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The Effect of Board Characteristics on Banks' Insolvency Risk: Empirical Evidence from an Emerging Economy

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Abstract: Bank failures have become a classic topic in the history of corporate finance literature. The reason is that these failures are caused by a sustained increment in insolvency risk from the global economic crisis in 2009, which came as a shock to most bank chief executives and board members, leaving them to contemplate how to reduce such risk. Most managers of banks in other countries keep asking themselves questions as to whether these problems experienced by the world's biggest banks could happen to them, not forgetting the financial crisis in Ghana in 2019, which led to the government of Ghana to force banks to adhere to the Basell Banking Supervision Regulatory Framework (Basell accord) to address the inefficiencies in the Ghanaian financial market to make it more resilient to shocks and risks in the long term. Hence, this study looks at the effect of board characteristics on insolvency risk, which has the tendency of strengthening the financial market of Ghana against possible liquidation. Board characteristics are measured using gender diversity and board meetings, while ownership identity is measured using institutional and director ownership. Insolvency risk is measured using a Z-score. The purposive sampling technique was used in selecting the banks for the study. Data was collected from a sample of nineteen (19) out of 23 banks in Ghana from 2008 to 2020. A panel data analysis was used for the study. Using pooled ordinary least squares, fixed effect, random effect, and system generalized method of moments, the results indicated a positive significance of board meetings and a negative significance of gender diversity in banks' insolvency. The study recognizes the importance of gender diversity on the board and institutional and director ownership, which enhances efficiency and shareholder wealth maximization.

Keywords: bank, insolvency, risk, board, performance

1. Introduction

A bank failure happens when a bank becomes insolvent or too illiquid to satisfy its liabilities, making it impossible for it to pay its depositors or other creditors. When the market value of a bank's assets is less than the market value of its liabilities, the bank usually experiences economic insolvency. Failures of banks have become an important topic in the history of corporate finance literature. The reason is that these failures are caused by a sustained increment in insolvency risk from the global economic crisis in 2009, which came as a shock to most bank chief executives and board members, leaving them to contemplate how to reduce risk [1]. Most managers of banks in other countries keep asking themselves questions as to whether these problems experienced by the world's biggest banks could happen to them [2]. The Basell Banking Supervision Regulatory Framework (Basell accord) was formulated to address the inefficiencies in the financial market to make it more resilient to shocks and risks. According to Ali et al. [3], bank risk can be defined as the inability of a bank to honor its long-term obligations, which stem from an extension of short-term debts, and risk cannot always be regarded as a hazard but can also lead to value enhancement.

The Ghanaian banking industry was not left out as it had its fair share of the crisis in 2017–2020 when the Central Bank (Bank of Ghana) conducted a financial sector clean-up, which provided relevant lessons for others to learn. The regulator, the Bank of Ghana, embarked on this exercise to restructure the financial system, making it more resilient to shocks and risks. In line with the Basel I accord, the regulators increased the capital of banks from GH¢ 120 million in 2013 to GH¢ 400 million in 2017 [4]. The aftermath of this led to the winding-up of some banks, while others merged, leaving 23 banks operating as universal banks after 9 banks lost their licenses [5]. The Bank of Ghana, in its address on the issue, mentioned that the collapse of these banks resulted from weak corporate governance on the part of the board of directors.

Corporate governance comprises policies, laws, and instructions that affect the management and control of firms, ensuring transparency and fairness in dealings with stakeholders. This framework is made up of internal and external contracts existing between employees and shareholders covering how responsibilities are disseminated and how rewards and conditions assist in steering clear of conflicts of interest [6], as this is crucial for the banks' survival

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(solvency). According to the Bank of Ghana, the board of directors and owners failed in their monitoring role in overseeing the affairs of the banks' governance and reporting system due to a lack of understanding, ignorance, experience, and self-seeking interest among themselves.

