Exploring the Impacts of Board Flexibility on Non-Performing Assets and Firm Value in the Context of a Fastest Growing Economy

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ABSTRACT

This paper plans to examine the effects of board extent on non-performing assets (NPA) and firm value measured as comprehensive financial performance (CFP) of banks in Bangladesh using data from 2016 to 2022. Using a sample of 210 firm-year observations, this paper reveals that NPA is significantly related to board size, which signals that a big board of directors (BODs) is linked with lowering the extent of NPA in the context of developing economies like Bangladesh. Besides, the affinity between board extent and firm value proxies as CFP is positive, but the result is not consequential. This research would be value additive to the literature because it examines the effects of board size on NPA and CFP, which is scanty in the corporate finance literature. Furthermore, this research finds no literature that applies CFP as the performance measure of banks, especially in Bangladesh.

Keywords: Corporate Governance, Board Size, Firm Value, Bank and Bangladesh
JEL Classifications: G30, G38, M14, O16

1. INTRODUCTION

Non-performing assets (hereafter called NPA) have been the concern of many banks in recent years, and they were a vital cause of the 2007 financial crisis. Bank insolvency has been a big problem in several countries worldwide for the last couple of decades (Fiador and Sarpong-Kumankoma, 2021). Banks in developing countries have a massive risk of misappropriation because of the absence of prudential oversight, inadequate legitimate defense, and groups having special interests (Reaz and Arun, 2006). The increasing growth of NPA is one of the critical causes of bank collapse. Therefore, the current study strives to examine what matters for financial performance and the level of non-performing assets of the banks in Bangladesh. A country's economic well-being is reflected in its business performance. The banking industry is regarded as the engine of a strong economy.

It is especially true for Bangladesh, which is still developing. The banking industry has taken much heat recently for several reasons, including an increase in non-performing loans (NPL), poor governance, political influence over banking operations, money laundering, and unethical behavior on the part of some bankers (Amin et al., 2019; Reaz and Arun, 2006; Uddin et al., 2017). It has unavoidably reduced the sector's production and efficiency and restricted companies and sectors with the potential to advance and strengthen the long-term health of the economy. Numerous unwelcome behaviors have frequently damaged the banking industry. The reputation of the banking industry has been harmed by some unwanted occurrences such as the Hallmark controversy, the Crescent Group episode, the AnonTex Cluster finance, cyber robbery of Bangladesh Bank, and others both domestically and internationally. Many high-performing companies fail due to ineffective corporate governance (CG) (Puni and Anlesinya, 2020).

As a result, developing countries' poor levels of development are due to a lack of sound CG mechanisms (Chanda et al., 2017).

CG structure is for directing and controlling businesses (Maniruzzaman, 2023). According to Shleifer and Vishny (1997), CG is concerned with how financial providers safeguard that firms obtain a profit on their assets, both financial and nonfinancial. CG has been demonstrated a positively impact on company's financial success (Bhagat et al., 2010). Existing literature suggests that CG positively influences corporate financial performance, dividend policies and a firm's innovations (Shukla et al., 2020). Board attributes have been used as proxies for CG in several earlier research studies (Bhagat and Black, 2001; Jackling and Johl, 2009; Maniruzzaman and Hossain, 2019a). Hillman and Dalziel (2003) documented that a company's BoDs supports in the oversight of managers and the provision of necessary resources to achieve the firm's objective toward value maximization. Board size positively and significantly impacts resource mobilization, such as attracting new customers, strengthening supplier relationships, and gaining support from investors and other key stakeholders (Shukla et al., 2020). Larger boards allow companies to gain access to external financial and non-financial resources (Pearce and Zahra, 1992). Firms experience this due to the plenty of information and skills available to larger boards and their leverage in efficiently mobilizing resources (Shukla et al., 2020). Despite data on the cost of bigger boards, experimental studies on the various paybacks of adding members to a company BoD has yet to receive much attention. Since the members on a board grows, so does the board's monitoring capacity. A larger board also allows to draw from a larger pool of knowledge and expertise. Jensen (1993) and Lipton and Lorsch (1992) recommend BoDs that are neither too tiny nor too large. Lipton and Lorsch (1992) advocate for boards of 8 or 9 members. However, Jensen believes that BoDs ought to be limited to 7 or 8 members. Regarding Tobin's Q, Adams and Mehran (2005) discovered that banks with bigger boards usually satisfy their counterparts and that the size of board rules in the banking industry may need to be revised. Yermack (1996), for example, claims that no uniform connection between the size of the board and business performance exists over the more downward span of board extents. According to this viewpoint, the optimal board size varies by firm, and the established relationship between board size and firm performance may result from several other nonexperimental aspects that influence a firm's size and performance, leading to the observed spurious relationship.

