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CORPORATE GOVERNANCE AND NONPERFORMING LOANS: EMPIRICAL EVIDENCE FROM PAKISTAN

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ABSTRACT

Growing default loans in a financially troubled economy may further limit a bank's ability to finance economic growth. Financial institutions can effectively control the expansion of nonfinancial loans by implementing robust corporate governance practices and adherence to stringent banking regulations. The objective of this study is to analyze the influence of corporate governance on the occurrence of non-performing loans in commercial banks in Pakistan. A panel data set was developed by retrieving information about nonperforming loans, corporate governance attributes, and bank-level control variables from the audited annual reports of 20 commercial banks from 2009 to 2020. Fixed effect and random effect panel estimators were employed to regress the effect of corporate governance attributes on the nonperforming loans. The results of regression analysis revealed that the corporate governance structure had a mitigating effect on loans. The size of the directors' board and the size of the risk committee board were the only commercial corporate governance attributes of bank governance that controlled the nonperforming loans of Pakistani commercial banks. Policymakers and regulators should give due consideration to corporate governance attributes while developing strategies and mechanisms for controlling the persistent rise in nonperforming loans. The surprisingly insignificant effect of some attributes of corporate governance calls upon academics to consider other board attributes like qualifications and experience of board members in their future research agenda.

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INTRODUCTION

The growth of nonperforming loans (NPLs) in a bank's loan portfolio erodes their financing ability consequently impedes the banking sector's growth and development. It also endangers the liquidity and profitability of commercial banks (Zhang et al., 2016). In the balance sheets of banks, NPLs reflect credit risk (Malimi, 2017) and indicate the probability of financial crises (Greenidge and Grosvenor, 2010). An increase in the level of NPLs cited as a major cause of the banking collapse (Fiador and Sarpong-Kumankoma, 2021). A high degree of non-performing loans largely constitutes bank defaults, which is detrimental to economic growth. Non-performing loans if not regulated, would erode the public's trust in the financial institutions (Nwankwo, 1996). Furthermore, some financial events, for example, the Asian financial collapse, and the subprime mortgage crises in the US have established the importance of credit risk management (Van Biljon, 2018). The financial meltdown of 2008 demonstrated that policymakers must acknowledge both financial and price stabilization objectives. Different factors like lax regulatory frameworks, bad governance, and complicated credit structure were reported to have caused the 2008 financial crisis. The management of non-performing loans is also a big challenge for commercial banks in both developing and developed countries. After the effects of COVID-19 have worsened the scenario. Lack of stringent control by regulatory authorities and poor governance of commercial banks increase the liberal lending by commercial banks.

A handful of studies have highlighted the effect of macroeconomic factors, bank characteristics, and the regulatory system on NPLs. Among these factors, the role of bank management, technological capacity, internal control, lack of adequate supervision and control, scarcity of debt collection methods, and a lack of legal infrastructure were found to have a significant impact on NPLs (Hosen et al., 2020). Prudential regulations are implemented to account for credit risks that commercial banks face (Arby, 2004). Strict compliance with corporate governance is one of the measures that are used to control the deteriorating level of nonperforming loans. According to La Porta et al. (2000), the strategic risk management process is significantly influenced by corporate governance practices. Later, Stultz (2016) also emphasized the role of corporate governance practices in aligning the risk-taking behavior of managers with the maximization of shareholders' value. Similarly, a proper governance mechanism is needed to mitigate agency costs (Tahir et al., 2020). Recently, Hunjra et al. (2020) suggested that nonperforming loans can be controlled by implementing an effective corporate governance structure in the financial sector. Thus, the significance of corporate governance in the banking industry cannot be ignored. A lax governance system and extreme risk-taking exposure contribute to banking uncertainty and economic default (Zhang et al., 2016). Therefore, good corporate governance increases public trust in the banking system. Otherwise, bank defaults are expected to rise as a result of the banks' bad performance (Ibrahim et al.,

2010). Xerox, Enron, Tyco, Sunbeam, and World-com are examples of large-scale corporate scandals triggered by inadequate corporate governance (Gillan and Martin, 2007). Asset value, costs, and financial positions were distorted due to a clash of interests among board members of a company.

Because of the high rate of bankruptcies in developed countries, most of the earlier studies on corporate governance were conducted in the United States, Australia, Japan, the United Kingdom, and Germany, etc. Non-performing loans of commercial banks have also been identified as one of the leading causes of bank collapse in developing countries. However, little is known about the implications of corporate governance in the banking sectors of emerging economies (Ahmed et al., 2016). We found a few studies (Adegboye et al., 2020; Love and Rachinsky 2015; Liang et al., 2016; Tarchouna et al., 2017; Zagorchev and Gao, 2015) that examined how corporate governance affects delinquent loans in developing nations such as Pakistan. Moreover, most of the earlier studies have looked at board structure concerning industrial firms, but only a few have looked at it specifically about commercial banks (Macey and Miller, 1995). For example, Liang et al. (2016) analyzed the association between the US bank asset diversification and bank Tobin's Q and reported that the board structure as a bank corporate governance system ameliorates agency conflicts of banking institutions. Similarly, Belkhir (2009), De Andres and Vallelado (2008), and Huang (2010) used board size, gender diversity, and independent ratio of the board of directors as proxy for banks' governance. Some studies (for example Andries and Brown 2017; Ellul and Yerramilli, 2013) used a CGI to test bank corporate governance.

