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## Abstract

Corporate governance and risk management are the essential elements of contemporary business management of commercial banks. This study endeavors to shed light on the influence of the corporate governance framework on the bank's risk, including credit risk, liquidity risk, and operational risk. We analyzed a sample of Pakistani banks using a two-step System GMM over the period 2009-2020. The estimation results validate that corporate governance indicators have significant impacts on banks' risk exposure. Board size, board independence, size of the audit committee, and risk management committee are performing vital role in reducing credit, liquidity, and operational risk. However, CEO duality causes an increase in these risks. Moreover, bank size, taxes, and asset structure have positive impacts and cause an increase in credit, liquidity, and operational risk. On the other side, cost-efficient banks are exposed to lower risk. The study's findings recommend that bank management enforce effective corporate governance mechanisms to encounter the risks timely.

**Keywords:** Corporate governance, commercial banks, Operational risk, Liquidity Risk, Credit risk

## 1. Introduction

Commercial banks are performing the function of financial intermediation using the principle of trust. Banks should uphold their customers' reliance to manage their funds profitably and securely. (Bastomi et al., 2017). As commercial banks engage in both conventional and innovative business operations, they are subject to a wide range of complicated risks. Therefore, maintaining the necessary level of stability and safety in both domestic and global systems while achieving performance targets depends on its appropriate governance structure for controlling all forms of risks (Raouf, 2018). It has been noted that putting in place appropriate corporate governance (CG) mechanisms can help minimize agency conflicts, comprehend and assess a company's risk aspect, and create an efficient risk management system (Abou-El-Sood, 2017; Hasan & Sadat, 2023). The demand for implementing efficient corporate governance (CG) processes is growing due to the complexity of hazards that commercial banks are exposed. Protecting the interests of stakeholders, boosting the bank's efficiency, and bolstering adherence to legal and ethical requirements all depend on good corporate governance (Fernandes & Fresly, 2017; Hussain, 2018).

It is documented in the literature that, during the financial crises of 2007-08, several financial institutions are failed due to poor CG practices. CG mechanisms are failed to supervise properly bank risk taking in a massive economic breakdown (Abou-El-Sood, 2017). Hence, global financial crises has impelled the need to advance the governance and risk management execution so that banks become proficient in finding and following up problems on timely and becoming more robust to crises (Permatasari, 2020). Furthermore, Permatasari (2020) found that risk management and sound corporate governance (GCG) can increase shareholder value in commercial banks. In a similar vein, GCG assists regulatory bodies in evaluating anticipated losses that banks face and that could jeopardize bank capital. For this reason, the Bank for International Settlement (BIS) (2011) clarified the important role that the board of directors (BOD) plays in enhancing the effectiveness of the risk management procedure inside financial houses. The BOD exercise proper administration over the executive management to mitigate risk and strengthen the operational risk management system. As a result, banks must provide sufficient CG compliance ethics. The main factor influencing banks' ability to manage risk effectively and operate well is their noncompliance with CG ethics (Kafidipe et al., 2021; Omri, 2022).

Numerous risks, such as market risk, credit risk, operational risk, interest rate risk, and liquidity risk are present for banks (Chen & Ling, 2016; Nsaibi, 2020). These risks have worsen impact on bank performance. Several banks are failed during the financial crises due to interest rate risk, liquidity risk, and loan losses (credit risk) (Chen & Ling, 2016; Wali, 2018). In addition, According to Rehman & Rashid (2022), bank-specific risks, such as credit, operational, liquidity risks, capital risk have an adverse effect on the expansion, stability, and performance of banks. The adverse impact of these risks can be mitigate by the implementation of effective corporate governance and regulation (Chen & Ling, 2016). Moreover, banking governance is a preemptive component of banking risks and risks can be supervised efficiently where quality control is prevailed (Olamide et al., 2015). Corporate governance is the mechanism engaged to identify the agency problems and manage risks effectively inside the firm (Peni & Vähämaa, 2012).

