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Moderating Role of Risk Management between Risk Exposure and Bank Performance: Application of GMM Model

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Abstract

This paper assessed risk management as a moderating variable between risk exposure and a bank's performance. A quantitative research methodology was employed to collect secondary data from 20 licensed banks in Ghana from 2013 to 2022, giving a total of 200 observations for this study. The study employed the dynamic panel System Generalized Method of Moments to assess the effect of risk exposure on the bank's performance in Ghana. The Generalized Method of Moments was employed in this research to control the issues of endogeneity and unseen heterogeneity. Secondly, the result from the moderating analysis showed that risk management moderates the negative relationship between risk exposure and the bank's performance. The findings highlight the importance of strengthening the corporate governance structure to moderate or enhance the relationship between risk management and the bank's performance. The study recommended that the banks in Ghana ought to be more proactive in their assessment and management of the bank's credit risk and liquidity risk to mitigate their adverse effect on the bank's performance.

Keywords

Credit Risk, Liquidity Risk, Market Risk, Operational Risk, Bank's Performance, Ghana

1. Introduction

The financial sector plays a very important role in the development of any economy by facilitating businesses and trade that ensures efficient allocation of idle funds and assets in the economy. The banking sector plays a pivotal role in the execution of the country's monetary policies (Nguyen et al., 2017). Gallati

(Gallati, 2003) defines risk as a condition that creates an exposure to adversity or a condition that creates the possibility of deviation from a desired outcome that is expected is hoped for. The banks facilitate the flow of funds from surplus economic units to deficit economic units. The classic business of the bank is to take deposits and lend money which most often results in operational risks to the bank. Risk is unavoidable and present in each human activity and business undertaking. We encounter risk in our daily lives, private and public sector organizations. The core of every bank activity essentially involves risks in the form of taking deposits, granting loans, and trading portfolios in conditions of uncertainty (Jaiye, 2009). It implies that the integral part of banking is to balance the risks against the returns and where the risks are more than the return then the bank's operation is considered as a failure. However, where the return is higher than the risk then it is considered as a successful operation. Management must ensure the bank's risk is minimized vice a viz the bank's returns. This means the core of banking activities will always revolve around risks but effective management of the risk is the essential element of management. The reason is that most of the banks in Ghana are operating in a volatile economic environment and therefore exposed to two main categories of risk: Financial risk and non-financial risk. Financial risk occurs as the result of banking transactions and it is further categorized as liquidity risk, credit risk, and market risk. While non-financial risk comprises operational risk, and compliance risk (Patel, 2015). All these risks threaten the viability and sustainability of the banks in Ghana.

Most studies carried out on risk and bank's performance nexus have most often tilted towards financial risk (i.e., credit risk, market risk, and liquidity risk) with very few studies carried out simultaneously on operational risks and financial risks. However, one of the root causes of the revocation of banks in Ghana was due to inadequate management of the bank's operational risk. The Bank of Ghana [BoG] press release (Bank of Ghana, 2019) opined that the purpose of the revocation of the seven banks in Ghana was due to some weaknesses identified by the central banks of Ghana for the collapse of these banks: these are poor corporate governance, poor risk of management, non-performing loans, undercapitalization, and regulatory lapses. As per Habib, Masood, Hassan, Mubin, and Baig (Habib et al., 2014), the importance of operational risk management cannot be overemphasized as it will serve to immediately recognize restricted activities, lessen future risk exposure, and eventually lead to a decline in operational losses. The Basel Committee on Bank Supervision (2006) acknowledges that operational risk affects the financial sector stability and performance adversely. This implies that if the bank's operational risk is not addressed systematically, it would affect the financial performance adversely with a disastrous consequent effect on the country's financial system (Hess, 2011; Andersen et al., 2012). Subsequently, the Basel Committee on Banking Supervision (BCBS) (Basel Committee on Banking Supervision (BCBS), 2011) outlined the importance of effective operational risk management of banks and has provided appropriate frameworks,

systems, policies, and standards to guide the bank's activities at all levels of operations. Since inadequate management of operational risk would impact negatively the bank's performance and eventually erode the bank's net worth (Muriithi & Waweru, 2017). According to Habib et al. (Habib et al., 2014), effective operational risk management lessens operational losses; decreases compliance costs, identifies illegal activities, and moderates the bank's exposure to risks. Additionally, effective operational risk management will help the bank to identify all the risks the bank is exposed to and fashion out frameworks to reduce the impact on the bank's performance (Barbu et al., 2008). Additionally, Chernobai, Jorion, and Yu (Chernobai et al., 2011) opined that some high-profile losses were related to operational risks that happened at Société Générale in 2008 were mainly due to the inadequate internal control systems and unmanaged operational risks. Again, most of the previous studies involving risk assessment and firm's performance were plagued with endogeneity, simultaneity, and unobserved heterogeneity challenges leading to mixed outcomes and sometimes inconsistent outcomes with theoretical underpinnings. In response to this endogeneity challenge, the study applies a dynamic panel GMM estimator to deal with lag in the bank's performance while operational risk is introduced in this study to deal with the issue of omitted variables caused by unobserved heterogeneity and simultaneity in the model.

For instance, some studies conducted on the relationship between credit risk and financial performance revealed a negative relationship (Kaaya & Pastory, 2013; Felix & Claudia, 2008) while some studies revealed a positive relationship between credit risk and bank performance (Afriyie & Akotey, 2012; Ekinci, 2016; Mwangi, 2012; Boahene et al., 2012). These inconsistencies make it imperative to include operational risk in assessing the effect of risk on the bank's performance. These imply that operational risk cannot be taken out in the context of total risk ravaging the bank's performance in Ghana.

There are three main motivations for this study: Firstly, is to assess comprehensively the effect of risk on the bank's performance in the presence of both operational risk and financial risk together. The latest pieces of literature involving Wintoki et al. (Wintoki et al., 2012), Tchamyou, Erreygers, and Cassimon (Tchamyou et al., 2019) contended that the previous company's performance affects the present performance and the error terms, resulting in endogeneity and unseen heterogeneity challenges in regression analysis. These studies showed that using the dynamic panel model has outperformed the use of ordinary least square (OLS) regression which often produces spurious and inconsistent outcomes. My second motivation is to use the dynamic panel to assess the relationship between independent and dependent variables. Using dynamic panel regression allows the analysis study to overcome the heterogeneity (omitted variables) and endogeneity challenges. Lastly, the study assesses the indirect effect of board experience (moderator) in the relation between risks and the bank's performance nexus. This study commences with a review of existing pieces of li-

terature in segment two, followed by a methodology in segment three. Segment three presented the methodology adopted to gather data for this study and the attendant analysis in this study. Segment four presents the outcomes and the accompanying discussion of the research outcomes. Finally, the study ended with some conclusions and recommendations for this study.