Since the last couple of decades, the corporate governance in Pakistan's banking system has gotten a lot of consideration. After the financial crisis of the 1990s, big corporate scandals in the 1990s such as Taj Enterprises, Mehran Bank, Sarah Company, Crescent Bank, and the ENGRO Group of Companies, etc., called upon the policymakers and managers to develop and implement corporate governance standards in Pakistan. However, over the last two decades, Pakistan has achieved considerable progress in improving its governance system and attracting regional and overseas investors. Despite the implementation of corporate governance mechanism in banking sector of Pakistan, NPLs have grown steadily over the last 10 years (Badar et al., 2013). According to the World Bank (2015), Pakistani banks' average NPL ratio remained about 14.87 during the last two decades. Pakistan is ranked 24th out of 119 countries based on NPL. In 2020 the non-performing loan ratio has increased from 8.6% to 9.2%.

The worsening position of NPLs in Pakistan requires urgent attention of policymakers and academics to investigate the determinants of NPLs and suggest measures to control this problem. Further, significant developments in corporate governance in Pakistan during the last two decades motivate to examine the effect of the implantation of corporate governance mechanisms on NPLs. Thus, this study is designed to investigate the impact of corporate governance on the non-performing loans of commercial banks in Pakistan and aims to contribute to the existing literature in the following stances. First, by testing the corporate governance index concept in the setting of an emerging economy, this research sheds light on the most used CG practices in a less developed economy. Second, the influence of individual corporate governance features, particularly the board risk committee, on the level of nonperforming loans in Pakistani commercial banks is also examined in this study. Third, the findings of this study revealed to bank management, banking regulators, and SECP which components of the CG mechanism need to be emphasized more for improving the loan quality and the stability of the banking sector in emerging economies like Pakistan. Last not the least, this research calls upon credit managers to adjust their credit policy in response to changes in NPLs and financial trends.

Agency Theory

Theoretical explanation and hypotheses

The agency theory highlighted the conflict of interest between business owners (called principals) and their managers (called agents). According to this theory, principals are outcome-oriented while agents are salary oriented. Later, Arrow (1971) emphasized the risk-sharing behavior of principals and agents (management). They postulated that owners assume the risk by handing over resources to agents and delegating authority to them for the allocation and utilization of these resources. Managers put their careers and reputations at risk when they undertake some risky project to maximize the wealth of principals. Sometimes agents put their interests first and avoid undertaking risky projects. They emphasize more on the preservation of their market reputation, job security, and increments in their financial perks rather than an increase in the wealth of owners. A misalignment of managers' interest with the interest of the principal is called an agency problem (Eisenhardt, 1989). A code of corporate governance is developed and practiced to control unethical managerial practices and minimize information asymmetry. For owners, inspecting an agent's activities has become difficult due to the asymmetry of information. Furthermore, these managers pass the risk to the principal owners and preserve their reputation and career (Adegboye et al., 2020).

Corporate governance can allow efficient oversight and mitigate management's opportunistic actions that can affect to interest of investors (Al-Jaifi, 2020). However, the agreements need to minimize agency expenses, which may incur high additional costs, like direct cost, implementation, and compliance of contracts between opposing major parties with a competitive interest (Fama and Jensen, 1983). Principals may be at risk if they seek to impose tight supervision of agents or agents to ensure that their interests will not interfere with the interests of principals (Al-Gamrh et al., 2020). Corporate governance promotes openness and transparency while assisting the expansion and stabilization of a company's prosperity (Faruqi et al., 2019). Good governance structures can be encouraged by shareholders of companies with high investment potential to ensure their sustainability.

Agency theory only emphasizes that managers as the custodians of resources of a firm, are required to exercise the delegated authority in the best interest of owners. However, this theory does not entail that managers look after the interests of stakeholders other than owners.

Stakeholder Theory

Stakeholder theory was put forward to take care of all stakeholders' interests rather than just of the owners. According to this theory, any group or person who may influence or is likely to be influenced by the accomplishment of the organization's objectives is called its stakeholder. This is further clarified that both owners and managers are the riders of the same boat and a conflict of interest might be destructive for both. Thus, both are required to take care of the interests of each other (Hill and Jones, 1992). According to the modern stakeholder theory, an organization's management has a wide system of value-added connections with the owners, staff, and vendors.), this useful network of relationships is much more important than the earlier agency theory's agent and principal relationships.

Moreover, this theory acknowledges that each stakeholder is entitled to a share of the organization's earnings. Management is responsible for the efficient execution of business operations to increase the payoff for all stakeholders equally and fairly. Unfortunately, there is no suitable mechanism that ensures equity in the distribution of wealth consistent with the stakeholder theory. Furthermore, it is difficult to satisfy all stakeholders due to disparities in the distribution of power and authority in the organization (Matt et al., 2015). The primary purpose of corporate governance is to ensure alignment of interests of various stakeholders (including, management, owners, creditors, lenders etc.). An efficient and dependable corporate governance management system disciplined the executives for holding them accountable for their decisions and actions (Allen and Gale, 2001).

