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Corporate governance and default probability: The moderating role of bank's efficiency

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Abstract: There is a need to explore the moderating role of banks' efficiency in the relationship between corporate governance (CG) and default probability in Pakistan. Such attention is required due to poor bank governance, which threatens banks' stability. This empirical study's objective is to ascertain the impact of CG on bank default probability by considering banking efficiency as a moderating factor for the period spanning 2012–2020 by using secondary data from banks in Pakistan. The results, estimated using System GMM regression—whose robustness was confirmed through Driscoll and Kraay's standard error approach findings—show a significant relationship between banks' CG and bank efficiency. Banks' better CG practices will improve bank efficiency toward financial soundness in Pakistan. Moreover, the current study puts forth certain implications, i.e. that the banks still need to improve the mechanism they use to implement corporate governance attributes to compete properly on the international stage.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: corporate governance; banks' efficiency; profitability; Z-Score; bank risk; pooled OLS

1. Introduction

Better corporate governance (CG) confirms that the business environment is transparent and all firms are independent, whereas weak corporate governance leads to mismanagement and corruption. Indeed, CG quickly changed and gained more attention after corporate scandals such as the

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Enron and WorldCom incidents. A CG perspective requires banks to be managed in an excellent manner so that they can engage in expanded activities. Banks with strong CG can expand their product offerings, profitable activities, and services (Barine & Minja, 2023; Deb & Chandra, 2023).

Bank CG is more important than in other industries. A financial crisis can occur due to banks in a specific country losing the confidence and ability of the market through poor CG (Alabdullah et al., 2018; Balagobei, 2019). Claessens and Fan (2002), and later Crisóstomo et al. (2020), reported the cost of transactions and capital leading to capital market efficiency due to better CG. De Haan and Vlahu (2015) demonstrated how financial companies differ from non-financial companies. Financial and non-financial firm differences may also influence management structures and compensation schemes. Banks want to use stock options within limits because such stock options are highly leveraged and may disturb those banks' debt-issuing costs and the CG market.

Moreover, similar measures have been emphasized by Mongid et al. (2020) to address financial firms' CG, debt risk and efficiency. According to Ahmed et al. (2020), the purpose of a firm declaring bankruptcy as a default rule is to serve and build confidence, which can undermine banks' financial stability and soundness to creditors. To guarantee the bank's stability, the regulator can ensure liquidity, but the bank's risk will result in overall financial stability objectives. Depositors and savers can help to avoid systemic collapse, financial contagion, and hardship. Indeed, a liquidity problem was the leading cause of the financial crisis; this problem is vital to developing countries. Jan et al. (2021) studied the nexus of Islamic CG and sustainability performance in financial institutions, focusing on the key elements of Islamic CG, namely Shariah board attributes and ownership structure, by examining its impact on the economy, society, and environment. Jan et al. (2022) investigated CG, risk management, and overall performance to ensure corporate sustainability in developing countries.

Government involvement among banks, depositors, and shareholders is high. Therefore, in a bank's governance, the external CG mechanism plays a vital role and reduces the risk-taking behaviour of commercial banks by implementing the capital adequacy requirement (Fanta et al., 2013; Ullah, 2020). The CG process of banks in Pakistan is new, as the CG code of the Securities and Exchange Commission of Pakistan (SECP) was revised in 2019. Strategic valuation, such as assessing bank efficiency improvements or decreases in bank defaults, is necessary; however, the available information is insufficient.

Bank efficiency can lead to a bearing of the debt burden and can benefit the well-being of depositors and routine people. This may be vital in shaping a buoyant economy and help achieve efficient economic progress. Less research has been conducted to examine the CG and efficiency of banks in developing countries. Therefore, investigating the relationship between CG and efficiency is essential (Proença et al., 2023). Better governance reduces the overall taxpayer burden by lowering essential borrowing costs. Hence, it is necessary to explore the roles of CG and bank default risk in developing countries (Mili & Alaali, 2023).

CG is considered the backbone of the financial system, leading to financial soundness in Pakistan. It can directly and indirectly influence banks' default probabilities through unnecessary and extra risk-taking practices, which can harm Pakistan's economy. Therefore, the critical research questions that need to be addressed are: What is the role of banks' corporate governance in identifying bank efficiency and impact on bank default? Moreover, what is the moderating role of banks' efficiency with corporate governance in determining default probability? The current study addresses this gap by considering the factors linked to CG and bank efficiency that affect default. Hence, this study contributes in multiple ways. First, it identifies the impact of banks' CG on the banks themselves by preparing a composite index based on board size (the number of board of directors), managerial ownership for internal control, board independence, transparency, Chief Risk Officer (CRO) or chairman duality, and audit committee members. Second, we explore the

moderating role of the banking efficiency PCA index by ascertaining profit and management efficiency from EPS, operational efficiency, technical efficiency and cost efficiency of banks. Third, we investigate banks' default and risk-taking practices with CG using a comprehensive set of financial soundness measures, namely the Z-score model. Moreover, bank-specific regulatory variables, such as the capital advocacy ratio, bank size, liquidity risk of advance to total deposits and capital advocacy ratio as risk management, are explored to contribute to this knowledge. Fourth, the current study employs a traditional approach in which financial ratios are used to assess banks' default probability, and the relationship is tested through System GMM and D-K standard error regression analyses.

The remainder of this paper is organized as follows. Section 2 provides a brief review of the literature on the topic. In this chapter, we tried to explain the theoretical and empirical relationships between corporate governance, efficiency and bank default. Section 3 unveils data availability, construction of variables, and model and estimation procedure selection. Section 4 explains the results obtained, whilst Section 5 concludes the study.

2. Literature review

The triangle gap model assumes that bank owners are only concerned about wealth maximization or investment returns and that business people are usually risk-averse. Tandelin, Kaaro, Mahadwartha, & Supriyatna, () put forth three points in their study to elaborate on the triangle gap model. First, it shows the ownership structure of corporate governance practices. Second, gaps exist between risk management and corporate governance, corporate governance and bank efficiency, and risk management and bank efficiency. Third and lastly, the different bank ownership structure has different risk management implications (Tandelin, Kaaro, Mahadwartha, & Supriyatna, 2014; Ullah et al., 2023). CG relates to the board of directors, top and senior managers, executives who govern the organization, minority shareholders, and other stakeholders. The Cadbury Report (1992) defines CG as "the process to direct and control the companies," whilst Ullah (2020) endorses studies on CG. Moreover, Rodrigues et al. (2020) reported that CG is a collection of tools that external investors can use to protect themselves from expropriation caused by insiders. Efficiency refers to the value created by rational capital (Onumah & Duho, 2020). Efficiency becomes important mostly when, with governance changes, the deregulation of state control is moderated. The economic efficiency of banks dominates their institutional stability (Burki & Ahmad, 2010). Moreover, "Risk" is the possibility of any incident or unfavorable occurrence/event disturbing the attainment of an organization's aims or goals (Ullah et al., 2023).

