sourced from the audited annual reports of firms for the period 2005-2019 financial year.

Model Specification

The focus of the study is to examine the impact of board characteristics (board independence, managerial ownership and board gender) and corporate fraud of listed firms in the Nigerian Stock Exchange (NSE). The model is anchored on Fraud Box Key Model (FBKM) which was propounded by Okoye and Onodi (2014).

The functional form of the model is stated thus:

$$CF = f(BIND, MANOWN, GEN) \text{-----} (1)$$

The econometric form is stated thus:

$$CF_{it} = \beta_1 + \beta_2 BIND_{it} + \beta_3 BMANOWN_{it} + \beta_4 GEN_{it} + w_{it}, \text{-----} (2)$$

Where: β_1 = a common mean value intercept for the thirty two (32); β_2 - β_4 = Unknown coefficients; i = Companies (1... 32 companies); t = Time [(1....5 years), w_{it} = combination of cross-section, or individual-specific error term (ϵ_i) and μ_{it} .

Estimation Result and Discussion of Findings

Table 1 Descriptive Statistic

	CF	BIND	MANOWN	GEN
Mean	2.822750	0.492500	0.140563	0.177438
Median	1.985000	0.500000	0.130000	0.150000
Maximum	65.22000	0.790000	0.250000	0.450000
Minimum	-32.27000	0.170000	0.010000	0.060000
Std. Dev.	11.59939	0.137122	0.062869	0.091818



Skewness	0.879562	-0.418865	-0.104847	0.904709
Kurtosis	8.700897	2.874011	1.950207	3.311843
Jarque-Bera	237.2983	4.784438	7.640239	22.47493
Probability	0.000000	0.091427	0.021925	0.000013

Source: Researcher's computation (2022)

Table 1 displays the description data used for this study. It was seen that corporate fraud has mean value of following statistics; Mean=2.822 which suggest that on the average, the degree of manipulation was not austere as it was beyond the benchmark. Though, this does not imply non-existence manipulation amid the sample of firms understudied. Standard deviation stood at 11.59 which is high and suggests that this variable for the firms understudied exhibits considerable levels of cluster around the mean value, Maximum = 65.220 and Minimum = -32.270. BIND shows the succeeding values; Mean= 0.495 which infers that the selected firms has an average of 49%of non-executive directors, STD= 0.013 which is low infers that this variable for the selected firms exhibits considerable level of clustering around the mean value, Max= 0.790 and Min= 0.17. MANOWN shows the following statistics; Mean= 0.140 implies that an average of 14% of shares of firms understudied are owned by directors, STD= 0.137554 which is low and suggest that this variable is for firms understudied are clustered around the mean value, Max= 0.250 and Min= 0.010. GEN show the following statistics; Mean=0.450 which indicates that the selected firms had an average of 17.7% of directors of firms understudied are female, Max =0.450; Min = 0.060 and STD= 0.091which is low and suggest that this variable for selected firms clustered around the mean value. Jarque-Bera(JB> 3) and Probability value($p < 0.5$) for the all variables used in model imply normality of all variables

Table 2: Correlation Result

	CF	BIND	MANOWN	GEN
CF	1.000000			

BIND	0.342010	1.000000		
	2.803308	-----		
	0.0432	-----		



MANOWN	-0.417776	0.082000	1.000000	
	-2.990801	1.034202	----	
	0.01380	0.3026	----	
GEN	0.098849	0.103486	-0.105175	1.000000
	1.248623	1.307823	-1.329406	----
	0.2136	0.1928	0.1856	----

Source: Researcher's computation (2022)

The results of correlation coefficients of the variables are examined as shown in table 2. The result shows CF is positively correlated with BIND($r=0.342$, $t=.2.80$, $p=0.014$), this relationship is positive at 5% while MANOWN inversely proportionate with CF as depicted by ($r=-0.418$, $t = -2.990$, $p= 0.014$). This relationship is significant at 5%. GEN on the contrary has positive relationship with CF as depicted by ($r= 0.09$, $t= 1.249$, $p= 0.214$) this relationship is not significant at 5%.

Finally, it is observed that board independence exhibits positive association with MANOWN and GEN as depicted by correlation coefficient ($r= 0.082$, $t=1.0342$, $p=0.302$) and ($r= 0.103$, $t=1.307$, $p=0.193$) respectively;

The association coefficient outcomes reveal that all the variables have weak correlation amid one another which specifies that the issue of multicollinearity does exist hence the data are apposite for running the regression.