Institutional Theory

Institutional theory integrates agency theory and the stockholders' approach. According to Scott (2005), institutional theory contributes to the establishment of values, rules, and standards for the organization that are fairly consistent with the core principles of governance by focusing on the resilient features of the sociocultural system. According to this theory, the complexity of corporate governance mechanisms varies across countries (Boehmer, 1999). Institutional laws act as lore that companies follow to obtain prestige, money, prosperity, and a stronger chance of survival (Meyer and Rowan, 1977).

According to Scott (2005), institutional theory has its origins in the formative era of social sciences. This theory emphasizes that companies should be viewed as social and cultural systems as well as means of producing and providing goods and services (Filatotchev and Nakajima, 2010). It gives a more realistic understanding of entities, arguing that they are affected by normative pressures, both internally and externally (Zucker, 1987). It also explores how social systems grow, diffuse, embrace, evolve, degrade, and become redundant over time and space (Scott, 2005). The institutional theory postulates that the behavior and actions of an individual or association of individuals are directed and controlled by a persistent system of well-recognized values and socially structured and accepted activities. In the social system, faith, diplomacy, legislation, and governance are the building blocks of institutional structures that direct or constrict the actions of an organization (Filatotchev and Nakajima 2010). These institutions direct our thoughts regarding corporate responsibility and declare concerns of social significance (Selznick, 1996). Thus, institutional theory provides a deeper insight and understanding of corporate governance in emerging markets (Scott, 2005). Moreover, this theory helps probe the societal, financial, and regulatory impact of institutions on countries as well as organizations (Brignall and Modell, 2000). Moreover, it also specifies a set of appropriate policies, and procedures for performing economic and social activities (Westphal and Zajac, 2013). They emphasized the role of social and political structure in designing the governance mechanism in organizations.

Hypotheses Development

Corporate Governance and Non-performing Loans

Strict compliance with the code of corporate governance in the banking sector causes a reduction in NPLs (Tarchouna et al., 2017). The emphasis of banking regulations is to increase the safety of investment in the banking system and to reduce the crippling impact of NPLs. Zhang et al. (2016) noticed that an increase in risky investment, moral hazard, and market volatility leads to an increase in the NPLs. Recently, Switzer et al. (2018) highlighted the role of corporate governance in the reduction of default risk and revitalization of the stock market after the financial crisis. They emphasized that the compliance of internal CG mechanisms (insider ownership, board structure, CEO duality, etc.) and corporate regulatory framework cause a substantial reduction in the default risk of firms. Later Amin et al. (2019) reported that NPLs are influenced by bank management efficiency, compliance with internal CG mechanisms, and corporate regularity developments in the country. Similar findings were also reported by Balagobei (2019). Recently, Fiador and Sarpong-Kumankoma (2021) suggested that effective implementation of corporate governance is essential in the banking industry to improve the quality of loan portfolios. Similarly, Tahir et al. (2020), reported that corporate governance has a significant effect on loan quality and sustainable bank loan performance. The above discussion suggests the following hypothesis to investigate the relationship between CG and NPLs.

H_1: Corporate governance has a negative impact on the non-performing loans.

Board Size and Non-Performing Loans

The role of the board of directors is pivotal in developing the integration between a company's owners and management of firms (Balasubramanian and George, 2012). Large board size is beneficial as it brings a portfolio of knowledge and expertise required for improvements in the performance of organizations (John and Senbet, 1998). It is widely accepted that a larger board provides, a portfolio of specialists from different fields that enhances firms' ability to be more innovative and efficient (Yermack, 1996). It is also established that the size of the board has a positive impact on the quality of bank loans. However, an overly large board would reduce the board's productivity as well as the efficacy of corporate governance processes. When the board becomes too big, it harms banks' performance and the quality of loans due to inadequate oversight and higher agency conflict.

Jackling and Johl (2009) stated that a big board causes improvement in loan management and reduces the level of non-performing loans. Later Salim et al. (2016) proposed that a big board has deep insight into administration and decision-making processes and consequently increases bank performance. Recently, Fiador and Sarpong-Kumankoma (2021) suggested that a fairly large board of directors, and participation of its members, and the diversity of their expertise, may lead to the enhancement of the quality of bank loans.

H_2: Board size has a negative impact on non-performing loans of commercial banks.

Board Independence and Non-Performing Loans

There remains a widespread belief that a board panel with a sufficient number of external directors is more likely to make unbiased decisions than a board fully controlled by insider experts. Independent directors are engaged for their experience, and abilities, and also due to their expertise. On the contrary, Bektas and Kaymak (2009), emphasized the dependence theory and proclaimed that independent directors are inefficient as they do not hold significant positions on the board. Minton et al. (2014), revealed that the professional experience of independent directors is negatively linked to asymmetric information (Pathan and Faff, 2013). Nevertheless, Nyor and Mejabi (2013) have found that the inclusion of independent directors on the board has minimal impact on non-performing loans (NPLs). Recently Sameera and Wijesena

(2018) observed that non-executive directors enhance the ability of the board to more effectively monitor the operational and credit risk. They emphasized presence of independent directors is essential for reducing the bank's credit risk exposure. Similarly, Gafoor et al. (2018) established the independence of directors for mitigating the agency problem and opportunistic behavior of management. The above discussion leads to the development of the following hypothesis.

