

RESEARCH

Open Access



# Predicting financial distress through ownership pattern: dynamics of financial resilience of Bangladesh

Shafiqul Alam<sup>1,2\*</sup> , Sumon Kumar Das<sup>2</sup> , Umma Rumman Dipa<sup>2</sup> and Syed Zabid Hossain<sup>3</sup> 

## Abstract

In light of agency and resource dependence theories, we explored the impact of ownership patterns on the likelihood of financial distress using 57 financial institutions (FIs) listed in Dhaka Stock Exchange and 390 firm years from 2016 to 2022. This study observed that 97.94% of the firms are in distress, 1.03% in gray, and 1.03% in the safe zone. Thus, the stability of FIs lags quite behind the expected standards. Multiple linear regression results show that director ownership is inversely associated with corporate failures, suggesting higher stakes of directors lower the risk of financial distress. When directors align their interests with those of firms by owning shares, it enhances firm performance and lowers the likelihood of failures. Also, institutional ownership negatively correlates with financial distress due to their active surveillance and focus on long-term performance. Besides, effective overseeing process of institutional investors works as a deterrent to making freaky decisions. Conversely, foreign ownership showed a positive affinity with financial distress. In Bangladesh, family dominance, lopsided influence, and political connections limit foreign investors' ability to contribute to a firm's long-term success. While most earlier studies in emerging economies showed financial resilience through the Altman Z-score, only a few have examined ownership patterns as a potential cause of firm bankruptcy. Considering ownership patterns as an explanatory variable of financial distress, this study discourses the corporate governance issues and resilience of FIs in an emerging economy.

**Keywords** Corporate failure, Shareholding pattern, Altman's Z-score, Banking and non-banking financial institutions, Emerging economy, Dhaka Stock Exchange

**JEL Classification** G33, G32, M41

## Introduction

Academics and policymakers agreed that effective and sound corporate governance (CG) practices enhance firm financial performance, stability, and growth and motivate local and foreign investors for new funds.

Contrarily, weak CG negatively impacts the firm performance and makes it weak, turning it into a troubled position. To achieve corporate goals and objectives, protect the interest of shareholders, maximize the firm's wealth, and comply with diverse legislations, sound CG works as an influential predictor. A firm with good governance promotes a positive image in the business community, imaged in the stock market. Historically, firms with sound CG can boost assets more than those with poor governance and positively impact their performance in the stock market [10]. Well-managed CG mechanisms can play a powerful role in augmenting firm financial performance [18, 25]. Conversely, firms with weak CG devices not only demotivate investors to invest but also

\*Correspondence:

Shafiqul Alam  
shafiq.alam@nstu.edu.bd

<sup>1</sup> Institute of Bangladesh Studies, University of Rajshahi, Rajshahi, Bangladesh

<sup>2</sup> Department of Business Administration, Noakhali Science and Technology University, Noakhali, Bangladesh

<sup>3</sup> Department of Accounting and Information Systems, University of Rajshahi, Rajshahi, Bangladesh



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

curb capital market growth, leading those firms into a state of financial distress [79]. The drawbacks of internal CG tools, economic uncertainties, and external factors can worsen a firm's distress [64]. All these situations underscore the urgent need for robust corporate governance practices.

In an ever-evolving global economic landscape, diverse macroeconomic determinants, such as the stock market crashes and bear markets, war, political instability, trade restrictions, and deteriorating law and order situation etc., and micro factors, such as weak CG, family dominance or lopsided influence in decision making, maximizing agent's interest, fund embezzlement, nepotism, etc., pave the way toward financial distress—the inability to manage and regulate working capital, pay debts, and reduce losses. Financial distress impacts its stakeholders and sheds light on the economy as a whole. To avoid unexpected situations like corporate failures, the prediction mechanism of the likelihood of financial distress plays a pivotal role in taking proper action from an early stage. It gives an early warning to the doubtless distressed firms through different models, such as *Z*-score, *F*-score, and *O*-score. That is why this concept has attracted the attention of researchers, practitioners, investors, and regulators to analyze the probable states of firms that may happen soon and help firms to turn back from distressed zones to resilience zones by taking effective strategies, maintaining stability, not only of that particular industry in which those companies belong to but also of that particular economy in which those firms operate their business. Measuring the financial state is necessary for investors and creditors to do their financial planning and take remedial measures to avoid probable corporate failure risks [40].