Ownership plays a vital role in the level of risk taken by banks, which has an impact on governance and insolvency risk. This is because owners, especially institutional shareholders, have a strong incentive for monitoring, and would naturally take decisions that positively affect their investment. Directors also protect their human capital or investment, so they are careful when it comes to risk-taking as this could lead to value distraction when there is a strong friendship between the board and the manager [7]. The presence of females on the board is an influential factor because women are more risk-averse than men. Through regular meetings, owners put pressure and strong monitoring incentives on managers to be transparent regarding risk-taking and disclosures to have access to secure information relating to risk to gain a competitive advantage and to reduce insolvency risk [3] of financial firms. Shareholders need information from managers about the operation of the business to reduce abuse of power, shirking, perks, entrenchment, and self-dealing of managers at the cost of the bank.

Previous empirical literature from Garcia-Lacalle et al. [6] looked at corporate governance and risk in different areas such as in the area of market risk. Additionally, Ali et al. [3] also examined liquidity, insolvency, and capital risk. However, none of them investigated how ownership enhances or worsens banks' insolvency risk. Due to the unresolved implications of corporate governance on bank insolvency, the investigators of this study were motivated to explore the effect of board characteristics on banks' insolvency risk in Ghana. The study's objectives are to examine the effect of board characteristics on insolvency risk, assess the effect of ownership identity on insolvency risk, and examine the moderating effect of ownership identity on the relationship between board characteristics and insolvency risk.

2. Literature Review

Several organizational theories explain and support the basis of establishing strong corporate governance to reduce the insolvency risk of financial firms. These theories include agency theory, stakeholder theory, and resource dependency theory.

2.1. Agency theory

Agency theory is explained to be the relations existing between managers and shareholders in business aimed at resolving problems within the agency relationship. This theory describes an organization as an important structure through which it is likely to apply relevant ideologies, such as board characteristics and risk. This idea depends on the relationship between agents and their principals, which is reinforced by the principal (manager) of an organization recruiting professionals to monitor the agent [8]. The theory explains that moral hazards and unfavorable selection of alternative programs influence the output of the agent [9]. The agency theory further explains that organizations have economic incentives to report on any relevant program that seeks to reduce insolvency risk. Agency theorists argue that corporate governance should lead to less risk when efficient supervision of managers. Agency theory posits that corporate managers pursue their own interest in protecting their undiversified human capital and investment rather than maximizing shareholder wealth, hence resulting in a conflict of interest between owners and managers; however, friendship with managers can influence more risk, thereby endangering the firm. In this regard, Adeabah et al. [10] asserted that shareholder-friendly corporate governance encourages risk-taking.

2.2. Stakeholder theory

Garcia-Lacalle et al. [6] suggest that a company's stakeholders are groups that determine the survival and existence of a business entity, and these groups include customers, employees, suppliers, political action groups, environmental groups, local communities, the media, financial institutions, governmental groups, and more. The theory posits that managers should not focus only on maximizing shareholders' wealth but should also have the interest of other stakeholders in mind since they determine the banks' survival by patronizing their products and services, as businesses, even the most successful ones, cannot exist in a vacuum. As posited by Cal et al. [11], it requires that there be investors to give them money, suppliers to sell them the goods that they will sell, customers to buy their goods or services, employees to serve the customers, and the community within which they operate. If any of these groups are absent, the business cannot be successful in the long term. Therefore, it is important for managers not only to think about the success of the business but also to give back to the society that made it grow.

2.3. Resource dependency theory

According to Barney [12], resource dependency theory is an approach that will enhance the company's ability to compete and improve its financial performance and control and utilize assets that are considered important resources. Resources can be said to be important if they meet three criteria: 1) these resources help companies get business opportunities, 2) these resources are difficult to be imitated or acquired in the market, and 3) these resources can be used for the benefit of the company itself. Nwoloziri et al. [13] provide theoretical reasons for the resource-based theory, discovering that resources are exclusive when they have an impact on the firm's strategies and are exclusively used by the firm alone. The theory is an economic model used by organizations to decide strategic resources that help the bank gain a competitive advantage over other firms, thereby owning resources that are heterogeneous and not completely mobile. These resources are heterogeneous when great efforts are needed to convert them into priceless resources that are neither absolutely imitable nor substitutable by other firms, namely, firm attributes and information, assets, abilities of the firm, and the acquisition of knowledge by employees and management, which help them to enhance efficiency and effectiveness [14]. Zameer et al. [15] mentioned that the green practices and environmental situation of a firm can influence the sustainable competitive advantage of the firm. Organizations can control the environmental factors to generate a more competitive advantage toward employee efficiency using conditions such as scarcity, imitability, and value [16], to enable the firm to exploit and handle long-term risk. Resources controlled by competitors instead of the company are scarce and rare.

