



BOARD MECHANISMS AND FINANCIAL PERFORMANCE OF QUOTED OIL AND GAS FIRMS IN NIGERIA; THE MODERATING EFFECT OF BOARD OWNERSHIP

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ABSTRACT

The study examined the moderating effect of board ownership on the relationship between board mechanisms and performance of quoted oil and gas firms in Nigeria for the period 2011 – 2020. The adjusted population of the study comprises of 8 firms which are arrived at using census sampling technique. Secondary panel data is collected from the annual reports and accounts of 8 quoted firms and analyzed using Fixed Effect multiple regression. The study found that board size has negative significant relationship with the performance of the

Introduction

One of the primary motives of every business enterprise is to generate income sufficient for distribution to all stakeholders that are involved in the business, in an increasing and consistent manner. To accomplish this motive, firms must develop good operational strategies and make decisions that can help them enhance their performance (Emmanuel& Hodo, 2012). Firm's performance represents the end results that every economic entity wishes to achieve from its operations and which is often measured in monetary term. Mirza and Javed (2013) described firms' performance as the ability of a company to achieve its objectives using its available resources. It is one of the basic indicators that is use to signal the external world the strengths and weaknesses of a firm in terms of operational efficiency and board quality.

Review of empirical literature has shown that board mechanisms such as board size, board independence and board ownership among others are part of the key factors influencing firm financial performance. Board size is the sum total of directors on the corporate boardroom. It is usually determined by aggregating the number of individual directors who held offices and participate in corporate decision process during the year. These directors include Chairman, chief executive officer and several other executive and nonexecutive officers that composed the governing board of the firm. Board



firms. Also, the result of the analysis shows significant positive relationship between board independence, board ownership and performance of the firms. In addition, the result of the interactions between board size and board ownership shows positive significant relationship with performance of the firms. While the result of the interaction between board independence and board ownership has negative significant relationship with performance of the firms. In light of the study findings, it is therefore recommends that the quoted firms in the Nigerian oil and gas subsector should appoint an optimal number of directors on their boards since increasing the size causes decrease on their performance; however, increase the proportion of board independence since it enhance performance. They are also advised to encourage board ownership of between 11 – 12% on average of their total outstanding shares since its increase board monitoring capacity and performance; however discourage independent directors' excessive ownership since it has significant negative effect on their performance.

Keywords: Agency Theory, Board Ownership, Oil and Gas Companies, Performance

independence is described as the ratio of outside or nonexecutive officers who held either little or no stake in the firm and are expected to willingly bring - in external expertise, independent decision/ judgments to the firm as thus expected to increase board effectiveness and performance. Studies such as Anya (2002) and Ubani *et al.* (2017) have shown that, for over seventy years ago, the Nigerian oil and gas industry used to accounts for over 80% of government revenue and more than 95% of the country's foreign earnings. The industry has also been the largest contributor for the country's infrastructural developments and also provides support for other industries (Nwosu *et al.* 2020; CBN, 2020; National Bureau of Statistics, 2021). However, in the recent years, the industry has witnessed serious dwindling in their financial performance especially within the period of 2015 to 2020 as covered by this study which makes some companies in the industry to nearly engage into financial statement malpractice with intent of covering their huge amount of net losses. For example, in 2017, Oando Nigeria Plc faced serious issues with Security and Exchange Commission (SEC) regarding their report of 2013, 2014 and 2015 financial year the matter which led to the suspension of the company's managing director as well as the board of directors (SEC report, 2021). This necessitates the need for fresh inquiries to check whether board structure and other mechanisms are behind the decline in the performance of the industry.

