

## **DO BOARD ATTRIBUTES MATTER FOR NON-PERFORMING LOANS?**

*Dr. Muhammad Saifuddin Khan<sup>1</sup> and Md. Uzzal Hossain<sup>2</sup>*

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### **Abstract**

*This study explores the impact of board attributes on non-performing loans in the banking sector of Bangladesh. It analyzes panel data of 29 listed banks in the DSE for a period of 16 years from 2009 to 2024. The findings show that some board attributes i.e. board size, gender diversity and sponsor ownership are negatively related to non-performing loan (NPL). Whereas, board independence and firm size are positively related to NPL. Institutional ownership was found to be insignificant in relation to NPL. With the ongoing NPL problem in Bangladesh, corporate governance strengthening should be prioritized with utmost importance. The paper suggests that regulators promote effective rather than symbolic board compositions, introduce and maintain gender diversity and create boards with optimal sizes. Ownership structure is also important as greater ownership by sponsor-directors increases the emphasis on monitoring, hence, lowers the NPL. With the newly elected government and previous reform suggestions, there is an opportunity to improve governance in the banking sector of Bangladesh.*

**Keywords:** Corporate Governance, Board of Directors, NPL, Banking Sector.

### **1.0 Introduction**

Non-performing loans have emerged as one of the most persistent problems that the banking sector of Bangladesh faces. Among different reasons stated by past researchers, NPL has been considered one of the main contributors to bank failures and banking crises (Us, 2017). Over the decades, the accumulation of classified loans has weakened the bank balance sheets, limited the steady growth of credit, and eroded confidence in the financial system of Bangladesh (Hossain et al., 2025). In 2024, banks of Bangladesh on average faced 23.3% NPL of their total investments; one of the highest in the Asian region. Although there have been many eye-catching policy reforms in the past few years, it is also true that the NPL ratio remains astoundingly high in the country; hence, it can be labeled as one of the top-most concerned industry issues in Bangladesh. What is most disturbing is that non-

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<sup>1</sup> Corresponding Author. Professor, Department of Finance, University of Dhaka,  <https://orcid.org/0000-0002-7944-9614>, Email: saifuddin@du.ac.bd

<sup>2</sup> Lecturer, Department of Finance, University of Dhaka,  <https://orcid.org/0009-0009-9193-053X>, Email: uzzal@du.ac.bd

conventional banks, which were supposed to be more prudent and conservative (due to their Islamic principles), are the ones that are mostly stricken by the wrath of the NPL crisis. This has led to one of the most notable events in the banking sector of Bangladesh – the recent merger of five Islamic banks. These banks are suffering from 77% of non-performing assets. This gives a reality check about the effectiveness and efficiency of so-called governance practices in the sector. Hence, the aforementioned issues have raised the need for more investigation into the matter of what causes such a high level of NPLs and how to address them in the coming future.

Among the various reforms proposed to curb NPLs by the past interim government, corporate governance and attributes of the board of directors were most notable. The board of directors is an important group of people who are representative of the vast shareholders and are responsible for strategic management, risk management, and overall discipline, all of which are central to prudent lending and effective monitoring (Armeanu et al., 2017). However, during the previous regime, lack of board independence, expertise, gender diversity etc. were widely perceived as contributing to weak governance practices, thereby worsening the NPL problem.

Following the recent change in political and regulatory regime, strengthening board governance has again been emphasized as a primary institutional response to the NPL crisis by the newly elected governor of Bangladesh Bank. Regulatory authorities and policymakers have increasingly stressed the importance of stronger corporate governance mechanisms for restoring discipline in the banking sector, because the bank's board will be accountable to its stakeholders following Ciancanelli et al., (2000). This renewed focus raises an important empirical question: *Do board attributes genuinely matter in controlling NPLs, or are they merely symbolic reforms?*

Against this background, this paper investigates whether and to what extent the board member attributes influence non-performing loans in the banking sector of Bangladesh. By examining key board attributes (such as board size, gender diversity, independence, ownership structure etc.), this paper aims to provide empirical evidence on whether board governance is an effective mechanism for tackling the widespread NPL problem. The results show that independent director is a contributing factor to NPL which is contrary to most literature; hence, supporting the neo-institutional theory in corporate governance. Gender diversity, board size and sponsor ownership, however, decrease the level of non-performing loans. Moreover, the study incorporates a 16-year time period to look into the recent developments in the banking sector of Bangladesh. In doing so, the study contributes to the growing literature on corporate governance and banking stability in emerging countries, while offering policy-relevant insights for debt-stricken countries like Bangladesh.

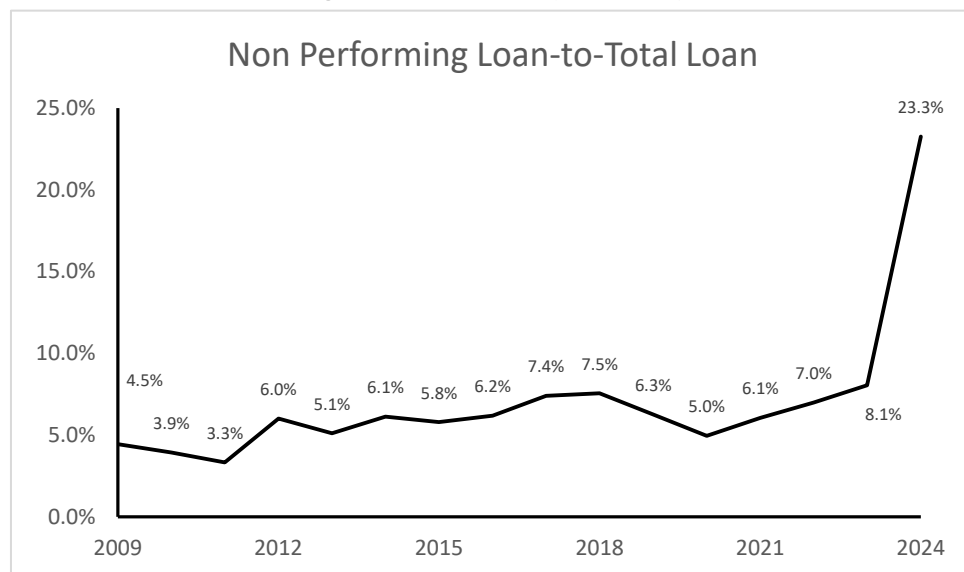
### *1.1 The Banking Sector and NPL*

In the banking sector of Bangladesh, there are 62 scheduled banks. These include 6 state-owned commercial banks, 43 Private Commercial Banks (PCBs), and 9 Foreign Commercial Banks (FCBs) as well as 3 specialized banks. Within the private sector,