3. Methodology

Data from the Bank of Ghana, Ghana Stock Exchange Fact Book series, Annual Report Ghana, companies' websites, and African Financials were used for the study covering 2008–2020.

Data were collected from a sample of nineteen (19) out of 23 banks in Ghana.

The research employs a quantitative approach to the investigation. Nineteen universal banks in Ghana from 2008 to 2020 make

Table 1
Variable description, measurement, and a priori expectation of parameters

Variable	Label	Description and measurement	A priori expectation	Source
Z-score of insolvency risk	Lnzscore	Return on assets plus capital adequacy ratio divided by sigma of return on assets	+/–	Smaoui, Mimouni, and Temimi (2019); Beck and Laeven (2006); Hesse and Čihák (2007)
Gender diversity	gnd_dumy	Proportion of female directors present on the board (dummy)	+/–	Garcia-Lacalle, Royo, and Yetano (2021); Adeabah, Gyeke-Dako, and Andoh (2018)
Board meeting	bd_mtg	Number of efficient meetings in the financial year	+/–	Garcia-Lacalle, Royo, and Yetano (2021); Ali, Hussain, and Iqbal (2020)
Director/managerial ownership	d_own	Percentage (%) of shares owned by directors or managers	+/–	Ali, Hussain, and Iqbal (2020); Purwanto (2011).
Institutional ownership	inst_own	Ratio of the number of shares held by institutional investors to the total number of outstanding shares	+/–	Ali, Hussain, and Iqbal (2020); Suryonugroho (2016)
Majority share ownership	maj_own	Individuals or institutions with the highest shares	+/–	Garcia-Lacalle, Royo, and Yetano (2021); Ali, Hussain, and Iqbal (2020)
Liquidity	Liq	Profit before interest and tax plus depreciation plus amortization of dividends to total assets	+/–	Garcia-Lacalle, Royo, and Yetano (2021); Smaoui, Mimouni, and Temimi (2019); Adeabah, Gyeke-Dako, and Andoh (2018)
Total-loans-to-total-assets	tln_ta	Ratio of total loans to total assets	+/–	Čihák and Hesse (2010)
Firm age	f_age	Year of incorporation	+/–	Garcia-Lacalle, Royo, and Yetano (2021); Adeabah, Gyeke-Dako, and Andoh (2018)
Firm size	f_size	Natural log of total assets	+/–	Garcia-Lacalle, Royo, and Yetano (2021)
Inflation	Infl	Consumer Price Index of Ghana (period average)	+/–	Garcia-Lacalle, Royo, and Yetano (2021)
Real interest rate	lnintr_rate	Real interest rate measured as the nominal interest rate of Ghana, adjusted for inflation (period average)	+/–	Garcia-Lacalle, Royo, and Yetano (2021)

up the study population. The banks are chosen based on how long they have been in business. It also relies on whether the bank is still operating at the time of the investigation and the information that is accessible. The sample uses universal banks that operated between 2008 and 2020. The study employs secondary data from financial firms listed in Ghana that have operated for a period of 13 years, spanning from 2008 to 2020. Banks that were liquidated between 2008 and 2020 and were not in operation prior to 2008 were not included in the investigation. Additionally, banks whose data were not up to five years old were not included. The data and details of these banks were obtained in Ghana from the Fact Book, banks' websites, the Ghana Stock Exchange website, and the Annual Reports Ghana database. Data were manually collected or hand-picked and entered into Excel and imported into STATA for the analysis.