Also, Except for Thompson (2016), Ishaku and Dandago (2017) and Zubairu (2017), most existing literature that studied board mechanisms in relation to performance of firms in Nigeria seemed to have focused more attention on financial sector and other subsectors of the nonfinancial sector in exclusion of oil and gas subsector despite the prominent roles it plays in the Nigerian economy. Moreover, both Thompson (2016), Ishaku and Dandago (2017) and Zubairu (2017) stopped their analysis at 2015 and this creates another gap for further research in order to analyze the impact of board mechanisms and performance of quoted companies in the Nigerian oil and gas subsector for a period beyond 2015 financial year. Above all, none of these existing studied bothered to



analyze the indirect relationship between the core board mechanisms and other important variables like board shareholding with firm performance. Owing to the gaps identified both within and outside the oil and gas subsector in Nigeria, it has become important to carry out another study in the country. Therefore, this study seeks to investigate the effect of board mechanisms on the performance of oil and gas companies quoted in Nigeria. Also, it is hypothesized that board mechanisms has no significant effect on the performance of quoted oil and gas companies in Nigeria.

Review of Empirical Studies and Theoretical Framework

Board Size and Performance

Empirical literatures were reviewed from the previous studies such as the work of Kiel and Nichoison (2003) who examined the linear association between board size and performance on a sample of 348 nonfinancial and financially related companies in Australia for a period 1996 - 1998. The study found large board having significant positive relationship with performance. Another work was conducted by Sanda, Garba and Mikailu (2005) who studied 93 nonfinancial companies quoted in Nigeria to examine the effect of governance mechanisms on company performance over the period 1996 – 1999. Their study found that performance is positively influenced by board size. The period covered by these studies is considered too short as they investigated only three and four year data respectively. Similarly, Belkhir (2008) investigated how board size influence performance of 174 nonfinancial companies for a period 1995 - 2002. He found board size having significant positive influence on ROA. Supporting the above findings is research conducted by Topal and Doğan (2014) who also documented that large board size is positively related to ROA. The study adopted Beck-Katz (1995) robust estimation technique to analyze the extent of relationship between large number of directors on board and performance from the sample of 136 quoted manufacturing firms on Borsa Istanbul for a period 2002 - 2012. Studies by Abdulazeez, Ndibe and Mercy (2016) investigated board mechanisms and performance of all quoted DMBs in Nigeria over a period 2009 - 2016. They found larger the size has significant positive influence on performance. Similarly, Emmanuel (2017) used a panel data set in pooled OLS to assess the board mechanisms and profitability of 10 quoted manufacturing companies in the Nigeria over a period 2006 - 2015. He also found size of the board influence performance positively.

Similarly, Tshipa, (2017) used 2-stages least square technique to study the impact of board of directors attributes on performance of 90 industrial companies in South Africa for the period 2002 – 2014. The research documented evidence in favour of significant positive association between the sum of directors on board and performance. Also, Agbaeze and Daniel (2018) studied the extent of relationship between the sum of individual directors and profitability from the sample of 6 quoted Nigerian banks for a period 2005 - 2015. They found that board size is positively associated with profitability. But sample of six banks may be inadequate enough to draw a meaningful conclusion in the sector considering the number of banks listed within the period.

On the other hand, Guest (2005) analyzed data of 2746 large firms in UK for the period 1981 – 2002 to study the effect of effect of board of director’s aggregation on profitability. The study found evidence in favour of inverse effect on performance. Similarly, Thompson (2016) used pooled-OLS multiple regression technique to analyze the relationship between board of directors’



characteristics and ownership on value of 6 companies quoted in Nigerian oil and gas subsector for the period 2008 - 2015. The study found evidence that board size is positively related with firm value. Ishaku and Dandago (2017) investigated relationship between board attributes and performance, using a sample of 8 companies quoted in Nigeria over a period 2005 - 2014. Their analysis shows board of directors' size is inversely affecting profitability of the sampled firms. Also, Oyedokun (2019) assessed the linear association between board of directors' size and performance of quoted Nigerian banks over a period 2013 - 2017. The study reveals the existence of inverse but significant association among the studied variables. Conversely, Jorge, Diógenes and Betancourt (2017) studied board of directors' profitability of 172 Colombian quoted companies over a period 2008 - 2014, using balanced panel regression model. The study found insignificant positive association between the size of the board and performance.