In Bangladesh, banks supply funds to the private and public sectors. However, this sector faces diverse challenges, including ineffective oversight, inadequate control, absence of stable governance, and disobedience to moral norms, leading to manifold banking frauds, like structuring and non-performing assets (NPA). In total, 61 banks in Bangladesh are under the central bank's control. The central bank is authorized to exert power under P.O. No. 127 of 1972, also called the Bangladesh Bank Order, 1972. However, only 33 of the 61 scheduled banks are enlisted with the Dhaka Stock Exchange (hereafter quoted as DSE), all private-sector commercial banks, except one, a state-owned commercial bank. The Bangladesh banking system has recently seen significant changes, mainly due to financial sector liberalization and reforms from 1982 to 2020 (Ali et al., 2015; Jahan and Muhiuddin, 2014). To strengthen the banking system, the government of Bangladesh continued to implement various programs and policies. The financial system of Bangladesh is dominated by banks, which account for a significant portion of the country's overall financial assets (Suzuki and Adhikary, 2010). Bank stability is critical for the financial system's overall strength due to its relationships with other financial constituents. Several studies have advanced the influences of board size on banks' economic achievement in developed countries, but there needs to be more research in developing countries, particularly in Bangladesh. Besides, some past studies considered only accounting measures of financial performance (measured as ROA and ROE) as a regressed variable, whereas others used the market measure of financial performance (Q ratio), but the current study considered only comprehensive financial performance through principal component analysis (PCA) among the three financial performance measure, such as ROA, ROE, and Q ratio. The study selects ROE as the performance measure based on PCA because it explains approximately 97% of the variance (Table 1 in the appendix). In addition, the present research plans to explore the influences of board size on the level of NPA, which still needs to be studied in the context of emerging economies, particularly in Bangladesh.

Grounded on data gathered from 30 sample commercial banks enlisted on the DSE during a period of seven financial years ranging from 2016 to 2022, this study estimates using fixed effects models for panel data analysis. The data is collected mainly from bank annual reports and various publications, magazines, and websites. The study concludes that the board size negatively and significantly impacts the NPAs of banks in Bangladesh, which indicates that big boards are more impactful in reducing the level of NPAs in Bangladeshi banks. However, larger boards do not benefit banks' profitability in Bangladesh, as the study outcome reveals the inconsequential effects of more oversized boards on banks' profitability in Bangladesh.

The study makes some contributions to the existing stock of learning and practices. Firstly, its conclusions may provide fresh theoretical perspectives to the body of knowledge on bank board size, which could be helpful for impending studies. Secondly, banks can improve economic success by implementing the study's results into practice. Third, lenders and investors may use the study's findings to determine whether to lend money to or invest in shares of a bank based on its findings. This research is distinctive as the sample banks' annual reports were used as the data source for the study's various variables instead of as a secondary database. Besides, this is the first study, particularly in Bangladesh, that examines the influences of board size on the level of NPA. The remainder of the article is presented as follows: The literature review and development of the theoretical framework are covered in the 2nd Section. The methodology is discussed in the 3rd Section, which includes information on sampling, use of variables, and defining model. Section 4 presents an analysis and discussion of the findings. Section 5 brings the study to a close and lays the groundwork for upcoming studies.