Table 3: Panel Regression Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BIND	6.918284	2.581835	2.679600	0.0082
MANOWN	-19.74702	6.925022	-2.851547	0.0049
GEN	2.178849	4.302640	0.506398	0.6133
R-squared=0.619,	R2=0.502, F-sta=7.03,		Pro sta=0.000	DW=1.646

Source: Researcher's computation 2022

Table 3 shows the regression outcome for the model. Examining the severity of the heterogeneity effect, the hausman statistical probability value of 0.257 indicates that the correlation between unseen attributes in each cross section and the error term is insignificant to undermine the estimation result, therefore then random estimation is accepted. Based on the REM, the analysis is done as follows: we observe that the R^2 is



0.502 while R is 0.619 which infers that the explanatory variables explain about 61.9% of the dependent. The F-stat (7.036) and p-value (0.000) suggest that the postulation of an emblematic direct association among dependent and independent variables is retained at 5% level whereas the D.W statistics of 1.646 infers that serial correlation does not exist in the residual of the data used by the researcher. Observing on the outlay from the analysis tool, it was observe that board independence (BIND) has a positively influences corporate fraud. This influence is statistically emblematic ($t=2.679$, $p=0.008$) at 5% level. Managerial ownership (MANOWN) appeared to negatively influence corporate fraud. This effect is statistically significant at 5% ($t=-2.851$, $p=0.0049$). Gender is seen to positively influence corporate fraud ($t=0.5063$, $p=0.6133$) this effect is not statistically significant at 5%

Table 4 Regression Assumptions Test

VIF		
Variable	Coefficient Variance	Centered VIF.
CF	2.615558	0.000
BIND	7.111455	0.000
MANOWN	6.284970	0.000
GEN	4.936684	0.000
Heteroskedasticity Test: ARCH		
F-statistic = 0.0880	Prob F(3,156)	0.974
Obs*R-squared = 0.2703	Prob. Chi-Square(1)	0.810
Breusch-Godfrey Serial Correlation LM Test:		
F-statistic = 1.593	Prob F(2,154)	0.2065
Obs*R-squared= 0.676	Prob. Chi-Square (2)	0.1975
Ramsey Reset Test		
t- statistics= 0.501	Df= 155	0.616
F-statistics = 0.251	Prob. F(1, 122)	0.697

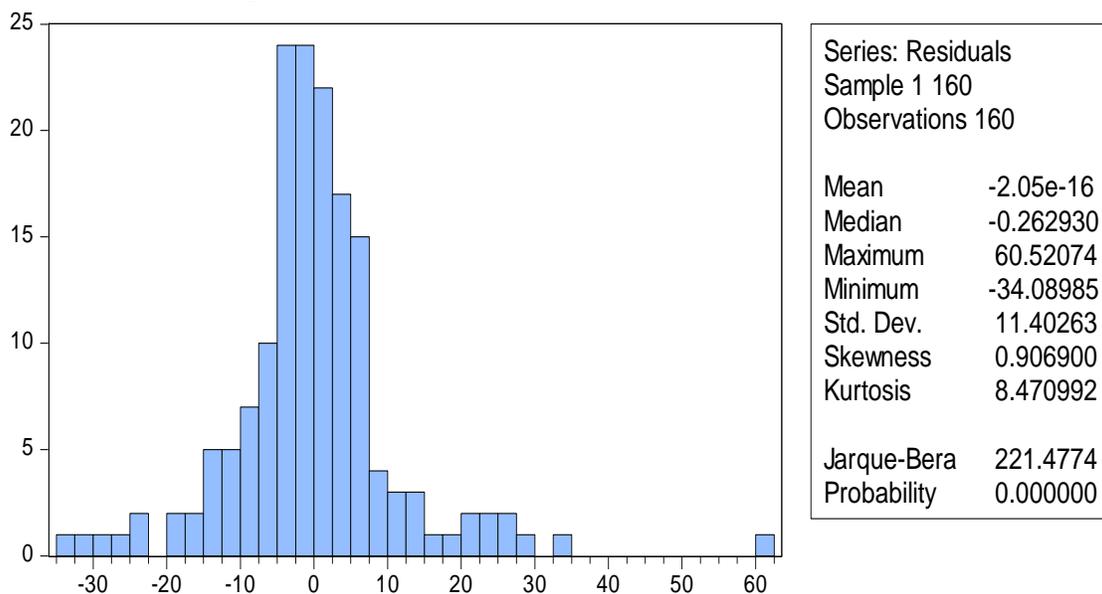
Source: Researchers Compilation (2022)