Board Independence and Performance

Babatunde and Olaniran (2009) have found ratio of independent directors on board is positively influencing performance after analyzing the linear association among the variables of board mechanisms and performance of 62 nonfinancial companies in Nigeria over a period 2002 - 2006. Sanda *et al* (2011) examined the relationship between board of directors composition performance of 89 quoted companies in Nigeria for the period 1996 - 2004. They found ratio of independent directors having significant positive influence on performance. The periods covered by the two studies above are equally not current as events have taken place after their study period which must have overtaken their research findings.

Fondo (2016) studied board composition and profitability of 35 state owned service firms in Kenya for a period of (September, 2016 - November, 2016). He found board independence having positive influence on ROA. The length of the period covered in his study is considered not sufficient as the study investigated only three months, September 2016 - November 2016. Geraldine, Sunday and John (2017) studied the effect of directors' independence on performance using dataset from 102 companies in Nigeria over a period 2014 - 2015. They found ratio of independent directors' on board is positively and significantly influencing performance. The period of the study is also considered too short as the study covered only two years 2014 - 2015. Sarkar and Sarkar (2018) studied board mechanisms and profitability of 46 public and privately owned banks listed in India using panel regression model over a period 2003 - 2012. Their finding revealed that ratio of directors' independence is positively associated with performance. Consistent to their findings, Koji, Adhikary and Tram (2020) recently documented a result in support of significant positive association between ratio of directors' independence and ROA of 1412 listed family and nonfamily firms in Japan for the period 2014 - 2018.

Contrary to the studies above, Adewuyi and Olowookere (2008) have documented that board independent and performance have significant inverse association with performance of 64 quoted non-financial firms in Nigeria for a period 2002 - 2006. Similarly, Roman and Persida (2012) studied how presence of independent directors affects performance of 386 companies in U.S for the period 2005-2009. The study found percentage of outside directors has significant but inverse influence on firm's profitability. The findings of these studies may also be affected by of many events that occurred beyond 2002 - 2012 period of their analysis. Conversely, Immaculate,



Nkundabanyanga and Nkote (2011) could not identify any significant link between the ration of independence and performance after conducting a cross-sectional analysis on 85 Ugandan public companies in 2010.

Theoretical Framework

Agency theory and resource dependency theory were reviewed to underpin the expected links among the variables of study. The agency theory provides the framework to use corporate governance mechanisms (both internal and external mechanisms) to minimize agency conflicts and provide protections to shareholders by unify their interests with that of the management. The fundamental point to consider within the framework is the compromising attitudes of the agents that often described them as self - centered individuals whose actions if not monitored closely is directed toward pursuing their personal -interest and thereby, giving little or no preference to the interests of primary equity holders who originally owns the company due to information lopsidedness. For example, managers especially those who served firm for a long period of time may possess sufficient information about firm's internal and external activities, and thus use as opportunity to fraudulently pursue their self – interest even if it will be at the expense of company's prospect or shareholders' interests. Therefore, to address this problem firms should make board members co-owners in the business by way of granting them the chance to acquiring a given fraction of shares in the firms total outstanding equity shares as thus, enhance board monitoring effectiveness and performance (Jensen & Meckling, 1976).

Resource Dependence Theory had its focus on building framework for the role played by board of directors as resources to the organization. According to this theory, in addition to firm level resources, assets, capabilities and other resource factors like external resources such as information, knowledge, skills, expertise, affiliation and connection among others are relevant factors that increase board of governance efficiency and improve firm financial performance.