33 operate as conventional banks while 10 are Shariah-based. Furthermore, the landscape includes 35 Financial Institutions (FIs), 5 non-scheduled banks, and 2 recently established digital commercial banks. Despite the large number of banks in the banking sector, the health of the banks is not up to mark.

Figure 1 illustrates the trend of the non-performing loan (NPL) ratio over the period 2009–2024 in the selected banks. The NPL ratio initially was around 3–4%, followed by a gradual upward movement, reaching around 7.5% in 2018. After a temporary moderation, the ratio resumed an increasing trend, reaching 8.1% in 2023. Most notably, a sharp surge to 23.3% in 2024 is observed here, indicating a severe downgrade in asset quality during the most recent period.

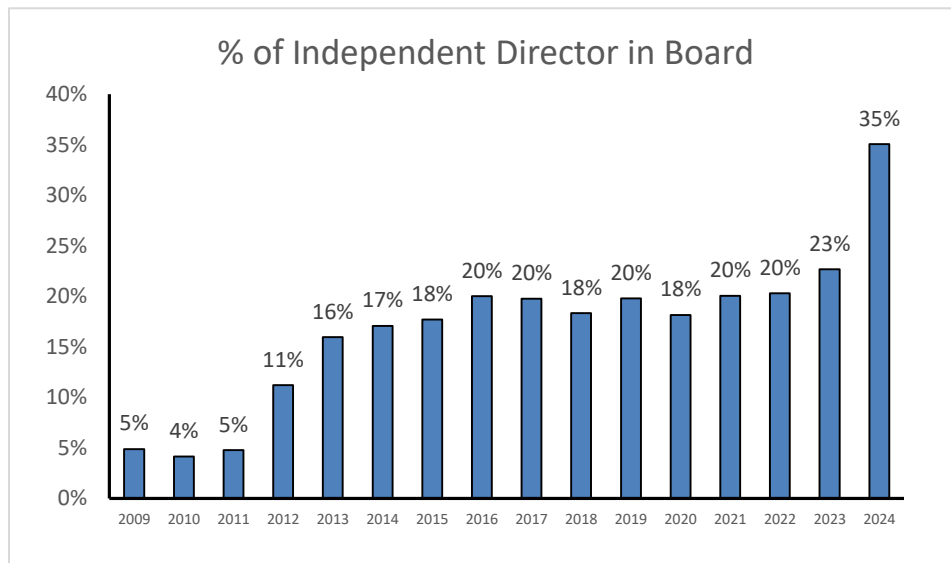
**Figure 1: NPL Trend (2009-2024)**



Source: Authors' Analysis

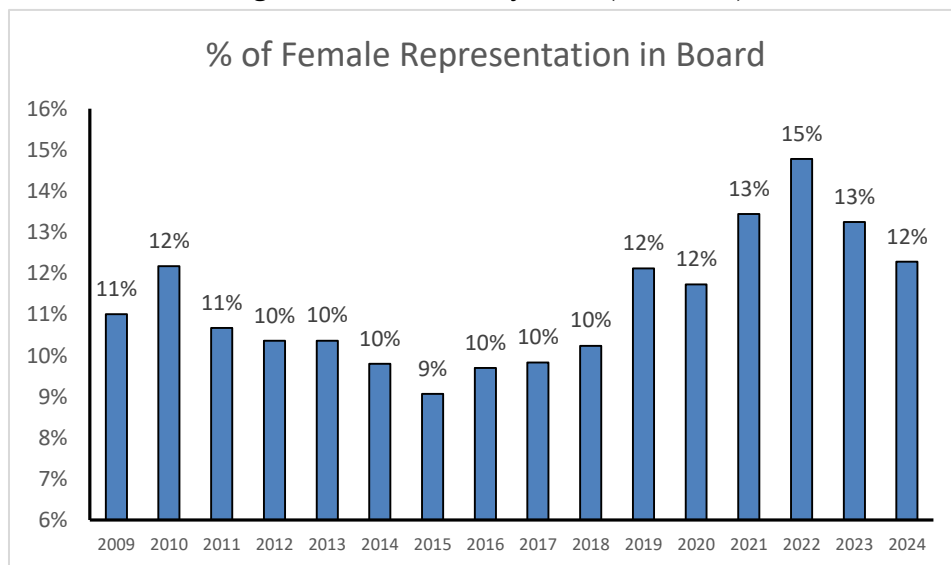
After the fall of the previous regime, independent assessments made by Bangladesh Bank revealed a more tragic number related to NPLs. This shock is one of the motivations for diving into the dynamics of board attributes as a potential medicine for NPL.

Figure 2 presents the trend in board independence over the same period. The percentage of independent directors to total directors on the board increased steadily from 4–5% before the 2010 financial crash to around 20% in the covid era, reflecting gradual improvements in corporate governance practices and better emphasis on board independence. The overall trend remains upward; this is evident by the significant rise to 35% in 2024. This consistency in the increase of NPL suggests that independence in bank governance is heavily stressed in the banking sector. Hence, it is imperative to see if such independence really matters statistically.

**Figure 2: Board Independence Trend (2009-2024)**

Source: Authors' Analysis

Figure 3 depicts the trend in female representation on bank boards from 2009 to 2024. In the early years, female participation varied between 10% and 12%; it reached a peak of 15% in 2022 and then slightly decreased to 12% in 2024.