This study focuses on the financial sector because a sound financial system is the heart of an economy. The inevitable affinity between financial institutions and economic development relies on a sound financial system. That is why the financial sector remains a paramount concern for policymakers, regulators, domestic and foreign investors, and stakeholders. By touching economies of scale, financial institutions (FIs) mobilize resources to help improve the overall efficiency of an economy and boost the sustainable economic growth. The ramifications of financial distress within the FIs extend far above individual institutions, potentially impacting the entire economy. Recognizing the critical significance of early detection and prevention of financial distress, researchers and practitioners have studied various factors that can predict such vulnerabilities. One such determinant that has garnered substantial attention is the ownership pattern. This research sheds light on the complex relationship between ownership patterns and financial distress in

the financial sector in an emerging economy like Bangladesh. Though the effects of shareholding pattern on firm performance and stability has been extensively studied in the literature, the specific analysis of these patterns within the financial sector to predict financial distress still needs to be studied in Bangladesh.

In Bangladesh, most of the business firms are family-dominated. Concentrated ownership through managerial stockholding is prevalent in the Bangladeshi financial sector. Institutional and foreign investors have recently emerged as an instrumental factor in the financial sector. Along with the dynamics in ownership patterns, financial sectors have been subdued with alarming non-performing loans, massive irregularities, and weak governance practices. Due to fragile conditions, five banks have already agreed to merge with the other five banks. The multifaceted news regarding the states of banks and NBFIs motivates the researchers to examine the stability of the financial institutions and investigate how the ownership pattern influences the likelihood of financial distress, which represents the variability of a firm. Though some prior studies assess the likelihood of financial distress of different firms in Bangladesh, to the best knowledge of the researchers this is the first study that analyzes the influence of ownership patterns (corporate governance issues) on the likelihood of financial distress. The core objective of the study is to explore how the ownership pattern impacts the financial distress of bank and non-bank financial institutions listed on the Dhaka Stock Exchange (DSE), Bangladesh. To achieve the core intent, this study also examines the nature, pattern, and trend of firms' ownership structures over the period and evaluate the financial distress status of bank and non-bank financial institutions using the Altman *Z*-score model.

This research will contribute to the growing knowledge of financial resilience, ownership patterns, and financial sector workings in emerging economies. By establishing a link between ownership structures and the likelihood of financial distress, we aspire to offer practical insights to regulators, FIs, investors, and policymakers to develop operational risk management strategies. This study helps the regulatory authorities to set ownership patterns in such a way that firms' stability can be enhanced by growing firm performance. The outcomes of this research would help present and potential investors, depositors, and lenders assess the financial stability of their firms. As the financial landscape continues to evolve, the findings of this study will assist potential investors in boosting the resilience of the bank and non-banking financial sectors and fostering sustainable economic growth in emerging economies. Since Bangladesh has been one of the fastest-growing economies in the world, this type of research will contribute to the honest representation of the financial

standing of our financial institutions. A constant demand to identify the variables, including CG factors that impact a firm's stability, motivates the researchers to reveal the situation from an emerging country perspective. Next, as the business environment, laws and regulations, and the economic and other related factors vary from country to country, living evidence must be searched for in a country like Bangladesh to present the state of the financial sector of an emerging economy. Finally, this study opens a surface for interested researchers to conduct future investigations on firms in other industries, indexes, or nations.