2.1. Corporate governance

Better CG is the outcome of the internal and external CG tools that are essential for decreasing bank agency problems. Better CG in banks can improve risk valuation, initial threat processes, and risk protection (Ullah, 2020). The internal CG system is wide and not only bound to the hierarchy of the board of directors and their value in observing a bank's management. By contrast, external CG mechanisms include government rules, principles, directions, and the market for corporate control (Fanta et al., 2013; Ghadamyari & Eslami Mofid Abadi, 2020). In Pakistan, the CG of recognized markets is characterized by less support from outside investors and capital markets but stronger support from financial institutions and large inside investors to attain efficiency in the corporate sector. Smaller (external) shareholders face the risk of expropriation when capital is transferred to more significant shareholders (Javid & Iqbal, 2010; Nazir & Afza, 2018). From the banking sector perspective, reported by Basel in 1999, the constitutional process of CG, in which the relationships of individual institutions and businesses are decided by their board of directors and senior management, manipulates how banks set corporate objectives. This includes generating economic returns to shareholders, business affairs, and day-to-day operations of the running process, considering stakeholders' interests and placing corporate activities (Hopt, 2020). Higher institutional ownership, part of CG, entails more risk before a financial crisis, so more significant shareholders may encounter larger losses if a crisis occurs (Hong & Linh, 2023).

Moreover, Vafeas (2005) claimed that corporations with larger CG boards may have lower earnings excellence. Pakistan's Corporate Governance Code of 2010 recommends a minimum independent management ratio of approximately 50%. Additionally, Bouaziz et al. (2020) reported the link between managing profit and CG as board independence; an undesirable link exists between the two. Gruszczyński (2020) contended that board independence is the most frequently discussed aspect of board structural relations. Board directors are responsible for accepting, auditing, and rejecting business recommendations from management teams. In addition, when directors in the company have the right to make decisions, most of them may hardly reject the proposals submitted by each director. Companies effectively monitor their proportion of independent directors. Zhu et al. (2020) studied the roles of Chinese Chief Executive Officer (CEO) and reported that management with good expertise is better supervised and is an extra helpful guide for upper-level executives.

Furthermore, CG components such as board size represent the total number of directors (Nuswantara et al., 2023). The board's directors are the banks' supreme governing bodies. They are responsible for setting a planned way of working for the bank and overseeing risk management policies (Boachie, 2023). Appointing senior management and establishing operational policies are the board's responsibilities when conducting a bank's business. The firm's shareholders appoint the directors of the board. A strong, independent, skillful, knowledgeable, and experienced board should be appointed to perform its duties effectively and efficiently. Boards ought also to be actively involved in banking activities. In bad times, the bank's active and involved board can help achieve survival and stability if it can evaluate problems and take corrective actions to solve them (Fernandes & Fich, 2023). In addition, with regard to attaining better CG, the addition of outside directors improves management monitoring. As the theory forecasts, this reduces conflicts of interest between investors. It also supports the argument, as per the results, that the board size, the financial company's proficiency, and the performance are dissimilar (Bouteska, 2020). From the CEO in control perspective, larger boards are less effective because it is challenging to manage, coordinate, process, and deal with an organization's strategic issues (Vitolla et al., 2020). Likewise, as a good CG component, transparency can strengthen the firm/banks (Liu et al., 2023).

Another component of CG, namely Chief Executive Officer (CEO) duality, occurs when the CEO is also the board chairperson (Boachie, 2023). If we conclude the power divide, then the person operating as both the CEO and chairman of the board should not recommend a perfect CG system (Berhe, 2023). Javid and Iqbal (2010) and Tahir and Sabir (2015) found that foreign and family owners adopt healthier governance and monitoring practices, consistent with agency theory. Moreover, De Haan and Vlahu (2015) claimed that the main drawbacks of CEO duality are recognized in the literature as per the CEO/chairman split rules, which include a negative impact on the board's monitoring activity and increased executive power to affect board decisions. Moreover, Gupta and Mahakud (2020) and Gontarek and Belghitar (2020) discovered that the same person providing services as the chairman of the board and CEO for banks may result in lower returns on assets and cost efficiency. Fang et al. (2020) showed that the CEO's control of the board's decision-making ability, including CEO duality, is challenging due to the risk procedures of all banks used and is statistically significant.

In addition, CG components, such as managerial ownership and internal controls, refer to banks' organizational and operational structure rules and governing controls, such as the process of reporting, risk-controlling functions, compliance, and internal inspection of the system (Waris & Haji Din, 2023). The main elements of CG are top management and expertise, whereas the board of directors provides a check-and-balance system for senior managers. Similarly, senior managers must adopt ethical methods for line managers, particularly business zones and activities. According to the four-eye management principle, significant decisions should be made through the communication and collaboration of more than one person. This principle should be implemented even in small banks (Basel, 2006; Naqvi & Jones, 2020). Nazir and Alam (2010) stated that better internal controls increase bank performance, whilst Westman (2011) and Rashid (2020)

declared that ownership by management and board members contributes to bank profitability. For non-transparent banks, managerial ownership as an indicator of good CG is essential because it is challenging to monitor CG as an outsiders.

Agency theory proposes that ownership distribution plays a significant role in a firm's control. From a CG ownership structure viewpoint, many countries have banking sectors with different ownership types for internal controls and shareholding ownership patterns. Therefore, in the case of the augmented version model, it was discovered that credit indicators would improve the efficiency of the central bank and that the private sector would demand responses to looser monetary conditions and shift their credit origination towards riskier borrowers (Bakhit & Bakhit, 2014, 2014).

2.2. Banking efficiency

Banks can expand and strengthen their activities, funds, profitability, and quality by improving their CG. This development reflects the improved rivalry between banks and the banking sector to ameliorate efficiency (Basharat et al., 2014; Zainal et al., 2020). Corporate governance, like board size, can play an active role in determining efficiency (Forbes & Milliken, 1999; Heemskerk, 2019). The CG factor independent and non-executive board directors' results show more improvements in the bank's efficiency because independent and non-executive board directors can make fair judgments and carry out risk management at the required volume level, which can lead to banking profitability and efficiency (Ullah, 2020).

Moreover, asset growth, earnings price per share, and expense-to-assets ratio describe management efficiency within a company. Increasing efficiency (management) increases banks' profitability (Ginesti & Ossorio, 2020). The efficiency of banks in Pakistan is higher than that of other firms (Burki & Niazi, 2010; Ullah, 2020; Zaman & Bhandari, 2020). The overall banking efficiency has been increasing over time in terms of technical, cost efficiency, and income efficiency (Sardari et al., 2013). Berger and De Young (1997) argued that cost efficiency and risk management have a fundamental relationship in controlling comprehensive management as a CG role for endorsing the protection and reliability of banks. Indeed, Hayat (2011) stated that very few studies on profit efficiency also examine banks' technical efficiency. Profit and technical efficiency have improved over the years, and efficiency analysis provides a fair idea because it maximizes the firm's profit from the given input resources.

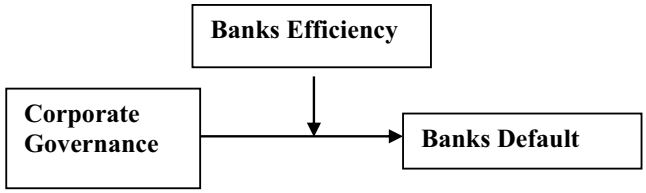
In comparison, cost efficiency is hampered by government interference and the primary use of funds. Jan et al. (2022) declared that banks' overall reporting performance improved over time, which may result from implementing business plans for the 2030 agenda in Malaysia. Moreover, Rustam and Rashid (2015) and Talpur (2023) found improvements in bank efficiency in Pakistan.