2. REVIEW OF CONTEMPORARY LITERATURE AND DEVELOPMENT OF HYPOTHESES

2.1. Review of Contemporary Literature

CG has been a subject of research due to the possible performance implications for businesses in both developed (Casavecchia and Tooman, 2016; Kowalewski, 2016; Lattemann, 2014; Reddy et al., 2010) and emerging economies (Aboagye and Otieku, 2010; Liedong and Rajwani, 2018; Maniruzzaman et al., 2023; Rashid, 2020; Simpson, 2014). CG is a tool for monitoring managerial actions to increase business profit and shareholder wealth (Shleifer and Vishny, 1997). Companies can use CG to mobilize society's financial and non-financial resources (Pfeffer and Salancik, 2015). CG balances the stakeholders' interests (Cooper and Owen, 2007). The role of CG, what multi-governance theory portrays, is to create a holistic idea by integrating diverse features of other CG ideas (Hill and Jones, 1992). So, CG incorporates the holistic view by encapsulating the definitions above to reduce agency costs and balance stakeholders' interest (Shukla et al., 2020).

Larmou and Vafeas (2010) advanced that a bigger board size is positively linked with the shareholders' value of 257 firms with a history of low operational performance for three consecutive years between 1996 and 2000. Pucheta-Martínez and Gallego-Álvarez (2020) examined the impacts of board traits on corporate profitability in 10,314 firm-year observations in 34 polities and reported that a few board attributes, such as size, autonomy, and keeping a female member, favorably linked with firm success. In contrast, contrary to our premises, CEO duality also positively affects firm profitability. Bhatt and Bhattacharya (2015) studied the consequences of BoD attributes on corporate economic attainment. They took a sample of publicly traded companies in the IT sector and noted that board size affects a company's financial performance positively and significantly. Farooque et al. (2007) investigated the effects through a two-way causality test between ownership and financial accomplishment to see whether a reverse causality exists between board ownership and performance. Their study was founded on DSE-enlisted nonfinancial and financial firms in Bangladesh, covering 8 years from 1995 to 2002. The study's findings revealed that board size impacts the ownership pattern of most of the firms in Bangladesh. Rashid (2010) tested the boardroom structure and profitability connection of 90 companies registered on the DSE from 2005 to 2009, 5 years. They advanced that board autonomy does not influence the financial performance of most Bangladeshi listed companies. They also documented that the board size is negatively associated with financial success. A follow-up study by Rashid (2018) examined the affinity between boardroom freedom and profitability of DSE-listed firms and noted that board size influences both board independence and financial performance. In addition, Mishra and Mohanty (2014) noted that the board attributes significantly impact the financial success of the 141 Indian listed companies. Huang and Hillary (2018), Huang and Wang (2015) advanced that board features could positively influence the ROA of publicly listed enterprises over the years 1998 to 2010. In a study of 29 banks in India from 2009 to 2016, Shukla et al. (2020) found that the board features had a valuable effect on the market performance of the banks studied. Ahmed Sheikh et al. (2013) investigated the influence of inside traits of CG on a firm's profitability based on the secondary information of non-financial firms enlisted with the Karachi Stock Exchange of Pakistan from 2004–2008, and they reported that board size was totally linked with EPS, ROA, and M/B ratio. Puni and Anlesinya (2020) tested CG devices and company profitability connection, taking a sample from Ghanaian listed companies from 2006 to 2018, where they advanced that board size has a significant positive bearing on corporate financial attainment.