Table 4 displays post regression test gotten from this study. The variance inflation factor (VIF) demonstrations extent of the alteration of a coefficient estimation of a regressor that has been overstated due to collinearity with the other regressors. Essentially, VIFs greater than 10 becomes a cause of



ultimate concern (Landau & Everitt, 2003). From the outcome is seen, all the variables have coefficient that is less than 10 which simply means that issue of multicollinearity does not arise. The ARCH test for heteroskedasticity was carried out on the residual as a precaution. The outcomes revealed that p-value is greater than 0.05, which resulted in rejection the existence of heteroskedasticity in the residuals. The Lagrange Multiplier (LM) test for higher order autocorrelation divulges that the postulation of zero autocorrelation in the residuals were retained. This is supported the p-value > 0.05. The LM test fails to divulge the presence of serial in the model. The Ramsey RESET test reveals a relative large p-values that is more than the critical values of 0.05, which connotes that there was no noteworthy proof of miss-specification.

Normality test fig 1



The histogram of the normality test further strengthened the Jarque-Bera statistics reported in table 1. The result reported in figure 1 signifies a bell-shaped histogram with mean Jarque-Bera value of 221.74 and associated probability value of 0.000000 which signifies normal distribution of the regression variables

Discussion of Findings



The results show that board independence is directly proportionate with corporate fraud at 5%. This suggests that increases in number of independent board members will result in upsurge of corporate fraud. These findings corroborate positive association of board independence with corporate fraud gotten by Nakano and Nguyen (2013) but at variance with *a priori* expectation.

The results show that MANOWN appears to have negative effect on corporate fraud. This result corroborate with Agrawal and Chadha (2005) but at variance with a priori expectation.

The results show that gender diversity has a positively influences corporate fraud. This influence is not significant at 5% level. This suggests that increases in female directors does not significantly influence corporate fraud. This is result negates extant negative of Barua, Davidson, Rama, and Thiruvadi (2013) and Al-Surf and Almubaideen (2018)

Conclusion

The study examined corporate governance and corporate fraud of selected companies listed in the Nigerian Stock Exchange between 2015 and 2019. The study was congenital out of the continuous corporate failure due to financial statement fraud that has bedeviled corporate entities in recent times despite the in existence of non-executive directors who are instill to serve check mechanism. This manifest in the fact those charged with governance often than not override internal control rendering it impotent. It generally believed that formidable board of directors will to large extent reduce corporate fraud. Premised on the preceding occurrences, this study reveals that increase in non-executive board members will lead increase in corporate fraud while increases in managerial ownership on other hand lead to reduction in corporate fraud. Employing inferential statistics such as the panel estimation technique, the result revealed that presence of female on board has no significant effect on corporate fraud.

Recommendations



Based on the findings of the study, the researchers recommend that: first, that the independence of the board should be in line with the complexities and scale of operation of the corporate entities as stipulated by the Nigerian Code of Corporate Governance issued by Financial Reporting Council of Nigeria (FRCN); second, statutory bodies should enact laws that lead to giving room for manager to acquire more shares. This will make them to be involved meticulously in the running of the entity because their investment is at stake and not want to lost their money in corporate fraud

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Appendix 1

Dependent Variable: CF
 Method: Panel EGLS (Cross-section weights)
 Date: 09/30/21 Time: 20:39
 Sample: 2015 2019
 Periods included: 5
 Cross-sections included: 32
 Total panel (balanced) observations: 160
 Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.131197	1.783528	0.634247	0.5268
BIND	6.918284	2.581835	2.679600	0.0082
MANOWN	-19.74702	6.925022	-2.851547	0.0049
GEN	2.178849	4.302640	0.506398	0.6133
Weighted Statistics				
R-squared	0.619260	Mean dependent var		4.377934
Adjusted R-squared	0.502323	S.D. dependent var		11.90160
S.E. of regression	11.28073	Sum squared resid		19851.77
F-statistic	7.041279	Durbin-Watson stat		1.645653
Prob(F-statistic)	0.000180			
Unweighted Statistics				
R-squared	0.025209	Mean dependent var		2.822750
Sum squared resid	20853.51	Durbin-Watson stat		1.771309

Appendix 2

	CF	BIND	MANOWN	GEN
Mean	2.822750	0.492500	0.140563	0.177438
Median	1.985000	0.500000	0.130000	0.150000
Maximum	65.22000	0.790000	0.250000	0.450000
Minimum	-32.27000	0.170000	0.010000	0.060000
Std. Dev.	11.59939	0.137122	0.062869	0.091818