This study has been structured into six sections. Section one concentrates on the introduction. Section two focuses on the literature review and hypothesis development, comprising a theoretical framework, prior studies, and hypothesis development. The next one describes the objectives of the study. Then, the methodology is discussed. In section five, findings and analysis are described. Section six elucidates the discussion and policy implications based on section five. Finally, the study has been concluded comprehensively, including suggestions and limitations.

## Literature review and hypothesis development

### Theoretical framework

#### *Agency theory*

To demonstrate a more detailed picture of the strikes of multifarious ownership structures on the probability of financial distress, the study considers the support of agency and resource dependency theories. The core insight of the agency theory is that organizations have an information asymmetry as management is separated from owners and mainly runs the operating activities, suggesting that separation generates agency conflicts between these two parties [37]. Agency theory prescribes that management may act in such a way that contributes to maximizing their interest by compromising the interest of shareholders [15], and such kinds of agency conflict incur costs for the investors [21]. For lopsided personal interest, maximization of management and the incurrance of owners' costs may negatively impact firm performance and firm value [78], increasing the potentiality of corporate failures. Thus, the ownership type and concentration can be considered a pivotal internal corporate governance framework to align management and owners' interests. Understanding the agency problem faced by business firms is one of the crucial motivating factors for researching stockholding patterns. Earlier studies found that the harmony between owners and managers increases firm performance. Ownership patterns significantly affect the perception of a firm's objective [77] and the approach toward research and development

investment [85]. That is why researching stockholding patterns to reduce agency conflict at the best level while increasing firm performance and reducing the chance of financial distress has become critical, especially in emerging economies like Bangladesh.

#### *Resource dependency theory*

Another theoretical view is that a wide range of ownership patterns with more robust and qualified owners contributes to closely watching, advising and controlling the managerial activities and providing access to external resources required to gain efficiency, boost firm performance, and reduce the possibility of corporate failures. This theoretical concept is aligned with the underpinnings of resource dependency theory (RDT). The core concept of RDT is that a firm cannot be self-sustainable because of resource constraints. That is why an organization must create a network with external parties to get smooth access to required resources to flourish in its position [57]. The RDT argues that the organization should be able to tap that firm into external resources such as financial resources, human capital, modern technology, and fast access to relevant information. These resources can contribute to firms making effective strategic decisions and increasing their legitimacy [45]. Thus, diversified ownership structures enable the firm to create a network with external resources that convey diverse skills and knowledge. Effective stockholding patterns provide the firm with multifarious skills, abilities, and quick access to required assets and information that increase firm performance and decrease the likelihood of corporate failures, even in crisis moments.

#### **Dynamic states of financial institutions in Bangladesh**

Although the Corporate Governance Code was first issued in 2004, revised in 2012 and 2018 in Bangladesh, we still lag behind in effective CG practicing in both financial and non-financial sectors. Though enriched empirical studies in context of Bangladesh showed the affinity between sound corporate governance practices and firm outcomes, there is a dearth of literature that considers corporate governance as a predictor of the likelihood of corporate failures. Diverse corporate scandals in our country have brought the rapidity of a sound CG mechanism to defend the interest of the stakeholders. Many other earlier studies pointed out that economically viable firms have better CG practices than economically distressed firms [5, 9, 17, 45]. Multifarious corporate scandals, along with different macro and micro economic factors, create the urgency to examine the tie between the corporate governance structure and the likelihood of financial distress. Among corporate governance mechanisms, ownership patterns can play a pivotal role in

increasing firm performance and reducing the likelihood of corporate failures. Yoo and Koh [86] observed that ownership patterns can significantly mitigate principal-agent conflicts.