Jensen (1993) indicates that firm performance declines when board size increases. This is based on the argument that working effectively with a large group of people to communicate, coordinate tasks, and make decisions is more complex and expensive than working with smaller groups. The expenditures outweigh the benefits of having more personnel available. Therefore, he noted that keeping boards small can help them function better. Several research studies document an adverse link between the board range and economic success (Anderson and Reeb, 2004; Coles et al., 2008; Das and Ghosh, 2006; Eisenberg et al., 1998; Fama, 1980; Guest, 2009; Ladipo and Nestor, 2009; Lipton and Lorsch, 1992; Yermack, 1996). Bonn et al. (2004) conducted a study on board composition on company performance and observed that board size is inversely linked with company success. Wang (2012) noted that board size has an adverse bearing on a company's risk-taking. Azeez (2015) found a set of 100 Sri Lankan companies performs worse when their boards get larger. Nguyen and Dang (2022) studied the upshot of board size on a company's worth and uncovered significant indications of a negative association using a large sample of Australian enterprises from 2001 to 2011. Yamori et al. (2017) examined the board size and its influence on the expense and yield efficacy scores of 75 Japanese cooperative and stock banks, and they came to the conclusion that the governing council size is inversely associated with the performance of sample banks. According to (Katarachia et al., 2018) studied a group of listed companies in India from 2009 to 2014 and found that board size negatively correlates with how widely their sample companies disseminate CG information. (Merendino and Melville, 2019) conducted a study taking a sample from the listed enterprises in Italy during 2003–2015 and discovered that board size has a helpful effect on company performance for smaller boards but a negative impact on profitability for larger boards. They find that firms with many directors are associated with CEO compensation and responsive to company size but not firm performance. This financial incentive agrees with the reality that companies with many directors have inferior operating performance and more significant operating costs.

The studies above have empirically examined the influence of the size of the bank board on accounting results in the context of developed markets. The prior literature did not focus on testing the effects of the board's extent on banks' comprehensive financial performance (hereafter called CFP) or exploring the affinity between the size of the board and the status of NPA of banks in Bangladesh. Hence, the present research strives to explore the impacts of board size on the CFP and the level of NPA of listed commercial banks in Bangladesh for seven years, from 2016 to

2022. The current study challenges the stewardship theory because more members in the boardroom do not reduce the firm's economic value; instead, it helps the board attract more resources from society due to more possible diversity among the board members. This research supports agency and resource dependency theories because having larger boards allows businesses to establish more connections with the outside world and, as a result, have greater access to external resources (Jensen and Meckling, 1976; Jensen, 1993). Thus, board size impacts the financial accomplishments of corporations. Founded on the discussions above, the current research proposes the hypotheses as under:

- H_1: Board size has no effect on the level of non-performing assets of banks in Bangladesh.
- H_2: Board size has no effect on the financial performance of banks in Bangladesh.

3. DATA AND METHODOLOGY

Data for this study comes from the audited reports of the selected commercial banks covering a period of seven years from 2016 to 2022, to study the impacts of board extent on their CFP calculated as principal component analysis (one component remains based on eigenvalues >1) and the level of NPA as the proportion of classified assets to entire assets. The annual report was regarded as the primary source of information for all dependent and independent variables because it is the most appropriate means of distributing information to all classes of stakeholders and the primary vehicle for communicating the extensive information (Mehedi et al., 2024). The sample size covers the whole Dhaka Stock Exchange-listed commercial banks in Bangladesh considering the following criteria:

- Enlisted on the DSE on or before December 31, 2016, and stay listed till December 31, 2022.
- Complete data available in the annual reports.

Based on the above-eliminating criteria, 30 banks were finally considered for the study (see Appendix Table 2).

3.1. Independent Variable
The study employs board size as the Independent Variable, which indicates the total number of directors in the boardroom.

3.2. Dependent Variables
To attain the objective of the study, this research accommodates two dependent variables, which are:

- Comprehensive financial performance (CFP): Financial performance can be measured based on management perspective (ROA), shareholders perspective (ROE), and market perspective (Q ratio). Every measure is constrained by some shortcomings. Therefore, this research plans to apply CFP instead of the noted proxies of financial performance. CFP is the result of principal component analysis (see Appendix Table 1), where one item has been selected based on the eigenvalues >1 (Jan et al., 2019).
- Non-performing assets (NPA): It is another dependent variable used in the current study, where NPA is the proportion of classified assets to total assets. It reveals the level of credit risk of the sample banks in Bangladesh.