An analysis was done to ensure the data were recognized as panel data, and the results indicated strongly balanced data. Firms that did not meet the selection criteria, especially with data about the ownership variable, were dropped, leaving nineteen (19) banks that were used for the study from 2008 to 2020. The control variables are made up of firm age (firm-level measurement), majority ownership, firm size, liquidity, loan-to-asset ratio, real interest rate, and inflation rate (macroeconomic variable). Specific variables were derived from the annual financial statements of both listed and unlisted banks. Also,

ownership variables were derived from the shareholding distribution schedule from selected banks' financial statements.

The study presents how corporate governance mechanisms of board characteristics and director ownership could influence the insolvency risk of banks. The researchers were therefore aided in testing the relationship between the variables in an empirical manner by the positivist epistemological approach, which emphasizes objectivity, observable evidence, and the scientific process to obtain knowledge. Using the Hausman specification, the research employed pooled ordinary least squares (OLS), fixed effect, random effect, and system generalized method of moments (GMM) model to determine the effect of board characteristics on insolvency risk.

3.1. Econometric model

The general linear form of panel data can be written as:

$$Y_{it} = \alpha_{it} + X_{it}\beta_i + \ell_{it} \quad (1)$$

where i represents the cross-sectional dimension and t is the time-series dimension. This means that the same information on a cross-section of banks surveyed over time and across space. Y_{it} is the dependent variable in the model. X_{it} represents the independent variable. ℓ_{it} represents the error term, α_{it} is the intercept, and β_i is the coefficient in the model, while μ represents the firm-specific effect. However, to achieve the objective of this study, a model, which includes board characteristics, ownership identity model, and insolvency risk, is specified. The functional forms of the model used in this study are standard in finance theory. Following the studies of Kosmidou et al. [17] and Bikker and Vervliet [18], the researchers set a model to capture the objectives of the investigation to examine the effect of board characteristics on banks' insolvency risk as follows:

$$\begin{aligned}\ln \text{Z-score}_{it} = {} & \beta_0 + \beta_1 \text{gnd\_dumy}_{it} + \beta_2 \text{bd\_mtg}_{it} + \beta_3 \text{lnf\_age}_{it} \\ & + \beta_4 \text{lnintr\_rate}_{it} + \beta_5 \text{liq}_{it} + \beta_6 \text{t ln\_ta}_{it} + \beta_7 \text{f\_size}_{it} \\ & + \beta_8 \text{infl}_{it} + \beta_9 \text{maj\_own}_{it} + \beta_{10} \text{d\_own} \\ & + \beta_{11} \text{inst\_own} + \text{u}_{it}\end{aligned} \quad (2)$$

The variables in the mathematical model were obtained from Table 1.

4. Results and Analysis

From Table 2, Z-score has a minimum of −4.48, a mean of 100.8, and a maximum of 1198.504, with a standard deviation of 210.263 over the period under review. Institutional ownership and director/managerial ownership both had minimum values of 0.00, mean values of 21.327% and 3.657%, maximum values of 97.91 and 27.02, and standard deviations of 23.892 and 6.341, respectively, over the period under consideration. Board meeting and gender diversity had minimum values of 1.386 and 0, mean values of 2.475% and 0.82%, maximum values of 5.198 and 1, and standard deviations of 0.511 and 0.385, respectively.

Majority ownership has a standard deviation of 21.689, as well as a minimum value of 0.00, a mean of 29.363, and a maximum of 97.91. Firm age, total-loan-to-total-assets, liquidity, and interest rate have a minimum of 0.693, 0.00, 0.001, and 13.56, a mean of 2.998%, 7.478%, 1.978%, and 20.54%, and a maximum of 4.234, 857.593, 23.107, and 26.5, respectively. Firm size and inflation report a minimum of 10.766 and 1.964, a mean of 15.736 and 2.487, and a maximum of 20.415 and 3.284 with a standard deviation of 1.568 and 0.322, respectively, per the variables under study.