Lastly, the research concludes the study made some recommendations for research and future research areas.

2. Literature Review

This section reviewed existing pieces of literature on risk management and the bank's performance. The literature review is organized into three sub-sections: Theoretical review, conceptual framework, and empirical review.

2.1. Theoretical Review: Stakeholder Theory

The Stakeholder theory was espoused by Freeman (1984) as a management that considers the interests and concerns of the individuals and groups (stakeholders) who can influence or are influenced by their actions. The theory proposes that a company's responsibilities extend beyond just maximizing profits for shareholders but management should take into account the needs and expectations of the various stakeholders. Stakeholder interest has a significant effect on the public (depositors, shareholders, employees, customers, and the regulator) interest by promoting and considering concerns that prioritize the interest of the stakeholders. The stakeholder theory stresses the necessity for risk management in the banking sector and the need to improve the value of the firm. However, the theory does not specify the influence of risk management on the firm's performance apart from the suggestion that risk management may influence the firm's performance. Therefore, stakeholder theory provides insight into the need for management to protect the stakeholder interest by undertaking a rationale for risk management for the bank. Stakeholder theory and risk management are closely related in the context of board decision-making processes. The theory is very instrumental in the identification of stakeholder risks, balancing interests, and ethical risk management. The importance of stakeholder theory is that it focuses on creating value for the broader range of stakeholder's interests. In summary, the stakeholder theory impacts positively the board's decision-making process to ensure that the organization's interest is aligned with the public interest in risk management.

2.2. Conceptual Framework and Hypothesis Development

This subsection looked at two conceptual frameworks direct and indirect risk exposure and risk management linked to a bank's performance for this study.

2.2.1. Direct Effect between Risk Exposure and Bank's Performance (i.e., without a Moderator)

Traditionally, the purpose of every management is to maximize profit for the

owners.

However, one of the limitations of profit maximization is that it ignores risk. This is the chance that the actual outcome or returns of the decision may suffer from the anticipated outcome or returns. Increasing the return for the bank and the shareholder has become the main goal of many banks and many banks may achieve this at the expense of risk. Theory on risk opined that the higher the rate of return the higher the risk. It implies that while management is pushing for higher bank performance they may be exposed to higher risks. Many banks have collapsed due to high exposures to risk, which sometimes leads to the failure of the whole financial system (Accornero et al., 2018). It is a well-noted fact available risk cannot be determined accurately for the business.

Most often, it is the risk that the actual returns may be more or less than those anticipated by the management. Risk is the uncertainty that an event may occur, and when it occurs, may either create a positive or negative effect on the organisational's objective. The effect may affect the timelines, the cost, the scope of the business; the quality, and the profits (Centre for Disease Control and Prevention [CDC], 2006). The banks may concentrate on their core to enhance their financial performance by issuing loans while playing their intermediary roles; banks, therefore, have a high chance of facing risk. The types and degree of risks in an organization may be exposed to depend upon some factors such as its size, complexity of business activities, volume, etc. (State Bank of Pakistan [SBP], 2003). The bank faces various types of risk; these include credit risk, liquidity, market risk, and operational risk (Konovalova et al., 2016; Oleiwi et al., 2019). These risks can be broadly classified into internal and external risk factors. Bank-specific factors are internal and able to control factors of the banks and this is due to credit risk and market risk while Bank-specific factors are internal and able to control factors of the banks. The external risk factor may be caused externally and may be due to credit risk, and market risk (Ofori-Abebrese et al., 2016). Risks are usually defined by the adverse impact on profitability of several distinct sources of uncertainty. This study espoused proposed four hypotheses to assess the relationship between risk exposure: credit risk (CR), liquidity risk (LR), market risk (MR), and operational risk (OR) and the bank's performance in this study:

***H*01:** *There is no significant relationship between market risk (MR) and the bank's performance (ROA). Hence market risk (MR) does not influence the bank's performance (ROA) for the period selected for the study.*

***H*02:** *There is no significant relationship between liquidity risk (LR) and the bank's performance (ROA). Hence liquidity risk (LR) does not influence and bank's performance (ROA).*

***H*03:** *There is no significant relationship between credit risk (CR) and the bank's performance (ROA). Hence credit risk (CR) does not influence and bank's performance (ROA).*

***H*04:** *There is no significant relationship between operational risk (OR) and the bank's performance (ROA). Hence operational risk does not influence and*

bank's performance (ROA).

2.2.2. Moderating Role of Corporate Governance (i.e., Role of the Board in Risk Management)

Risk management is a systemic approach that aligns itself with business strategy, people, technology, process, and knowledge to assess and manage the risk that the organization faces. Risks have become the most significant factors influencing the objectives of every enterprise (Salami & Ibrahim, 2018). It is integral to a bank's performance and long-term success. Risk management helps to identify, assess, and mitigate the bank's risk while optimizing capital allocation and resource utilization. Risk management practices are indispensable for organizations that aim at maximizing shareholders. The benefit of risk management practices is that can be used to minimize financial losses to the firm (Olamide et al., 2015; Ashby & Diacon, 1996). According to the Committee of Sponsoring Organizations of the Treadway Commission (COSO) report in 2009, the role of the board of directors in risk management has become progressively more important as expectations for board engagement in risk are at all-time highs. The board plays a crucial role in risk management within the banks. These include risk oversight, strategic risk alignment, and monitoring and reporting on the bank's risk. The board has a responsibility to determine the strategic direction of the organization and to create an enabling environment and the structures for risk management to operate effectively.

The role of the board of directors in risk management is to balance performance and compliance by ensuring that management's actions are consistent with corporate strategy, reflective of the culture of the business, and in line with the organization's risk tolerance. In the banking sector risk management can be performed by the corporate governance mechanisms. The market has no sufficient power to control the operation of the bank. The role of the board of directors is to ensure stakeholder interests are protected through an executive group, a non-executive committee, an audit committee, or such other function that suits the organization's way of operating and is capable of acting as a 'sponsor' for risk management.