3.3. Control Variables
The current study uses a few control variables, such as total assets estimated as the natural log of all assets and age (years of functioning since listing) of the sample banks. The purpose of using these control variables in the same regression model is to detect the impacts of the predictor variable on the response variable more accurately. To capture the impacts of the size of the board on the CFP and NPA, this research develops the following two models:

Model 1 for NPA

$$NPA_{it}=\alpha+\beta_1BS_{it}+\beta_2TA_{it}+\beta_3LA_{it}+\varepsilon_{it} \qquad (1)$$

Where,

NPA refers to the non-performing assets measured as the ratio of classified assets to overall assets.

BS denotes board size, the total number of directors in the boardroom.

TA denotes the total assets used as the proxy variable of the size of a bank estimated as the natural log of the bank's assets.

LA refers to the listing age used as a proxy variable of a bank's age, measured as the total number of years since listing in the Dhaka Stock Exchange.

Model 2 for CFP

$$CFP_{it}=\alpha+\beta_1BS_{it}+\beta_2TA_{it}+\beta_3LA_{it}+\varepsilon_{it} \qquad (2)$$

Where,

CFP=Comprehensive Financial Performance.

BS denotes board size, which is directors on the company board.

TA represents the total assets used as the proxy variable of bank size computed as the natural log of the bank's assets.

LA refers to the listing age used as a proxy variable of a bank's age, measured as the total number of years since listing in the Dhaka Stock Exchange.

4. RESULTS AND ARGUMENTS

4.1. Explanatory Statistics
Table 1 shows that the CFP for the sample banks ranges from −0.0997 to 0.0820 times, with a mean CFP of 0.009318. The average value of the NPA to overall assets ranges from 0.01% to 0.84%. The mean of banks is 19.4083 years, though sample banks' ages range from 3.00 to 49.00 years. The log of the sample banks' total assets ranges from 9.33 to 14.16, with an average value of 12.1074. The sample banks' board sizes fluctuated from 5 to 23, with a mean of 13.9528.

4.2. Correlations Matrix

Table 2 shows the correlations among the variables using the Pearson pair-wise correlations matrix. The correlation matrix for the sample banks shows that the bank size is correlated positively with the BS at a 1% significance level. The CFP is positive, and NPA is negatively connected with the sample banks' board size at a 1% significance level. Nevertheless, age is negatively associated with the board extent. Besides, The CFP and NPA are associated inversely at a 1% significance level for the sample banks.

4.3. Regression Results

Cross-sectional and time dimensions make up the two characteristics of panel data. The computation of panel data is more complex than examining the cross-sectional or time series dimensions. Panel data can be helpful for computation and inference (Baltagi, 2011). The VIF and their mutual tolerances have to study the Multicollinearity issues, an incidence in which an explanatory variable in a multiple linear regression (MLR) can be linearly predicted from the others with a considerable degree of precision. The multicollinearity supposition has a maximum threshold for VIF values is 10 (Mehedi et al., 2017). In this research, tolerance fluctuated from 0.60 to 0.80; hence, its reciprocal, the VIF, is between one and two ways under the threshold, indicating that multicollinearity is not a cause for concern (Ahmed Sheikh et al., 2013; Wichianrak et al., 2021). Initially, this research plans to conduct the OLS regression model for data analysis. However, the Breusch-Pagan-Godfrey test reveals that p values are <5% for both models, which means that null hypotheses are rejected and, as such, heteroscedasticity issues remain with the dataset. Under these circumstances, this research drops the OLS model for data analysis and plans to apply either fixed effects model (FEM) or random effects model (REM). For this, this paper conducts the Hausman test for Model1 and Model 2 to select a suitable model for regression analysis. Hausman test statistics (Table 3) indicate that FEM is ideal for this research. Therefore, this paper advances FEM regression models for data analysis and further discussions.