The topic of risks faced by commercial banks and the importance of effective CG mechanisms has been attract the attention of bank managers, regulator, academicians, and investors after the occurrence of financial crises. Numerous earlier empirical studies inspected the importance of CG practices in relation to bank risk management. According to Chen & Ling (2016), for example, CG plays a beneficial impact in reducing credit risk as well as interest rate risk. The other studies like Ntim et al. (2013), Rose (2017), Bastomi, et al. (2017), Honey et al. (2019), Elamer et al. (2018) Permatasari (2020), and Nsaibi et al. (2020) scrutinized the impact of CG mechanisms on the bank behavior of risk. These studies undertaken different measurement indicators of CG and provides different results. There is, however, a dearth of particular research on how CG practices reduce credit risk, liquidity risk, and operational risk. This study closed the gap by presenting empirical data on the noteworthy influence of key CG indicators on the operational, liquidity, and credit risks exposed by Pakistani. The majority of the existing research on bank risk exposure has been on either one risk alone or on the way that any two risks interact. We have assumed three significant risks: the operational risk that all banks confront, the credit risk, and the liquidity risk.

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The rest of the paper is arranged as follows. The methodological section comes after the detailed literature review in section 2. The results analysis are presented in Section 4. The final section encompasses conclusions and recommendations.

## 2. Literature Review

Over the past 20 years, academics and bank stakeholders have increasingly turned their attention to the idea and applications of corporate governance (CG) (Fatima et al., 2018; Elmagrhi et al., 2019; Srivastava et al., 2018). Due to growing worries about the prevalence of corporate fraud, falsified financial statements causing a corporate crisis, and the failure of multiple businesses (Gerged et al., 2018). Specifically, the banking sector has been exposed to several high profile operational loss events over the past decade. These losses have not only adversely affect the activities of banking business, but also disrupted the whole financial system (Nsaibi, 2020). Banks are exposed to many risks like liquidity risks, off-balance-sheet risk, interest rate risk, foreign exchange risk, operational risk, technological risk, market risk, credit risk, and country risk (Chen & Lin, 2016). These risks have extensive adverse influence on the financial performance and soundness of banks. Nevertheless, the effects of these risks can be mitigate through the effective implementation of corporate governance mechanisms (Rehman & Rashid, 2022). Likely, good governance structure make enable investors to treat more efficiently with risk' diversification and diminish investors' uncertainty (Ntim et al., 2013; Shahbaz, 2018; Audi & Masri, 2024). In addition, the placement of effective CG mechanisms in an organization can reduce the asymmetry information and conflict of interest that may cause high cost of non-performing loan and capital cost (Bastomi, et al., 2017).

Ntim et al. (2013) inspected the influence of firm-level CG on the corporate risk disclosure. They reported that institutional ownership and block ownership have negative nexus with risk disclosures. The board independent, board diversity, presence of non-executive directors, board size are positively associated with risk disclosure. However, the board leadership structure has insignificant relationship with corporate risk disclosure. Likewise, Adams and Jiang (2016) determined positive connection between risk taking and board size while investigated the sample of UK' Insurance firms for the period 1999-2012. Additionally, the importance of CG mechanisms in the correlation between interest rate risk, liquidity risk and credit risk was studied by Chen and Lin (2016). Between 2002 and 2010, they assessed a sample of banks in forty-three different countries. They concluded that shareholders controlled banks are more exposed to these risks, and thus concerned authorities must monitors their activities regularly. According to a study by Bastomi et al. (2017), banks' financial performance can be enhanced by better implementing corporate governance, which can reduce the amount of operational and credit risk. They examined 27 banks that were listed between 2011 and 2015 on the Indonesian Stock Exchange.