**Figure 3: Board Diversity Trend (2009-2024)**

Source: Authors' Analysis

Compared to board independence, improvements in gender diversity appear more stable. Nevertheless, the overall upward movement in recent years indicates growing emphasis on gender diversity and inclusive governance practices within the banking sector.

## 2.0 Literature Review and Hypothesis Development

In the plethora of research related to NPL, there remains a dispute regarding the impact of board attributes on non-performing loans. Furthermore, while the causes of non-performing loans (NPLs) have been thoroughly studied in Western conditions (Arhinful et al., 2025; Lu et al. 2018; Titova, 2016; Tarchouna et al., 2017), there is still a dearth of empirical research on emerging economies, particularly Bangladesh (Budotela et al., 2023).

### 2.0.1 Corporate Governance and NPL

Corporate governance, according to Cadbury (1992), is the framework that governs how organizations are run, including the relationships between different stakeholders, internal accountability systems, and the rules and regulations that regulate how the organization is governed. According to Laeven (2013), risks and regulatory environment in the banking industry are different, hence, corporate governance in banks is different from that in non-banking companies (such as manufacturing, utility etc). This is in conformity to agency theory that suggests effective governance mechanisms should reduce managerial opportunism and excessive risk-taking. According to research by John et al. (2016), a board's effectiveness is primarily determined by its structure, which includes factors like board independence, size, the existence of specialized committees, the division of the CEO and chairman roles (CEO duality), and the general competence of board members. Weak governance structures frequently fail to identify or prevent excessive risk-taking, which can result in risky financial practices, according to empirical findings (Grove et al., 2011). Similarly, Liem (2016) emphasized that effective corporate governance is particularly important in the banking industry because it helps prevent financial scams that could result in the banks being in financial distress or even bankruptcy. Corporate fraud can be prevented by strong governance procedures (Salleh & Othman, 2016). In general, responsible lending practices and sound governance procedures support long-term financial stability and lower the number of non-performing loans (NPLs) (Laeven and Levine, 2009). Contemporary literature further show evidence of the fact that governance quality has a significant role in keeping bank risk controlled and improving lending practices, particularly in developing economies where institutional enforcement is somewhat weak (Goldberg, 2021; Hakimi et al., 2025; Hossain et al., 2025).

### 2.0.2 Independence of Board Members

There is conflicting evidence in the literature about the connection between non-performing loans and board independence. From the perspective of agency theory, independence of board is expected to reduce the non-performing loans by improving monitoring, oversight etc. This can be seen in Dogan and Eksi (2020), where a greater percentage of independent directors enhances the board's capacity to oversee management, assisting in bringing managers' interests into line with owners. In the context of commercial banks, board independence is thought to be crucial for increasing productivity, boosting investor confidence, and possibly lowering non-performing loans (Saha & Chandra, 2019). According to a number of studies, which include those by Adu (2024), Lee and Chung (2017), Liang et al. (2013), and Pathan (2009), independent directors are crucial in reducing the non-performing loans.

Additionally, Arora (2024) points out that actually independent directors in banks aid in balancing the power of senior management and executives. Kartika (2022) emphasizes that independent board members have the ability to influence the quality of loans. Independent directors are linked to a decrease in non-performing loans, according to additional research such as Hakimi et al. (2025) and Poudel and Hovey (2012) etc. In addition, board independence, considered by Switzer and Wang (2013) as an important indicator of a board's ability to perform effective oversight, can strengthen corporate governance and contribute to reducing NPL levels.

However, the literature remains mixed, especially, in emerging markets where the effectiveness of such independent directors depends on overall institutional quality, enforcement, and the "actual independence" of the so-called independent board members. For instance, Alaryan (2017) as well as Petra (2005) observe a positive relationship between the independent directors in the boards and the level of NPLs. More recent study by Kartika et al., (2022) shows that board independence does not affect NPL in emerging economies, rather financial performance does. This may be due to neo-institutional theory, that suggest that board members are symbolic and often appointed with a view to fulfilling requirements rather than effective participation. Hence, based on the mixed results, we can develop a hypothesis that:

H<sub>1</sub>: A higher percentage of independent directors on board is significantly associated with NPL.

### 2.0.3 Gender Diversity of Board Members

Researchers conclude that having a diverse board of directors, especially female directors, is crucial to good corporate governance (Mohsni et al., 2021). Female board members serving on boards may help lower the number of non-performing loans (Gupta and Sharma, 2022; PK Luh, 2026). This is supported by the resource dependence theory that suggests gender diversity in the boardroom can bring unique perspectives (board capital) which in turn improves lending practices. Lee and Chung (2016) find similar results that the diverse perspectives that female directors bring can improve board decision-making. In a similar vein, Doldor et al. (2012) discovered a negative correlation between the percentage of women on boards and the degree of risk-taking. This indicates that women are more risk-averse.

Some academics, however, offer a more skeptical viewpoint. Terjesen and Singh (2008) cautioned against imposing quotas on the number of women on boards. This can be viewed under the Neo-institutional theory that states that female board members are kept as an eyewash to the regulations. Regarding women's risk preferences, there are conflicting results. According to Wagner (2011), female directors might be more likely than male directors to take risks. In a similar vein, female board members may exhibit greater risk tolerance than their male counterparts, according to Adams and Funk (2012). However, having women on boards is frequently linked to wider advantages. Female participation improves the incorporation of diverse knowledge bases, different perspectives, and unique viewpoints in board meetings and decision-making, according to Post et al. (2011). These mixed results suggest that the relationship between gender diversity and NPL depends on board culture, actual involvement of females in boardroom activities etc. Hence, from the perspective of Bangladesh, we can expect that:

H<sub>2</sub>: A higher percentage of female directors on the board is significantly associated with NPL.

#### 2.0.4 Board Size

Board size refers to the total number of members serving on a bank's board of directors (Muchemwa et al., 2016). Past research works provide mixed empirical evidence regarding the relationship between board size and NPLs.