2.3. Probability of default

Risks signify actions with an undesirable impression which can decrease the current worth and stop development worth. Actions with hopeful impressions may offset adverse impressions or signify probabilities. IN HIS REVIEW OF CG for UK banks and other financial industry entities, Sir David Walker recommended that financial service organizations use risk-committee boards. The role of risk management in controlling and governing bank defaults in the financial sector was revolutionized in the 1970s when financial risk management became a priority for many small- and large-scale firms, such as banks, non-financial enterprises, and insurance companies, to reveal price variations. According to Lee (2023), executives allocate more time to risk-taking than to the operational level because the importance is likely to control practices at the strategic level.

During the past decade, risk management's ability to control and govern banks, linked to developing a healthy and robust banking system, has also gained substantial consideration in developed and developing countries. Quintyn (2007) claimed that banks, shareholders, and stakeholders have both interest and risk, which are complex. Indeed, risk management has become

Figure 1. Theoretical framework.



more complex and different compared to standard CG practices through the supervision and regulation of governance. Pathan (2009) studied financial companies' board independence, efficiency, and Z-score, revealing that 212 large US bank holding companies (BHCs) from 1997 to 2004 used the percentage of independent directors and systematic risk. Asset return risk, total risk, idiosyncratic risk, and the Z-score as dependent variables resulted in the opposite relationship. Farmer (2014) determined that companies were less involved in subprime lending, which is related to CG in terms of different gender-diverse boards, and later found that a larger ratio of female board members is related to increased risk-taking. Similarly, Farag and Mallin (2018) confirmed and endorsed the Chinese market by investigating the influence of CEO demographic characteristics on corporate risk-taking. Elamer et al. (2020) observed substantial progress in bank efficiency when considering risk and quality governance factors. They examined the Z-score and bank default probability to determine the impact of risk. In addition, we find that banks with less risky assets are more efficient. This also indicates that banks with well-capitalized efficiency perform better. Therefore, better CG, risk, and quality factors can improve bank efficiency. Besides the aforementioned, investors and stakeholders are interested in banks; therefore, banks' risk involvement is complicated because all beneficiaries have influential power and high-interest rates (Cotugno et al., 2020; Quintyn, 2007).

2.4. The theoretical framework

In this study, a self-developed framework was used based on the literature. The rationale of the aforementioned framework is to identify the relationship between CG and bank-specific variables and the impact that the former has on the latter. Indeed, bank-specific variables are important for all banks for the regulator, so ascertaining their impact on efficiency variables and bank default is crucial. The framework is as follows in Figure 1:

3. Data and methodology

This study examined the nexus of CG, efficiency, and default probability of Pakistani banks. The study uses data from 21 banks registered in the State Bank of Pakistan based on data availability from 2012–2020, collected from their financial reports (Appendix A). The advantages of the positivist perspective include objective data interpretation and research conclusions that are generally calculable, noticeable, and repeatable (Collins, 2011). The independent variable is corporate governance, composed of the board of directors/board size, executive, managerial ownership for internal control, chairman/chief executive officer (CEO) duality, board independence, and transparency. The corporate governance index is calculated using De Haan and Vlahu (2015), whilst Ullah (2020) studied the corporate governance index = board independence + CEO is chairman/duality + board size/board of directors + transparency + managerial ownership for internal control. Appendix B presents the variables and indicators used for the measurements.

Moreover, the moderating dependent variable is the bank's efficiency index based on PCA of profit efficiency, management efficiency (EPS), technical, operational efficiency and cost efficiency. In addition to this is the bank's default probability of seeing insolvency and financial soundness, which comprises the bank's Z-score as the dependent variable. Moreover, Capital Advocacy Ratio (CAR), liquidity risk (LR), risk-taking practices (RTP), and bank size (BS) are the control factors. Liquidity risk is proxied by total advance to total deposit, and risk-taking practices (RTP) are proxied by total loan to total assets. The research design follows a positivist viewpoint and a deductive methodology. Banking data often exhibits dynamic behavior where the past values of variables

influence the current and future values. System GMM allows researchers to incorporate lagged values of the dependent variable, helping to model this dynamic behavior accurately.

System Generalized Method of Moments (System GMM) is a statistical technique used in banking panel research to address endogeneity issues and estimate dynamic panel data models. Its key advantages include handling endogeneity, using efficient instrumental variables, accommodating heterogeneity, ensuring consistency and efficiency of estimates, modeling dynamic behavior, handling short panel data, overcoming endogeneity bias, conducting instrument validity tests, and working with non-stationary data. System GMM helps address endogeneity by using lagged values of the dependent variable and instruments to control for unobservable factors. System GMM allows for heterogeneous effects across individuals and periods. In banking panel research, this is valuable as banks may have different responses to economic shocks or regulatory changes, and these heterogeneous effects can be captured in the analysis. System GMM models is developed using the following equation:

$$DFI_{i,t} = \alpha_i + \lambda(DFI)_{i,t-1} + \beta_1(CG)_{i,t} + \beta_2(BEI)_{i,t} + \beta_3(CG * BEI)_{i.t} + \sum_{j=1}^{k} \delta_j \boldsymbol{Z_{jit}} + \varphi_t + \varepsilon_{it} \quad (1)$$

The Driscoll and Kraay (Newey-West) standard error method is a valuable tool in econometrics for dealing with heteroskedasticity and autocorrelation in data, allowing for more accurate statistical inference in regression analysis. D-K regression equation is:

$$DFI_{i,t} = \alpha_i + \beta_1(CG)_{i,t} + \beta_2(BEI)_{i,t} + \beta_3(CG * BEI)_{i.t} + \sum_{j=1}^{k} \delta_j \boldsymbol{Z_{jit}} + \varphi_t + \varepsilon_{it} \quad (2)$$

Where, DFI represents the default probability index through Z-Score. CG means corporate governance index, and BEI indicates banking efficiency index. i indicate the country while *t*-1 is the time indicating lag. While control factors are represented through$\delta_j Z_{it}$. Moreover, ε_{it} describes error term and φ_t refers to the fixed year effect i.year of common shocks. Moreover, α, β_0, β_1 and, β_2 are to be estimated, unknown parameters are α, β_0, β_1 β_2 and β_3.

4. Result and discussion

The descriptive statistics of all examined variables were assessed using Stata-15 and included mean, median, maximum, minimum, and standard deviation. Moreover, the total number of observations was calculated for all variables in the total 189 observations for 21 banks in Pakistan. The outcomes show that the data is normally distributed. The detailed descriptive statistical results are reported in Table 1.

4.1. Correlation matrix and variance inflation factor analysis

A correlation matrix was used to check for correlations between variables. The results show that CG, BEI and an interaction term of CG*BEI are significantly positive related to bank default at the significance level of 5%, 1% and 1% respectively. The bank efficiency is the highest correlation, at 27.5%, whilst CG and CG*BEI are also strongly correlated. We consider the control factors such as risk-taking practices and banking size which showed mixed correlation with default probability. The detailed results are presented in Table 2.

Variance inflation factor (VIF) is a useful tool for diagnosing multicollinearity and making informed decisions about how to improve the stability and interpretability of regression models. In practice, a common rule of thumb is to consider a VIF value of 5 or greater as a sign of problematic multicollinearity. Hence in this case there is no multicollinearity as all variables value is less than bench mark in Table 3.