Besides developed nations, emerging economies have experienced numerous notable scams since the last half of the twentieth century, and Bangladesh is within the box. In the last 2 decades, it has experienced remarkable corporate failures such as the Hallmark and Sonali Bank scandal (2010–11), Basic Bank loan irregularities (2009–13), Oriental Bank (2011), Farmers Bank and Bismillah Group (2015), Reliance Finance (2018), People's Leasing and Financial Services (2018), and Bangladesh Industrial Finance Company (2018) etc., in which majority is related with the financial sector. Risky loan amounts, including non-performing loans (NPLs), outstanding rescheduled loans, and outstanding restructured written-off loans, have dramatically increased in recent years, threatening the country's economic prosperity. The banking sector's total risky loans amounted to TK377,922 crore at the end of 2022, outstanding rescheduled loans TK212,780 crore, and outstanding written-off loans TK44,493 crore [12]. Bangladesh Bank reported that NPLs reached TK131,621 crore as of March 31, 2023, 9% higher than just 3 months ago and 16% from a year earlier [78], securing the second highest position in South Asia [76]. The banking industry suffers from large amounts of NPLs due to fund diversion, political and board of directors' interference, corrupt bankers, aggressive banking, weak monitoring, and lack of coordination among related parties [4]. The worse scenario also prevails in non-banking financial institutions (NBFIs). Now, 35 NBFIs have been operating in Bangladesh; among those, 16 NBFIs have over 30% non-performing loans of total outstanding loans, and six have classified over 90% loans for weak CG and inept board [26]. To recover from such worse conditions and settle pending financial disputes, FIs should have sound corporate governance mechanisms. Central Bank should closely monitor the operations of commercial banks, especially the default loan issue. Proper corporate governance laws, rules, and regulations should be enacted to reform the financial sector to enhance investors' confidence.

### Prior studies and hypotheses development

Financial distress means a state of the industry in which a firm or person cannot generate adequate revenue or income to fulfill working capital requirements, making the firm or person unfit to pay financial obligations. A firm's cash flow problem, debt crisis, and operational losses result in financial distress, also called economic hardship, financial stress, and financial toxicity. The scope of its harshness largely depends on the firm size

[61]. Predicting financial distress has become a critical topic for researchers, policymakers, shareholders, lenders, customers, and capital market participants as it plays a role in giving early warning about bankruptcy. This model can function as a whistle-blowing tool since corporate managers can step up remedial measures to avoid potential bankruptcy [82]. Firstly, the bankruptcy prediction model was developed by Altman Edward I in 1968 using multivariate discriminant analysis and, known as the Z-score [51]. Later on, to predict bankruptcy more accurately, the Z-score model was constantly updated by Altman [27] and further prescribed a model for developing countries' firms, emerging market companies, and non-manufacturers in 1995 [6]. The lower the score of Z-value, the higher the likelihood of bankruptcy of that firm.

Multifarious models have been developed to predict financial distress, such as the Z-score by Altman, univariate analysis by Beaver, neural networks, the O-score by Ohlson, the F-score by Piotroski, decision trees and genetic algorithms [27, 41, 51, 55, 58, 59, 81]. The applicability and acceptability of the Z-model are widespread. To test the validity of the Altman Z-score, Cheing [13] studied four European distressed banks, Smarakoon and Hasan [74] investigated Sri Lankan firms and Jaisheela [36] examined Indian leasing firms and found the notable degree of accuracy of the Z-score to predict corporate failures. Pustynnick [60] introduced the P-score along with the Z-score and found that the new P-score/Z-score clearly shows the 82.76% likelihood of detecting fraud, and the combined approach gives a 96.55% chance of detecting fraud in financial statements. Hamid et al. [27] applied the Z-score to predict the financial distress of 15 publicly traded NBFIs in Bangladesh from 2011 to 2015. Most of the sampled NBFIs are lying at the bankruptcy level. Nandi and Choudhary [52] used the Altman Z-score model to predict future banks' defaulters, helping banks to take remedial actions accordingly. Though sound CG effectively stops a firm from being exposed to failure and bankruptcy, weak CG worsens the firm position and creates a smooth way to be bankrupt [29]. Effective CG is a prerequisite for drawing the capital required to ensure continued and long-term economic growth, and it leads to better ties with employees, creditors, and other stakeholders. However, good governance is not possible under the family-based culture in Bangladesh [28].