H_3: Non-performing loans are negatively impacted by the independence of the board.

Management's Ownership and Non-Performing Loans

According to agency theory, managers control the businesses and are more likely to indulge in activities that result from an increase in their private wealth at the cost of owners (Zied and Mohamed, 2013). To avoid this, strict supervision of business affairs should be performed directly by owners which is very costly and sometimes not possible. Alternatively, agency problems in a firm can be managed in a better way by offering stock options to management. The voting power of directors is linked with their ownership in a company. Ownership of stocks by top-level management decreases the level of agency problems (Noval et al., 2020). A manager who owns stocks in a company would be more interested in increasing its performance (Noval et al., 2020). A higher proportion of ownership owned by bank directors, allows them to be more vigilant while taking credit risks. Tarchouna et al. (2017) assessed a mechanism of bank governance to mitigate delinquent loans. They found corporate governance structure of small banks is frail and vulnerable, which contributes to poor loan quality. Whereas for large banks, directors' ownership has little impact on NPLs. They established the higher proportion of ownership retained by board members helps reduce the NPLs of small banks. Indeed, as an incentive tool, a higher proportion of directors 'ownership motivates them to exercise greater caution while taking risks. Consequently, the bank's probability of entrenchment is decreased. The above discussion leads to the following research hypothesis:

H_4: Directors' ownership has a significant negative impact on non-performing loans in the commercial banks.

Board Engagement/ Board Meetings and Non-Performing Loans

According to Nugraheni and Muhammad (2019), the main risk in the banking industry is credit risk. The board meeting is a forum for the discussion on the key issues and to make crucial decisions for the organization's progress and survival. A board of directors meeting is needed for any policy and strategic decision. Liang et al. (2016) established that the frequency of meetings of BoDs is positively related to the asset quality and performance of the banks. Similarly, Ahmad et al. (2016) emphasized that frequent board meetings are essential for timely addressing the problems of loan-related losses. Later an empirical study conducted by Gafoor et al. (2018) also revealed a negative relationship between the frequency of board meetings and non-performing loans. Recently, a couple of studies, including Nugraheni and Muhammad (2019) and Tahir et al. (2020) also reinforced the role of board engagement in improving the quality of loans and controlling the credit risk of banks. Thus, based on the proceeding discussion, the following hypothesis statement is developed.

H_5: Board engagement adversely affects the level of non-performing loans in the commercial banks.

Board Risk Committee Size and Non-Performing Loans

The risk committee is responsible for managing and accessing the risks associated with banking activities. The risk committee of the board limits the manager's discretion when it comes to approving loans. When the scope of this control expands, so will the number of non-performing loans reduce (Ben Saada, 2018).

The risk committee's size has a significant impact on its efficiency and capability. Increase the size of RCs with diverse experience to better monitor managers' risk management. The risk management committee (RMC) is a core component of the risk management process and a crucial element of the corporate governance system (Nor and Ishak, 2017). The risk committee acts as a governance framework for closely overseeing and managing business risks and transmitting such risks effectively to different stakeholders (Nahar et al., 2016). The establishment of RMC supports the board's awareness and commitment to internal control mechanisms and effective corporate governance (Bakalikwira et al., 2017; Tumwebaze et al., 2018). The research hypothesis of this study is:

H6: The size of the board risk committee has an adverse effect on the level of non-performing loans in the commercial banks.

Board Risk Committee Independence and Nonperforming Loans

The inclusion of independent directors on the risk committee led to an enhancement in corporate governance (Dionne and Triki, 2005; Elamer and Benyazid, 2018). The Risk Committee is an independent board panel that is wholly responsible for the development of risk control mechanisms and their implementation (Ramly and Nordin, 2018). The primary responsibility of the risk management Committee (RMC) is to oversee a company's extensive risk management system (Ames et al., 2018). Admati and Hellwig (2011) reported that the presence of independent directors in risk committees enhances their unbiased control over the risk-taking behavior of managers. Moreover, internal monitoring is likely to be more effective in an organization with a risk management committee (Iselin et al., 2019). Thus, ensuring the independence of the risk management committee would result in more stringent control over nonperforming loans. Based on the above discussion following hypothesis is developed.

H_7: The independence of the risk audit committee has a negative impact on non-performing loans in the commercial banks of Pakistan.

Board Risk Committee Meetings and Non-Performing Loans

The risk committee's activities to monitor risk are perceived by the number of risk management committee meetings every year. According to Sori et al. (2009), the frequency by which meetings are conducted indicates the amount of time spared by committee members in monitoring and controlling credit risk (Rahman and Haneem Mohamad Ali, 2006). Moreover, committee meetings allow members to be updated regarding the activities that are related to handling major risks by conducting regular reviews (Elamer and Benyazid, 2018). Ben Saada (2018) revealed that the frequency of risk management committee meetings plays a significant role in minimizing non-performing loans as compared to other committees like (audit and credit committees). The hypothesis of the study is that;

H_8: The risk committee meetings adversely affect the level of non-performing loans in commercial banks.