Methodology

Correlation research design is adopted in this study as it intended to measure the links between board mechanisms, ownership structure and performance of firms quoted in the Nigerian oil and gas subsector. The study population comprises 11 quoted companies for the period 2011 - 2020. This population was further adjusted down to 8 firms and the remaining 3 firms were selected out for failing the criteria of not having annual reports readily available for all the years in the study period. The study used the adjusted population as its sample size, hence adopted census sampling approach by studying all the 8 firms as sample size. The study used secondary data, extracted in the annual reports of the 8 sampled firms. The study used Fixed Effect (FE) multiple regression technique for data analysis which established relationship among the variables of the study.

Variables Definition and Measurement

Table 1: Variables Measurements and Definitions

Variables Acronym	Variables Name	Variables Measurement and Source
RDA	Return on Assets (Dependent variable)	Earnings before interest and taxes to total assets (Mwangi & Birundu, 2015).



BSIZ	Board size (Independent variable)	Sum total of all directors on board (Sanda <i>et al.</i> 2005).
BIND	Board independence (Independent variable)	Ratio of nonexecutive/ independent directors to sum total of all directors on board (Sorin <i>et al.</i> 2017). The percentage of total of shares owned by the members of the board to sum total of firm outstanding shares (Thompson, 2016).
BOWN	Board ownership (Moderator)	The interaction between board size and managerial ownership of firm <i>i</i> at time <i>t</i> .
BSIZ*BOWN		The interaction between board independence and managerial ownership of firm <i>i</i> at time <i>t</i> .
BIND*BOWN		

Sources: Compiled by the Author, 2021

Model Specification

The model employed for testing the hypothesis in this study is as follows:

$$ROA_{it} = \alpha + \beta_1 Bsize_{it} + \beta_2 Bind_{it} + \epsilon_{it} \dots \dots \dots i$$

$$ROA_{it} = \alpha + \beta_1 Bsz_{it} + \beta_2 Bind_{it} + \beta_3 Bown_{it} + \beta_4 Bsz_{it} * Bown_{it} + \beta_5 Bind_{it} * Bown_{it} + \epsilon_{it} \dots \dots \dots ii$$

Results and Discussion

In this section, summary of descriptive statistics, correlation matrix and regression results is presented and discussed as follows;

Table 2: Descriptive Statistics

Variables	Min.	Max.	Mean	Std. Dev.
ROA	-0.07651	0.10134	0.04025	0.32013
BSIZ	6.88830	2.07128	4	14
BIND	0.44	0.78	0.521	0.155
BOWN	0.0015	0.65176	0.11306	0.18071
BSIZ*BOWN	0.00401	5.05822	1.00163	1.20042



BIND*BOWN 0.00036 0.45644 0.06393 0.13152

Source: Stata Output, 2021

From Table 2, shows an average figure of 0.040 and standard deviation of 0.120 for ROA implying low level of dispersion of the data. This followed by the minimum value of -0.44 and maximum values of 0.25. Board size has the minimum and maximum value 4.00 and 13.00 respectively, followed by the mean value 0.625 and a standard deviation of 0.975 implying deviation of data from the mean by 0.975. Board independence shows 0.50 as its minimum value and 1.73 as its maximum value respectively. Also, the mean value for board independence stood as 0.521 and standard deviation value of 0.055 indicating level of deviation of 0.055 which is relatively low to the mean. Board gender diversity has minimum value of 0.00 and maximum value of 0.63. This followed by the mean value of 0.191 and the standard deviation value of 0.187, indicating that the data for board gender diversity is dispersed from the mean at a low level.