Although scholars focused on investigating the affinity between CG and firm financial performance in the context of developed, developing, and emerging economies, a few scholars have explored the association between CG, like ownership patterns, and the probability of firms' financial distress. The majority of the studies that



examine the tie between ownership patterns and financial distress have been performed in the context of developed or developing countries, such as companies listed in Bursa Malaysia, Malaysia [48], assembling companies listed in Indonesia Stock Exchange [88], companies other than financial institutions in Indonesia [7], non-financial companies listed in Shanghai and Shenzhen Stock Exchanges in China [72], manufacturing companies in Indonesia [69], manufacturing companies in UK [22], firms listed in Amsterdam Stock Exchange, Netherlands [17], coal mining companies in Indonesia [87], transportation sector in Indonesia [56]. Only a few studies have focused on emerging or underdeveloped economies, for example, manufacturing companies in Pakistan [79] and non-financial firms in Egypt [71]. Few studies examined the effects of corporate governance, including ownership patterns, on predicting financial distress in the financial sector, motivating us to explore this enveloped area.

In Bangladesh, only the financial distress analysis has been performed by earlier studies, for example, Z category companies [14], pharmaceutical companies [34], small and medium enterprises [35], cement [32], ceramic [46], commercial banks [3], conventional and non-conventional commercial banks [51], and non-banking financial institutions [27]. No study has examined the tie between corporate governance variables such as ownership patterns or board diversity and financial distress in Bangladesh. The outcome of prior studies regarding predicting the financial distress of different industries in Bangladesh and the dearth of research examining the affinity between corporate governance variables beyond an exclusive reliance on financial indicators and corporate failures create a vacuum for investigation. Another motivation for doing this study is that no prior studies in Bangladesh covered the recent periods which experience the super express rate of NPLs, reshuffled loans, irregularities and instability of financial firms. To analyze the role of corporate governance on firms' stability, ownership pattern has been deemed the most critical element [43, 89]. Since the stability and growth of banks and NBFIs are essential to stabilizing the financial system, researchers have become interested in investigating how the ownership pattern plays a pivotal role in financial distress. For the first time, this study explored the effect of ownership patterns on the likelihood of financial distress in Bangladesh.

#### **Director ownership and financial distress**

The stockholding pattern is mainly dominated by director or sponsor ownership and family-concentrated ownership in South Asia. Substantial stakes of a few stockholders or family members lead to active monitoring of management activities that reduce agency problems and

confirm the firm's long-term success [43]. The sponsor/director ownership in the financial sector of an emerging economy plays a critical role in understanding the relationship between ownership structure and economic distress. Their role is imperative in shaping corporate strategies, assessing and managing systematic and unsystematic risks, fostering a sense of responsibility and commitment to the firm, complying with regulations that lead firms to achieve the desired success, and averting the risk of corporate failures. Directors are individuals responsible for controlling a firm's management and safeguarding its shareholders' interests.

The significant stake of director ownership helps reduce agency problems and advance the firm's performance [16, 71]. In light of agency theory, it is presumed that more stockholdings by directors align the interest with the shareholders, increasing the firm performance and decreasing the likelihood of financial distress. Jensen & Meckling [37] also pointed out that a notable amount of managerial ownership reduces agency conflict as directors' interests align with those of shareholders and increases firm performance, which lessens the probability of financial distress. Prior studies observed a negative influence of director ownership on the likelihood of corporate failures [56, 69, 83, 87]. Reverse evidence has also been found. The percentage of directors occupied by the controlling shareholder showed a positive affinity with the risk of financial distress [44, 79]. A few studies noted an insignificant influence of managerial ownership on the chances of corporate failures [22, 88]. Though a few studies observed no affinity or positive outcome, the prevalent results of the studies mentioned above and the insight of agency theory stipulate us to assume a negative impact of sponsor and director ownership on reducing the likelihood of financial distress. Therefore, the first hypothesis of the study is:

*Hypothesis 1* Firms with higher proportion of director/managerial ownership have less likelihood of financial distress.