Table 1. Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Default Probability Index (DPI)	189	1.578	1.612	−3.871	5.322
Corporate Governance (CG)	189	2.635	0.825	1.000	4.000
Banking Efficiency Index (BEI)	189	0.000	1.000	−2.684	6.894
CG*BEI	189	0.027	3.120	−10.738	20.683
Capital Advocacy Ratio (CAR)	189	0.240	1.038	−0.022	12.64
Liquidity Risk (LR)	189	1.316	1.484	−5.117	4.432
Risk Taking Practicing (RTP)	189	0.889	0.100	0.036	.984
Bank Size (BS)	189	2.152	0.189	1.792	2.639

Table 2. Correlation analysis of variables

Variables	(DPI)	(CG)	(BEI)	(CG*BEI)	(CAR)	(LR)	(RTP)	(BS)
DPI	1.000							
CG	.158**	1.000						
BEI	.279***	0.033	1.000					
CG*BEI	.267***	0.034	0.483***	1.000				
CAR	−.035	−0.035	−0.008	−0.009	1.000			
LR	.005	−0.120*	0.047	0.041	−0.055	1.000		
RTP	−.019**	0.072	−0.032**	−0.014	−0.011*	0.083	1.000	
BS	.064*	−0.091	0.139*	0.143*	−0.004	0.267***	.006	1.000

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

Table 3. Variance inflation factor

Variable	VIF	1/VIF
CG	1.030	0.971
BEI	1.608	0.621
CG*BEI	1.609	0.622
CAR	1.005	0.995
LR	1.103	0.906
RTP	1.026	0.975
BS	1.104	0.906
Mean VIF	1.201	.

Table 4. Results of System GMM and D-K regression

	(1)	(2)
Dep. Variables	DFI	DFI
	Main Model	Robust
L. DFI (ZScore)	0.697***	
	(0.019)	
Corporate Governance (CG)	0.271**	0.219***
	(0.083)	(0.024)
Banking Efficiency (BE)	−0.145*	−0.130**
	(0.037)	(0.031)
CG*BE	1.345**	0.570*
	(0.137)	(0.098)
Capital Advocacy Ratio (CAR)	−0.300	−0.267
	(0.177)	(0.128)
Liquidity Risk	0.053**	0.032*
	(0.084)	(0.069)
Risk-taking	−0.224*	−0.241**
	(0.091)	(0.102)
Bank Size	−0.165***	0.194
	(0.051)	(0.087)
I.year	Yes	Yes
Observations	168	189
Number of Banks	21	21
AR1	−1.116	
AR1p-value	0.026	
AR2	−9.752	
AR2p-value	0.452	
Sargan test	128.5	
Hansen test	45.675	
Hansen p-value	0.168	
j-stat	14	
Chi2 -Wald Test	1729	
Chi2-p value	0	
R-squared		0.730
Prob > F		0.000

Table 4.3 shows the results ***, ** and * show significance at 1%, 5% and 10% standard errors are reported in parentheses.

4.2. Results of CG, efficiency and default probability analysis

This study attempts to determine the impact of CG and efficiency on the probability of bank default in Pakistan. For this purpose, System GMM and D-K standard error estimation was employed, and the regression results are shown in Table 4 relates to the default probability. In Column (1), the results shows that default probability index (DPI) is significantly positive which confirm the dynamic nature of DPI. CG relationship with default probability is positively and very significantly correlated with each other at the significance levels of 5%. Also, the outcomes demonstrate that moderating banking efficiency (BEI) and interaction term of CG*BEI significantly and positively impact default probability at the significance levels of 10% and 5%, respectively. Moreover, other control factors have mixed effects on banks default probability. The liquidity risk shows significantly positive effect on the default probability of the banks at the significance level of 5%. Apart

from that, the CAR have an insignificant and negative effect on default probability. However, risk-taking practices such as loan and bank size have a slightly harmful effects on default probability.

The diagnostic tests for the System GMM method in Table 4 of Column (1) provide strong confirmation of the method's validity. Specifically, the AR 1 p-value is found to be less than 5%, indicating a high level of confidence in the model's ability to address first-order autocorrelation. In contrast, the AR2 p-value exceeds the 5% threshold, suggesting that the model adequately addresses second-order autocorrelation. Furthermore, the Hansen statistic falls within the recommended range outlined by Roodman (2009),which suggests that the instrumental variables used in the model are well-suited and appropriately chosen, as it falls between 0.10 and 0.30. This adds to the robustness of the method's results. In addition to these diagnostics, the Sargan test, Wald test, and the outcomes related to the instruments collectively affirm the model's fitness. These tests help ensure that the instruments utilized are both exogenous and relevant to the model's specifications, enhancing the overall credibility of the analysis. Overall, the combination of these diagnostic tests provides a comprehensive evaluation of the System GMM model, reinforcing its validity and suitability for the analysis at hand. The detailed results are presented in Table 4.

4.3. Robustness check of results

The robustness of the model, as assessed through the Driscoll-Kraay standard error regression (D-K fixed effect), is presented in Column (2) of Table 4. By employing the covariance matrix estimator developed by Driscoll and Kraay, our results align closely with those obtained through the heteroscedasticity and autocorrelation-consistent estimator, as outlined by Newey and West in 1987. This alignment in results between D-K and the established estimator lends strong support to the robustness of our findings. Notably, the overarching outcomes derived from the D-K regression serve to both corroborate and substantiate the key findings of the primary System GMM method, in line with previous research and assertions. This reaffirms the D-K regression's effectiveness in addressing and rectifying issues related to heteroscedasticity and autocorrelation. Driscoll and Kraay's approach, which incorporates robust standard errors to account for cross-sectional dependence, autocorrelation, and heteroscedasticity, further underscores the model's reliability. In essence, the outcomes of our robustness checks, conducted through the D-K regression, provide compelling evidence in support of the validity of the central model outputs. This dual verification process, encompassing both the System GMM method and the D-K regression, bolsters our confidence in the robustness and credibility of our research findings.

5. Discussion of results

CG was first introduced to manage the affairs of large firms better and quickly changed and gained more attention after corporate scandals such as Enron and WorldCom. Therefore, the current study attempts to determine the impact of CG and efficiency on the probability of bank default in Pakistan. This study employed a traditional approach, using five CG indexes based on the characteristics with variables between "zero and one" to assess their impact on bank default. Also, the moderating effect of the traditional ratios-based PCA index of banking efficiency was constructed to determine the interaction term of CG and banking efficiency on the default probability. We deduced from the results that introducing the CG mechanism to be adopted by banks was designed to lessen moral hazard problems within the bank. This was mainly implemented to alleviate the dangers of bankruptcy and insolvency. In addition, all employed techniques, robustness tests, and diagnostic values indicate that the model can be used and contribute to the findings.

The key findings signal that the corporate governance index significantly and positively impacts the Z-score as the default probability. This indicates that the alternate hypothesis of the CG's impact on Z-score default probabilities is accepted. The findings related to CG and default probability (Z-scores) endorse the argument of Mongiardino and Plath (2010), who reported that hazard governance needs to avoid bank defaults. Second, these two entities should be independent of each other. Third, a Chief Risk Officer (CRO) ought to be a loyal risk-taking member. They reported

that banker-based systems are much better for temporary risk distribution than those based on the market. The findings also confirm the concluding remarks of De Haan and Vlahu (2015), who claimed that managers might behave more like principals and less like agents if they have larger equity stakes than other stakeholders. A hostile takeover for corporate control so that decisions can be made where managers act more in accordance with the interests of shareholders is possibly an essential trick in the market.