METHODOLOGY

Sample and Data Source

To investigate the impact of corporate governance on nonperforming loans, a sample of 20 commercial banks was chosen from 29

commercial banks. The data about corporate governance attributes and nonperforming loans of sampled commercial banks were retrieved from their audited annual reports for the period 2009 to 2020. The reason behind choosing this span is that gross nonperforming loans (NPLs) in Pakistan increased to 12.4% in 2009 and tend to fluctuate, hitting a high 15.74 percent peak in 2011 and staying high at 10.06 percent in 2016 (Detragiache and Demirgüç-Kunt, 2010), that is above the ratio of 10% of threshold. The percentage of NPLs in 2019 was 8.6% and 9.2% in 2020 which is an alarming situation according to SBP (2020). The commercial banks that meet the following filtering specifications were selected for this study. First, consistent with Thakur and Kannadhasan (2019), only those commercial banks were considered to have data of at least 5 sequential years to certify the robustness of results. Second, only those commercial banks selected as a final sample, which reported nonperforming loans in their financial statements.

In addition to the corporate governance attribute of commercial banks, some bank-specific, bank regulatory frameworks and macro-economic variables were used as control variables. Annual reports of commercial banks were used to retrieve data about nonperforming loans, corporate governance attributes, and some bank-specific variables. Data about the capital adequacy ratio, economic growth rate, inflation rate, and lending rate were obtained from economic surveys of Pakistan. The control variables were selected based on their significant impact on nonperforming loans evidenced by the existing literature. For the measurement of dependent and independent variables, we followed earlier studies on commercial banks. The definition and measurement variables are described in Table 1.

Measurement of Variables

The research uses non-performing loans as a dependent variable to reveal the study's goal. The index of corporate governance, bank regulations, bank-specific features, and macroeconomic indicators found in previous studies are all independent variables that could affect the nonperforming loan trend.

Table 1. Variables and their measurement.

Variables	Acronym	Measurement	References
Dependent Variable			
Non-Performing Loan	NPLs	The ratio of non-performing loans to gross loans and advances	Kingu et al. (2018)
Independent Variables			
Corporate Governance Index	CGI	Calculated utilizing principal component analysis of corporate governance characteristics: The corporate governance index is developed based on eight factors: board size, number of board independent directors, director ownership, non-executive directors and board composition, board meetings, and board engagement, board risk committee size, board risk committee independence, and board risk committee meetings.	Allen et al. (2018)
Size of Board of Directors	SBD	Total number of existing members on board	Sameera and Wijesena (2018), Khatun and Ghosh (2019).
Independence of Board of Directors	IBD	The proportion of non-affiliated directors to the overall number of directors serving on the board	Sameera and Wijesena (2018), Khatun and Ghosh (2019).
Ownership by Board of Directors	OBD	Percentage of the number of shares held by the directors to total outstanding shares.	Sameera and Wijesena (2018), Khatun and Ghosh (2019).
Engagement of the Board of Directors	EBD	Number of meetings held by BoDs yearly	Sameera and Wijesena (2018), Gafoor et al. (2018).
Board Risk Committee Size	BRCS	Total number of risk committee members	Elamer and Benyazid (2018), Adegboye et al. (2020).
Board Risk Committee Meetings	BRCM	Number of meetings held by board risk committee	Ben Saada (2018), Elamer and Benyazid (2018).
Board Risk Committee Independence	BRCI	The ratio of independent directors to total members of the board risk committee	Elamer and Benyazid (2018).
Control Variables			
Bank Size	BS	Logarithm of banks' total assets	Liang et al. (2016)
Profitability of Bank	PROF	Profit after tax to total assets	Rajan (1994).
Loans to Deposit Ratio	LDR	Bank total loans to total deposits ratio	Hakim (2017).
Capital Adequacy Ratio	CAR	Bank capital adequacy ratio	Fapohunda and Eragbhe (2017), Le et al. (2019).
Growth Rate	GR	Real gross domestic product growth rate	Anjom and Karim (2016).
Inflation Rate	IR	Year-end change in consumer index	Badar et al. (2013).
Lending rate	LR	Yearly nominal lending rate	Adegboye et al. (2020).

Estimation Technique and Model Specification

Stata version 12 was utilized to evaluate the data collected for the research study. At the initiative level, descriptive analysis was done to demonstrate the properties of data. In this research, the mean values, standard deviation, maximum, and minimum are all examined. Advanced statistical tests will be done to extract inferences from the collected sample after exploring that the data is normal. Correlation analysis was carried out to determine the degree of connection among the research study's variables. To test the hypotheses, we employed regression estimators (Pooled OLS, Fixed Effect, and Random Effect) in the panel data set consisting of 20 commercial banks and 10 years. The Hausman test was applied to test the suitability of the estimator. The following panel regression model was specified.

$$Y_{it} = \beta_{\circ} + \beta_1 X_{it}1 + - - - - - \beta_n X_{it} + \mu_{it} \quad (1)$$

In Eq. 1, Y refers to the dependent variable, X refers to the independent variable, i refers to the name of the bank, t refers to the period, and μ refers to the error term. Further, the detailed model is expressed as follows:

$$NPLs_{it} = \beta 0 + \beta 1 CGI_{it} + \beta 2 CAR_{it} + \beta 3 BS_{it} + \beta 4 PROF_{it} + \beta 5 LDR_{it} + \beta 6 GR_{it} + \beta 7 IR_{it} + \beta 8 LR_{it+} \mu_{2it} \quad (2)$$

$$NPLs_{it} = \beta 0 + \beta 1 SBD_{it} + \beta 2 IBD_{it} + \beta 3 OBD_{it} + \beta 4 EBD_{it} + \beta 5 BRCS_{it} + B6 BRCM_{it} + \beta 7 BRCI_{it} + \beta 8 BS_{it} + \mu_{2it} \quad (3)$$

RESULTS AND DISCUSSION

Descriptive statistics

Descriptive statistics is a useful approach for evaluating the features of research variables by examining their actual behavior. Descriptive statistics that give detailed information on the variance, central tendency, minimum, and maximum values of the variables are reported in Table 2.