Table 2
Descriptive statistics

Variable	Mean	Std. dev.	Min	Max
Lnzscore	100.844	210.263	–4.482	1198.504
bd_mtg	2.475	0.511	1.386	5.198
gnd_dumy	0.82	0.385	0	1
d_own	3.657	6.341	0	27.02
inst_own	21.327	23.892	0	97.91
maj_own	29.363	21.689	0	97.91
tln_ta	7.478	67.633	0	857.593
f_age	2.998	0.798	0.693	4.234
f_size	15.736	1.568	10.766	20.415
Liq	1.978	3.134	0.001	23.107
Infl	2.487	0.322	1.964	3.284
lnintr_rate	20.54	4.134	13.56	26.5

Table 3 presents the correlation matrix for the variables used in the study. Variables with more than 0.8 value are seen to be highly correlated [19]. The correlation matrix above specifies that the variable relationships were generally lower, which illustrates correlation efficiency, being an indication of no strong correlation between the variables. From Table 3, board meeting, gender diversity, director ownership, firm size, and liquidity have a positive relationship to insolvency risk, with coefficients of 0.2830, 0.1196, 0.1460, 0.0136, and 0.0039, respectively. Meanwhile, institutional ownership, majority ownership, total-loans-to-asset, firm age, inflation, and real interest rate have a negative correlation with insolvency risk, with coefficients of −0.2923, −0.1676, −0.0630, −0.3619, −0.0366, and −0.0194, respectively.

Gender diversity, director ownership, institutional ownership, majority ownership, total-loans-to-assets ratio, and liquidity have a positive relationship with board meeting, with coefficients of 0.2596, 0.2665, 0.0597, 0.0742, 0.0065, and 0.1770, respectively. Firm age, firm size, inflation, and real interest rate have a negative relationship with board meeting, with coefficients of −0.1419, −0.026, −0.1263, and −0.0836, respectively. Director ownership, institutional ownership, majority ownership, total-loans-to-total-assets ratio, firm age, firm size, and liquidity have positively correlated values with gender diversity, with coefficients of 0.1152, 0.0839, 0.1465, 0.0466, 0.0114, 0.0869, and 0.0216, respectively. However, inflation rate and real interest rate have a negative correlation with gender diversity, with coefficients −0.0574 and −0.0271, respectively. Institutional ownership, majority ownership, total-loans-to-total-asset ratio, and firm age have a negative relationship with director ownership, with coefficients of −0.2717, −0.0597, −0.0102, and −0.3860, respectively. Nevertheless, firm size, liquidity, inflation rate, and real interest rate have a positive relationship, with coefficients of 0.4517, 0.1451, 0.0575, and 0.0087 on director ownership, respectively. Majority ownership, total-loans-to-total-assets ratio, and firm age also have a positive relationship with institutional ownership, with coefficients of 0.8854, 0.0248, and 0.0349, respectively. However, firm size, liquidity, inflation, and real interest rate are negatively correlated with institutional ownership, having −0.2873, −0.0799, −0.0409, and −0.1035 coefficients, respectively.

As specified in Table 4, the study used four models: pooled OLS, fixed effect, random effect, and system GMM model. The R^2 statistically measures the proportion of variance for the dependent variable as explained by the independent variable. Generally, a higher R-squared value indicates that more variability is explained

Table 3
Correlation matrix

	lnZscore	bd_mtg	gnd_dumy	d_own	inst_own	maj_shh	tln_ta
lnZscore	1.0000						
bd_mtg	8.2830*	1.0000					
gnd_dumy	8.1196	8.2596*	1.0000				
d_own	8.1468*	8.2665*	0.1152	1.0000			
inst_own	–8.2923*	8.8597	0.0839	–9.2717*	1.0000		
maj_shh	–9.1676*	8.8742	0.1465*	–9.9597	0.8854*	1.0000	
tln_ta	–8.8630	8.8965	0.0466	–9.9192	0.0248	0.9578	1.0000
f_age	–9.3619*	–8.1419*	0.0114	–9.3860*	0.8349	–9.9243	9.9230
f_size	8.8136	–8.8263	0.0869	9.4517*	–8.2873*	–9.1835•	–9.1188*
liq	8.8839	0.1770•	0.0216	9.1451*	–8.8799	9.9578	–9.9476
infl	–9.8366	–8.1233*	–0.0574	9.9575	–0.8409	–0.9103	9.0213
lnintr_rate	–9.8194	–8.8836	–0.0271	9.9087	–0.1935	–9.9696	9.9465
	f_age	f_size	liq	infl	lnintr_rate		
f_age	i.0000						
f_size	8.1821•	1.0000					
liq	8.8080	–8.8268	1.0000				
infl	–9.8599	–8.8125	–0.0644	1.0000			
lnintr_rate	–8.8695	–8.8233	–0.0968	9.6793*	1.0000		