Correlation Matrix

Table 3: Correlation Matrix

Variables	ROA	BSIZ	BIND	BOWN	BSIZ*BOWN	BIND*BOWN
ROA	1.0000					
BSIZ	-0.3016	1.0000				
BIND	0.1066	0.0330	1.0000			
BOWN	0.1252	-0.1711	-0.1107	1.0000		
BSIZ*BOWN	-0.1051	0.0042	-0.1036	0.9475	1.0000	
BIND*BOWN	-0.1442	-0.0917	-0.0380	0.9606	0.9191	1.0000

Source: Stata Output, 2022

Table 3, shows the correlation between the dependent variable, ROA and the independent variables of board size and board independence, on one hand, and among the independent variables themselves on the other. It also reveals the strength of association between the ROA and the moderator variable, the board ownership as well as the relationship between the ROA and the interaction variables. Logically, the degree association between the dependent and the independent variables is expected to be high, while on the contrary, the extent of association among independent variables themselves is expected to be low. Gujarati (2004) and Kennedy (2008) have suggested that, where a correlation coefficient among two or more independent variables shows a value that is equal to or higher than 0.80 such association is considered excessive. Therefore some measures are required to be taken in order to correct such anomaly in the data set.



As presented in Table 4, it can be observed that the correlation between the dependent variable ROA and the independent variables of board size shows negative coefficient of -0.3016 implying that the variable moves in opposite direction with the ROA. This means that increase in the value of board size can cause decrease in ROA. Board independence shows positive coefficients of 0.1066. This implies that variable of board independence is moving in the same direction with ROA, signifying that as the value of board independence increases, so the ROA increases. The correlation between board ownership (the moderator) and ROA is equally positive with coefficient of 0.1252. This sign of positive association implies that the independent variable of board ownership moves in the same direction with ROA, suggesting that as board ownership increases, so the ROA increases. However, all the interaction terms are negatively correlated to ROA. Meanwhile, both the interaction terms of board size with board ownership and board independence with board ownership reveals negative correlations coefficients of -0.1051 and -0.1442 respectively. The correlation between the independent variables themselves appeared not to be too high except for the interaction terms that show the highest correlations values which is however considered not harmful as noted out by Cohen (1992). This correlate result suggests the possible absence of harmful multi-collinearity (Gujirati, 2004 and Kennedy, 2008). Though, further robust test of variance inflation factor (VIF) and tolerance value (TV) need to be conducted to confirm the absence of potential multi-collinearity.

Regression Results and Discussion of Findings

In order to improve the robustness of the results, certain tests for multicollinearity and heteroskedasticity were carried out. The multicollinearity test for both Models show variance inflation factor and tolerance values of less than 10 and 1 respectively, explaining that the data used in the study does not contained any multicollinearity problems. The hetroskedasticity test for Model 1 showed a Chi² value 9.07 and a p-value 0.010 which is significant at 5%, whereas that of Model 2 reveals a Chi² value 6.12 and p-value 0.000 which is significant at 1% indicating hetroskedasticity problem in the data.

The fact that the studied data is in panel form, the fixed and random effect models were conducted for both Model 1 and 2, and Hausman Specification test was used to decide between the outcomes in both models. The results of the Hausman test for both reveals a Chi-square statistics of 17.62 and 28.19 for Model 1 and 2 respectively, both accompanied by p-value of 0.000 which are statistically significant at 1%. The implication of this significant p-value is that the fixed effect model results are preferred to the random effect model results both for Models 1.

Table 4 Summary of Fixed Effect Regression Results

Variables	Model 1			Model 2		
	Coefficient	t - value	p - value	Coefficient	t - value	p - value
Intercept	0.13156	2.126	0.000***	0.20314	3.117	0.000***
Bsiz	-0.00241	-0.034	0.356	-0.00602	-2.214	0.023**



Bind	-0.11063	-1.027	0.011**	0.15113	2.462	0.000***
Bown				0.28501	1.688	0.012**
Bsiz*Bown				0.14622	1.044	0.000***
Bind*Bown				-0.27790	-1.842	0.001***
R ² Within	0.4361			0.5604		
F - Stat	11.266			13.050		
Prob. > F			0.027**			0.000***
Hetest	9.07		0.010**	6.12		0.000***
Hausman	17.62		0.000***	28.19		0.000***