The Committee of Sponsoring Organizations [COSO], (Committee of Sponsoring Organizations [COSO], 2004), of the Treadway Commission in the USA characterized enterprise risk management as a procedure, impacted by the firm's board of directors, management, and other personnel, applied in strategy setting and across the undertaking, intended to recognize potential events that may influence the firm, and to manage the firm's appetite for risk, and to give reasonable assurance in respect of the entity objectives. The role of the Board is to moderate and help mitigate risk exposure through enhanced corporate governance practices. This requires that the board should not be concerned with a higher return on their investment, but should also aim at minimizing the bank's risk exposure among the parties. Given the role of board in the mitigating the bank's

risk exposure, the regulator (i.e., Bank of Ghana) regulates and supervises the Board to ensure the public interest is protected. Bank of Ghana regulates and supervises the bank's corporate governance mechanisms which are related to controlling the bank and improving the risk management process. According to Schmidt and Roth (Schmidt & Roth, 1990) and Opoku-Adarkwa (Opoku-Adarkwa, 2011), risk management is activities performed to minimize the negative effect on the firm's performance. We proposed a moderating role that hypothesizes the interaction model of corporate governance (i.e., CG) between risk exposure (CR, LR, MR, and OR) and the Bank's Performance (ROA). A conditional hypothesis is applied to a causal claim to obtain sufficient effect between the relationships. A conditional hypothesis is one in which a relationship between two or more variables depends on the variables of one or more other variables. The interaction model is used to test the null hypothesis for conditional effect.

***H*05:** *Corporate Governance (CG) moderates the negative relationship between credit risk exposure (CR) and the bank's performance (ROA) for the selected banks in this study. Hence the CG indirectly affects the relationship between CR and ROA.*

***H*06:** *Corporate Governance (CG) moderates the negative relationship between liquidity risk exposure (LR) and the bank's performance (ROA) for the selected banks in this study. Hence the CG indirectly affects the relationship between LR and ROA.*

***H*07:** *Corporate Governance (CG) moderates the negative relationship between market risk exposure (MR) and the bank's performance (ROA) for the selected banks in this study. Hence the CG indirectly affects the relationship between MR and ROA.*

***H*05:** *Corporate Governance (CG) moderates the negative relationship between operational risk (OR) and the bank's performance (ROA) for the selected banks in this study. Hence the CG indirectly affects the relationship between OR, and ROA...*

A moderating variable modifies the form, direction, and effect of the relationship between the independent variables and the dependent variable (**Figure 1**). The moderator is an interaction term because it interacts with both the dependent and independent variables. Corporate governance moderates between risk exposure and the bank's performance. The study expects corporations to moderate (i.e., enhance or strain) the relationship between risk exposure and the bank's performance.

2.3. Empirical Review

Empirical research is a study based on the outcomes from observed and measured phenomena and derives from previous studies rather than from theories or beliefs. Two empirical reviews were carried out on (1) *the Effect of Credit Risk and the Bank's Performance and (*2*) the Effect of liquidity Risk and the Bank's Performance.*

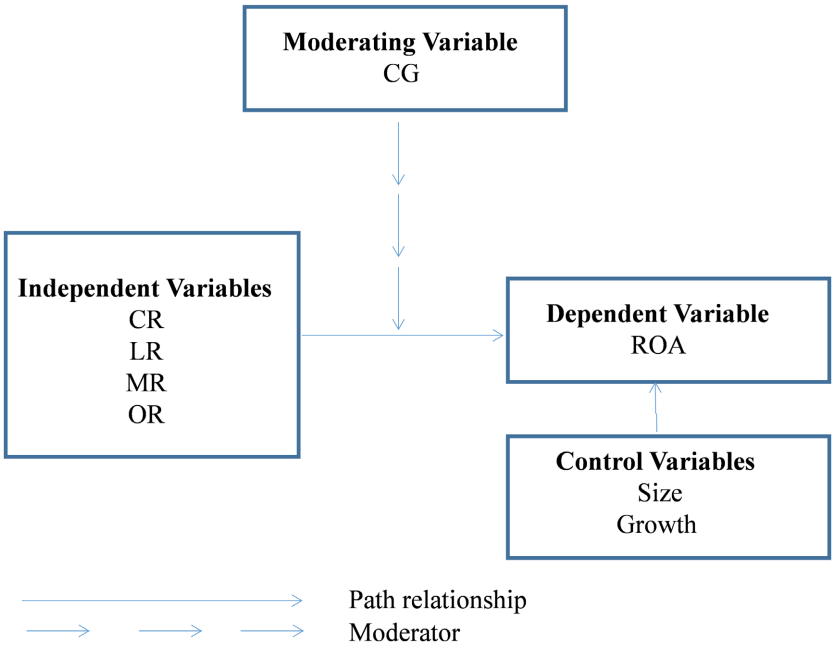

Figure 1. Conceptual framework.

2.3.1. Effect of Credit Risk and Bank's Performance

This sub-section explores the relationship between credit risk and bank performance by reviewing pieces of empirical literature to support this study. According to the Basel Committee on Banking Supervision (BCBS) (Basel Committee on Banking Supervision [BCBS], 2001), and it is the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). The higher the bank's exposure to credit risk the higher the tendency of the bank to experience financial adversity which in turn affects the bank's performance adversely. Theoretically, we expect a higher credit risk to be accompanied by higher bank performance. Hence, we expect a positive relationship between credit risk and the bank's performance. However, pieces of empirical evidence revealed inconsistency and mixed outcomes. Some studies revealed a negative relationship between credit risk and bank's performance (Kaaya & Pastory, 2013; Boahene et al., 2012; Kolapo et al., 2012; Apanga et al., 2016; Tassew & Hailu, 2019; Felix & Claudia, 2008) while these studies opined a positive relationship between credit risk and bank's performance (Afriyie & Akotey, 2012; Ekinci, 2016; Mwangi, 2012; Boahene et al., 2012). Lastly, Von Tamakloe, Boateng, Mensah, and Maposa (Von Tamakloe et al., 2023) conducted a study that concluded that there was an insignificant effect between credit risk and bank performance.

2.3.2. Effect of Operational Risk and Bank's Performance

Operational risk arises from either direct or indirect loss due to failed internal processes, people, and systems or from external events (Basel Committee on Banking Supervision, 2008). It implies that operational risk may be due to human error, or deficiencies in the organizational system. Santika et al. (Santika et al., 2022) opined that operational risk may be due to employee error, system failure,

or scam. When an operational risk occurs it may result in losses to the organization because most organizations do not have adequate structures and guidelines in place for handling operational risk due to neglected processes. According to Bessis (Bessis, 2010), operational risk occurs when there the malfunctions in the information systems, reporting systems, internal monitoring rules, and internal procedures designed to take timely corrective actions, or compliance with the internal risk policy rules (Bessis, 2010). Operational risk is an event risk and more often than not there is no efficient means to track and report operation risk leading to some important operations risks being ignored and the corrections action also ignored which may lead to disastrous consequences for the organization.

Given this, the principles of effective banking supervision of the Basel Committee of Banking Supervision require that supervisors ensure that banks put in place risk management policies and processes that identify, assess, monitor, and control operational risk. Some studies revealed a negative relationship between operational risk and a bank's performance (Chen et al., 2009; Nair & Fissha, 2010). Given this, the study expects an adverse relationship between operational risk and the bank's performance.