One school of thought believes a larger board leads to a reduction in NPL, as more members translate to more expertise and control in monitoring bank lending activities (Abid et al., 2021; Ahrens et al., 2025; Gupta and Sharma, 2022; Hakimi, 2025; O'Sullivan et al., 2015; Switzer and Wang, 2013). This is in support of resource dependence theory, where more board members translate to greater resources brought to the table. Although some researchers like Haan and Vlahu (2016) disagree, many academics contend that larger boards may improve performance (Wang et al., 2017). This will be done by offering a wider range of expertise and enhancing consultative and surveillance functions. Another researcher, Boateng (2018), states that better-qualified directors on larger boards are more likely to implement responsible credit management procedures and uphold a more organized decision-making process.

The other school of thought, however, points out possible disadvantages of larger boards; this is in support of agency theory. According to a seminal paper by Jensen (1993), a board with seven to eight members is the ideal size because it promotes effective decision-making, facilitates board member coordination, lessens agency issues, and aids in the control of opportunity-seeking decisions and actions. This is seen in Ho et al. (2016), which states that a larger board could lead to free-riding issues among directors. Such a condition would make it more difficult for each member to keep track of activities; hence, it would possibly result in higher NPLs. In support of this claim, many studies i.e. Grove et al. (2011), Ho et al. (2016), Pathan (2009) and Tarchouna et al. (2022) found a positive relationship between board size and non-performing loans (NPLs). Hence, suggesting that a larger board may hinder its effectiveness, supporting the agency theory. Hence, we formulate the following hypothesis based on the mixed results:

H<sub>3</sub>: Board size is negatively associated with NPL.

#### 2.0.5 Ownership Structure

Ownership structure plays a crucial role in shaping banks' governance and risk-taking behavior. Calomiris and Carlson (2016) analyzed bank ownership structure. They found that higher levels of sponsor and director ownership were inversely associated with default risk. Similarly, Ameni (2020) reported that sponsor directors' ownership has a negative effect on non-performing loans (NPLs). Hence, these literatures suggest that management ownership may strengthen monitoring and lending activities. That is, when directors hold shares in the bank, they tend to act more cautiously in credit decisions.

Iannotta et al. (2007) conducted research in the European banking sector. It was found that higher ownership concentration improves loan quality. This, in turn, reduces both risk and the likelihood of eventual bank insolvency. Large shareholders also play a significant monitoring role in corporate governance. This is according to

Prowse (1997), who states that significant shareholders (5-10% shareholding) can limit managerial power and replace inefficient managers. Hence, in turn, this would encourage directors to behave more responsibly and adopt more risk-averse strategies.

Beltratti and Stulz (2012) further argued that a higher percentage of managerial ownership in company shares can motivate managers to align their decisions with shareholders' interests. This statement is consistent with the agency theory proposed by Jensen and Meckling (1976). Jensen and Meckling state in their seminal work that greater managerial ownership can improve firm performance by aligning managers' incentives with those of shareholders. In the context of this paper, it can be assumed that when bank directors hold a significant share of ownership, they are more likely to exercise caution when taking risky investments and adopt practices that are prudent and competent. In the context of Bangladesh, Uddin et al. (2022) state that directors with political affiliation having significant ownership play a significant role in reducing NPL.

Similar results can be seen in the case of different ownership structures. For example, Adu (2024) and Sadaa et al. (2022) found that just like sponsor-director ownership, institutional ownership contributed to the reduction of NPL. However, contrasting results that institutional ownership increases NPL exist in the context of developing nations (Barako & Tower, 2007). Hence, we come up with the following hypotheses:

H<sub>4</sub>: Sponsor ownership is negatively associated with NPL.

H<sub>5</sub>: Institutional ownership is significantly associated with NPL.

#### *2.0.6 Control Variables*

Both bank size and leverage, which are our key control variables, have been found to be important variables that impact NPLs in different research works. Studies such as Biekpe (2011) and Pathan (2009) suggest that banks that are comparatively larger show lower levels of risk-taking potential compared to smaller peers. Ameni (2020) added that the impact of corporate governance on the loan's quality might change based on the bank's size. Contrary findings that bank size increases NPL, as large banks practice excessive lending, are also found in the literature (Tarchouna et al., 2022). In the context of Bangladesh, this can be evident by the fact that large banks like National Bank Limited bear a greater burden of the NPL problem. Another significant factor that has been found to influence loan performance is a firm's leverage. A firm's lagged leverage has a statistically significant impact on the amount of bad loans in banks, according to Ghosh's (2005) analysis of the relationship between corporate debt and banks' NPL ratios.

This study uses a number of bank-specific control variables that have been extensively employed in earlier research to investigate the connection between corporate governance and non-performing loans (Dimitrios et al., 2016; Kauko, 2012; Konstantakis et al., 2016; Louzis et al., 2012; Zagorchev & Gao, 2016). These control variables, which aid in capturing crucial operational and financial aspects of banks, include firm size, debt-equity ratio (leverage) etc. Moreover, macroeconomic variables i.e. GDP, inflation etc. are also employed as control variables as per existing literature (Christodoulou-Volos, 2024; Koju et al., 2018; Peykani et al., 2025; Rehman et al., 2026).

### 2.1 Theoretical Framework

Corporate governance is an important aspect of **agency theory**. Hence, the majority of the research based on corporate governance encompasses the said theory. Our theoretical framework will also be based on it. The agency theory is the prime theory that explains the relationship between the principal and agents. As corporations have a huge number of owners (principals), they require a smaller and workable number of representatives (agents) who will work for the interest of the owners with delegated authority. These will include top-level decisions. (Jensen and Meckling, 1976). However, there might arise a conflict of interest when agents go rogue and work for the betterment of themselves rather than that of their owners. The agency theory provides an important framework addressing such a conflict of interest (Fama, 1980).

Moreover, the theory also talks about the mechanisms of governance that are required for the managers so that they act in the best interest of the owners of the firm by increasing and maximizing their wealth (share price) as discussed by Shleifer and Vishny (1997).