Skewness	0.879562	-0.418865	-0.104847	0.904709
Kurtosis	8.700897	2.874011	1.950207	3.311843
Jarque-Bera	237.2983	4.784438	7.640239	22.47493
Probability	0.000000	0.091427	0.021925	0.000013
Sum	451.6400	78.80000	22.49000	28.39000
Sum Sq. Dev.	21392.81	2.989600	0.628449	1.340449
Observations	160	160	160	160

Appendix3

Covariance Analysis: Spearman rank-order				
Date: 09/30/21 Time: 20:43				
Sample: 2015 2019				
Included observations: 160				
Correlation				
t-Statistic				
Probability	CF	BIND	MANOWN	GEN
CF	1.000000			

BIND	0.142010	1.000000		
	2.803308	----		
	0.0432	----		
MANOWN	-0.117776	0.082000	1.000000	
	-2.990801	1.034202	----	
	0.01380	0.3026	----	
GEN	0.098849	0.103486	-0.105175	1.000000
	1.248623	1.307823	-1.329406	----
	0.2136	0.1928	0.1856	----

Appendix4

Variance Inflation Factors			
Date: 09/30/21 Time: 20:48			
Sample: 1 160			
Included observations: 160			
	Coefficient	Uncentered	Centered



Variable	Variance	VIF	VIF
C	18.76453	2.615558	NA
BIND	44.74946	7.111455	1.009528
MANOWN	219.7764	6.284970	1.042242
GEN	102.5747	4.936684	1.037548

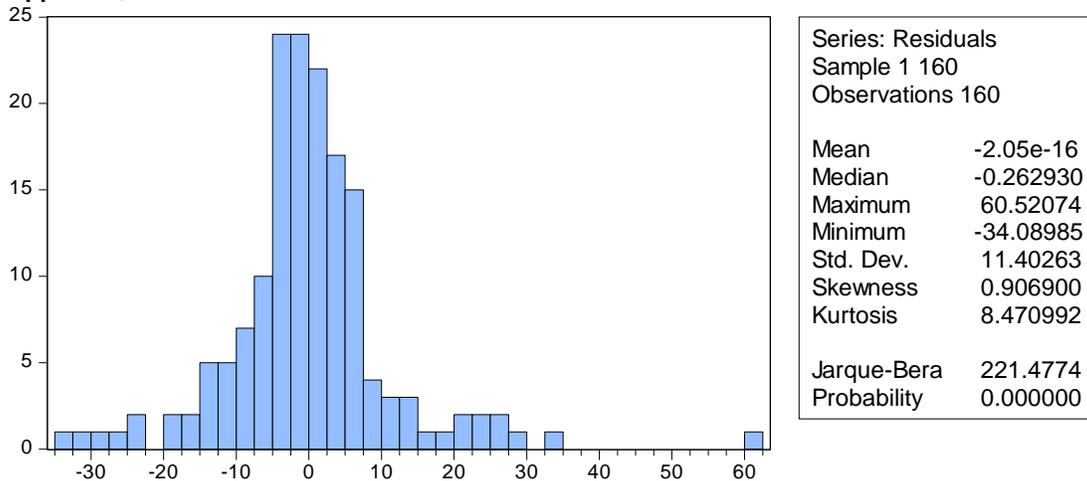
Appendix 5

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.593489	Prob. F(2,154)	0.2065
Obs*R-squared	3.244013	Prob. Chi-Square(2)	0.1975

Appendix 6

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.088023	Prob. F(3,156)	0.9665
Obs*R-squared	0.270382	Prob. Chi-Square(3)	0.9655
Scaled explained SS	0.960140	Prob. Chi-Square(3)	0.8109

Appendix 7



Appendix 7

Ramsey RESET Test			
Equation: UNTITLED			
Specification: CF C BIND MANOWN GEN			
Omitted Variables: Squares of fitted values			
	Value	Df	Probability
t-statistic	0.501719	155	0.6166
F-statistic	0.251722	(1, 155)	0.6166



Likelihood ratio	0.259631	1	0.6104	
F-test summary:				
	Sum of Sq.	Df	Mean Squares	
Test SSR	33.51904	1	33.51904	
Restricted SSR	20673.17	156	132.5203	
Unrestricted SSR	20639.66	155	133.1591	
LR test summary:				
	Value	Df		
Restricted LogL	-615.9436	156		
Unrestricted LogL	-615.8138	155		