The present investigation plans to examine the hypothesis (H1), the affinity between BS and NPA of the selected banks over seven years from 2016 to 2022, resulting in (30*7)=210 sample-year observations. The annual report is considered the primary source of information for all dependent and independent variables. Table 3 presents regression results based on FEM, where we see that the R^2 and adjusted R^2 values (see model-1) are 0.976123 and 0.970817, indicating that the model is robust to explain the affinity between the explanatory and the regressed variables. Besides, the Durbin-Watson statistic of the same model shows a value of 1.751748, which indicates that the dataset is free from autocorrelation issues. It demonstrates that FEM is valid for this research (Ode-Ichakpa et al., 2020; Wichianrak et al., 2021). Model-1 reveals (Table 3) that the affinity between the BS and NPA is adverse but significant at the 1% level (t-value = −2.314447 and P = 0.0218). This outcome indicates that a large board effectively reduces NPA in Bangladeshi publicly listed banks. This outcome supports the predictions of agency theory on the ground that board size has a vital role in improving the ability of directors to supervise and control the activities of managers (Detthamrong et al., 2017). An oversized board is supposed to provide a better pass to diverse resources than a tiny one. A corporate board with diverse backgrounds and understanding could hold more effective wisdom to make rational decisions. Thus, the more the number of directors, the more the surveillance ability of the boards, which helps the board select the quality borrowers, resulting in reduced NPA. This result is backed by some earlier research investigations (Haider and Fang, 2016; Huang and Wang, 2015; Koerniadi et al., 2014; Mathew et al., 2016; 2018; Nakano and Nguyen, 2012; Wang, 2012) advances that a large board is more robust to reduce NPA.

On the other hand, Akbar et al. (2017) argue that larger boards of the sample banks cannot reduce the level of NPA. Besides, bank size is negatively associated with NPA at a 1% significance level (in Model-1, t-value = −3.048127 and P = 0.0027), implying that large banks are more efficient in managing the asset grades of the 'sample banks under the study. The affinity between experienced banks and NPA (t-value = −1.283830 and P = 0.2009) is also negative, but the affinity is not statistically significant (see Model-1). It indicates that ageing does not matter for the level of NPA in the context of DSE-listed banks in Bangladesh.

Furthermore, this research formulates another hypothesis ((H2) on the relationship between board size and CFP. Table 3 presents regression results based on FEM, where we see that the R^2 and adjusted R^2 values (see Model-1) are 0.687829 and 0.618458, which also implies that the model is robust in explaining the affinity between the explanatory and regressed variables. Besides, the Durbin-Watson statistic of the same model shows the value of 1.538991 because the threshold level of the Durbin-Watson statistic varies between 1.5 and 2.5, which indicates that the data set is free from autocorrelation issues. It confirms that FEM is valid for this research (Ode-Ichakpa et al., 2020; Wichianrak et al., 2021). Table 3 (see Model-2) shows that board size is positively

Table 1: Explanatory statistics of the study variables

Variables	n	Minimum	Maximum	Mean	SD
CFP	210	−0.0997	0.0820	0.009318	0.0136287
NPA	210	0.01	0.84	0.0751	0.13104
BS	210	5.00	23.00	13.9528	4.27150
FS	210	9.33	14.16	12.1074	0.81544
FA	210	3.00	49.00	19.4083	9.86637

SD: Standard deviation, CFP: Comprehensive financial performance, NPA: Non-performing assets

Table 2: Correlation matrix

Variables	CFP	NPA	BS	FS	FA	Tole.	VIF
CFP	1						
NPA	−0.642**	1					
BS	0.164**	−0.340**	1			0.869	1.151
FS	0.286**	−0.664**	0.322**	1		0.800	1.251
FA	−0.134*	0.066	−0.074	0.301**	1	0.888	1.126

*Correlation is significant at the 0.05 level (two-tailed), **Correlation is significant at the 0.01 level (two-tailed). CFP: Comprehensive financial performance, NPA: Non-performing assets