Coming to the banking sector, who sits on the board should also matter when it comes to upholding the interest of the shareholders. That means, board member characteristics should provide meaningful information regarding the reduction of agency conflicts, such as approving and providing loans to clients who are less likely to return them, as seen in the case of Bangladesh. Hence, board attributes should translate to better monitoring and managerial decision making (Roberts et al., 2005).

Another theory relevant to this study is resource dependence theory, which argues that directors are not only responsible for monitoring but also responsible for providing valuable resources. Where agency theory mainly focuses on issues i.e. conflicts of interest and agency costs, resource dependence theory focuses on the positive role of directors in improving organizational performance (Hillman & Dalziel, 2003; Pepper & Pepper, 2019). Directors contribute resources known as “board capital”, through their knowledge, corporate connections and years of experience (Haynes & Hillman, 2010). Hence, board attributes can lead to the enhancement of a firm’s access to resources and improvement of decision-making capabilities. A larger board would lead to greater resources, unlike a smaller board, as stated in agency theory (Wang et al., 2017). Moreover, diversity in gender, education etc. can bring different perspectives to the boardroom. Furthermore, director ownership would align the goals of both parties to enhance firm performance. Thus, resource dependence theory supports the view that board attributes can enhance asset quality and lending practices, which in turn reduces NPL (Jiang et al, 2022). Hence, it will be used alongside agency theory to better explain the relationship between board attributes and NPL (Zona et al., 2015).

However, there is widely available literature about the failure of corporate governance or board attributes in reducing NPL in the context of developing economies. Neo-institutional theory suggests that organizations are shaped by external environmental pressures that force them to adopt certain practices to gain social acceptance through isomorphism (DiMaggio and Powell, 1983; Scott, 2014). According to Aguilera (2007), corporations may not only seek economic resources but also social approval. Hence, compliance with corporate governance practices (i.e.

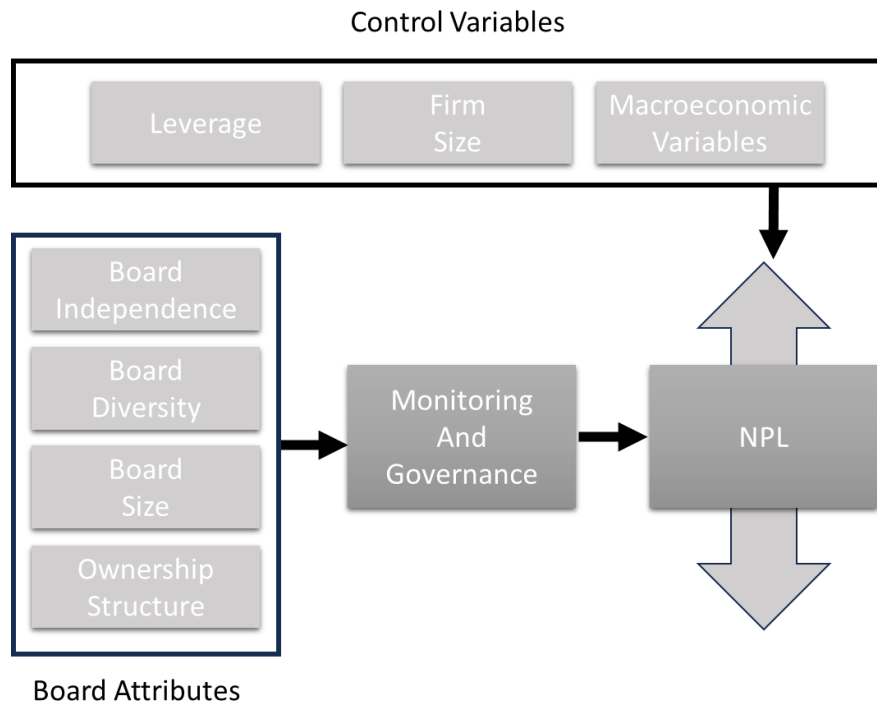
gender diversity, independence) can be used to portray an image to gain corporate legitimacy.

Despite all the talks about board attributes, it is also true that, despite the corporate governance codes, rules and regulations about who should sit on the board, there is the “small” problem of huge NPL, particularly in Bangladesh. Hence, it has to be checked whether good board member composition is an effective measure or not.

## 2.2 Conceptual Framework

In the conceptual framework, the independent variables are the board attributes such as board size, independence and gender diversity. Based on the extensive literature review showing mixed findings, these are expected to translate to increasing or decreasing NPL as shown in Figure 4. Leverage, firm size and macroeconomic variables are also kept as control variables to better measure the impact of board attributes on the non-performing loans.

**Figure 4:** Conceptual Framework of Research



Source: Authors' Analysis

## 3.0 Data and Methodology

### 3.1 Data and Sampling

This study employs a balanced panel dataset covering a period of 16 years, comprising almost all listed commercial banks operating in the banking sector of Bangladesh. Initially, the population consists of 30 banks listed on the stock exchanges from 2009 to 2024. ICB Islamic Bank Limited is excluded due to the

negative equity during the entire period. The dataset primarily relies on secondary sources. Bank-level financial data and information on non-performing loans are collected from audited annual reports of the respective banks. Macroeconomic data are collected from the World Bank database.