3. Methodology

The study employed an explanatory research approach involving longitudinal data. A longitudinal study is a collection of regular and longer-period observations of a sample repeated at regular intervals. Longitudinal data is very useful to monitor trends and to predict future effects of the observed variables for this study. The research population for the study consisted of all the licensed operating in Ghana since this study focused specifically on financial institutions in Ghana. The study employed a purposive methodology to sample 20 licensed from the 23 licensed banks from the Bank of Ghana from 2013 to 2022. The inclusion criteria for the selected are based on the availability of data. This would help the study obtain a reliable and robust assessment of the variables. The analytical tools used to analyze the data collected are descriptive statistics, correlational analysis, collinearity, and panel data regression in the study. The study employed STATA (version 15) as the analytical software for this study.

3.1. Research Variables

The research variables specified in this study are dependent, independent variables, and control variables. The proxy for the dependent variable is the bank's performance, the independent variables are credit risk, liquidity risk, market risk, and operational risk and the control variables are the bank's size and risk.

3.1.1. Dependent Variable (i.e., ROA)

Return on Assets (ROA): ROA provides information on the ability of management to generate business income.

The proxy for a bank's performance is measured as the ratio of net profit after

tax to total assets. According to Rivard and Thomas (Rivard & Thomas, 1997), the return on assets is the best measure of a bank's performance because it is not distorted by the equity multipliers. For formula for calculating Return on Assets (ROA) is expressed in Equation (1):

$$\text{ROA} = \frac{\text{N et profit before tax}}{\text{total Assets}} \tag{1}$$

3.1.2. Independent Variables (i.e., CR, LR, MR and OR)

Risk variables are independent variables used to determine the effect on a bank's performance. The four risk exposure variables were used. These variables credit risk (CR), liquidity risk (LR), market risk (MR), and operational risk (OR) were used to assess the effect on the bank's performance.

Credit Risk (CR): Credit risk relates to the individual creditors or counterparties that are unable to service their debt obligation to the bank either in the form of interest or principal repayments at any time either now or in the future (Hudson et al., 1998). The study expects that credit risk to affect bank's performance positively because higher risk should accompany higher returns (Afriyie & Akotey, 2012; Ekinci, 2016; Mwangi, 2012; Boahene et al., 2012; Isanzu, 2017). The proxy for measuring credit is the bank's non-performing loans divided over the total loans or advances granted as shown in Equation (2):

$$\text{Credit Risk}\left(\text{CR}\right) = \frac{\text{non-performing loans}}{\text{total Loans Granted}} \tag{2}$$

Liquidity Risk (LR): Liquidity risk is associated with the bank's inability to fund its day-to-day operating obligations as they fall due within the short-term period. Effectively handling of liquidity risk is very important to ensure entire it does not transcend from one individual bank to create panic or repercussions for the financial system in general (Greuning & Bratanovic, 2003). Most of the previous studies revealed a negative relationship between liquidity risk and the bank's performance (Tassew & Hailu, 2019; Endaweke, 2015; Muriithi, 2016). The proxy for measuring liquidity risk is current assets divided by current liabilities as shown in Equation (3):

$$\text{Liquidity Risk}\left(\text{LR}\right) = \frac{\text{Total advances}}{\text{Total deposit}} \tag{3}$$

Market Risk (MR): Market risk is the value of the trading portfolio that decreases due to the change in the value of the market risk factors. The proxy for measuring market risk is NIM and it is calculated as the ratio of net interest income to total assets (Gul et al., 2011; Fadun & Oye, 2020). This risk is inherent within a bank's asset/liability portfolio and also in the bank's dealing and trading activities according to Greuning and Bratanovic (Greuning & Bratanovic, 2003). Studies have revealed a negative relationship between market risk and a bank's performance (Muriithi et al., 2016; Namasake, 2016). The following studies used NIM as a proxy for measuring the market risk (Gul et al., 2011; Fadun & Oye,

2020) and it is calculated as the ratio of net interest income to total assets. For formula for calculating MR is expressed in Equation (4):

$$\text{Market Risk}(\text{MR}) = \frac{\text{Interest Received} - \text{Interest Paid}}{\text{Total Assets}} \quad (4)$$

Operational Risk (OR): Operational risk arises from inadequate or failure in the bank's internal process, people, and systems or from external extents. Operational risk is largely caused by internal failures within the bank and therefore the factors may not be universally applicable. The study expects operational risk to affect bank's performance negatively (Chen et al., 2009; Nair & Fissha, 2010). The proxy for measuring operational risk is the ratio of the bank's operational expenses divided by total revenue as shown in Equation (5):

$$\text{Operational Risk}(\text{OR}) = \frac{\text{Operating expenses}}{\text{total revenue}} \quad (5)$$

3.1.3. Control Variables (i.e., Size and Growth)

Based on pieces of literature on the need to control the specific effect of corporate governance and the bank's performance, firm size, and growth are included in the regression model as control variables.

Bank Size (Size): The bank size is used to measure either the economy of scale or diseconomies of scale for the bank in this study. Boone et al. (Boone et al., 2007) opined that bank's size increases its diversification extends into different business activities, and therefore, more corporate advice and counsel are needed from the board as the bank increases in size. According to Lehn et al. (Lehn et al., 2004) and Abbasi and Malik (Abbasi & Malik, 2015) bank size affects performance positively. The proxy for calculating bank size is the natural logarithms of the bank's total assets.

$$\text{Bank Size (Size)} = \text{Log (Total Assets)} \quad (6)$$

Growth: Growth signifies the rate of growth of a firm or a growing firm. A growing firm can produce sufficient income to fund its activity as well as the other way around. A growing firm contributes positively to the firm's performance. According to Pandey (Pandey, 2007), growth is positively and significantly related the a firm's performance. Park and Jang (Park & Jang, 2014) estimated proxy for growth using the current year's net interest got less than last year's net interest as shown in Equation (6):

$$\text{Growth} = (\text{Present year's NIM} - \text{Last year's NIM})/\text{Last year's NIM} \quad (7)$$

3.1.4. Moderating Variables (CG)

Corporate governance (CG) is the control variable used in this study. The study used a control variable to assess the transparency, accountability, and responsiveness of management decisions to their stakeholders. Many studies have used different measurements in the past to measure corporate governance. The study used seven factors to construct a corporate index for measuring the proxy of corporate governance practice (CG) for each firm selected to enhance accounta-

bility, transparency, and responsiveness of management to the firm's stakeholders for this study. The variables are determined based on the following test items or constructs:

- Is the board of directors headed by a non-executive director?
- Are board members and management staff responsibilities set out in writing?
- Is there an independent internal audit function with the firm?
- Is there any provision in the Company's Articles of Association mandating the rotation of external auditors?
- Is there an audit committee?
- Does the Audit Committee produce a report on the internal audit function?
- Is the internal audit plan reviewed on an annual basis?