Rose (2017) examined the sample of Danish banks and determined that CG variables significantly influence the exposure of credit risk. For example, there is a positive correlation between executive directors' compensation and their exposure to credit risk. On the other side, the study revealed that credit risk decrease with the increasing number of executive/inside directors. This suggests that an enhanced system of checks and balances was built by adding additional inside directors to the executive board. Similarly, Elamer et al. (2018) examined how inner CG mechanisms affected risk-taking behavior of UK insurance companies between 2005 and 2014. The estimation results showed that board meetings and board size had a significant and detrimental effect on the sample companies' willingness to take risks. However, the size of audit committee and the independence of the board have a negligible negative impact on the companies' propensity to take risks. Honey et al. (2019) looked at a sample of Pakistani commercial banks from 2011 to 2016 in order to investigate the association between CG features and credit risk as indicated by loan loss provisions. They take several CG individual factors like board size, attendance in board meetings, CEO duality, and independent directors. They found effective CG play a vital role in the credit risk management. Such as Chairman-CEO duality shows a negative impact and mitigates the credit risk effectively. On the other side, larger board size cause increases in the credit risk. However, attendance in board meeting and independent director do not influence significantly on credit risk.

The connection between risk management and CG in Indonesian banks was assessed by Permatasari (2020). The author utilize CG composite rating for the assessment of corporate governance, while the proxies of credit, operational, liquidity, and market risk are used to assess risk management. The author's findings investigated the idea that effective CG implementation improves risk management. On the other hand, CG has varying effects on credit, operational, and liquidity risk. In a similar vein, Bufarwa et al. (2020) looked at how CG mechanisms affected financial risk reporting. They scrutinized data of listed non-financial corporations over the period 2011 to 2015 in London Stock Exchange. The estimation results provide evidence that CG mechanisms have significant impacts on financial risks disclosure. Moreover, block ownership and gender diversity present in the board, in particular, had a favorable effect on the degree of financial risk disclosure. However, board size does not display an impact on the disclosure of financial risk. Nsaibi et al. (2020) determined the influence of CG indicators on operational risks management over the period 2006-2013. The study results provide evidence that board independence, proportion of institutional directors, board size, rotation of the directors, percentage of foreign directors in the board, proportion of government representative on board show significantly positive impact on the severity of operational losses. Conversely, there exists a negative and strong correlation between the internal rating variable and operational losses.

We construct the following three hypothesis based on literature.

**H<sub>1</sub>**; *corporate governance indicators have a significant impact on the credit risk of commercial banks in Pakistan.*

**H<sub>2</sub>**; *corporate governance indicators have a significant impact on the liquidity risk of commercial banks in Pakistan.*

**H<sub>2</sub>**; *corporate governance indicators have a significant impact on the operational risk of commercial banks in Pakistan.*

## 3. Methodology

Methodology section signify population, sample and data description. Moreover, this section also describe regression models and variables' description.

### 3.1. Population, Sample and Data Collection

The target population for this empirical study is the banking industry of Pakistan. 22 banks are selected as sample through purposive sampling technique. The main reason of the selection of these banks are the data availability for the sample period. The data regarding

the concerning variables is collected manually from the annual report of each bank from 2009 through 2020. An analysis of the data was conducted utilizing a two-step approach GMM. A two-step system GMM has the advantage in terms of encountering endogeneity and autocorrelation problems that may exist in a panel data set.

### 3.2. Regression Models

Three Equations (1), (2), and (3) are estimated to observe the nexus of CG indicators and credit risk, liquidity risk, and operational risk, respectively. In Equation (1),  $CR_{it}$  represent credit risk, while  $BoD_{it}$  is the board size,  $BI_{it}$  board independence,  $CEOD_{it}$  is the CEO duality,  $RMC_{it}$  is the risk management committee size, and  $AC_{it}$  is the audit committee size. The other is the control variables such  $BS_{it}$ ,  $CE_{it}$ ,  $TR_{it}$ , and  $AS_{it}$  signify bank size, cost efficiency, tax ratio, and assets structure, respectively.  $\emptyset$  and  $\varepsilon$  show slope coefficient and error term, respectively.