The findings endorse the contention of Basharat et al. (2014), who claimed that development reflects improved rivalry between banks and that the banking sector ameliorates efficiency. Bank efficiency indicates the efficiency of the financial brokerage function. Indeed, the bank efficiency issue for developing markets has been given specific importance in the trend of deregulation and financial reforms over the last decade (Khan, 1998). Banks' efficiency can help bear the debt burden and benefit depositors and routine people (Shaari et al., 2011). Moreover, findings between CG, efficiency, and default probability support Heemskerk's (2019) argument that CG components, such as board size, attendance, and proficiency, play an active role in determining the efficiency of the board; therefore, in estimating the facts of opposing substitutes and obtain well-reasoned decisions for a bank, an effective board typically needs to relate to the board members' cooperation to exchange evidence. These findings align with Bouaziz's et al. (2020) conclusion that CG and (earning profit) have a desirable link.

Pakistani banks need to improve the CG component of internal control and management efficiency, which can also help ameliorate efficiency (profit) to achieve sustainable efficiency and stability of banks in Pakistan. Moreover, the findings on CG and efficiency suggest that Pakistani banks should promote economic costs. A bank is cost-efficient if it utilizes a given input at the lowest cost and produces the maximum output in a shorter period under the same conditions. In the banking sector of Pakistan, the inefficiency is significantly enhanced by the non-performing loans. Some banks are technically efficient, so they refer to cost efficiency, which is the component of their efficiency PCA. In addition, the findings align with Siauwijaya (2020), who concluded that cost reduction played a major role in efficiency following diseconomies of scale. Hence, Pakistani banks should promote the economic concept of cost. Furthermore, the findings align with a recent report by Osore et al. (2020), which found that market rivalry forces firms to minimize banks' efficiency (cost) by implementing CG as a control mechanism to keep the floating costs of external money to a minimum.

Similarly, other risk and control factors, such as CAR, liquidity risk, risk-taking practices and bank size show a mixed effect. Liquidity risk has a significant positive effect on acceptance of the alternate hypothesis, while risk-taking practices and banks negatively impact acceptance of the null hypothesis. Additionally, CAR has a negative but insignificant effect on default probability. This indicates that the alternate hypothesis of CAR with DPI is rejected. Therefore, for banks to survive in an environment of crisis risk, some requirements are specific to protecting banks before insolvency, such as the CAR. This also protects deposit holders by minimizing the risk of default. The condition for banks is 10% of the bank's risk-weighted assets (a Basel Committee requirement), and this is indeed the amount of capital required by the central bank to protect commercial banks against provided loans. The higher the capital adequacy ratio (CAR), the riskier the banks' assets, which means that banks are involved in uncertain lending. Hence, according to laws levied by the central authority, more capital is required to buffer the unanticipated loss of unsafe investments. Banks' minimum paid-up capital (MCR) is a mandatory buffer for banks that contributes positively towards profitability and efficiency. This might lead to public confidence that a cushion exists for banks' deposits. The CAR variable is meant to protect the rights of depositors, owners, and shareholders and is not linked to the banking industry's efficiency. Moreover, to safeguard the rights of customers and the bank itself, although CAR and risk are imperative, it is also necessary to ascertain their impact on the bank's main objectives. The main motive and purpose of CAR and risk variables have always been to rearrange banks' corporate governance component ownership from nationalization towards privatization, so as to augment competition amongst banks in a country. In the case of the augmented version model, it was discovered that credit indicators would improve the efficiency of the central bank and that the private

sector would demand responses to looser monetary conditions and shift their credit origination towards riskier borrowers.

In developing countries such as Pakistan, better CG is needed because the banking sector is the main source of savings through deposits due to the economy's most accepted mode of payment, which can lead to financial stability and sustainability in the country. In the banking sector, CG and efficiency play a major role in the better management of the economy, representing approximately more than 70% of the financial portion of the economy. The findings indicate that banks' CG differs from other businesses because government involvement is high in banks and depositors' exposure, in addition to that of shareholders. Pakistan's sample findings suggest that banks' CG and efficiency can help to prevent unnecessary risk-taking practices and help them achieve financial soundness and sustainability. Better CG practices in Pakistan will improve bank efficiency and financial soundness as default risk. Moreover, our findings encourage the concluding remarks of Hopt (2020), i.e., that behavior expecting safe and sound functions will be performed in banks, applied according to the laws and regulations, and will save depositors' interests in financial stability and sustainability in the country.

6. Conclusions, recommendations and future work

6.1. Key conclusions and recommendations

Corporate governance has recently been given a great deal of consideration. Although it has been implemented, there is plenty of room for improvement in the mechanism used to implement CG properly attributes both internationally and in Pakistan. The concept of CG in Pakistan's banking industry has received little attention. In March 2017, the Securities and Exchange Commission of Pakistan (SECP) issued a revised Corporate Governance code to increase transparency, improve governance, and protect investors' interests through financial reporting of firm improvements. The failure of Pakistan's KASB bank raises a question regarding the policies of state banks and governance. A bank's efficiency can result in its ability to bear debt burdens whilst benefitting the well-being of depositors and regular people. When questioning why taxpayers should bear the bank costs of poor governance, bank efficiency becomes more necessary. Moreover, in the modern era, bank efficiency in developing countries has gained attention. Given these points, a need remains to explore the role of CG and efficiency in bank default probability.

This study was conducted with a secondary empirical aim, i.e. to ascertain the relationship amongst CG, bank efficiency, and the Z-score for bank default probability for the period spanning 2012–2020 using secondary data collected from the financial reports of 21 banks in Pakistan. This study employs a traditional approach akin to system GMM and D-K regression analysis using Stata-15. Bank efficiency PCA is measured using profit efficiency, management efficiency (EPS), technical, operational efficiency, and cost efficiency. The Z-score measures the bank's default model, whilst the capital advocacy ratio, liquidity risk, risk-taking practices and bank size are used as the control factors. This study utilizes five CG characteristics computed using variables with yes as one and no as zero, such as board independence, CEO is chairman/duality, the board size, transparency and managerial ownership for internal control.

In the correlation analysis, CG and efficiency are significantly correlated with the default probability variables. The estimated results show a significant relationship amongst bank's CG, efficiency, and default probability. Hence, overall, better CG and better bank efficiency of banks in Pakistan lead to financial soundness; however, this differs across the risk-taking practices and size of the bank. The current study concluded that the bank's CG mechanism to be adopted was designed to lessen rising moral hazard problems within the bank. This was mainly implemented to alleviate the dangers of bankruptcy and insolvency.

In conclusion, we witnessed that, no matter what method is used to generate the efficiency scores, i.e., the System GMM and D-K regression techniques or other methods, the banks are resourceful and efficient; in our sample, it is proven that they are profitable and cost-efficient, and Pakistan is an out-performer. They performed efficiently and effectively between 2012 and

2020. The Basel CG requirement has been adopted successfully, contributing towards high efficiency and less default. The banks managed their risky liquid assets well, and the improvement appeared to affect their development. Moreover, this study suggests that banks still need to improve to compete internationally, especially with better regulatory and risk-taking practices and management policies. Although these companies work efficiently, they must manage their efficiency by reducing costs and increasing profit.

Efficiency as profitability is associated with gross domestic product (GDP) growth and financial sustainability; therefore, thriving banks should protect themselves during times of decline to avoid being severely impacted by default. To boost financial sustainability, there is a greater need to improve firm governance through numerous other reforms, such as director remuneration, hiring criteria, and regulations governing party transactions. Banks must establish purposeful and strong boards to improve the timeliness, accuracy, breadth, and concentration of financial reporting since all of these factors affect the interests and rights of minority shareholders. This can guarantee the foundations of a sound CG system by applying rigorous accounting standards, adequate security, corporate laws, efficient judicial systems, and effective regulators, especially in developing countries such as Pakistan, to ensure financial sustainability. The findings suggest that institutional investors can reduce firm risk and overall capital costs by increasing the pressure on managers to satisfy shareholders, regulators, and sustainable country development. Despite financial liberalization, governments should focus more on the financial sector than on other economies. Moreover, governments should protect small depositors through deposit insurance and liquidity to avoid bank default. This also justifies the government's regulatory role in boosting financial stability and sustainability.