The score is based on a dummy variable that equates yes to "1" and no to "0" in this analysis. A total score of seven indicates a higher CG practice and a minimum score of 0 indicates that the firm does not comply with corporate governance practice. We expect a positive relationship between corporate governance and the bank's performance (Claessens & Yurtoglu, 2013; Love, 2011; Ahulu & MacCarthy, 2020). According to Rajagopalan and Zhang (Rajagopalan & Zhang, 2008), good corporate governance practices reduce agency costs, minimize information asymmetry, lower capital costs, build trust for the stakeholders, and improve a firm's performance.

3.2. Model Specification

To estimate the effect of operational risk management on the bank's performance, the study adopted panel data regression analysis. Panel data was adopted due to the paucity of data, especially in most developing economies, panel data comes in handy in resolving the issue of data scarcity. The dataset for this analysis is taken from both cross-sectional and time series observations from the selected firms and it is organized to fit panel data. The general form of the panel data model can be specified in Equation (8) as follows:

$$Y_{it} = a + bX_{it} + \varepsilon_{it} \tag{8}$$

where Y is the dependent variable, X is the independent variable, and b are the coefficients to be estimated, the subscript i represents the cross-sectional dimension, t represents the time-series dimension, and ε_{it} is the error term. The study incorporates Y_{it-1} introduced into Equation (8) and expressed it in the form of Equation (9). It is one period of lagged observations of the bank's performance (i.e., ROA_{it-1}) which is commonly referred to as Autoregressive Order 1 or AR (1) regression. AR (1) assumes that the current bank's performance (ROA_{it}) is linearly dependent on the previous bank's performance (ROA_{it-1}). The presence of AR (1) structure is a technique used to improve the robustness of the regression analysis when working with panel data (Owusu et al., 2017). It can deal with the problems of endogeneity issues, simultaneity issues and unobserved heterogeneity issues commonly associated with ordinary least regression which if not properly addressed would create serious estimation biases (Flannery

& Hankins, 2013; Wintoki et al., 2012). To resolve these challenges, the study adopted Blundell and Bond's (Blundell & Bond, 1998) two-step GMM (i.e., BB two-step SGMM) as the main estimation technique to deal with the endogeneity, simultaneity, and unobserved heterogeneity concerns. The BB two-step SGMM is increasingly being used in recent times to deal with endogeneity, simultaneity, and unobserved heterogeneity issues and it is expressed as equation (9):

$$\begin{aligned} ROA_{it} = {} & \beta_0 + \beta_1 ROA_{it-1} + \beta_2 CR_{it} + \beta_3 LR_{it} + \beta_4 MR_{it} + \beta_5 OR_{it} + \beta_6 CG_{it} \\ & + \beta_7 \left(CG * CR\right)_{it} + \beta_8 \left(CG * LR\right)_{it} + \beta_9 \left(CG * MR\right)_{it} \\ & + \beta_{10} \left(CG * OR\right)_{it} + \beta_6 Size_{it} + \beta_7 Growth_{it} + \mu_t + \eta_t + \varepsilon_{it} \end{aligned} \tag{9}$$

where *ROA* is the proxy for the bank's performance with the cross-section of i and year t, ROA_{it-1} is the lagged bank's performance, β_0 is the constant, and α_1 to α_6 are unknown coefficients to be estimated. (v_t) firm-fixed effects, (μ_t) the time-specific effects, and (η_t) that are time-variant and common to all banks, such as the effect of growth and bank size. Lastly, ε_{it} is the white noise or the error term of the model. Moderating terms (CG * CR), (CG * LR), (CG * MR), and (CG * OP) were incorporated into the regression model (Baron & Kenny, 1986; Jaccard et al., 1990).

4. Result and Discussion

This section contains results and discussions of the results. These are descriptive statistical analysis, the Pearson correlation analysis, and the panel GMM regression analysis outlined in this study.

4.1. Descriptive Statistics Analysis

Descriptive statistics is used in this study to describe the basic features of the data before data analysis. The descriptive statistical analysis uses the mean and standard deviations to provide insight into the data distribution and the dataset abnormality. The result from descriptive statistical analysis is presented in Table 1.

Table 1. Descriptive statistics

Variable	Mean	St. Dev.	Min	Max	Kurtosis	Skewness	J-B	Prob
ROA	0.042	0.035	(0.116)	0.093	2.235	(1.804)	14.29	0.09
CR	0.595	0.208	0.258	1.393	1.968	1.517	13.96	0.06
LR	0.384	0.115	0.186	0.627	(0.908)	0.088	13.46	0.21
MR	0.120	0.035	0.068	0.185	0.185	0.181	13.27	0.52
OR	0.577	0.231	0.250	1.227	0.500	0.868	14.90	0.60
CG	2.153	0.302	1.000	7.000	2.499	0.849	11.32	0.47
Size	7.156	0.995	6.000	9.819	2.029	1.743	16.92	0.11
Growth	0.161	0.161	(0.639)	0.456	1.672	(1.070)	13.05	0.66

Source: Researcher's STATA version 15 Compilation.

Table 1 provides information on the descriptive statistical analysis results. The result starts with the second column contains information on the variables' mean. The study used information on the mean to identify any potential abnormality in the variables before the inferential statistical analysis while the third column contains information on the standard deviation. The means for ROA, CR, LR, MR, OR, CG, Size, and Growth were 0.042, 0.595, 0.384, 0.120, 0.577, 2.153, 7.156, and 0.161, respectively, for the ten-year understudy. Furthermore, Table 1 contains information on the normality test using skewness and kurtosis of the dataset. The study used the result from the skewness and kurtosis to assess the normality assumption for this study. The tolerable range for the skewness should be between −2 and +2 while the acceptable range for kurtosis should be between −3.8 and +3.8 for regression analysis (Gravetter & Wallnau, 2014). The outcome reveals that ROA, CR, LR, MR, OR, CG, Size, and Growth show a positive skewness and it extends closely from zero rightward. Therefore, the skewness for ROA, CR, LR, MR, OR, CG, Size, and Growth is approximately symmetrical. Table 1 shows that CR, LR, MR, OR CG, and Size are right skewed while ROA and Growth are left skewed. When the data distribution has a longer right tail than the left tail then the dataset is referred to as a positive skewness but when the data distribution has a longer left tail than the right tail then the dataset is referred to as negative skewness. The kurtosis for ROA, CR, LR, MR, OR, CG, Size, and Growth were 2.235, 1.968, (0.908), 0.185, 0.500, 2.499, 2.029, and 1.672, respectively. The ranges of kurtosis values closer to 3 indicate that the data is normally distributed. A value of kurtosis lower than 3 relates to the "thickening" of the tails and a broadening of the data at the peak. Therefore, it is platycurtic as it mirrors a normal distribution. The statistics from the Jarque-Bera test reject strongly the null hypothesis that assumes the dataset is distributed abnormally. The result indicates that the data is normal and suitable for the analyses. Accordingly, the null hypothesis for Jarque-Bera testing indicates that the data is normally distributed since the p-values were significant (i.e., p-values were higher than 5%).