Note: Lnzscore = Z-score of insolvency risk; gnd_dumy = Gender diversity; bd_mtg = Board meeting; d_own = Director/managerial ownership; inst_own = institutional ownership; maj_own= majority share ownership; liq = liquidity; tln_ta = total-loans-to-total-asset ratio; f_age = firm age; f_size = firm size; infl = inflation; lnintr_rate = log of interest rate.

Table 4
The effect of board characteristics on insolvency risk

Regressors	Pooled OLS	Fixed effect	Random effect	Sys. GMM
bd_mtg	(0.992) ***	(0.587)	(0.789) **	(0.377) **
	3.7	1.34	2.08	2.28
gnd_dumy	(0.686) **	(–0.157)	(0.054)	(–0.348)
	2.01	–0.62	0.21	–1.28
inst_own	(–0.084) ***	(0.017)	(–0.022)	(–0.030) ***
	–6.87	0.64	–1.07	–3.49
maj_own	(0.007) ***	(–0.052)	(0.002)	(0.023) ***
	4.36	–1.37	0.08	3.07
tln_ta	(–0.007) ***	(–0.006) ***	(–0.006) ***	(–0.021)
	–2.68	–3.25	–3.01	–0.30
f_age	(–1.103) ***	(0.950) ***	(0.101)	(–0.051) **
	–6.61	2.80	0.38	–2.47
f_size	(–4.962) ***	(–5.8530**	(–2.328)	(–0.283) **
	–3.27	–2.41	–1.11	–2.10
Liq	(–0.116) ***	(0.094) **	(0.039)	(–0.047) *
	–2.88	1.96	0.86	–1.81
Infl	(0.174)	(–0.054)	(–0.034)	(0.788) **
	0.27	–0.12	–0.07	2.65
lnintr_rate	(–1.422)	(–0.012)	(–0.374)	(–0.990) **
	–1.48	–0.02	–0.52	–2.09
R2	0.688	0.745	0.675	0.701
P-value	0.003	0.000	0.000	0.000

Note: ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively. Pooled OLS = pooled ordinary least squares; Sys. GMM = system generalized method of moments.; bd_mtg= Board meetings; gnd_dumy = Gender.

by the model used in the study. The econometric model is considered to have a high predictive power if the model has a high R^2. From Table 4, all the models produced R^2 values of approximately 0.7. The R^2 of pooled OLS of board characteristics on insolvency risk is 0.688, meaning that 68.8% of the variations in insolvency risk are jointly caused by all the independent variables: board meeting, director ownership, institutional ownership, majority ownership, total-loans-to-total-assets, firm age, firm size, liquidity, inflation, and interest rate.

This indicates that approximately 31% of the variations in insolvency risk can be explained by other variables outside the model. The R^2 of fixed effect, random effect, and system GMM models produced values of 0.745, 0.675, and 0.701, respectively. The bigger the percentage of correct predictions, the better the model fit for the investigation. Also, the *p*-values of the four models are between 0.000 and 0.003, making the models statistically significant. In view of this, board meeting, director ownership, institutional ownership, majority ownership, total-loans-to-total-assets, firm age, firm size, liquidity, inflation, and interest rate are jointly significant in explaining the variation in insolvency risk over the period 2008–2020. The models displayed a high *p*-value of 0.000, depicting a great predictability measure of the probability that the observed result might occur just by random chance, when the null hypothesis of the given statistical test is true. A unit change in one variable results in a directional effect on the other. Consequently, an increase in one variable results in an increase in the other and vice versa. For instance, if board meeting (bd_mtg) is to be increased, then there is a proclivity that insolvency risk will also be affected, which supports the research work of Ali et al. [3].