6.2. Limitations of the study

The scope is limited to Pakistan's banking sector, specifically registered banks in 21 stock markets from the strongly balanced panel data of 2012–2020, whilst the work focuses on the role of CG on default probability, considering the moderating role of banks' efficiency in Pakistan.

6.3. The future work

Future research could also draw on cross-country comparisons by examining the impact of different CG methods and their implementation level, as well as the impact of the regulator on efficiency, risk management of bank defaults, and financial stability. The effects of the board of directors are legal and dominated by control, making them ineffective through agency-reducing conflicts between shareholders and controllers. The split between shareholdings and stake holdings is less valuable in CG speculation. Meanwhile, in recent times, material conditions and philosophical insights have been changed knowingly by terminating the division between shareholdings and stake holdings. All investors rely on auditor integrity, which ensures that investments have credibility. Financial mediators play five major roles in theoretical models: gaining borrower information, risk provisions to decrease contracts, accumulating capital, CG improvements, and comforting business practices. Theoretically and practically, the important policy implications indicate that policies in a fever of financial development or promoting liquidity in the banking sector might not enhance banking efficiency, default probability, or stability. Therefore, to assess a bank's or a firm's governance level, a rating system should evaluate the stringency of a set of governance practices. Various governance categories should be considered, including board composition, ownership of shareholdings, transparency, disclosure, auditing with competition, and financial technology with financial stability and sustainability.

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References

Ahmed, T., Binte, M., Khan, Z. I., Hera, M., & Haque, M. (2020). Factors affecting banking bailout: A study on Bangladeshi commercial banks. *Journal of Asian Business Strategy*, *10*(2), 184–191. https://doi.org/10.18488/journal.1006.2020.102.184.191

Alabdullah, T. T. Y., Nor, M. I., Ahmed, E. R., & Yahya, S. (2018). The determination of firm performance in emerging nations: Do board size and firm size matter? *International Academic Journal of Accounting and Financial Management*, *5*(3), 57–66. https://doi.org/10.9756/IAJAFM/V5I2/1810017

Bakhit, W., & Bakhit, S. (2014). Banks' stability: The effect of monetary policies in the light of global financial crisis. *International Journal of Finance and Banking Studies*, *3*(2), 2147–4486. https://doi.org/10.20525/ijfbs.v3i2.184

Balagobei, S. (2019). Does board structure in banks really affect their efficiency? *Research Journal of Social Science & Management*, *9*(1), 55–62.

Barine, K., & Minja, D. (2023). *Effective corporate governance: Theory and best practices*. Vernon Press.

Basel Committee on Banking Supervision (BCBS) (2006). *Enhancing corporate governance for banking organizations*. Bank for International Settlements.

Basharat, A., Arshad, A., & Khan, R. (2014). Efficiency, risk and profitability of microfinance industry in Pakistan: Statistical analysis. *Pakistan Microfinance Network*, *22* (May), 1–10. https://www.findevgateway.org/sites/default/files/publications/files/efficiency_productivity_risk_and_profitability_of_microfinance_industry_in_pakistan_a_statistical_analysis.pdf

Berger, A. N., & De Young, R. (1997). Problem loans and cost efficiency in commercial banking. *Journal of Banking and Finance*, *19*(3/4), 849–870. https://doi.org/10.1016/S0378-4266(97)00003-4

Berhe, A. G. (2023). Board structure and bank performance: Evidence from Ethiopia. *Cogent Business & Management*, *10*(1). https://doi.org/10.1080/23311975.2022.2163559

Boachie, C. (2023). Corporate governance and financial performance of banks in Ghana: The moderating role of ownership structure. *International Journal of Emerging Markets*, *18*(3), 607–632. https://doi.org/10.1108/IJOEM-09-2020-1146

Bouaziz, D., Salhi, B., & Jarboui, A. (2020). CEO characteristics and earnings management: Empirical evidence from France. *Journal of Financial Reporting and Accounting*, *18*(1), 77–110. https://doi.org/10.1108/JFRA-01-2019-0008

Bouteska, A. (2020). Do board characteristics affect bank performance? Evidence from the eurozone. *Journal of Asset Management*, *21*(6), 535–548. https://doi.org/10.1057/s41260-020-00181-2

Burki, A. A., & Ahmad, S. (2010). Bank governance changes in Pakistan: Is there a performance effect? *Journal of Economics and Business*, *62*(2), 129–146. https://doi.org/10.1016/j.jeconbus.2009.08.002

Burki, A. A., & Niazi, G. S. K. (2010). Impact of financial reforms on efficiency of state- owned, private and foreign banks in Pakistan. *Applied Economics*, *42*(24), 3147–3160. https://doi.org/10.1080/00036840802112315

Claessens, S., & Fan, J. P. H. (2002). Corporate governance in Asia: A survey. *International Review of Finance*, *3*(2), 71–103. https://doi.org/10.1111/1468-2443.00034

Collins, H. (2011). *Creative research: The theory and practice of research for the creative industries*. AVA Publications.

Cotugno, M., D'Amato, A., Gallo, A., & Stefanelli, V. (2020). Do supervisory enforcement actions affect board composition? *Corporate Governance an International Review*, *29*(1), 22–44. https://doi.org/10.1111/corg.12336

Crisóstomo, V. L., De Freitas Brandão, I., & López-Iturriaga, F. J. (2020). Large shareholders' power and the quality of corporate governance: An analysis of Brazilian firms. *Research in International Business and Finance*, *51*, 101076. https://doi.org/10.1016/j.ribaf.2019.101076

Deb, S., & Chandra, A. (2023). Corporate governance mechanism in an emerging economy: Synthesis and future directions. *Business Law Review*, *44*(2), 85–99. https://kluwerlawonline.com/journalarticle/Business+Law+Review/44.2/BULA2023010

De Haan, J., & Vlahu, R. (2015). Corporate governance of banks: A survey of corporate governance of bank. *Journal of Economic Surveys*, *30*(2), 228–277. https://doi.org/10.1111/joes.12101

Elamer, A. A., Ntim, C. G., & Abdou, H. A. (2020). Islamic governance, national governance, and bank risk management and disclosure in MENA countries. *Business & Society*, *59*(5), 914–955. https://doi.org/10.1177/0007650317746108

Fang, H., Lee, J. S., Chung, C. P., Lee, Y. H., & Wang, W. H. (2020). Effect of CEO power and board strength on bank performance in China. *Journal of Asian Economics*, *69*, 101215. https://doi.org/10.1016/j.asieco.2020.101215

Fanta, B. A., Kemal, S. K., & Waka, K. Y. (2013). Corporate governance and impact on bank performance. *Journal of Finance and Accounting*, *1*(1), 19–26. https://doi.org/10.11648/j.jfa.20130101.12

Farag, H., & Mallin, C. (2018). The influence of CEO demographic characteristics on corporate risk-taking: Evidence from Chinese IPOs. *European Journal of Finance*, *24*(16), 1528–1551. https://doi.org/10.1080/1351847X.2016.1151454

Farmer, R. E. A. (2014). Financial stability and the role of the financial policy Committee. *The Manchester School*, *82*(S1), 35–43. https://doi.org/10.1111/manc.12070

Fernandes, N., & Fich, E. M. (2023). Are outside directors with greater board tenure valuable? Evidence from the last credit crisis. *Journal of Accounting and Public Policy*, *42*(1), 107037. https://doi.org/10.1016/j.jaccpubpol.2022.107037

Forbes, D. P., & Milliken, F. J. (1999). Cognition and corporate governance: Understanding boards of directors as strategic decision-making groups. *Academy of Management Review*, *24*(3), 489–505. https://doi.org/10.2307/259138

Ghadamyari, M., & Eslami Mofid Abadi, H. (2020). The effects of corporate governance on banks' performance (evidence from of Indian banks). *International Economics Studies*, *50*(2), 17–28.