Table 3: Regression results based on fixed effects model

Variables	NPA (model 1)		CFP (model 2)	
	t	P	t	P
BS	−2.314447	0.0218***	1.502477	0.1348
LOGFS	−3.048127	0.0027***	0.831029	0.4071
LOGFA	−1.283830	0.2009	2.324897	0.0213***
R²	0.976123		0.687829	
Adjest R²	0.970817		0.618458	
F statistics	183.9683		9.915175	
P	Significant		Significant	
Durbin−Watson statistic	1.751748		1.538991	
Hausman test χ² statistic, P	39.672415 significant		17.977215 significant	

Source: Authors' Calculation

associated (t-value=1.502477 and P = 0.1348) with CFP, and the affinity is insignificant. This outcome suggests that the board size of the different listed banks in Bangladesh cannot influence the earning capacity. Some past literature in various contexts supports this finding (Ahmed Sheikh et al., 2013, 2013; Bhatt and Bhattacharya, 2015; Larmou and Vafeas, 2010; Mishra and Mohanty, 2014; Pucheta-Martínez and Gallego-Álvarez, 2020; Puni and Anlesinya, 2020), who reported a positive affinity between the oversize board and firm value. This finding contrasts with some past evidence that found negative links between the large board and corporate financial performance (Anderson and Reeb, 2004; Coles et al., 2008; Das and Ghosh, 2006; Eisenberg et al., 1998; Fama, 1980; Guest, 2009; Ladipo and Nestor, 2009; Lipton and Lorsch, 1992; Maniruzzaman, 2023; Nguyen and Dang, 2022; Yermack, 1996). The tie between bigger banks and CFP is positive (t-value = 0.831029 and P = 0.4071), but the result is not statistically significant (see Model-2). The result suggests that large banks in Bangladesh must have failed to improve their earning capacity. The affinity between experienced banks and CFP is positive (t-value = 2.324897 and P = 0.0213) and statistically significant (see Model-2). These finding notes that experience matters for firm value in the context of listed banks in Bangladesh.

5. CONCLUSION

The study aims to determine how the size of the board influences a firm's economic performance and the level of NPAs of the DSE-listed banks in Bangladesh. Data for this study comes from the sample banks' audited annual reports covering twelve years from 2016 to 2022 to study the impacts of board size on the CFP measured as principal component analysis (one component remains based on eigenvalues >1) and the level of NPA as the proportion of classified assets to total assets. The sample size of the study covers DSE-listed commercial banks in Bangladesh, taking the two criteria into consideration- the first one is that the banks must be listed on the DSE on or before Dec. 31, 2016, and the other one is these banks to be listed until Dec. 31, 2022, and the other one is must have complete information in the annual reports required for this research. (Maniruzzaman and Hossain, 2019b).

Initially, this research plans to conduct OLS regression for data analysis. However, the Breusch-Pagan-Godfrey test reveals that

P values are less than 5% for both models, which means null hypotheses are rejected; heteroscedasticity issues remain with the dataset. Under these circumstances, this research drops the OLS model for data analysis and plans to apply either FEM or REM. For this, this paper conducts the Hausman test for Model-1 and Model-2 to select a suitable model for regression analysis. Hausman's test statistic (Table 3) indicates that FEM is ideal for this research. Therefore, this paper advances FEM regression models for data analysis and further discussions.

FEM reveals that the size of the bank board has a positive impact on CFP though the tie is not consequential, which signals that banks having large board sizes are not linked to the bank's economic value in the Bangladesh context. We also find that firms with large board sizes can reduce non-performing assets in Bangladesh. However, the result is that the banking industry is on the verge of collapse, with local banks having low profitability and high-risk indicators. In contrast, despite operating in the same environment, international banks typically have superior outcomes, stability, and robust governance procedures. As a consequence, the banking sector of Bangladesh has been experiencing declining profitability, rising non-performing assets, capital and provision shortfalls, deteriorating loan specialization, widespread lawlessness backed by political processes, lower loan comeback rates, impaired asset quality, managerial flaws, extreme government and significant shareholders interference, ineffective regulatory and supervisory roles, etc. (Reaz and Arun, 2006). The ability to act on behalf of the depositors must be granted to Bangladesh Bank, the central bank of Bangladesh. The central bank must reform itself to be more effective and accountable, using better monitoring methods, technology, and human resources.