From Table 4, board meeting is positive with a *p*-value of less than 5% for random effect and system GMM, suggesting that there is a positive relationship between board meetings and insolvency risk in these models. This relationship shows that an increase of 1 unit of board meeting results in an increase in the *z*-score by 0.377 and 0.789 for random effect and system GMM; thus, insolvency risk improves. It is expected that efficient board meetings lead to information sharing, effective monitoring, and risk sharing, which then results in improved performance through improvement in insolvency risk. This is confirmed by the results of Ntim and Osei [20] that board members contribute effectively during meetings, which enhances banks' insolvency risk. The results also support the resource dependency theory that effective meetings contribute to enhancing insolvency risk and lead to the long-term performance of banks. Gender diversity produced a negative coefficient for fixed effect and system GMM, suggesting that the presence of gender composition affects the quality of monitoring roles and can also influence firm performance, which ultimately affects insolvency risk. Consequently, a higher proportion of females on the board could be related to a dwindled firm performance.

From the table above, an increase in the proportion of female representation causes a decrease of 0.157 and 0.348 for fixed effect and sys. GMM in *z*-score signifies that bank insolvency risk worsens. Even though the results are not statistically significant, it contributes to waning insolvency risk, which corroborates the position of Pham and Hoang [21], Lu and Boateng [22], and Johnston and Ogechukwu [23] that the mere presence of females does not contribute to improved bank risk, but a "critical mass" of females is needed to influence insolvency risk. The resource dependency theory also supports more females, say, 50% of the board, to have a significant influence. Institutional ownership shows a statistically negative *p*-value at a 1% level of significance for both pooled OLS (−0.084) and system GMM (−0.030). This means that a unit increase in institutional ownership reduces insolvency risk by 0.084 and 0.030 for the aforementioned two models, respectively, exemplifying that an increase in institutional ownership worsens banks' insolvency risk. The empirical evidence provided in this study is in consonance with the position of Oranefo et al. [16], as well as Iqbal and Vähämaa [24] that large institutional shareholders ignore the interest of the rest of shareholders, negatively influence managers thereby increasing risk of banks and not interested in the long-term prospects of the firm because they are highly diversified. Majority ownership (maj_own) has a positive coefficient using pooled OLS, random effect, and system GMM. The results show substantial positive *p*-values, which are statistically significant at 1% for pooled OLS and system GMM. This means that insolvency risk is increased by 0.007 and 0.023 for the respective (two) models when majority ownership increases by 1 unit. The results prove that majority shareholders could significantly contribute to enhancing banks' insolvency risk. This outcome is not supported by Li and Sun [25], asserting that controlling shareholders persuade managers to pay out funds meant for the business operation without paying back and provide luxurious traveling's to motivate them at the expense of the firm.

However, this study agrees with the findings of Marti et al. [26] that majority shareholders are able to build the reputations of the firms they invest. Total-loans-to-total-assets shows negative *p*-value for all four models (pooled OLS, fixed effect, random effect, and system GMM). The degree of the negative coefficient (and having all other things remaining constant) suggests that increasing the overall total-loans-to-total-assets by 1 unit reduces the banks' insolvency risk. This output is identified as statistically momentous at a 1% significance level for pooled OLS (0.007), fixed effect (0.006), and random effect (0.006). This indicates that banks in Ghana do not diversify into other portfolios but rather give out more loans, increasing their risk exposure and breeding inefficiency, which is supported by Zameer et al. [15], Kwashie et al. [27], and Muriithi [28] that banks focus more on giving out loans without investigating whether repayment is possible by the client, thereby increasing banks' insolvency risk. Firm age shows a negative statistical significance of *p*-value at 5% (0.283), using system GMM. This indicates that a unit increase in firm age causes a decrease of 0.283, which means worsening insolvency risk. This is not in agreement with the position established by Guo and Kou [29] that as firms grow, they become more significant, able to understand the market better than their new counterparts, and enjoy economies of scale and access to credits, among others [30]. Congruently, firm size has a negative statistical significance of *p*-value at 5% (0.051). This shows that a unit increase in the size of banks causes a reduction of 5.1% of insolvency risk. This illustrates that banks' insolvency risk worsens as they expand in the industry.