$$CR_{it} = \emptyset + BoD_{it} + BI_{it} + CEOD_{it} + RMC_{it} + AC_{it} + BS_{it} + CE_{it} + TR_{it} + AS_{it} + \varepsilon \quad (1)$$

$$LQR_{it} = \emptyset + BoD_{it} + BI_{it} + CEOD_{it} + RMC_{it} + AC_{it} + BS_{it} + CE_{it} + TR_{it} + AS_{it} + \varepsilon \quad (2)$$

$$OPR_{it} = \emptyset + BoD_{it} + BI_{it} + CEOD_{it} + RMC_{it} + AC_{it} + BS_{it} + CE_{it} + TR_{it} + AS_{it} + \varepsilon \quad (3)$$

In Equations (2) and (3),  $LQR_{it}$  represent liquidity risk while  $OPR_{it}$  denote operational risk. All other variables notions are same.

### 3.3. Variables Description

The dependent variables for the study include three risks (credit risk, liquidity risk, operational risk) faced by banks. The explanatory variables of the study is CG indicators such as board size, CEO duality, board independence, risk management committee (RMC), Audit Committee (AC)). The study looked at a number of control variables, such as asset structure, tax ratio, bank size, and cost-effectiveness. Credit risk defines as the possibility of the borrowers' defaults to fulfill their loan contract either to not repay the principal amount of loan or its interest instalment according to the stipulated contract. The ratio of non-performing loans to total loans serves as a proxy for credit. Liquidity risk arises in the situation where bank is unable to fulfil the obligations of depositors or to arrange necessary funds for granted loans without incurring losses or intolerable costs. We used the cash-to-asset ratio for the measurement of liquidity risk. Operational risk refers to the risk that arise from the incapability of internal systems, personnel, or procedures. In literature, various proxies are used for the measurement of operational risk that cover the diverse operational activities of a bank. However, we used the proxy of operational expense to profit before interest and tax.

The board size, the first independent variable, is computed as the total number of directors in the board. Independence of board is calculated by the percentage of independent directors in board size. If the CEO and the board chairman are the same individual, CEO duality has a value of 1, and if not, it has a value of 0. The size of committee (RMC) and (AC) is measured by total members present in committees.

**Table 1: Description of Variables**

Variables	Proxies	Key reference
Credit risk	Non-Performing Loan to Total Loans	Belkhaoui et al. (2020), Permatasari, (2020).
Liquidity risk	Cash to asset ratio	Ramzan & Zafar, (2014) Chen & Lin, (2016).
Operational Risk	Operational expense to profit before interest and tax	Alsahrin et al. (2018), and Ali et al. (2018)
Board Size	Total number of directors in a board	Kafidipe et al., (2021), El-Chaarani et al., (2022)
Board Independence	Percentage of independent directors to board size	Kafidipe et al., (2021), Elamer et al., (2018)
CEO Duality	Takes value 1 if the CEO and the chairman of the board is the same person, and 0 otherwise.	Chen & Lin, (2016), Aslam & Haron (2020)
Risk Management Committee Size	Total number of members in risk management committee	Kafidipe et al., (2021) Aebi et al., (2012).
Audit Committee Size	Number of members in audit committee	Elamer et al., (2018)
Bank Size	Natural Log of total assets	Chen & Lin, (2016) Djebali & Zaghdoudi, (2020)
Cost efficiency	Cost to income ratio	Belkhaoui et al. (2020), Ozili (2019)
Tax ratio	Total tax paid to profit before tax	Abbas et al. (2019), Shair et al. (2019).
Asset structure	Total loan to total assets	Zins & Weill, (2017) Isnurhadi, et al., (2021)

The first control variable bank size is defined as natural logarithm of total assets of a bank. Cost efficiency is proxied by the percentage of expense to income ratio. While the tax ratio is defined as annual total tax paid to profit before tax. Higher tax ratio indicates greater cost of banks and eventually affect adversely bank assets, deposits, and loans. Asset structure shows the composition of the bank's assets. It is computed by the ratio of total loans provided as a percent of total assets.