Ginesti, G., & Ossorio, M. (2020). The influence of family-related factors on intellectual capital performance in family businesses. *Journal of Management & Governance*, *25*(2), 535–560. https://doi.org/10.1007/s10997-020-09510-4

Gontarek, W., & Belghitar, Y. (2020). CEO chairman controversy: Evidence from the post financial crisis period. *Review of Quantitative Finance & Accounting*,

56(2), 1–39. https://doi.org/10.1007/s11156-020-00906-9

Gruszczyński, M. (2020). The microeconometrics of corporate governance. In *Financial microeconometrics* (pp. 159–195). Springer International Publishing. https://doi.org/10.1007/978-3-030-34219-7_5

Gupta, N., & Mahakud, J. (2020). CEO characteristics and bank performance: Evidence from India. *Managerial Auditing Journal*, *35*(8), 1057–1093. https://doi.org/10.1108/MAJ-03-2019-2224

Hayat, S. J. (2011). *Efficiency analysis of commercial banks in Pakistan – A non parametric approach* [Lahore School of Economics Student Thesis].

Heemskerk, K. (2019). Promising avenue or dead end street? A meta analytic review of the Forbes and Milliken model of board behaviour. *Corporate Governance the International Journal of Business in Society*, *19*(3), 471–489. https://doi.org/10.1108/CG-01-2018-0017

Hong, N. T. H., & Linh, T. K. (2023). Institutional investors, corporate governance and firm performance in an emerging market: Evidence from Vietnam. *Cogent Economics & Finance*, *11*(1), 2159735. https://doi.org/10.1080/23322039.2022.2159735

Hopt, K. J. (2020). Corporate governance of banks and financial institutions: Economic theory, supervisory practice, evidence and policy. *Evidence and Policy (March 13*, 2020). *European Corporate Governance Institute-Law Working Paper (507)*.

Jan, A. A., Lai, F. W., Asif, M., Akhtar, S., & Ullah, S. (2022). Embedding sustainability into bank strategy: Implications for sustainable development goals reporting. *International Journal of Sustainable Development & World Ecology*, *30*(3), 1–15. https://doi.org/10.1080/13504509.2022.2134230

Jan, A. A., Lai, F. W., & Tahir, M. (2021). Developing an Islamic corporate governance framework to examine sustainability performance in Islamic banks and financial institutions. *Journal of Cleaner Production*, *315*, 128099. https://doi.org/10.1016/j.jclepro.2021.128099

Javid, Y. A., & Iqbal, R. (2010). Corporate governance in Pakistan: Corporate valuation, ownership and financing. *PIDE Working Papers*, *57*.

Khan, M. Z. (1998). *Transforming banking in Pakistan. Study commissioned by ADB for RETA 5770: Study of financial markets in selected member countries*, 28 August

Lee, S. K. (2023). Firms' risk-taking for customers' benefit and its relevance with performance relative to aspiration. *Cogent Business & Management*, *10*(1), 2192842. https://doi.org/10.1080/23311975.2023.2192842

Liu, C., Li, Q., & Lin, Y. E. (2023). Corporate transparency and firm value: Does market competition play an external governance role? *Journal of Contemporary Accounting & Economics*, *19*(1), 100334. https://doi.org/10.1016/j.jcae.2022.100334

Mili, M., & Alaali, Y. (2023). Does corporate governance quality improve credit ratings of financial institutions? Evidence from ownership and board structure. *Corporate Governance the International Journal of Business in Society*, *23*(4), 867–887. ahead-of-print. https://doi.org/10.1108/CG-05-2022-0232

Mongiardino, I., & Plath, C. (2010).risk governance at large banks: Have any lessons been learned? *Journal of Risk Management in Financial Institutions*, *3*, 116–123. https://www.ingentaconnect.com/content/hsp/jrmfi/2010/00000003/00000002/art00002

Mongid, A., Iramani, R. R., & Muazaroh, M. (2020). Value creation in the listed banks: Do governance matter? *International Journal of Business and Society*, *21*(2), 917–930. https://doi.org/10.33736/ijbs.3302.2020

Naqvi, N., & Jones, E. (2020). Politicians, regulations, and banks advocate Basel. *The Political Economy of Bank Regulation in Developing Countries: Risk and Reputation*, 105. https://doi.org/10.1093/oso/9780198841999.003.0004

Nazir, M. S., & Afza, T. (2018). Does managerial behavior of managing earnings mitigate the relationship between corporate governance and firm value? Evidence from an emerging market. *Future Business Journal*, *4*(1), 139–156. https://doi.org/10.1016/j.fbj.2018.03.001

Nazir, M. S., & Alam, A. (2010). The impact of financial restructuring on the performance of Pakistani banks: A DEA approach. COMSATS Institute of Information Technology Paper.

Nuswantara, D. A., Fachruzzaman, Prameswari, R. D., Suyanto, R. R., & Hendrati, I. M. (2023). The role of political connection to moderate board size, woman on boards on financial distress. *Cogent Business & Management*, *10*(1), 2156704. https://doi.org/10.1080/23311975.2022.2156704

Onumah, J. M., & Duho, K. C. T. (2020). Impact of intellectual capital on bank efficiency in emerging markets: Evidence from Ghana. *International Journal of Banking, Accounting and Finance*, *11*(4), 435–460. https://doi.org/10.1504/IJBAAF.2020.110303

Osore, S. A., Ngugi, P. K., & Ogollah, K. (2020). Influence of technological orientation on performance of conventional and Islamic banking in Kenya. *Journal of Business and Strategic Management*, *5*(1), 1–14. https://doi.org/10.47941/jbsm.366

Pathan, S. (2009). Strong boards, CEO power and bank risk-taking. *Journal of Banking and Finance*, *33*(1), 340–350. https://doi.org/10.1016/j.jbankfin.2009.02.001

Proença, C., Augusto, M., & Murteira, J. (2023). The effect of earnings management on bank efficiency: Evidence from ECB-supervised banks. *Finance Research Letters*, *51*, 103450. https://doi.org/10.1016/j.frl.2022.103450

Quintyn, M. (2007). Governance of financial supervisors and its effects – a stocktaking exercise. *SUERF Studies, SUERF – The European Money and Finance Forum, number 2007/4*.