Principal Component Analysis of the Corporate Governance Index

This study created a corporate governance indicator that examines the full corporate governance practices of specified Pakistani commercial banks using the statistical method for lowering dataset dimensionality without sacrificing vital data. Interestingly, the principal component analysis combines seven governance measures into a corporate governance indicator. This study employs the designated corporate governance attributes to establish a corporate governance indicator for commercial banks in Pakistan. The variables considered in this study, such as board size, board independence ratio, director ownership percentage, board engagement, size of the board risk committee, meetings of the board risk committee, and the independence of the board risk committee, are based on previous studies conducted by Ellul and Yerramilli (2013), Florackis and Ozkan (2009a). The initial principal components are selected to analyze the existing variation in the database.

In Table 3, Panel A, shows the relationship between corporate governance indicators utilized to calculate the index. The variables have weak correlation coefficients, demonstrating diverse corporate governance systems in Pakistan's selected commercial banks. Panel (B) of Table 3 presents the weights assigned to the first principal components that have a significant impact on this study. These components include board involvement, board risk committee size, and meetings, as indicated by factor loading values over 0.5. Active engagement in corporate governance in a positive manner. Table 3 of this analysis demonstrates the considerable influence of board size on corporate governance as a whole.

Table 2. Descriptive analysis.

Variables	Mean	Std. Dev.	Min	Max
NPLs	0.416	1.684	0.013	14
CGI	0.406	2.511	2.437	14.411
SBD	8.04	1.067	0.6	13
IBD	2.053	6.585	0.1	45
OBD	0.155	1.48	0	23
EBD	6.510	2.13	3	14
BRCS	3.4102	1.463	0	6
BRCM	3.686	1.791	0	12
BRCI	1.060	9.110	0	100
BS	11.386	0.662	9.01	13.33
PROF	1.006	1.782	-11.5	12.2
LDR	0.561	0.144	0.18	0.98
GR	3.683	1.653	0	5.8
IR	7.623	3.903	2.5	13.65
LR	11.561	2.209	8.21	14.54
CAR	0.168	0.090	-0.08	0.56

Total observations 'n' is 240.

Table 3. Panel (A): Correlation matrix.

Correlation	SBD	IBD	OBD	EBD	BRCS	BRCM	BRCI
SBD	1.000						
IBD	0.064	1.000					
OBD	-0.570	-0.008	1.000				
EBD	-0.118	0.013	-0.054	1.000			
BRCS	0.188	0.102	0.022	0.156	1.000		
BRCM	-0.023	0.119	0.025	0.320	0.609	1.000	
BRCI	-0.093	0.047	-0.008	0.152	-0.025	0.021	1.000
Panel (B): Principal Component Weight							
Index	-0.080	0.432	-0.004	0.559	0.658	0.778	0.241
Panel (C) Validity of Principal Component Analysis							
Bartlett test of sphericity (p-value)				0.000			
Kaiser-Meyer- Olkin				0.539			

The validity of the principal component analysis (PCA) is also shown in Panel (C) Table 3. The data indicate a linear relationship between corporate governance traits and their development. The Kaiser-Meyer-Olkin "KMO" ranges from 0 to 1, with 0.50 being the minimum sample adequacy (Florackis and Ozkan, 2009b). In this study, KMO is 0.539, indicating appropriate sampling. This implies that the index accurately captures corporate governance indices. These two experiments prove that principal component analysis can develop a corporate governance index in this study.

Correlation Analysis

This correlation analysis examines the strength and direction of delinquent loans, commercial supremacy indicators, bank regulations proxies (capital adequacy ratio), bank-level factors (size, profitability, and loan-to-deposit ratio), and macroeconomic factors.

The sequence-wise correlation between the research variables is shown in Table 4. The relationship between NPLs and CGI is positively significant because the r value is 0.7414. The correlation of NPLs and CGI is significant at a 1% level. The coefficient of correlation between independent variables is weak and implies that there is less likeliness of severe collinearity if all independent variables are regressed jointly in one equation.

Regression Analysis for Corporate Governance Index

To study corporate governance indicator and delinquent loans the regressed equation 2 findings are shown in Table 5. Regression research shows how corporate governance index, bank regulations, and bank-specific and macroeconomic variables affect non-performing loans. Table 5 shows that the Hausman Test confirms random effect with Prob>chi2 = 0.9895. Additionally, the model's preliminary goodness of fit and repressors' explanatory power must be assessed.

The random effects in Table 5 reveal that the independent factors explain 60.5% of the variation in the dependent variable (non-performing loans). The model's reliability and validity are improved by F statistics' 1% p-value, which demonstrates statistically significant explanatory power.

Table 4. Correlation matrix.