## 4. Results and Discussions

### 4.1. Descriptive Statistics

The findings of descriptive statistics are displayed in Table 2 and include the observation, mean, standard deviation, minimum, and maximum values. There are 242 observations in all. With a standard deviation of 0.43, the mean percentage of non-performing loans

to total loans is 0.855. Likewise, the bank has an average 0.946 cash-to-asset ratio. This mean that averagely banks faces difficulty in paying short-term obligations with its existing assets. Further, the mean value of operational expense to profit before interest and tax ratio is 0.305. Regarding the corporate governance indicators, the bank have averagely 8 directors in board and maximum directors in board is 13. Moreover, the mean value of board independence show that bank have 30.64 percent independent director in board.

**Table 2: Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
logNPL	242	0.855	0.43	-1.70	1.63
logCA	242	0.946	0.15	0.672	1.44
Log OEPBIT	242	0.305	0.44	-0.85	1.53
BOD	242	8.736	1.67	4	13
InD	242	30.64	16.32	0	100
CEOD	242	0.274	0.45	0	1
ACM	242	3.963	0.73	3	6
RMC	242	3.847	0.76	0	5
BS	242	8.49	0.57	7.01	9.98
CE	242	9.632	2.54	5.28	20.65
Tax ratio	242	0.375	0.22	.01	1.80
Log AS	242	1.605	0.10	1.19	1.85

The mean value of CEO duality is 0.27, which denote that less than 50 percent bank have CEO with a dual charge of board chairmanship. In addition, the members in the audit committee is 3 to 6 which signifies that banks have sound audit committees. Regarding the risk management committee the bank averages 4 members.

#### 4.2. Estimation Results

The estimation outcomes of Equations (1), (2), and (3) are displayed in Table 3. The effects of corporate governance measures are noteworthy in each of the three models. Such as the coefficients of board size provide evidence that board size has negative and significant impact on credit and operational risk. Further, the coefficient of board size is positive to the proxy of liquidity risk. This means that board size paly vital role in mainlining adequate cash reserve to fulfill the financial obligation. A bank hold higher cash to asset ratio exposed to lower liquidity risk. This supports the finding of (Lu & Boateng, 2018) in reference to credit risk.

**Table 3: Estimation Results**

Variables	Credit Risk (NPL)	Liquidity Risk (CA)	Operational Risk (OEPBIT)
BOD	-0.161*** (0.041)	0.133** (0.004)	-0.246*** (0.012)
InD	-0.008** (0.003)	0.123*** (0.017)	-0.073*** (0.001)
CEOD	0.407*** (0.106)	-0.192*** (0.017)	0.059*** (0.054)
ACM	-0.192*** (0.07)	0.048 (0.01)	-0.065** (0.033)
RMC	-0.281*** (0.072)	0.276*** (0.01)	-0.021**** (0.034)
BS	0.358*** (0.104)	-0.046** (0.017)	0.183**** (0.056)
CE	-0.001** (0.023)	0.002* (0.004)	-0.045*** (0.014)
Tax ratio	0.158** (0.217)	0.064 (0.029)	0.322** (0.096)
Log AS	0.306** (0.32)	-0.224*** (0.068)	0.692*** (0.225)
Constant	0.74*** (1.05)	0.473** (0.184)	1.388** (0.607)
Diagnostic Test			
No. of observation	242	242	242
No. of Institutions	22	22	22
No. of Instruments	19	21	21
AR(1)	0.003	0.000	0.000
AR(2)	0.159	0.299	0.662
P-Value (Sargan)	0.684	0.327	0.813

