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Board of Directors and Bankruptcy Risk Using GMM Approach

Mohammed Maidugu Umar[1], Onipe Adabenege Yahaya[2]

[1]NDA Postgraduate Program, Master of Science in Accounting, Nigerian Defence Academy, Kaduna, Nigeria.

[2]Associate Professor, Department of Accounting, Faculty of Management Sciences, Nigerian Defence Academy, Kaduna, Nigeria.

Correspondence: Mohammed Maidugu Umar. E-mail: ummaidugu@kadunapolytechnic.edu.ng

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Abstract

Motivated by agency theory, we investigate how a firm's overall quality of board of directors reduces its bankruptcy risk. Using 129 listed firms over a period of five (5) years (2017-2021) sample of firms with boards' data from the MachameRatios, we find that firms with stronger boards exhibit a higher ability to reduce bankruptcy risk. Board of directors' characteristic show mix results, for example, board independence, board female gender, board size show negative significant effects; board meetings (positive) and board ownership (negative) show insignificant effects. In terms of the three control variables, leverage, firm size and big4 show negative significant effects. The results are consistent with the notion that shareholders of firms with better boards quality are able to force managers to take measures to avoid or reduce bankruptcy risk, thereby ensuring that the going concern remains in place. We employ the Generalized Method of Moments approach to cope with possible endogeneity and still obtain consistent results. Our results are important as they show that corporate boards' quality does have a palpable impact on critical corporate phases such as bankruptcy risk. This study suffers from some limitations. First, the study sample is limited to only 645 observations. However, this is due to the number of listed firms with balanced data of the Nigerian Exchange. Second, the study period ended in 2021. Third, although this study examines the effect of corporate boards, not all board aspects have been examined in the study model. Nevertheless, this paper is significant to regulators, market players, banks, shareholders, corporate boards, management, lenders (creditors), and a number of other stakeholders. It offers empirical evidence for both policy improvement, performance improvement, future research and it provides additional body of knowledge.

Keywords: Bankruptcy Risk, Board of Directors, Board Female Gender, Board Independence, Board Meetings, Board Ownership, Board Size

JEL Codes:
G2, G32, G34

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1. Introduction

Bankruptcy risk (BR), sometimes, also known as bankruptcy likelihood, or financial distress likelihood, is a source of concern to corporate shareholders, boards, creditors (lenders), market participants, scholars and regulators in recent time. Furthermore, there are growing concerns about firms titling toward bankruptcy and many factors have been traced to be responsible for this scenario. However, these concerns continue to generate more inconclusive findings and therefore creating room for more research in the area. The aim of this study is to examine the role of board of directors in bankruptcy risk in Nigeria. A review of several empirical studies from continents in the world shows different results. Furthermore, the review also reveals the following research gap (1) most past studies were done outside Nigeria, but all the studies in Nigeria in particular ignore all listed firms (2) these past studies also completely ignore the endogenity across industries.

This study, therefore, seeks to address these research problems by firstly ensuring that variables like board size, board independence, board female gender, board meetings, board ownership that are mostly used as proxies of board of directors are included in our study. It is instructive to note that board of directors have been proxy variously with other measures, such as board accounting expertise, board finance expertise, board supervisory expertise, board tenure, board remuneration, and numbers of board committees. Secondly by ensuring an observation (645) of 129 listed firms over 5 years is used unlike previous studies that use firm-year observation. Thirdly, the study uses a Generalized Method of Moments (GMM) regression approach with period and cross sectional effects captured unlike previous studies that used mostly Ordinary Least Square regression which does not capture the heterogeneity and endogeneity effects of firms from different sectors and over different periods. Lastly, the study to the best of our knowledge will be the first in the context of Nigeria to use the Generalized Method of Moments to investigate the relationship between board characteristics and bankruptcy risk.