Correlation	NPLs	CGI	BS	PROF	LDR	GR	IR	LR	CAR
NPLs	1.000								
CGI	0.741***	1.000							
BS	-0.002	0.137***	1.000						
PROF	0.089**	0.119***	0.208***	1.000					
LDR	-0.008	-0.016	-0.268***	-0.285***	1.000				
GR	-0.317***	-0.406***	0.134***	-0.083**	-0.100***	1.000			
IR	0.051***	-0.031	-0.473***	0.078**	0.120***	-0.369***	1.000		
LR	0.117***	-0.013	-0.322***	0.116***	0.165***	-0.684***	0.760***	1.000	
CAR	0.020**	-0.021	-0.232***	0.103***	-0.062	-0.000	-0.021	0.012	1.000

***Significant at 1% level, ** Significant at 5% level, * Significant at 10% level.

Table 5. Corporate governance and bank regulation impact on non-performing loans.

Variables	Pooled OLS	Fixed Effect	Random Effect
CGI	0.579***	0.838***	0.579***
	(0.000)	(0.000)	(0.000)
BS	-0.478***	0.479***	-0.478***
	(0.003)	(0.052)	(0.003)
PROF	-0.01	-0.032	-0.011
	(0.788)	(0.452)	(0.787)
LDR	-1.039*	-0.010	-1.039*
	(0.071)	(0.989)	(0.070)
GR	0.256***	0.318***	0.256***
	(0.001)	(0.000)	(0.001)
IR	-0.126***	-0.117***	-0.126***
	(0.001)	(0.006)	(0.000)
LR	0.260***	0.313***	0.260***
	(0.003)	(0.000)	(0.003)
CAR	-0.529	0.054	-0.529
	(0.544)	(0.961)	(0.544)
Const	2.325	1.037	2.325
	(0.314)	(0.748)	(0.313)
Number of observations	240		
Adj. R^2	0.589	0.596	0.605
R^2 within		0.473	0.455
R^2 Between		0.882	0.896
Wald ch2			351.19
Prob> chi1			0.000
F-test	39.02	21.02	
Prob>F	(0.000)	(0.000)	
Root MSE	1.078		
Hausman Test		2,12	
Prob> chi1		0.989	

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

The corporate governance index (CGI) affects delinquent loans (Table 5). The corporate governance index positively affects Pakistani commercial bank nonperforming loans. A 1-unit change in corporate governance increases non-performing loans by 0.579 units, according to the beta coefficient. At 1% significance, the corporate governance index affects nonperforming loans with a p-value of 0.000. The positive corporate governance index effect on nonperforming loans suggests inadequate bank governance. This conclusion is supported by previous research (Zagorchev and Gaos, 2015). Corporate governance improved delinquent loans during the global financial crisis, according to Erkens et al. (2012), and Beltratti and Stulz (2012). The negative correlation between bank capital ratio and credit risk suggests that capital regulation reduces credit risk in emerging nations. However, this study has little effect, therefore the capital ratio does not affect Pakistani commercial banks' nonperforming loan ratio. Khan et al. (2020) and Malimi (2017) validate these findings.

The bank size coefficient is negative and statistically significant at 1%. A unit increase in bank size reduces commercial bank nonperforming loans by 0.478 units. Previous investigations by Barus and Erick (2016) validate the findings. This association illustrates that Pakistani banks' non-performing loans decrease with size. Large banks can check loans more often and manage risk well, especially with high diversification potential (Wanjala and Gachanja, 2020). Non-performing loans lower bank profits. Previous research by Kumar and Kishore (2019) supports the findings. The ratio of non-performing loans has little effect on profitability. When profitability diminishes, banks engage in hazardous enterprises, increasing NPLs.

The LTDR negatively impacts NPLs, hence raising it will reduce the likelihood of nonperforming loans. The findings match Yulianti et al. (2018). They claimed that reducing deposits raises LTDR. One bank with a high LTDR may be supporting its loans with its capital, while another with a low LTDR may be more conservative and have a lower NPL.

This study examined how macroeconomic variables affected nonperforming loan ratios using three indicators: growth rate (GR), inflation rate (IF), and lending interest rate (LR) as a control variable. GR positively affects the nonperforming loans ratio, according to this study. Lax lending practices during demand periods lower a bank's asset quality with a lag in a positive growth relationship. GDP and non-performing loans are positively correlated (Twum et al., 2021). Nonperforming loans were also negatively affected by inflation. According to Chaibi (2016), rising inflation makes it harder for borrowers to get loans and lowers their incomes. Non-performing loans benefit greatly from interest rates. High interest rates increase NPLs because financial institutions prefer floating rates. Thus, borrowers repay loans awkwardly.

Regression Analysis for Attributes of Corporate Governance

To examine the impact of corporate governance attributes on nonperforming loans, Eq3 was regressed and its results are reported in Table 6. The Hausman Test (Prob > chi2 value is 0.000 that is less than 0.05) shows the estimation by fixed effect is more appropriate. According to Table 6; Adj. R2 = 0.1798 % of the variation in the non-performing loans is explained by the independent variables, and the F- value is 0.000 which indicates that the overall model is fit.