#### **Institutional ownership and financial distress**

Institutional investors, a recent and significant force in the financial sector, have acquired substantial stockholdings in various banks and NBFIs in Bangladesh. Their increased stakes not only promote ownership concentration but also significantly influence financial sector dynamics, particularly corporate stability and failures. Their role as a watchdog is pivotal in enhancing firm performance and economic stability. Moreover, they establish crucial links with external resources, improving corporate efficiency and effectiveness.

The institutional perspective implies that by having solid formal institutions, developed countries are more able to reduce uncertainty than emerging economies with underdeveloped institutional structures [66]. In light of the RDT concept, institutional investors can create links with external resources that foster the development of connections between the company and critical economic players in a complicated business environment [30]. They can be watchdogs on managerial decisions that motivate management to maintain greater transparency and accountability [11] emphasize long-term benefits, be more competent, professional, and experienced, and increase their chances of success [19]. In turn, the enhanced oversight by institutional investors can mitigate the likelihood of financial distress by encouraging prudent risk-taking and strategic planning. Prior studies explored a mixed outcome on the tie between institutional ownership and the chances of corporate failures. Some studies found that institutional ownership plays a pivotal negative role in the probability of financial distress [22, 56, 69, 83] while other studies pointed out a positive affinity between these two [7] and an insignificant tie has also been observed [79, 88]. Although prior studies posit mixed results, the outcome of the majority studies and the theme of RDT showed a link, leading us to assume the following hypothesis:

*Hypothesis 2* Firms with higher proportion of institutional ownership have less likelihood of financial distress.

#### **Foreign ownership and financial distress**

Foreign investment in emerging countries offers a double-edged sword with potential benefits and risks. Foreign investment in the financial sector can induce valuable resources, expertise, and global market access, enhancing the domestic banking sector's overall efficiency and competitiveness with updated technology. Based on RDT, foreign investment creates contact with other external resources to manage the firm environmental uncertainties and meet the demand for internal resources. Foreign banks often use cultured banking systems, innovative financial products and best risk control practices, which can significantly enhance domestic banks' efficiency and operational abilities [23].

Greenaway et al. [24] opined that foreign investors contribute to an effective management system and pave easy access to resources. They become more prone to profit and closely oversee managerial activities, which reduces the likelihood of corporate failures. Earlier studies examined the effect of foreign ownership on the probability of financial distress and observed a negative association between these two variables [7, 48, 69, 79], while others found a positive tie [68]. However, the operation of

foreign institutions may also aggravate instability, especially during economic downturns. Research has indicated that foreign banks may be more prone to sudden withdrawals of funding from host countries during periods of crisis [8], resulting in increased liquidity shortages in the domestic financial system, contributing to a credit crunch, and squeezing loan facilities to businesses and individuals. As a result, the more expansive economy may face significant challenges, such as reduced investment, lower consumption, and slower economic growth. In the context of an emerging economy like Bangladesh, understanding the implications of foreign ownership on financial distress is particularly crucial. Most outcomes mentioned in the above studies motivate the present researchers to hypothesize a negative impact of foreign ownership on financial hardship. Therefore, the third hypothesis of the study is:

*Hypothesis 3* Firms with higher proportion of foreign ownership have less likelihood of financial distress.

Along with different financial crises and notable corporate scams during the last 2 decades, the dearth of research on predicting financial distress through ownership patterns in emerging economies has increased the interest of researchers in this area. In Bangladesh, a state of financial distress has been observed by earlier researchers in various industries, but no study considers any association between ownership structure or CG variables of firms and predicting financial risk. To the best of the researchers' knowledge, earlier studies in Bangladesh covered the latest period of 2019. After the recent financial resilience of the Bangladeshi listed firms has not been unveiled. Thus, this study strives to give a vivid picture of the dynamics of the likelihood of financial distress in the financial sector of Bangladesh from 2016 to 2022.