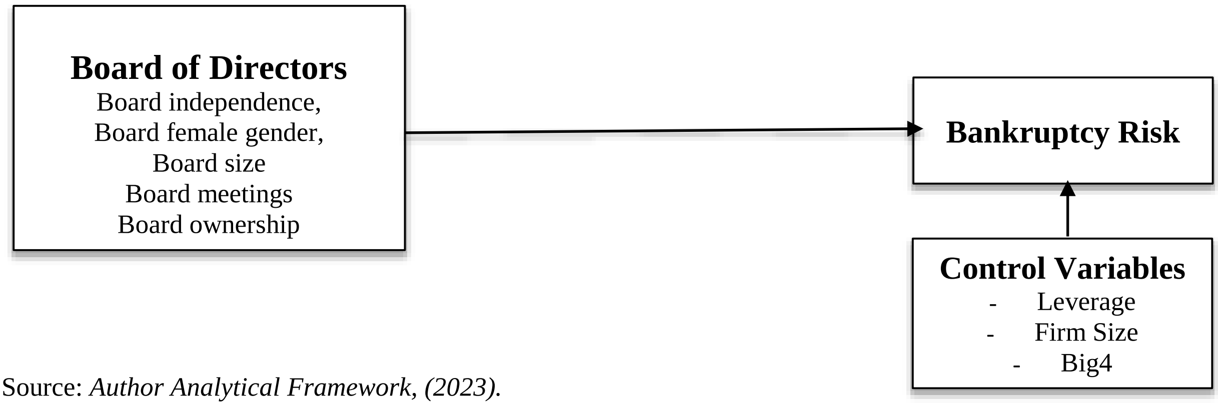
Listed firms in Nigeria are diverse and rich, which is a good basis for an empirical work that uses GMM because of the presence of endogeneity in panel data. Two types of differences usually arise (1) first, there are differences among firms and (2) there are differences across years, within a firm; both of these problems of endogeneity are resolved by use of GMM. Nigeria is an emerging economy, according to the World Bank; there is need, therefore, to conduct series of studies, like this study and several more, in order to avoid bankruptcy risk and corporations. Nigeria is ranked in the World at number 30 with a Gross Domestic Product of $477 billion, with a population of about 218.5 million people. These figures, no doubt, are potential markets for the world. Thus, there is need to carry out a study of this nature so as to warn corporations to avoid actions that could lead to bankruptcy.

The remainder of the paper is organized into four sections. Section 2 presents literature review, covering both conceptual, theoretical and empirical literature. Section 3 presents the methodology, covering research design, population and sample, sources and methods of data collection, analyses and post estimations diagnostics. Section 4 presents the descriptive statistics, correlation matrix and regression results. Section 5 presents the conclusions, drawn based on the empirical results and offers both policy and performance improvement recommendations based on the conclusions.

2. Literature Review

The agency theory has been widely adopted in diverse studies by scholars to provide theoretical understanding of the nexus between board of directors, as part of corporate governance mechanisms and bankruptcy risk in empirical literature. Basically, agency theory posits that companies' board of directors exist in order to protect the interests of shareholders. Agency theory, therefore, focuses in resolving conflicts of interest between shareholders and management. Thus, the analytical framework for this study will further be explained by the agency theory. The agency theory is the most widely used theory to explain the role of board of directors in corporations as going concern. Agency theory is derived from the concept of stewardship accounting, which recognizes that the shareholders are Principals, while the management of the firm are the Agents. To put it clearly, agency theory is a principle that is used to explain and resolve issues in the relationship between business principals and their agents. Most commonly, that relationship is the one between shareholders, as principals, and company executives, as agents.

Agency theory was developed by Jensen and Meckling in 1976, they suggested a theory of how the governance of a company is based on the conflicts of interest between the company's owners (shareholders), its managers and major providers of debt finance. Each of these groups has different interests and objectives. Whether a firm would be bankrupt or not would depend on an effective board of directors. With a sound and active board of directors, a firm which is generally accepted with a high board of directors will want to maintain its stewardship with stakeholders, specifically, shareholders by way of saving the firm away from bankruptcy. In effect, with board of directors' characteristics, organizations seek to ensure that they operate within the bounds and norms of the society and serve the owners well by projecting a sound management and run the firm on going concern basis. Board of directors can change the rules under which the agent operates and restore the principal's interests. The principal, by employing the agent to represent the principal's interests, must overcome a lack of information about the agent's performance. Agents must have incentives encouraging them to act in unison with the principal's interests. Figure 1 illustrates the interaction with bankruptcy risk likelihood and board of directors' characteristics (which include board female gender, board independence, board meetings, board ownership, and board size.