With system GMM, liquidity produced a *p*-value, which was negative (−0.047) and statistically significant at a 10% significance level. This indicates that a unit increase in liquidity causes a reduction of 0.047 in insolvency risk. This means liquidity worsens banks' insolvency risk. These findings support the results of Cheng et al. [31] that firms in Ghana may not be liquid enough, which shows that in the event of distress, they could not have enough liquid assets to sell quickly to redeem the firm from possible liquidation. However, according to Hoque et al. [32], higher liquidity does not lead to reduced insolvency risk but encourages borrowing, thereby introducing more risk to the firm. Inflation rate also shows a positive statistical significance at a 5% level for system GMM. This shows that a 1 unit increase in the rate of inflation increases insolvency by 0.788. This means that a higher inflation rate strengthens banks' solvency to diversify their resources and reduce borrowing, leading to enhanced insolvency risk, which does not support the findings

of Guo and Kou [29]. Nevertheless, interest rate displays a negative statistical significance for all the models. This means that a unit increase in interest rate reduces the insolvency risk of the bank. For instance, a 1 unit increase in the interest rate reduces insolvency by 1.422, 0.012, 0.374, and 0.990 for pooled OLS, fixed effect, random effect, and system GMM, respectively. This shows that banks' lending rates are higher than diversifying into other investments, thereby introducing the banks to higher risk due to high customer defaults, as a result of high interest rates.

5. Conclusion

The study examines how board composition affects insolvency risk, which has the potential of fortifying the financial sector against potential liquidation. While institutional and director ownership are used to determine ownership identification, gender diversity and board meetings are used to measure board characteristics. The analysis of the results proves that both board characteristics and ownership identity contribute significantly to banks' insolvency risk, with the results showing either a positive significance or negative coefficient on insolvency risk.

It was found that board meetings have a strong positive significance on insolvency risk and contribute to enhancing banks' insolvency risk. This means that when board meetings are efficient, it will lead to information sharing, effective monitoring, and risk disclosures that will lead to efficient use of resources, thereby improving banks' insolvency risk in Ghana, which agrees with the results of Adu [33]. Results prove that females' contribution is relatively small, meaning that the mere presence of females on the board does not contribute to improved bank risk. In view of this observation, a "critical mass" of competent women is needed for their influence to be felt in improving banks' insolvency risk. This finding alludes to the position of Rahi [34] that banks' risk-taking behavior could be controlled after a critical mass of effective female board members is attained.

The study suggests that the strain of today's international competition emphasizes how important it is to implement globally accepted best practices in corporate governance so that industry participants can take full advantage of market opportunities. The findings of this investigation demonstrate the need for academics and industry professionals, including financial institutions and governance authorities, to have a deeper understanding of the factors influencing board composition, particularly for banks experiencing various forms of financial complexities.

It would be feasible to conduct various research works in the future by analyzing board features, employing different statistical techniques, utilizing a mixed method approach. Besides that, comparing board independence across developed and developing nations can be used to assess the board's efficacy on risk and bank performance.

Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

Data are available from the corresponding author upon reasonable request.

Author Contribution Statement

Bernice Obesebea Tipong-Annor: Conceptualization, Resources, Project administration. **Stephen Owusu Afriyie:** Methodology, Investigation, Supervision. **Michael Nana Owusu-Akomeah:** Formal analysis, Writing – review & editing, Visualization. **Joseph Asare:** Software, Data curation. **Emmanuel Attah Kumah Amponsah:** Validation, Writing – original draft.

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