### 3.2 Variable Construction

The following table shows how the variables were constructed:

**Table 1:** Construction of Variables

| Variable                     | Symbol    | Construction                                          |
|------------------------------|-----------|-------------------------------------------------------|
| <b>Dependent Variable</b>    |           |                                                       |
| Non-Performing Loans         | NPL_Loan  | Ratio of Non-Performing Loans to Total Loans          |
| <b>Independent Variables</b> |           |                                                       |
| Independent Directors        | Ind_Dir   | Number of Independent Directors / Total Board Members |
| Female Directors             | Fem_Dir   | Number of Female Directors / Total Board Members      |
| Sponsor Ownership            | SpOwn     | Percentage of shares held by Sponsors/Promoters       |
| Institutional Ownership      | InsOwn    | Percentage of shares held by Institutional Investors  |
| Board Size                   | ln_Dir    | Natural Logarithm of the Number of Board Directors    |
| <b>Control Variables</b>     |           |                                                       |
| Bank Size                    | ln_Asset  | Natural Logarithm of Total Assets                     |
| Leverage                     | Leverage  | Ratio of Total Liabilities to Total Assets            |
| GDP Growth                   | GDP       | GDP Growth Rate                                       |
| Inflation                    | Inflation | Annualized Inflation Rate                             |

Source: Authors' Analysis

### 3.3 Research Framework

The study employs a panel data regression analysis using the Feasible Generalized Least Squares (**FGLS**) model. Heteroskedasticity and autocorrelation have been found in the data set. Therefore, Feasible Generalized Least Squares (**FGLS**) is chosen to account for heteroscedasticity as well as autocorrelation within the panel dataset.

There are six models in this paper. These sequentially test the influence of board attributes on NPL. The paper will evaluate the individual impact of independent directors (**Ind\_Dir**), female directors (**Fem\_Dir**), sponsor ownership (**SpOwn**), and institutional ownership (**InsOwn**), step by step in Model-1 through Model-4. Model-5 represents the all-factor models. Moreover, Model-6 incorporates macroeconomic variables. The general empirical models are specified as follows:

$$\textbf{Model (1): } \text{NPL\_Loan}_{it} = \alpha_i + \beta_1 \text{Ind\_Dir}_{it} + \beta_2 \text{ln\_Dir}_{it} + \beta_3 \text{ln\_Asset}_{it} + \beta_4 \text{Leverage}_{it} + \varepsilon_{it}$$

$$\textbf{Model (2): } \text{NPL\_Loan}_{it} = \alpha_i + \beta_1 \text{Fem\_Dir}_{it} + \beta_2 \text{ln\_Dir}_{it} + \beta_3 \text{ln\_Asset}_{it} + \beta_4 \text{Leverage}_{it} + \varepsilon_{it}$$

$$\textbf{Model (3): } \text{NPL\_Loan}_{it} = \alpha_i + \beta_1 \text{Sp\_Own}_{it} + \beta_2 \text{ln\_Dir}_{it} + \beta_3 \text{ln\_Asset}_{it} + \beta_4 \text{Leverage}_{it} + \varepsilon_{it}$$

$$\textbf{Model (4): } \text{NPL\_Loan}_{it} = \alpha_i + \beta_1 \text{Ins\_Own}_{it} + \beta_2 \text{ln\_Dir}_{it} + \beta_3 \text{ln\_Asset}_{it} + \beta_4 \text{Leverage}_{it} + \varepsilon_{it}$$

$$\textbf{Model (5): } \text{NPL\_Loan}_{it} = \alpha_i + \beta_1 \text{Ind\_Dir}_{it} + \beta_2 \text{Fem\_Dir}_{it} + \beta_3 \text{Sp\_Own}_{it} + \beta_4 \text{Ins\_Own}_{it} + \beta_5 \text{ln\_Dir}_{it} + \beta_6 \text{ln\_Asset}_{it} + \beta_7 \text{Leverage}_{it} + \varepsilon_{it}$$

$$\textbf{Model (6): } \text{NPL\_Loan}_{it} = \alpha_i + \beta_1 \text{Ind\_Dir}_{it} + \beta_2 \text{Fem\_Dir}_{it} + \beta_3 \text{Sp\_Own}_{it} + \beta_4 \text{Ins\_Own}_{it} + \beta_5 \text{ln\_Dir}_{it} + \beta_6 \text{ln\_Asset}_{it} + \beta_7 \text{Leverage}_{it} + \beta_8 \text{GDP}_t + \beta_9 \text{Inflation}_t + \varepsilon_{it}$$

Where,

- $i$  denotes the individual cross-sectional unit (bank/firm)
- $t$  represents the time period
- $\alpha_i$  is the intercept
- $\beta_1$ – $\beta_9$  are the coefficients
- $\varepsilon_{it}$  is the idiosyncratic error term.

## 4.0 Empirical Analysis and Findings

### 4.1 Summary Statistics

Table 2 shows the summary statistics of the variables. The mean value of non-performing loans (NPL) in the panel data is 6.97% with considerable dispersion; SD is 0.0916, ranging from 1.08% to 91.75%. This range shows the huge difference in the quality of the bank's lending across the banking industry.

**Table 2:** Summary Statistics

| Variable | Mean   | Std. Dev. | Min    | Max    | Observations |
|----------|--------|-----------|--------|--------|--------------|
| NPL_Loan | 0.0697 | 0.0916    | 0.0108 | 0.9175 | 464          |
| Ind_Dir  | 0.1688 | 0.1315    | 0.0000 | 1.0000 | 464          |
| Fem_Dir  | 0.1130 | 0.1054    | 0.0000 | 0.6000 | 464          |
| SpOwn    | 0.0038 | 0.0017    | 0.0000 | 0.0090 | 464          |
| InsOwn   | 0.0019 | 0.0012    | 0.0000 | 0.0075 | 464          |

|           |         |        |         |         |     |
|-----------|---------|--------|---------|---------|-----|
| ln_Dir    | 2.5969  | 0.3249 | 1.6094  | 3.2189  | 464 |
| ln_Asset  | 26.1890 | 0.7103 | 23.9356 | 28.4309 | 464 |
| Leverage  | 0.9505  | 0.5411 | 0.8457  | 12.5715 | 464 |
| GDP       | 0.0616  | 0.0112 | 0.0345  | 0.0788  | 464 |
| Inflation | 0.0709  | 0.0189 | 0.0542  | 0.1140  | 464 |

Source: Authors' Analysis

Board independence (Ind\_Dir) has an average value of 16.88%; where SD = 0.1315. Female director representation (Fem\_Dir) remains relatively low with a mean of 11.30% and moderate variation; SD = 0.1054. Sponsor ownership (SpOwn) and institutional ownership (InsOwn) exhibit low mean values of 0.0038 (SD = 0.0017) and 0.0019 (SD = 0.0012), respectively. The rest of the variables show differing means and variations as stated in the table.