Source: *Author Analytical Framework, (2023).*

In terms of board of directors' characteristics, there are various views on the concept. Some authors proxy board of directors by board gender diversity, measured by the number of female directors sitting on the board. In this study, board independence (BI) is operationalized as the proportion of independent non-executive directors (NEDs) to the total number of board members (Number of independent non-executive board members divided by total number of board members (Ahmed & Duellman, 2007; Bhagat & Black, 2001; Boone et al., 2007; Hermalin & Weisbach, 2001; Krishnan, 2005; Kumar & Singh, 2012).

Furthermore, there is board meetings measured by the number of times the board meets in a given year. There is also board ownership, measured by the total directors direct and indirect shares owned divided by total numbers of shares (%). In conformity with previous studies that measured board size by the total number of company directors (Cheng, 2008; Karamanou & Vafeas, 2005; Kumar & Singh, 2012; Parsa & Kouhy, 2008), this study employs the number of members on the board as a measure of board size (Ahmed & Duellman, 2007; Bhagat & Black, 2001; Boone et al., 2007; Hermalin & Weisbach, 2001; Krishnan, 2005; Kumar & Singh, 2012).

In terms of bankruptcy, a bankruptcy score was derived as an index to measure bankruptcy risk (Alali et al., 2012; Alkhawaldeh et al., 2021; Arora, 2020; Ashbaugh-Skaife et al., 2015; Dasilas & Papasyriopoulos, 2015; Sareen & Vij, 2015; Skaife et al., 2004). In order to understand the relationship between board of directors characteristics considered in this study and bankruptcy risk, there have been various studies conducted inside and outside Nigeria. For example, Fich and Slezak (2008) examine financially distressed firms and document how board governance characteristics affect (1) a firm's ability to avoid bankruptcy and (2) the power of accounting variables to predict bankruptcy. Overall, their findings indicate that a distressed firm's board governance characteristics significantly affect its probability of bankruptcy. They find that smaller and more independent boards with a higher ratio of non-inside directors and with larger ownership stakes of inside directors are more effective at avoiding bankruptcy once distress is indicated.

Furthermore, Elloumi and Gueyie (2001) examine a sample of Canadian firms using results from logit regression analysis of 46 financially distressed and 46 healthy firms lead them to conclude that the board of director's explains financial distress, beyond an exclusive reliance on financial indicators. Additionally, supplemental results indicate that outside directors' ownership and directorship affect the likelihood of financial distress. In addition, Wilson and Altanlar (2009) examine the characteristics of the directors of private companies in relation to insolvency risk, with a specific focus on the incidence and impact of female directors. They analyze data on over 900,000 limited companies in 2007-8 including over 17,000 that ceased trading due to insolvency. In the context of an enhanced failure prediction model, which controls for a wide range of company, industry characteristics and governance, they isolate the effects of having female directors on the likelihood of insolvency.

Platt and Platt (2011) examine how the composition and characteristics of corporate boards relates to firms' success and solvency. This study finds that both board composition and member characteristics relate to whether or not firms can avoid bankruptcy. Boards have a major role to play in whether or not the company can remain solvent. A more versus less independent board, one which is larger and comprised of older members, has more members currently serving as CEOs of other companies, and whose independent/outside directors own less stock is best positioned to help a firm remain out of bankruptcy. Ciampi (2015) analyzes how the relationship between corporate governance mechanisms and business failure changes in small enterprises compared to larger firms. Logistic regression was applied to a sample of 934 Italian small enterprises and a small enterprises default prediction model built based on both financial ratios and corporate governance characteristics. The findings (1) a reduced number of outside directors on the board (no more than 50%) are significantly and negatively correlated with small company default and (2) corporate governance variables significantly improve the small enterprises default prediction accuracy rates.

Mathew et al. (2016) attempt to find whether board size, percentage of non-executive directors, women on the board, a powerful chief executive officer, equity ownership amongst executive board directors and institutional investor ownership are associated with firm risk using data sample that is unbalanced panel of 260 companies' secondary data on FTSE 350 index in the UK, from 2005 to 2010. The study establishes the board attributes that were significantly related to firm risk. The results show that a board which can increase firm risk is one that is small in size, has high equity ownership amongst executive board directors and has high institutional investor ownership. Also, Agarwal et al. (2016) uses a unique dataset that merges motor vehicle events with bankruptcy outcomes and personal data from Singapore, this study finds significant evidence of a gender gap in personal bankruptcy risk. Cho et al. (2021) empirically investigate the relationship between the gender-diversity and bankruptcy risks in Chinese-listed manufacturing firms using a sample of 4,079 firm-year observations from 2005–2016, they find that, at the executives' level, firms with greater gender-diversity have a lower propensity for bankruptcy risk compared to firms with lower gender-diversity. Maier and Yurtoglu (2022) estimate classic Z-Score models using panel data comprising 2,519 listed non-financial firms from 29 European countries over the 2012–2020 period. They found that board independence is associated with lower risk of bankruptcy. The presence of female directors on board reduces bankruptcy risk. While board independence and diversity decrease bankruptcy risk in financially non-distressed firms, they have the opposite effect in financially distressed firms.