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$  Standard Error in Parenthesis

The board's main duty is to increase the company's future cash flow and make an effort to mitigate the risks connected with achieving that projected cash flow (Christy et al. 2013). The board independence have a significant and negative impact on the proxies of credit and operational risk. This suggest that higher number of directors in board is better for controlling and eliminating of credit and operational risk. On the other side, board independence has a significant and positive impact on cash to asset ratio. This suggest that presence of increasing number of independent director in board enhance the cash to asset ratio which ultimately reduce liquid risk. Because a higher cash-to-asset ratio indicates lower liquidity risk.

The estimated coefficients of CEO duality is positively related to non-performing loans and Operating expense to profit before interest and tax ratio while negative to liquidity risk ratio.. The finding is consistent with the results of (Lu & Boateng, 2018). This means that CEO hold the charge of both CEO and Chairmanship of the board increasing the credit and operational risk. CEO duality, reference to the agency, can undermine the board's ability to effectively carry out its monitoring role, which could lead to the collapse of the interior control system. (Chen & Al-Najjar 2012). Moreover, lower the percent of CEO duality, the bank have improved financial condition and the minor is the level of risk-taking (Silva et al. 2016). In addition, audit committee size has a significant and negative impact that signify that greater audit committee are playing role in the mitigation of credit and operational risk. On other side, audit committee size has an insignificant impact on the ratio of liquidity risk. Likewise, the coefficient of risk management committee is related negatively with the ratio of credit and operational risk and positively related to the liquidity risk' proxy cash-to-asset ratio. The higher cash-to-asset ratio means that a bank has sufficient cash to fulfill its financial obligations and is less exposed to liquidity risk. The results signify that a larger risk management committee effectively decrease the magnitude of aforementioned risks.

Observing the effects of control variables, bank size has significant and positive impacts on the ratio of credit and operational risk. This provides support to the finding of Ahamed, (2021). This may be because larger banks have larger lending transactions and maintaining more admin staff, and thus exposed to higher credit and operational risk. In contrast, bank size has a negative coefficient that signify that greater bank face the shortage of cash, which may leads to higher liquidity risk. On the contrary, the coefficient of cost efficiency indicate that cost efficient banks exposed to lower credit, liquidity and operational risks. However, the effects of cost efficiency is minimal on all three risks. The coefficient of tax ratio validate that taxes increase the level of credit and operational risk for a bank. However, tax ratio have insignificant to liquidity risk ratio. Asset structure adversely affects credit liquidity and operational risk. It means that banks' lending more loans in a portion of total assets will increase the probability of more credit and operational risk. Further, asset structure is negatively related with the ratio of cash to asset ratio, a proxy of liquidity risk, means that more loan decrease the cash balance. This leads to more liquidity risk.

## 5. Conclusion

The core objective of this empirical study is to investigate how corporate governance indicators affect credit, liquidity, and operational risk levels in commercial banks of Pakistan. Using a two-step approach GMM, a panel data set of banks covering the years 2010–2020 is examined. The study's estimation results offer important insights into which aspects of corporate governance significantly affect the risks faced by banks. Such as board size, board independence, size of the audit and risk management committee perform vital role in the controlling and mitigation of credit, liquidity and operational risk. However, CEO duality leads to increase in the level of these risks. Moreover, bank size, taxes, and asset structure increase the level of credit, liquidity and operational risk, while cost efficient banks exposed to lower risks.

The study provide significant suggestions for the stakeholders of banks. The study recommend that bank management enforce the effective corporate mechanisms to determined and cover up the risk related problems early. The implementation of effective corporate governance mechanisms will assist bank management in efficient management of various risks. This study also provide guidelines for the development of regulatory initiative and monitoring strategies. This study also is the valuable source for academicians to conduct future study related corporate governance and risk management. Future study may be conduct by taking more bank internal risks and macroeconomic risks.

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