*** Denotes significance at 1%, ** Denotes significance at 5% & * Denotes significance at 10%.

Table 4 presents the summary of fixed effect regression results that were obtained using STATA. From the results, it can be seen that Model 1 has an R² Within of 43.61% while Model 2 has an R² Within of 56.04%. The higher R² Within in Model 2 implies that the inclusion of the two interaction terms has increased the model explanatory power by 12.42%. This is corroborated by the increase in F-Statistic from 11.266 in Model 1 to 13.050 in Model 2 as shown in the table. Both models have p-values of 0.027 and 0.000 respectively. This shows that both models are well fitted. Based on this therefore, the results obtained from these moderating terms as included in Model 2 are considered relevant and thus used in the study analysis to enable test the hypotheses formulated.

The Table shows that board size has negative coefficient of -0.00602 and p-value 0.023 with ROA which is significant at 5%. This implies that, holding all other factors constant 1 person increase in board size will lead to a decline in performance of firms quoted in oil and gas subsector in Nigeria by 0.006%. This results is consistent in with ishaku and Dandago (2017), but inconsistent with Orjinta and Evelyn (2018)

Board independence has positive coefficient of 0.15113 and p-value of 0.000 with ROA which is significant at 1%. This implies that, holding all other factors constant 1% increase in board independence will lead to an increase in performance of firms quoted in the Nigeria oil and gas subsector by 15.00%. The result is consistent with the resource dependency theory which predicted that inclusion of more independent directors on board increase firm chance of accessing huge resources from the outside; enhance board monitoring efficiency and performance. However, contradicted the findings of Hussain *et al.* (2018).

As for the moderator, the Board ownership shows positive coefficient of 0.28501 and p-value of 0.012 with ROA which is significant at 5%. The result indicates that holding all other factors constant, a unit increase in Board ownership is likely going to increase the performance of quoted firms in the Nigeria oil and gas subsector by 28,50. The result is in line with Jensen and Meckling (1976) who



assumes that higher proportion of board ownership unify the interests of management and shareholders. However, contradicted Gugong *et al.* (2015).

The interaction between board size and board ownership with ROA has positive coefficient of 0.14622 and p-value 0.000 which is significant at 1%. The result suggests that *ceteris paribus*, in firms quoted in oil and gas subsector in Nigeria, 1 person increase in board will likely increase their performance by 14.62% when board ownership is at 11.31%. The findings is in tandem with Jensen and Meckling (1976) who found that board ownership with a sufficient board size likely increase board monitoring effectiveness and enhance performance.

The interaction between board independence and board ownership with ROA provides a negative coefficient of -0.27790 and p-value of 0.001 which is significant at 1%. The result suggests that holding all other factors constant, 1% increase in board independence, the performance of quoted firms in the oil and gas subsector in Nigeria is likely going to decrease by 27.79% when board ownership is at 11.31%. The finding is in line with convergent hypothesis of agency theory which suggests that board shareholding enhance firm performance. However, contradicted Morck *et al.* (1988) who predicted that, firm performance rises when board ownership is between 0% and 25%.

Conclusion and Recommendations

The study investigates the effect of board mechanisms on financial performance of quoted firms in the Nigerian oil and gas subsector. It was found that board size has negative influence on their performance; whereas board independence has significant positive effect performance. Board ownership the moderator) has significant positive effect on performance. The study also found that the moderated board size has significant positive effect on performance, while the moderated board independence has significant negative effect on performance suggesting that increasing board size is contingent to a given degree on board ownership. Based on the findings above, the study recommends that, the quoted firms in the Nigerian oil and gas subsector should appoint an optimal number of directors on their boards since increasing board size on overall causes decrease in their performance; however, increase the existing proportion of board independence since it enhance performance. They are also advised to encourage their board members' especially the executive directors to acquire not less than 11 – 12% on average of their total outstanding shares since its increase board monitoring capacity and performance; however discourage independent directors excessive share ownership since it was found having significant negative effect on their performance.

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