3. Methodology

This section explains the techniques and approach employed in carrying out the empirical study on the quality of board of directors' characteristics and bankruptcy of listed companies in Nigeria. To this end, the section begins with the research design, closely followed by the population of the study. This is followed by the sample size and sampling techniques, before we have a method of data collections which is closely followed by model specification and technique of data analysis. In this study, the research method adopted was an expo-facto type of research and content analysis technique. The study is longitudinal covering a period of five (5) years. That is, from 2017 to 2021 employing companies quoted in the Nigerian Exchange. The population of the study consists of one hundred and twenty-nine (129) companies quoted on the floor of the Nigerian Exchange (NSE) as at 31st December, 2021. The financial statements of these quoted firms were statutorily published and made available to the general public. The sampling technique employed was purposive since companies were included in the sample if they meet the criteria for selection. These criteria were based on: the companies are quoted on the Nigerian Exchange for 2017-2021; there were access to their annual financial reports within the period. Newly listed firms and delisted firms were excluded from the study. Thus, only firms that had all relevant data due to continuous existence. Our final sample size as aforementioned was arrived at based on the availability of data for five years for all the research variables. The sample consists of firms from: agriculture, conglomerate, construction/real estate, consumer goods, financial services, healthcare, ICT, industrial goods, natural resources, oil and gas, and services.

The study uses secondary data (historical data) collected in respect of the variable captured covering the time frame of five years (2017 to 2021) which were obtained from the financial statements and accounts of the sampled firms. Most previous studies have used annual financial statements. According to Gray et al (1995), annual financial statements is the main official and legal document produced by companies on a regular basis and an important medium for their communications. Companies exercise control over the annual financial statements to prevent any possible journalistic information distortion or interpretation (Gray et al., 1995). According to Tilt (2001), financial statements are mandatory by legislation to be regularly produced particularly by all quoted corporate entities and by these facts making comparisons quite easy or simple. We operationalize our variables and a priori signs in Table 1 as follows.

Table 1 *Measurement of variables and expected signs*

Serial	Variables	Notation and sources	A priori sign
1	Y – Bankruptcy risk	BR, measured as 1.2 [Working Capital/Total Asset] +1.4[Profit after Tax/Total Asset] +3.3[Profit before interest and tax/Total Asset] +0.6 [Market Capitalization /Total Liabilities] +1.0[Revenue/Total Asset]	
2	X_1 – Board female gender	Board female gender (BFG) measurement is by the number of female directors sitting on the board (Rao, Tilt & Lester 2012)	+
3	X_2 – Board independence	Board Independence (BI) is measured using number of independent non-executive board members divided by total number of board members (Ienciu, 2012)	+
4	X_3 – Board meetings	Board meetings (BM) is measured by the number of times the board meets in a given year (Al-Shammari & Al-Sultan 2010).	+
5	X_4 – Board ownership	Board ownership, measured as total directors direct and indirect shares owned divided by total numbers of shares (%)	+
6	X_5 – Board size	Board Size (BS) was measured by the number of directors sitting on the board (Parsa & Kouhy, 2008)	+
7	X_6 – Leverage	LEV is measured as total liabilities divided by total asset	+
8	X_7 – Firm size	(i)Firm Size (FS) is measured in terms of natural log of total assets (Galani et al., 2011)	+
9	X_8 – Big4	Big4 measured as dummy where "1" is assigned to companies that use PWC, Deloitte, E&Y and KPMG as external auditors and "0" otherwise.	+

Source: Author's Compilation (2023)