The banking industry is vital to Bangladesh, a nation making great efforts to support its still-fragile but rapidly growing economy. Bangladesh requires its banking sector to operate efficiently while transitioning from an agriculture-based to an industry-based economy. A functional and stable financial system is crucial for good CG.

The study has made numerous contributions to the literature and to practitioners. First, the study's results add fresh theoretical outlooks to the literature on the appropriate board size of a bank that could be useful for future studies. Second, financial institutions can help improve their performance by utilizing the study findings. Third, the findings can be used by lenders and investors to determine whether to lend money to or invest in the shares of a bank.

The findings are based on data ranging from 2016 to 2022. Thus, they may differ if the time frame is modified. The effect of board size on other financial success indicators, such as the cash dividend payout ratio, EPS, per share dividend, NAV per share, and debt-equity ratio of banks in Bangladesh, can be explored further. Future research can also examine the effect of other board attributes on the performance of banks, such as the number of board meetings, gender diversity, directors' educational background, CEO Duality, and board autonomy.

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APPENDIX

Table 1: Principal component analysis

Components	Eigen-values	Percentage variance	Raw component	Rescaled component
ROE	2.314	97.376	1.521	1.00
Q-ratio	0.062	2.618	−0.016	−0.062
ROA	0.000	0.007	0.000	0.032

Table 2: Dhaka Stock Exchange Listed Banks in Bangladesh as on 31st December, 2022

S.N	Name of the Bank(s)	Listing Year	Market Capitalization (in mm) BDT
1.	AB Bank Limited	1983	11,534.574
2.	Al-ArafahIslami Bank Ltd.	1998	28,752.359
3.	Bank Asia Ltd.	2004	24,134.272
4.	BRAC Bank Ltd.	2007	79,353.827
5.	The City Bank Ltd.	1986	29,241.444
6.	Dhaka Bank Ltd.	2000	13,769.559
7.	Dutch-Bangla Bank Ltd.	2001	49,588.000
8.	Eastern Bank Ltd.	1993	36,723.782
9.	Exim Bank of Bangladesh Ltd.	2004	18,383.978
10.	First Security Islami Bank Ltd.	2008	12,850.957
11.	ICB Islamic Bank Ltd.	1990	3,389.982
12.	IFIC Bank Ltd.	1986	29,935.269
13.	Islami Bank Bangladesh Ltd.	1985	51,519.701
14.	Jamuna Bank Ltd.	2006	17,606.803
15.	Mercantile Bank Ltd.	2004	18,081.298
16.	Mutual Trust Bank Ltd.	2003	15,599.917
17.	National Bank Ltd.	1984	22,691.498
18.	National Credit and Commerce Bank Ltd.	2000	15,558.126
19	One Bank Ltd.	2003	12,796.354
20.	Premier Bank Ltd.	2007	15,646.061
21.	Prime Bank Ltd.	2000	24,344.095
22.	Pubali Bank Ltd.	1984	28,278.091
23.	Rupali Bank Ltd.	1986	15,216.556
24.	Shahjalal Islami Bank Ltd.	2007	23,257.591
25	Social Islami Bank Ltd.	2000	16,841.941
26	Southeast Bank Ltd.	2000	18,666.366
27.	Standard Bank Ltd.	2003	11,136.318
28.	Trust Bank Ltd.	2007	23,988.507
29.	United Commercial Bank Ltd.	1986	21,093.550
30.	Uttara Bank Ltd.	1984	14,794.705