Results reported in Table 6 show that among the attributes of corporate governance in commercial banks only the size of the director board and size of the risk management committee have a significant and negative effect on nonperforming loans. The size of the board panel has a negative connection with the bank's credit risk. This is significant from a statistical standpoint. Consequently, the hypothesis is highly supported. These findings are consistent with the findings of earlier studies. De Andres and Vallelado (2008) and Klein (2002) assert that a large board size should be recommended as it provides more expertise, more effective monitoring, and advice.

Table 6. Corporate governance attributes and non-performing loans.

Variables	Pooled OLS	Fixed Effect	Random Effect
SBD	-0.199**	-0.531***	0.199**
	(0.024)	(0.000)	(0.023)
IBD	-0.019	-0.011	-0.019
	(0.151)	(0.425)	(0.150)
OBD	-0.023	-0.011	0.023
	(0.703)	(0.849)	(0.703)
EBD	0.007	0.008	0.007
	(0.875)	(0.989)	(0.875)
BRCS	-0.176**	-0.234	-0.176**
	(0.029)	(0.012)	(0.028)
BRCE	-0.146**	0.099	0.146**
	(0.031)	(0.199)	(0.030)
BRCI	-0.003	-0.007	-0.003
	(0.075)	(0.938)	(0.756)
Const	3.608**	6.968***	3.608
	(0.033)	(0.006)	(0.313)
Number of observations	239		
Adj. R^2	0.34	0.179	0.366
R^2 within		0.135	0.061
R^2 Between		0.251	0.918
Wald ch2		132.60	
Prob> chi1		0.000	
F-test	14.73	3.66	
Prob>F	(0.000)	(0.000)	
Root MSE	1.366		
Hausman Test		45.97	
Prob> chi1		0.000	

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

Table 6 shows a strong but negative relationship between board risk committee size and non-performing loan ratio. This suggests that nonperforming loans diminish as the board risk committee grows. This investigation confirms previous findings (Ellul and Yerramilli, 2013). The resource reliance theory supports this view, according to Bedard and Johnstone (2004), as a larger committee may have more resources to address issues.

Post-regression Diagnostic Tests

To test the multicollinearity VIF test is applied after regressing Eq 1 and results are reported in Table 7. If the VIF value is more than 10, there will be a problem of multicollinearity among the study indicators. The results findings of the variance inflation factor test are provided in Table 7, which demonstrates that multicollinearity does not exist among all independent variables because the VIF value of all independent indicators is less than 10.

Table 7. Multicollinearity test.

Variables	VIF	Tolerance
Corporate Governance Index (CGI)	1.62	0.619115
Capital Adequacy Ratio (CAR)	1.27	0.789510
Bank Size (BS)	2.34	0.427794
Profitability (PROF)	1.23	0.813027
Loan to Deposit Ratio (LDR)	1.41	0.709151
Growth Rate (GR)	3.38	0.296207
Inflation Rate (IR)	4.47	0.22348
Lending Rate (LR)	7.58	0.131886
Mean VIF	3.16	

CONCLUSIONS AND RECOMMENDATIONS

The growth of non-performing loans (NPLS) is a critical subject for the overall world economy and also, particularly for the economy of Pakistan. The Central Bank has responded by introducing several initiatives, including the improvement of good governance standards. Financial globalization drives the necessity for the relevance of an efficient bank governance structure to settle agency issues between the shareholders of financial institutes and management, as well as to make the appropriate decisions to enhance performance, decrease risks, and thus improve a firm's prosperity (Afza and Nazir, 2015).

The primary objective of this research work is to ascertain the impact of corporate governance on non-performing loans in the commercial banks of Pakistan. This study analyzed a total of 20 commercial banks in Pakistan from 2009 to 2020. The regression investigation revealed a positive correlation between the corporate governance index and nonperforming loans, which is unexpected. Given the positive correlation between corporate governance and non-performing loans, it can be inferred that banks are inadequately supervised and managed. This study discovered that enhanced corporate governance standards do not enhance banks' propensity to make excessive risk decisions. Additionally, this study discovered that the non-performing loans of Pakistani commercial banks decreased in response to an increase in the size of the directors' board and the board's risk committee.

Our findings provide a significant inclusion between the relation of bank governance and risk-taking in Pakistan's banking system, and they have a variety of implications. Pakistani commercial banks might mitigate their non-performing loans by developing policies based on governance structures. One important conclusion is that having a large board of directors comprised of persons with suitable experience and knowledge is likely to reduce non-performing loans. As a result, if banking companies want to decrease their non-performing loans, they should look to expand the size of their boards of directors with qualified members, depending on their scope of activities. Last but not least, the study recommends the implementation of tighter regulations to encourage the adoption of CG best practices which would lead to more effective credit risk management, increased shareholder security, and a favourable economic effect.

The findings of the study were exposed to some limitations and assumptions while generalizing these findings due care should be exercised. The limitations of the study are: Only commercial banks were included in the analysis, although data from private, state-owned, specialized, and Islamic banks may also be possible to take and make a comparison to illustrate a different viewpoint. Although this study focused on the board characteristics and board risk committee directors to assess their impact on NPLs, other characteristics of board members like experience, age, gender diversity, political representation, etc., were not considered. This research is restricted to Pakistan's banking industry, a detailed investigation may be broadened to include worldwide financial sectors to provide regulatory authorities with more conclusive/generalizable findings.

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