In this study, a model was specified to capture board of directors' characteristics and bankruptcy risk. Thus, the study adapted the model specified by Maeir and Yurtoglu (2022) which was modified for the purpose of establishing the relationship between dependent variables and the linear combinations of several independent variables captured in the study. The model reflects the identified board characteristics and bankruptcy risk. The model was specified as:

$$BR_{i,t} = \beta_0 + \beta_1 BFG_{i,t} + \beta_2 BI_{i,t} + \beta_3 BM_{i,t} + \beta_4 BO_{i,t} + \beta_5 BS_{i,t} + \beta_6 LEV_{i,t} + \beta_7 FS_{i,t} + \beta_8 BIG4_{i,t} + \varepsilon_{i,t}$$

Whereas:

BR = Bankruptcy risk

BFG = Board female gender

BI = Board independence

BM = Board meetings

BO = Board ownership

BS = Board size

LEV= Leverage

FS = Firm size

BIG4 = Big4 for audit quality

ε= Stochastic disturbance

i = ith firm (in this case, the firms are 129)

t = time period (in this case, t = 5 years)

Based on previous research (Ahmad, et al., 2003; Ahmad & Osazuwa, 2015; Choi, 1999; Juhmani, 2014; Akbaş 2014; Murcia & Souza, 2009; Andrikopoulos & Kriklani, 2013). The model is adapted to depict the relationship between board of directors' characteristics and bankruptcy risk. Thus, our a priori expectations are:

$X_1>0$: Means that a rise in board female gender will generate a decrease in bankruptcy risk.

$X_2>0$: Means that a rise in board independence will generate a decrease in bankruptcy risk.

$X_3>0$: Means that a rise in board meetings will generate a decrease in bankruptcy risk.

$X_4>0$: Means that a rise in board ownership will generate a decrease in bankruptcy risk.

$X_5>0$: Means that a rise in board size will generate a decrease in bankruptcy risk.

The econometric techniques adopted in this study is the Generalized Method of Moments technique. The rationale for its usage is based on the following justifications: the data collected have time and cross-sectional attributes that gives room for studying board of directors characteristics and bankruptcy risk over time (time series) as well as across the sampled firms (cross-section); panel data regression provides better results since it increases sample size and reduces the problem of degree of freedom (Muhammad, 2012); it avoids the problem of multicollinearity and help to capture the individual cross-sectional (or firm-specific) effects that the various pools may exhibit with respect to the dependent variable in the model. Hausman and Taylor (1981) also recommended panel data estimation method because it enables a cross-sectional time series analysis which usually makes provision for a broader set of data points, but also because of its ability to control heterogeneity and endogeneity issues. Hence panel data estimation allows for the control of individual-specific effects usually unobservable which may be correlated with other explanatory variables included in the specification of the relationship between dependent and explanatory variables.

In evaluating the panel regression results, the GMM is used. The individual statistical significance test (T-test) and overall statistical significance test (F-test) are also used. Importantly, the goodness of fit of the model will be ascertained using the coefficient of determination (R^2). Our panel analysis will be done after descriptive statistics, correlation analysis. All analyses will be conducted at 5% level of significance using STATA 15, Version 1 software.

4. Results and Discussion

Table 2 reports the results of descriptive statistics of 129 firms over 2017 to 2021, showing the number of observations (obs), central mean (average), standard deviation (Std. Dev., volatility), minimum mean (min) and maximum mean (Max).

Table 2 *Descriptive Statistics*

Variable	Obs	Mean	Std. Dev.	Min	Max
BR	645	54.364	18.493	16	100
BI	645	73.433	12.994	16.67	100
BG	645	15.535	13.431	0	66.67
BS	645	9.256	3.163	3	21
BM	645	4.896	1.751	1	16
BO	645	22.254	28.204	0	100
LEV	645	71.304	46.67	.67	395.45
SIZE	645	4.859	1.019	2.62	7.45
BIG4	645	.555	.497	0	1

Source: STATA 16 Outputs

Legends:

BR = Bankruptcy Risk

BI = Board Independence

BG = Board Gender

BS = Board Size

BM = Board Meetings

BO = Board Ownership

LEV = Leverage

SIZE = Firm Size

BIG4 = Big Four Audit Firms

The results in Table 2 show that the number of observations is 645 (129 firms multiplied by 5 years). Furthermore, bankruptcy risk (BR) averages 54.364, which means that about 54 percent of the listed firms, under consideration are exposed to bankruptcy risk. The standard deviation is 18.493, and relative to the mean, is 34 percent. The minimum and maximum means are 16 and 100 percent, respectively, meaning that some of the firms are severely under distress and facing bankruptcy risk. On the independent variables, board independence averages 73.433 percent, meaning that about 73 percent of the firms have boards that are mostly consist of independent non-executive directors. It shows a standard deviation of 12.994 percent, which compares with the mean shows about 18 percent. The minimum and maximum means are 16.67 and 100 percent, respectively.