4.2. Pearson Correlation Matrix

This sub-segment utilized Pearson correlation analysis to evaluate the relationship among the variables and also assess the probability of multicollinearity among the independent variables. Furthermore, the study used Pearson correlation analysis to evaluate the positive and negative association between the independent and dependent variables. Pearson's connection utilizes the coefficient index (r) to decide the strength of the association among the independent variables and a dependent variable using values ranging (r) from going from −1 to +1. The outcome from the Pearson correlation matrix indicates whether there is any relationship between financial risk, operational risk, and the bank's performance. The outcome from the Pearson correlation matrix is presented in Table 2.

The outcome in Table 2 indicated that there was a high correlation or association

Table 2. Pearson correlation matrix.

Variables	ROA	CR	LR	MR	OR	CG	size	Growth
ROA	1							
CR	(0.718)	1						
LR	(0.559)	−0.452	1					
MR	(0.511)	−0.449	0.393	1				
OR	(0.697)	−0.414	0.363	0.284	1			
CG	0.682	0.332	0.280	0.215	0.682	1		
Size	0.587	0.364	0.233	0.284	0.477	0.277	1	
Growth	0.724	0.483	0.181	0.392	−0.421	0.179	−0.26	1

Source: Researcher's STATA version 15 Compilation.

among independent and dependent variables used for the analysis. However, the correlation among the independent variables was not high enough to violate the multicollinearity assumption. It is worth noting in Table 2 that all the independent variables or predictors have correlation coefficients less than 0.7 thresholds. This implies that there is no multicollinearity problem. Table 2 shows that the correlation index (r) between CR, LR, MR, OR, and ROA were (0.718), (0.559), (0.511), and (0.697), respectively. This indicates a negative and significant relationship among credit risks (CR), liquidity risk (LR), market risk (MR), operational risk (OP), and Bank performance (ROA). The negative relationship means an increase in the bank's risks may decrease the bank's performance. However, there was a positive and significant relationship between corporate governance (CG), size, growth, and bank performance (ROA).

The study further investigates multicollinearity by using tolerance and VIF. The tolerance level (TL) index and Variance Inflation Factor (VIF) index are common indexes used to identify multicollinearity issues among the independent variables used in regression analysis. Chatterjee and Hadi (Chatterjee & Hadi, 2012) argued that when the VIF index is higher than 10.0 and the TL index is below 0.10, and then it shows multicollinearity issues are absent with the regression analysis. The results from the TL index and VIF index are presented in Table 3.

Table 3 shows that the tolerance level for the predictors was greater than 0.10 and the variance inflation factor was lower than 10, thus reaffirming the fact that multicollinearity was not likely to be a problem with this data (Chatterjee & Hadi, 2012; Tabachnick & Fidell, 1996). The lowest tolerance was 0.202, far above the recommended tolerance level of 0.10. According to RayKov and Marcoulides (RayKov & Marcoulides, 2006) existence of multicollinearity issues among the variables does not influence the analysis to be carried out but rather the translation of the outcome.

4.3. Result of the Dynamic Panel GMM

This sub-segment presents the outcome of the GMM estimator used to assess the

effect of the financial risk and operational risk on the bank's performance. Available pieces of literature on studies variables involving a firm's performance opined the existence of reverse causality leading to endogeneity challenges. Therefore, using static models may bias the regression estimates and generate inconsistent outcomes (Wintoki et al., 2012). Consequently, this study employed dynamic panel GMM to resolve the problem of unobserved heterogeneity and endogeneity problems in two ways: 1) the study included a lag of explanatory variable in the model and 2) the study employed a suitable estimator between the dynamic panel GMM estimator based on the two widely-used techniques for correcting the problem of inconsistency in the estimation when T is fixed using 1) Arellano and Bond Difference GMM estimator (AB DGMM) proposed by Arellano and Bond (Arellano & Bond, 1991) and 2) Bundell and Bond Special GMM (BB SGMM) proposed by Bundell and Bond (Bundell & Bond, 1998).

4.3.1. Econometric Techniques for Efficient Estimation

There are two steps involved in deciding between the best estimators for the analysis. The first step required that the study estimate the coefficient of the ROA_{it-1} of the Pooled OLS and fixed effect assessor and the second step requires the comparison of the coefficient of ROA_{it-1} of BB Special GMM (SGMM) to the coefficients of Pooled OLS estimator, and fixed effect assessor are used to determine the most suitable estimator for this study. The results obtained from the coefficients of the Pooled OLS estimator, fixed effect assessor, and dynamic panel estimator are presented in Table 4.

Table 3. VIF and TL indexes.

Variables	Tolerance (i.e., 1/VIF)	VIF level
ROA	0.365	2.740
CR	0.295	3.390
LR	0.239	4.184
MR	0.202	4.950
OR	0.467	2.141
CG	0.301	3.322
Size	0.221	4.525
Growth	0.373	2.681
Mean VIF		3.492

Source: Researcher's STATA version 15 Compilation.

Table 4. Criteria to determine between SGMM and DGMM.

	Pooled OLS	Fixed Effect	DGMM	Recommendation
Mode (1) ROA_{it-1}	0.333	0.214	0.039	SGMM

Source: Researcher's STATA version 15 Compilation.

The result obtained in Table 4 shows that the coefficient for the Pooled OLS estimator is 0.333 and it represents the upper-bound estimate, while the coefficient for the Fixed Effect assessor was 0.214 and it represents the lower-bound estimate. The general rule recommended by Bond (Bond, 2002) is to compare the coefficient of DGMM with the coefficient of the Fixed Effect assessor and if the coefficient of DGMM is near or beneath the fixed effect assessor then SGMM is the most suitable estimator for the analysis. Table 4 that the coefficient of DGMM is 0.039 and is lower than the coefficient of the Fixed Effect assessor of 0.214, [(i.e., DGMM = 0.039) ≤ (Fixed = 0.214)]. This outcome implies that the model is downward biased due to a weak instrument and therefore, SGMM should be the most suitable estimator for this analysis. Based on the Bond (Bond, 2002) recommendation, the study settled on the SGMM as the most suitable estimator to assess the effect of the financial risk and operational risk on the bank's performance nexus. The study is certain that the outcome from the SGMM estimator would produce a reliable and better estimate than the Pooled OLS and fixed effect assessors.