#### 4.2 Diagnostic Tests

Table 3 presents the pairwise correlation matrix among the variables. Since all pairwise correlation coefficients are below 0.70, multicollinearity is unlikely to be a serious issue in the subsequent regression. The VIF statistics, in Table 4, also show a similar conclusion as the values are close to 1 and less than 5.

**Table 3:** Correlation Matrix

|              | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10   |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 1 NPL_Loan   | 1.00  |       |       |       |       |       |       |       |       |      |
| 2 Ind_Dir    | 0.37  | 1.00  |       |       |       |       |       |       |       |      |
| 3 Fem_Dir    | -0.16 | 0.14  | 1.00  |       |       |       |       |       |       |      |
| 4 SpOwn      | -0.29 | 0.10  | 0.09  | 1.00  |       |       |       |       |       |      |
| 5 InsOwn     | 0.11  | 0.20  | 0.17  | -0.23 | 1.00  |       |       |       |       |      |
| 6 ln_Dir     | -0.41 | -0.51 | -0.14 | 0.00  | -0.07 | 1.00  |       |       |       |      |
| 7 ln_Asset   | 0.23  | 0.49  | 0.09  | 0.01  | 0.29  | -0.13 | 1.00  |       |       |      |
| 8 Leverage   | 0.00  | 0.02  | -0.01 | -0.01 | 0.10  | -0.04 | -0.13 | 1.00  |       |      |
| 9 GDP        | -0.15 | -0.04 | -0.01 | 0.02  | -0.03 | 0.09  | 0.02  | 0.07  | 1.00  |      |
| 10 Inflation | 0.18  | 0.04  | 0.04  | -0.06 | 0.11  | -0.05 | 0.04  | -0.04 | -0.27 | 1.00 |

Source: Authors' Analysis

**Table 4:** VIF Statistics

| Variable | VIF  | 1/VIF   |
|----------|------|---------|
| Ind_Dir  | 1.85 | 0.54001 |
| ln_Asset | 1.48 | 0.67514 |
| ln_Dir   | 1.41 | 0.70931 |
| InsOwn   | 1.25 | 0.80131 |

|           |      |         |
|-----------|------|---------|
| SpOwn     | 1.11 | 0.90422 |
| Inflation | 1.09 | 0.91498 |
| GDP       | 1.09 | 0.91574 |
| Fem_Dir   | 1.07 | 0.93572 |
| Leverage  | 1.06 | 0.94546 |
| Mean VIF  | 1.27 |         |

Source: Authors' Analysis

**Table 5:** Modified Wald Test for Heteroskedasticity

| Chi-Square Statistic | P-Value |
|----------------------|---------|
| 7163.77              | 0.0000  |

We conducted the Modified Wald test to check heteroskedasticity. As the p-value of the Chi-Square statistic is less than 0.01, we can conclude that there is heteroskedasticity in the data set at 1% level of significance.

**Table 6:** Wooldridge test for Autocorrelation

| F Statistic | P-Value |
|-------------|---------|
| 20.5290     | 0.0001  |

We conducted the Wooldridge test to check autocorrelation. As the p-value of the F-statistic is less than 0.01, we can conclude that there is autocorrelation in the data set at 1% level of significance.

#### 4.4 Empirical Results and Discussion

Table 7 reports the results of the FGLS regression model showing the impact of board attributes on non-performing loans (NPLs) in the banking sector of Bangladesh. p-values are reported in parentheses.

**Table 7:** FGLS Regression

|         | (1)                   | (2)                    | (3)                     | (4)                | (5)                     | (6)                     |
|---------|-----------------------|------------------------|-------------------------|--------------------|-------------------------|-------------------------|
|         | NPL_Loan              | NPL_Loan               | NPL_Loan                | NPL_Loan           | NPL_Loan                | NPL_Loan                |
| Ind_Dir | 0.1039***<br>(0.0071) |                        |                         |                    | 0.1509***<br>(0.0000)   | 0.1500***<br>(0.0000)   |
| Fem_Dir |                       | -0.2044***<br>(0.0000) |                         |                    | -0.1861***<br>(0.0000)  | -0.1880***<br>(0.0000)  |
| SpOwn   |                       |                        | -15.9525***<br>(0.0000) |                    | -16.2655***<br>(0.0000) | -15.9636***<br>(0.0000) |
| InsOwn  |                       |                        |                         | 2.6282<br>(0.4475) | -1.6501<br>(0.6137)     | -2.9459<br>(0.3590)     |

|              |                        |                        |                        |                        |                        |                        |
|--------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| ln_Dir       | -0.0909***<br>(0.0000) | -0.1181***<br>(0.0000) | -0.1093***<br>(0.0000) | -0.1095***<br>(0.0000) | -0.0898***<br>(0.0000) | -0.0862***<br>(0.0000) |
| ln_Asset     | 0.0143**<br>(0.0221)   | 0.0252***<br>(0.0000)  | 0.0233***<br>(0.0000)  | 0.0215***<br>(0.0002)  | 0.0139**<br>(0.0171)   | 0.0146**<br>(0.0106)   |
| Leverage     | -0.0007<br>(0.9249)    | 0.0004<br>(0.9486)     | 0.0002<br>(0.9811)     | -0.0000<br>(0.9949)    | -0.0017<br>(0.7912)    | 0.0006<br>(0.9288)     |
| GDP          |                        |                        |                        |                        |                        | -0.6950**<br>(0.0252)  |
| Inflation    |                        |                        |                        |                        |                        | 0.6011***<br>(0.0011)  |
| Constant     | -0.0865<br>(0.5911)    | -0.2599*<br>(0.0750)   | -0.1959<br>(0.1702)    | -0.2145<br>(0.1692)    | 0.0012<br>(0.9936)     | -0.0269<br>(0.8551)    |
| Observations | 464                    | 464                    | 464                    | 464                    | 464                    | 464                    |