Board female gender (BG) averages 15.535 percent, meaning that about 16 percent of the firms have at least a woman on their boards. The standard deviation is 13.431 percent, which is worrisome, because it is 87 percent relative to the mean. The minimum and maximum means are 0 and 66.67 percent, respectively, meaning that some firms do not have female directors at all on their boards. Furthermore, board size averages 9 members, with a standard deviation of 3 members and minimum and maximum means are 3 and 21 members, respectively. Furthermore, board meetings show averages of about 5 times, with a standard deviation of 1 time and minimum and maximum means are 1 and 16 times in a year, respectively. Finally, board ownership averages 22.254 percent of the equity shares of the firms under consideration. The standard deviation is 28.204 percent, which is higher than the mean (127 percent), suggesting that the level of volatility is worrisome. The minimum and maximum means are 0 and 100 percent, respectively, suggesting that some firms are fully owned by board members. On the control variables, leverage averages 71 percent, which is high, with standard deviation of 46.67 percent, which is volatile (66%) relative to its mean. The minimum and maximum means are .67 and 395.45 percent, respectively, which is extremely worrisome. In addition, firm size averages 4.859, with a standard deviation of 1.019 and minimum and maximum means are 2.62 and 7.45 points, respectively. Finally, big4 averages .555 points, with standard deviation of .497, which is high relative to its mean (90%). The minimum and maximum means are 0 and 1, respectively.

Table 3 reports the results of correlation analysis, showing the bivariate relationship between two variables and to determine whether there exists, multicollinearity among both the independent and control variables.

Table 3 *Results of Correlation Matrix*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) BR	1.000								
(2) BI	-0.088*	1.000							
	(0.027)								
(3) BG	-0.146*	0.136*	1.000						
	(0.000)	(0.001)							
(4) BS	-0.079*	0.054	0.115*	1.000					
	(0.045)	(0.176)	(0.004)						
(5) BM	0.009	0.002	0.103*	0.334*	1.000				
	(0.830)	(0.951)	(0.010)	(0.000)					
(6) BO	-0.038	0.011	-0.007	-0.073	-0.058	1.000			
	(0.329)	(0.776)	(0.862)	(0.064)	(0.148)				
(7) LEV	-0.416*	-0.065	0.053	-0.140*	0.007	0.059	1.000		
	(0.000)	(0.103)	(0.180)	(0.000)	(0.864)	(0.138)			
(8) SIZE	-0.028	-0.102*	0.156*	0.640*	0.379*	-0.221*	-0.018	1.000	
	(0.479)	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.657)		
(9) BIG4	0.124*	0.073	0.235*	0.353*	0.284*	-0.283*	-0.066	0.539*	1.000
	(0.002)	(0.067)	(0.000)	(0.000)	(0.000)	(0.000)	(0.093)	(0.000)	

**** $p<0.01$, ** $p<0.05$, * $p<0.1$*

Source: STATA 16 Outputs

First, the results in Table 3 show that board independence and bankruptcy risk have negative significant relationship. Second, board female gender shows that it has negative significant association with bankruptcy risk. In the same vein, board size shows that it has negative link with bankruptcy risk. Board meetings show that it is not significant in relation to bankruptcy risk. Also, in the same vein, board ownership is not significant in relation with bankruptcy risk. All the control variables show significant relations with bankruptcy risk.

Furthermore, we examine the regression effects of board characteristics on bankruptcy risk for 129 firms over 2017 to 2021 years (5) and the results are shown in Table 4.