Rashid, M. M. (2020). "Ownership structure and firm performance: The mediating role of board characteristics". *Corporate Governance the International Journal of Business in Society*, *20*(4), 719–737. https://doi.org/10.1108/CG-02-2019-0056

Rodrigues, R., Samagaio, A., & Felício, T. (2020). Corporate governance and R&D investment by European listed companies. *Journal of Business Research*, *115*, 289–295. https://doi.org/10.1016/j.jbusres.2019.11.070

Roodman, D. (2009). How to do Xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal*, *9*(1), 86–136. https://doi.org/10.1177/1536867X0900900106

Rustam, A., & Rashid, K. (2015). A comparative study of the performance of local and foreign banks in Pakistan: Some ANOVA evidence. *The IUP Journal of Bank Management*, *14*(1). http://www.kasbit.edu.pk/journal/index.htm

Sardari, A., Azeem, M. M., Hassan, S., & Bakhsh, K. (2013). Comparison of efficiency between pure Islamic banks and Islamic bank windows and role of Islamic banking in agriculture sector. *Pakistan Journal of*

Agricultural Sciences, *50*(1), 155–161. http://www.pakjas.com.pk

Shaari, J. A. N., Khalique, M., & Isa, A. H. B. M. (2011). Ranking of public and domestic private sector commercial banks in Pakistan on the basis of intellectual capital performance. *KASBIT Business Journal*, *4* (2011), 61–68. http://kbj.kasbit.edu.pk/Volumes-Updated-2020/Vol4/Topic5.pdf

Siauwijaya, C. (2020). Analysis of factors that affect the capital structure and value of manufacturing firms in Indonesia. *PalArch's Journal of Archaeology of Egypt/egyptology*, *17*(7), 2833–2849.

Tahir, S. H., & Sabir, H. M. (2015). Ownership structures as determinants of financial decisions: Evidence from Pakistani family owned listed firms. *Zbornik radova Međimurskog veleučilišta u Čakovcu*, *6*(1), 117–127.

Talpur, A. B. (2023). Market power and concentration-performance analysis of the banking sector: A comparative study of Singapore and Pakistan. *Social Sciences & Humanities Open*, *7*(1), 100383. https://doi.org/10.1016/j.ssaho.2022.100383

Ullah, S. (2020). Role of corporate governance in bank's efficiency in Pakistan. *Studies in Business and Economics*, *15*(1), 243–258. https://doi.org/10.2478/sbe-2020-0018

Ullah, S., Majeed, A., Popp, J., & Bilan, Y. (2023). Determinants of bank's efficiency in an emerging economy: A data envelopment analysis approach. *PLoS One*, *18*(3), e0281663. https://doi.org/10.1371/journal.pone.0281663

Vafeas, N. (2005). Audit committees, boards, and the quality of reported earnings. *Contemporary Accounting Research*, *22*(1), 093–122. https://doi.org/10.1506/1QYN-2RFQ-FKYX-XP84

Vitolla, F., Raimo, N., & Rubino, M. (2020). Board characteristics and integrated reporting quality: An agency theory perspective. *Corporate Social Responsibility and Environmental Management*, *27*(2), 1152–1163. https://doi.org/10.1002/csr.1879

Waris, M., & Haji Din, B. (2023). Impact of corporate governance and ownership concentrations on timelines of financial reporting in Pakistan. *Cogent Business & Management*, *10*(1), 1–19. https://doi.org/10.1080/23311975.2023.2164995

Westman, H. (2011). The impact of management and board ownership on profitability in banks with different strategies. *Journal of Banking & Finance*, *35* (12), 3300–3318. https://doi.org/10.1016/j.jbankfin.2011.05.013

Zainal, N., Nassir, A. M., Kamarudin, F., & Law, S. H. (2020). Does bank regulation and supervision impedes the efficiency of microfinance institutions to eradicate poverty? Evidence from ASEAN-5 countries. *Studies in Economics and Finance*, *38*(2), 272–302. https://doi.org/10.1108/SEF-10-2019-0414

Zaman, M. S., & Bhandari, A. K. (2020). Financial deregulation, competition and cost efficiency of Indian commercial banks: Is there any convergence? *Indian Economic Review*, *55*(2), 1–30. https://doi.org/10.1007/s41775-020-00100-7

Zhu, H., Zhu, Q., & Ding, Z. (2020). The roles of Chinese CEOs in managing individualistic cultures in cross-border mergers and acquisitions. *Journal of Management Studies*, *57*(3), 664–697. https://doi.org/10.1111/joms.12556

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Appendix A

List Of Sample Banks

Sr. No	Bank Name	Sr. No	Bank Name
1	Allied Bank Limited	12	KASB bank
2	Albaraka Bank Limited	13	Muslim commercial bank (MCB)
3	Askari Bank Limited	14	Meezan Bank
4	Bank Al-Habib	15	National bank of Pakistan (NBP)
5	Bank Alfalah Limited	16	NIB
6	Bank Islami	17	Silk Bank Limited (Saudi Pak Commercial Bank Limited)
7	Bank of Khyber	18	Soneri Bank Limited
8	Bank of Punjab	19	Standard Chartered
9	Faysal Bank Limited	20	Summit Bank
10	Habib Bank Limited	21	United bank Limited (UBL)
11	JS bank		

Appendix B: The measurement of corporate governance, efficiency and default probability

Table B1. The Corporate Governance Variables

Measures of Corporate Governance

Group	Indicators (Measurement)	Explanation (If needed)
Corporate Governance Index	Board independence	Percentage of outside directors on the board per bank, *Dummy variable*: 0 if less than 60% of directors are independent and 1 if 60% or more directors are independent.
	CEO is chairman/duality	Chairman same as CEO, if not any lead director per bank. When the CEO is also the chairperson of the board, it is known as CEO duality; *Dummy variable*: 0 if the CEO is a chairperson of the board and 1 if the CEO is not the chairperson of the board.
	Board size/board of directors	Total number of directors per bank, *Dummy variable*: 0 if greater than the median of the sample and 1 if less than the median of the sample.
	Transparency	When the bank publishes its financial statements quarterly, semi-annually, and annually, *Dummy Variable*: 0 if financial statements are not published and 1 if financial statements are published.
	Managerial ownership for internal control	Percentage of shares held by intellectual capital (executive director and senior management) divided by the total number of shares per bank, *Dummy Variable*: 1 if percentage is less than the sample median and 0 if percentage is greater than the sample median.

Table B2. The efficiency/profitability variables

To measure efficiency and profitability (here we use some profitability variables also because ROA and ROE are linked with banks' effectiveness and can cause bank default)

Group	Indicators (Measurement)	Explanation (If needed)
Profit Efficiency	Profit after tax to TA	Profit After Tax/Total assets
Operational Efficiency	Non-interest expenses/net bank revenue	Net bank revenue = interest income + other income-interest expenses.
Management Efficiency	Earnings per share (EPS)	We considered the banks' earnings per share, which is a proxy for the bank's management efficiency and the bank's earnings and market share.
Banks' cost efficiency	Total assets (input)/total loans and the growing non-lending activities (other earning assets) (Output) TA to NPL+ TA or TL	Total costs (personnel expenses + other administrative expenses + interest paid + non-interest expenses) total Assets/NPL+ total advances or total loan
Technical efficiency	Input/output	Inputs are no of employees,no of branchesadmin expenses, non-interest expense and loan loss provision. Outputs are net interest income,net commission, and total other income.

Table B3. The bank default probability and financial soundness

To measure bank default probability and financial risk soundness index

Group	Indicators (Measurement)	Explanation (If needed)
To measure the bank's default probability Z-score model	Z= (ROA+E/A) banks Sd. of ROA	E/A is its equity-to-asset ratio
Liquidity risk and risk-taking practices (RTP) proxied by total loan to total assets.	proxied by total advance to total deposit	
Risk-taking practices	RTP proxied by total loan to total assets.	
Bank Size	Log of total assets	
CAR	Capital adequacy ratio: the ratio of capital to risk-weighted assets (credit, operational, market).	