4.3.2. Result from BB SGMM Estimator

This sub-section presents the outcome obtained from the assessment of financial risk, and operational risk on the bank's performance and also the result obtained from testing the post-estimation specifications needed to establish that the model is well-specified to generate reliable findings for the analyses. The outcomes from the analyses contain the estimated coefficients and the standard errors (in parenthesis) with the corresponding significance levels for each variable in the model. The result from the direct analysis is presented as a baseline result in model (1) and the result from the indirect analysis is presented as in model (2) to (5). The analyses were carried out in two steps to select the most suitable independent variables for the model. Again, the control variables involving size and growth are used in all the analyses.

Table 5 shows the estimated coefficients, the standard errors, and the significance levels obtained for the various variables used in this analysis. The robustness of the result was checked using the Wald Chi-squared test, AR (2) test, and Sargan test. The tests were used jointly to assess the goodness of fit of the SGMM estimator used to analyze the effect of risk exposure, and risk management on the bank's performance nexus. Table 5 show that the p-values for AR (1) were less than 5% and it implies AR (1) values are statistical significance, while the p-values for AR (2) were 0.253, 0.255, 0.252, 0.256, and 0.161and it implies AR (2) values were statistically insignificant, and therefore the AR (2) model would not contribute to the model fit. Therefore, AR (1) specified in equation (9) is a valid instrument for the estimation, as well as showing there is no second-order autocorrelation problem in the data at the 5% significance level at the AR (2) test.

Additionally, the result from the Sargan test confirmed that the SGMM

Table 5. GMM regression results.

	Model 1	Model 2	Model 3	Model 4	Model 5
ROA_{t-1}	(0.217)***	(0.201)	(0.177)	(0.196)	(0.189)
	(0.063)	(0.067)	(0.039)	(0.054)	(0.065)
CR	(0.468)**	(0.497)	(0.463)	(0.490)	(0.480)
	(0.157)	(0.134)	(0.076)	(0.131)	(0.134)
LR	(0.226)**	(0.247)	(0.238)	(0.232)	(0.243)
	(0.055)	(0.074)	(0.063)	(0.045)	(0.075)
MR	(0.221) ***	(0.228)	(0.191)	(0.201)	(0.209)
	(0.074)	(0.056)	(0.066)	(0.053)	(0.053)
OR	(0.321) ***	(0.354)	(0.274)	(0.298)	(0.314)
	(0.086)	(0.129)	(0.091)	(0.101)	(0.119)
CG	0.199**	0.245	0.209	0.212	0.213
	(0.073)	(0.086)	(0.058)	(0.055)	(0.056)
Size	0.151 **	0.128	0.123	0.130	0.126
	(0.053)	(0.032)	(0.025)	(0.043)	(0.032)
Growth	0.177 ***	0.144	0.109	0.132	0.127
	(0.048)	(0.038)	(0.029)	(0.035)	(0.034)
CG * CR		0.130			
		(0.043)			
CG * OR			0.188		
			(0.056)		
CG * LR				0.113	
				(0.039)	
					0.121
					(0.044)
CG * MR					
Constant	0.158	0.263	(0.192)	0.071	0.036
	(0.055)	(0.090)	(0.065)	(0.021)	0.009
Firm-fixed effect	Yes	Yes	Yes	Yes	Yes
Time-fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	200	200	200	200	200
Number of Firms	10	10	10	10	10

Continued

Wald Chi-squared statistics	533.74	560.74	545.73	555.15	364.37
P-value	0.000	0.000	0.000	0.000	0.000
Sargan test	56.586	55.770	56.423	55.988	44.47
P-value	0.116	0.115	0.116	0.115	0.232
AR (1)	22.08	22.76	22.65	24.65	18.18
P-value	0.001	0.000	0.000	0.000	0.003
AR (2)	20.282	20.439	20.203	20.498	2.341
P-value	0.253	0.255	0.252	0.256	0.161

Source: Researcher's STATA version 15 Compilation.

estimator adopted for the analysis was validly specified. This implies that the analysis has not violated any of the underlying diagnostic assumptions, and therefore the model is stable and rightly specified to estimate the inferences for the study.

Table 5 shows that the coefficient (β), t-statistic value, and p-value between credit risk (CR) and the bank's performance were (β = −0.468, t = 2.981, and $p < 0.05$). This implies that credit risk affects the bank's performance negatively and significantly since the p-value is less than a 5% level of significance. This result is consistent with past studies (Afriyie & Akotey, 2012; Ekinci, 2016; Mwangi, 2012; Boahene et al., 2012). Therefore, the study rejects the null hypothesis (H01) and concludes that credit risk affects the bank's performance negatively. Therefore, when all things are held constant, a 1% increase in credit risk leads to a decrease of 46.8% in the bank's performance. Again, the result shows that the coefficient (β), t-statistic value, and p-value between liquidity risk (LR) and the bank's performance were (β = −0.226, t = 4.109, and $p < 0.05$). This implies that liquidity risk affects the bank's performance negatively and significantly since the p-value is less than a 5% level of significance. This result is consistent with past studies (Tassew & Hailu, 2019; Endaweke, 2015). Therefore, the study rejects the null hypothesis (H02) and concludes that liquidity risk affects the bank's performance negatively. Therefore, when all things are held constant, a 1% increase in liquidity risk leads to a decrease of 22.6% in the bank's performance. Additionally, the result shows that the coefficient (β), t-statistic value, and p-value between market risk (MR) and the bank's performance were (β = −0.221, t = 2.986, and $p < 0.05$). This implies that market risk affects the bank's performance negatively and significantly since the p-value is less than a 5% level of significance. The market risk decreases the bank's performance. This result is consistent with past studies (Muriithi et al., 2016; Namasake, 2016) which opined that market risk affects firm performance negatively. Therefore, based on the result in Table 5 and the explanations thereof, the study failed to reject the null hypothesis (H03) and concludes that market risk affects the bank's perfor-

mance significantly. Therefore, holding other variables constant, a 1% increase in market risk leads to a decrease of 22.1% in the bank's performance.

Finally, **Table 5** shows that the coefficient (β), t-statistic value, and p-value between operational risk (OR) and the bank's performance were ($\beta = -0.321$, $t = 2.986$, and $p < 0.05$). Therefore, there is a negative and significant effect between operational risks and the bank's performance at a 5% significant level. This result is consistent with past studies (Chen et al., 2009; Nair & Fissha, 2010). Therefore, the study rejects the null hypothesis (H02) and concludes that operational risk affects the bank's performance negatively. Therefore, all things being equal, a 1% increase in operational risk leads to a decrease of 32.1% in the bank's performance.

Finally, the study introduced corporate governance variables as control variables into the model (1) and showed that the p-values and coefficients of the corporate governance variables were positively but not significantly related to the bank's performance ($\beta = 0.199$; $t = 2.733$, $p < 0.05$).