Table 4 *Results of Regression Analysis*

Number of parameters = 9

Number of moments = 9

Initial weight matrix: Unadjusted

Number of obs = 645

GMM weight matrix: Robust

	Coef.	Robust Std. Err.	z	P>z	[95% Conf.	Interval]
BI	-.0361885	.054756	-0.66	0.040	-.1435083	.0711312
BG	-.2128065	.0510629	-4.17	0.000	-.1127251	.3128879
BS	-.3718213	.2620374	-3.42	0.015	-.1417625	.8854051
BM	.190654	.3765829	0.51	0.613	-.547435	.9287429
BO	-.02805	.0246651	-1.14	0.255	-.0763926	.0202926
LEV	-.1818216	.0173706	-10.47	0.000	-.2158673	-.1477759
SIZE	-3.416106	.9162553	-3.73	0.000	-5.211933	-1.620279
BIG4	-3.63869	1.697439	-2.14	0.032	-.3117702	6.96561
/b0	78.03334	6.08708	12.82	0.000	66.10288	89.9638

Instruments for equation 1: BI BG BS BM BO LEV SIZE BIG4 _cons

Source: STATA 16 Outputs

First, the results in Table 4 confirm that the number of observations is 645. Also, the number of variables are 9, of which the dependent variable is 1, independent variables are 5 and the control variables are 3. The regression results in Table 4 are from GMM and robust and therefore can be presented. From the table, it means that every unit increase in board independence, bankruptcy risk would reduce by 3.6%. Furthermore, every increase in board female gender will lead to reduction of 21% in bankruptcy risk. Also, every unit increase in board size will lead to reduction of 37% in bankruptcy risk. Both board meetings and board ownership have no significant effects on bankruptcy risk. From the results in Table 4, the three control variables are significant. First, every unit increase in leverage will lead to reduction of bankruptcy risk by 18%. Similarly, every unit increase in firm size leads to 3 times reduction in bankruptcy risk. In the same vein, engagement of a big4 auditor leads to reduction of about 4 times reduction in bankruptcy risk.

Furthermore, the results in Table 4 show that board independence, board female gender and board size show significant negative effects on bankruptcy risk. In contrast, board meetings and board ownership show insignificant effects on bankruptcy risk. Thus, Hypotheses 1, 2 and 3 are hereby rejected, because board independence, board female gender and board size have significant effects on bankruptcy risk. In sharp contrast, Hypotheses 4 and 5 are hereby accepted, since board meetings and board ownership show insignificant effects on bankruptcy risk. These results are consistent with our a priori expectations and prior studies (Agarwal et al., 2016; Cho et al., 2021; Ciampi, 2015; Elloumi & Gueyie, 2001; Fich & Slezak, 2008; Maeir & Yurtoglu, 2022; Mathew et al., 2016; Platt & Platt, 2011; Talbi & Menchoui, 2022; Wilson & Altanlar, 2009).

5. Conclusions and Recommendations

This paper examines the effects of board of directors' characteristics on bankruptcy risk of listed firms in Nigeria using the Generalized Method of Moments because prior empirical studies have shown strong predictive power for bankruptcy risk of firms. Yet, few studies have been carried out to examine whether board characteristics contribute to the predictive power of firms' bankruptcy risk. In this paper, we contribute towards this debate using a cross-sector sample of listed firms in Nigeria, using a data set from MachameRatios® on board characteristics and bankruptcy risk. The findings of our empirical analysis can be summarized as follows.

Board of directors' characteristic show mix conclusions, for example, board independence, board female gender, board size are determinants of bankruptcy risk of listed firms in Nigeria. Board meetings and board ownership are not determinants of bankruptcy risk and therefore, money, time and energy should not be wasted on them. In terms of the three control variables, leverage, firm size and big4 are also determinants of bankruptcy risk in listed firms in Nigeria. Thus, we have provided evidence that board characteristics enhance the predictive power of bankruptcy risk.

In our study, heterogeneity arising from differences in the characteristics of the firms and across periods of study are resolved using the Generalized Method of Moments. Our results highlight the need for scholars, practitioners and policy-makers, such as regulators, credit rating agencies, banks, insurance firms, lenders, market participants, to better understand the drivers of board characteristics, specifically when it comes to bankruptcy of firms in Nigeria, and by extension, in emerging countries. Further research can be carried out to examine whether our results were driven by subsamples of agriculture sector, conglomerates, consumer goods sector, industrial goods sector, financial services sector, services sector, oil and gas sector, natural resources sector, healthcare sector and information and communications technology sector. This exercise can be conducted to by splitting the sample into sectors. It is also meaningful to split the sample into different stages of bankruptcy risk.

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