Source: Authors' Analysis

The results indicate that board independence (ln\_Dir) is positively related to NPLs and the relationship is statistically significant; hence, we accept H<sub>1</sub>. In Model-1, the coefficient of independent directors is 0.1039 with a p-value of 0.0071, which is less than 0.01. The results remain the same in Model-6. In Model-6, the coefficient is 0.1500 with a p-value of less than 0.01. Hence, it is safe to state based on the evidence that a higher presence of independent directors leads to a higher level of NPLs in the banking sector of Bangladesh. This can be explained by the fact that the independent board member in Bangladesh is only kept to fulfill the regulatory requirements. They might be only present on the board due to their familiarity and good relationship with the directors, or if that is not the case, they simply cannot compete with the directors when raising their voice for suggestions and feedback. Making the mechanism ineffective. This is similar to the Neo-institutional theory, where the representation of such outside members is simply to project a progressive image, whereas underneath they are given no significant decision-making power.

Female board (Fem\_Dir) representation is negatively related to NPL in all the pertinent models. It is also statistically significant. Hence, H<sub>2</sub> is accepted. In Model-6, the coefficient of female directors is -0.1880 with a p-value of less than 0.01. Hence, greater diversity in terms of gender leads to lower NPL, similar to the findings of Gupta and Sharma (2022), Lee and Chung (2016), PK Luh (2026) etc. Resource dependence theory is validated by this, as greater diversity increases board effectiveness, which translates to lower NPLs.

Board size (ln\_Dir) shows a consistent negative (-0.0862) and significant (p-value < 1%) relationship with NPL in all models. Therefore, we accept H<sub>3</sub>. Hence, if a board size is larger, it might lead to decreased NPLs as larger board members can better handle credit risk-taking behavior using their knowledge and experience from a diverse background (Ahrens et al., 2025).

Sponsor ownership (SpOwn) is also negatively related to NPL as hypothesized and the relationship is also statistically significant across all the pertinent models. The coefficient in the model is  $-15.9636$  with a p-value of less than 0.01. Therefore, we also accept  $H_4$ . Hence, it can be said that higher ownership by sponsor-directors leads to better monitoring and control of the management decisions which, in turn, reduces NPL. This is similar to the works of Uddin et al. (2022), which demonstrated that directors with significant ownership, though politically connected, performed well in reducing NPL levels in Bangladesh.

Unfortunately, the institutional investors play a limited role, as shown by a consistent statistical insignificance among the models. Hence, we fail to accept  $H_5$ . In developing countries like Bangladesh, this might be due to (1) relatively lower stakes in ownership, (2) passive investment and lack of shareholder activism, and most likely (3) maintaining political or business relationships with the banks, which compromises their role as institutional investors.

Firm size (ln\_Asset) shows a positive and significant relationship with NPL throughout the models. This is because large banks follow excessive lending practices, which in turn increase NPL levels (Tarchouna et al., 2022). Leverage is statistically insignificant throughout the models. Hence, in case of NPL in Bangladesh, capital structure does not directly impact NPL. However, the macroeconomic variables used as controls (i.e. GDP and Inflation) are significant. GDP is negatively related to the NPLs, whereas, Inflation is positively related to it (Christodoulou-Volos, 2024; Peykani et al., 2025).

## 5.0 Conclusion and Policy Implications

The main objective of the study was to find out whether board attributes influenced non-performing loans in the banking sector of Bangladesh. From all the models used to analyze this, we found consistent results that some board attributes do play an important role in addressing the ongoing NPL crisis.

The hypothesis testing results reveal that  $H_1$ ,  $H_2$ ,  $H_3$ , and  $H_4$  are accepted. Board independence shows a positive and significant association with NPL (Alaryan, 2017; Kartika et al., 2022). Moreover, a larger female representation, larger board size, and higher sponsor ownership have a significant relationship with NPL. The negative coefficient also suggests that they are an effective mechanism against the ongoing NPL crisis. These results are similar to the works of Ahrens et al. (2025), Ameni (2020), Hakimi (2025) and PK Luh (2026) etc. In contrast,  $H_5$  is rejected as institutional ownership is insignificant in terms of the relationship with NPL levels in all respective models.

These results are particularly important for Bangladesh, where the banking sector is a textbook example of bad corporate governance. This led to the massive surge in NPL levels in the last few decades, eroding the asset quality and the confidence of both investors and depositors. Good corporate governance is important for taking decision which maximizes the value of shareholders such as lending the depositors' money to

lenders who are most likely to return the capital with maximum interest. However, the situation was quite the opposite in Bangladesh. Loans were approved and distributed which served the interest of neither the depositors nor the shareholders but that of the corrupt directors and management. Hence, there should be improved emphasis on the board attributes to improve the control, monitoring and governance which will tackle such hazardous lending behaviors. Absence of good governance practices led to the current NPL crisis, hence, strengthening corporate governance in the banking sector should be the number one priority of the newly appointed governor of Bangladesh Bank.

From a policy perspective, regulators should focus on improving board effectiveness by (1) ensuring that the independent directors are not merely symbolic rather contribute to the decision making process, (2) enacting laws and corporate governance codes that ensure greater gender diversity, (3) ensuring participation of the sponsor and directors in the ownership of the banks so that their skin are also at stake, and finally, (4) maintaining optimal size of the board members.

In the past few years, Bangladesh has witnessed some historic changes in its political and regulatory environment. From the July Uprising in 2024, to the formation of the interim government and now finally the comeback of BNP-led government through public voting. This has led Bangladesh to an opportunity where it can introduce meaningful reforms in the banking sector. Following the aforementioned policy recommendations, it can put academic research suggested by various researchers, including ours, to the test in the real economy by ensuring good governance practices, introducing boards with better attributes, which will lead to sound lending practices in the financial system and gradually restoring the country from the current NPL crisis.

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