Subsequently, the study introduces the moderator variables to assess the indirect relationship between risk exposure, risk management, and the bank's performance in this study. The outcome from the indirect analysis is presented as model (2) through model (5). The study observed that there was a significant improvement from model (1) through model (2) and model (5). Analyzing the coefficient and p-value of the interaction term between corporate governance and credit risk (CG*CR) in the model (2) indicates a positive and significant relationship with the bank's performance ($\beta = 0.245$, $t = 2.849$, $p < 0.05$) since the p-value is less than 0.05 or 5% significance. Therefore, the study concludes that the interaction term between corporate governance and credit risk has a positive and significant effect on the bank's performance. This result is consistent with past studies (Achou & Tenguh, 2008; Opoku-Adarkwa, 2011; Otiemo et al., 2016). According to Otiemo, Nyagol, and Onditi (Otiemo et al., 2016), effective risk management enhances the firm's performance. Therefore, the study rejects the null hypothesis (H05) and concludes that corporate governance moderates the negative relationship between credit risk (CR) and the bank's performance (ROA) for the selected banks in this study.

Again, the coefficient and p-value of the interaction term between corporate governance and liquidity risk (CG*LR) in the model (3) indicates a positive and significant relationship with the bank's performance ($\beta = 0.209$, $t = 3.611$, $p < 0.05$), since the p-value is less than 0.05 or 5% significance. Therefore, the study concludes that the interaction term between corporate governance and credit risk has a positive and significant effect on the bank's performance. This result is consistent with stakeholder theory and previous studies. As indicated by the Institute of Risk Management (2002) the duties of the board are to ensure the stakeholders' interests are safeguarded or protected by the executive group, non-executive group, and other committees whose function is suited to the organization capable of performing as a 'sponsor' for risk management. Therefore,

the study rejects the hypothesis (H06) and argues that corporate governance moderates the negative association between liquidity risk (LR) and the bank's performance (ROA) for the selected banks in this study.

Additionally, the coefficient and p-value of the interaction term between corporate governance and market risk (CG * MR) in the model (4) indicates a positive and significant relationship with the bank's performance ($\beta = 0.212$, $t = 3.879$, $p < 0.05$), since the p-value is less than 0.05% or 5% significance. Therefore, the study concludes that the interaction term between corporate governance and market risk has a positive and significant effect on with the bank's performance.

This result is consistent with past studies (Olamide et al., 2015; Ashby & Diacon, 1996). By maintaining a strong risk management culture, the bank can enhance its financial stability; and improve the bank's performance and its reputation in the market. Therefore, the study rejects the hypothesis (H07) and argues that corporate governance moderates the negative association between market risk (MR) and the bank's performance (ROA) for the selected banks in this study.

Furthermore, the coefficient and p-p-value of the interaction term between corporate governance and operational risk (CG*OR) in the model (5) indicates a positive and significant relationship with the bank's performance ($\beta = 0.213$, $t = 3.818$, $p < 0.05$), since the p-value is less than 0.05% or 5% significance. Therefore, the study concludes that the interaction term between corporate governance and operational risk has a positive and significant effect on with the bank's performance. This result is consistent with past studies (Olamide et al., 2015; Achou & Tenguh, 2008). According to Olamide, Uwalomwa, and Ranti (Olamide et al., 2015), the benefit of risk management practices is that can be used to minimize financial losses to the firm. Therefore, the study rejects the hypothesis (H08) and argues that corporate governance moderates the negative association between operational risk (OR) and the bank's performance (ROA) for the selected banks in this study. Finally, we observed that with the inclusion of the interaction terms (CG*CR), (CG*LR), (CG*MR), and (CG*OR) in the models, the coefficient and the p-values became positively related to the bank's performance. It implies when the moderating terms are included in the models (2) to (5) the bank's performance was enhanced.

4.3.3. Diagnostic Checks and Robustness Test

To ensure that the regression model is well-specified to estimate the relationship between financial risk, operational risk, and the bank's performance, the study tested these regression assumptions: normality test, autocorrelation test, endogeneity test, and heteroskedasticity test to ensure suitable inference can be made from the outcome. The test result is shown in **Table 6**.

Testing the underlying assumptions is the antecedent to effective regression except for endogeneity and unobserved heterogeneity tests since they are just

Table 6. Results from the assumption testings.

Diagnostics Testing	Chi² (5)	P-value	Status
Smirnov-Kolmogorov for Normality	15.45	0.143	Evidence of Normality
Wu-Hausman test for Endogeneity	4.260	0.372	Absence of endogeneity
Cumby-Huizinga Test for Autocorrelation	1.471	0.227	Absence of autocorrelation
Breusch-Pagan for Heteroskedasticity	12.83	0.421	Absence of heteroscedasticity

Source: Compiled by the author (2023).

conceivable after the regression is done. Table 6 shows that the coefficients of the model were correctly specified because they pass through the normality test, endogeneity test, autocorrelation test, and heteroscedasticity test.

5. Conclusions and Recommendations

The paper assesses the relationship between financial risk, operational risk, and the bank's performance and the moderating effect of risk management on the relationship. The result from the dynamic panel GMM showed a negative significant relationship between risk exposure (credit risk, liquidity risk, market risk, and operational risk) and the bank's performance. This implies that increasing exposure to financial and operational risks would have an adverse effect or reduce the bank's performance. However, the relationship between the interaction terms (CG*CR), (CG*LR), (CG*MR), and (CG*OR) showed a positive and significant relationship with the bank's performance. This outcome is instructive and consistent with the Bank of Ghana regulation that requires that the board should be adequately resourced in terms of non-executive directors with requisite skills to manage risk and internal control issues. Therefore, the strengthening corporate governance structure at the board would minimize the risk exposure and enhance the bank's performance. This result is consistent with stakeholder theory. Again, the study jointly tested for the absence of second-tier autocorrelation using the AR (2) test and Sargan test and confirms the model is valid for this study. These findings have significant implications for structuring corporate governance mechanisms at the board in Ghana. For instance, it provides the necessary evidence needed to manage risk exposure to enhance a bank's performance. In line with the findings, the study recommends that Ghanaian banks make a concerted effort to monitor and control risks arising from non-performing loans to improve the financial performance of the banks, especially credit and operational risks. Secondly, the banks should design an effective credit system that minimizes the banks' risk exposure. Also, banks need to create a mechanism necessary for hedging against risks inherent in the financial market. There are two main limitations to this study. The primary limitation of this study requires an adequate sample size to make inferences about the entire pop-

ulation. However, the sample size for this study is limited to a sample of 20, which requires that care must be taken to ensure that this limitation does not compromise the validity of the findings. The second limitation is that the study only looks at moderating analysis without looking at mediating analysis to assess the interaction between risk exposures and the bank's performance.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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