#### **Research methodology**

This study is descriptive. It applies a quantitative research design which delineates the association between two or more variables. The approaches employed to complete the research successfully rely on secondary data.

#### **Research design and sample selection**

The ownership structures and financial distress of banks and NBFIs include all listed financial firms on the DSE. To ensure uniformity among the samples regarding features, rules, and regulations, the study considered DSE-listed 35 banks and 22 NBFIs and excluded non-listed financial firms. Abbas et al. [1] noted that collecting data from a uniform source decreases the risk of bias in data analysis. Considering data availability, this research covers the latest 7 periods from 2016 to 2022. Though the

total number of firm years would be 399, data have been collected from 390 firm years due to the unavailability of 9 annual reports including 2 observations from a bank, 7 observations from three non-banking financial institutions. The data have been gathered from the annual reports of sample firms. The annual report has been considered one of the reliable sources to collect data about business firms.

**Operationalization of variables**

Considering various factors during the data collection and analysis, the study examines the correlation between the pattern of ownership structure and financial distress. Based on extant literature, we consider managerial, institutional, and foreign ownership (proxy of corporate governance) as independent variable representing ownership patterns [7, 56, 69, 79, 87, 88]. As the government of Bangladesh owns stocks of a few firms in the financial sector, we excluded government ownership as the predictor of corporate failure. The study controls some factors that influence the probability of financial distress. Board size represents the pool of resources that helps to

reduce financial distress risk [88]. Independent directors and audit committees act as watchdogs of the board’s and management’s activities and priorities stakeholders’ benefits in strategic decisions. These factors contribute to ensuring financial stability [71]. Highly leveraged firms could face more chances of financial distress [49]. Firm size is pivotal in reducing the likelihood of financial distress [7]. Better firm performance, represented by return on assets, reduces financial distress risk [72]. Since positive business trends increase firm performance, firms doing business with growth opportunities and positive business trends are less likely to face corporate failures [1, 2]. Inflation is one of the critical predictors of financial distress [2] (Table 1).

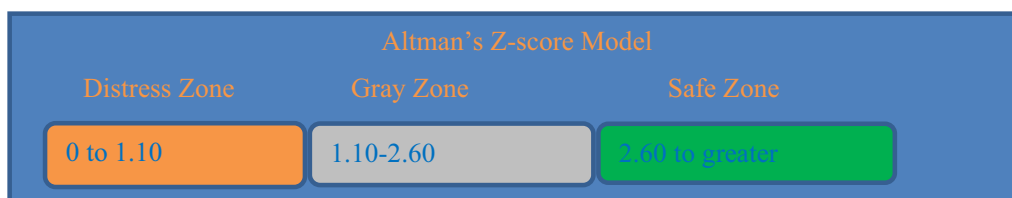
**Dependent variable: financial distress**

The Altman Z-score is used as a dependent variable in this study to predict the likelihood of financial distress. The Altman Z-score considers liquidity, profitability, leverage or solvency, and performance ratios to predict the bankruptcy of a firm [20]. This study considers the revised Altman Z-score developed in 1995 as

**Table 1** Explanation of variables

Variables	Acronym	Measurement
<i>Dependent variables (financial distress)</i>		
Altman’s Z-score	Z-score	Representing the likelihood of financial distress, Altman Z-score reflects the probability of corporate bankruptcy or financial distress. [48, 56, 79, 83] The Z-score is measured as $Z\text{-score} = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$ (Description is given below) [3, 27, 51, 53]
<i>Independent variables (ownership patterns)</i>		
Director/managerial ownership	DSPO	Director ownership, the supreme governing ownership, is scaled by the number of shares held by the directors and sponsors divided by the total number of shares outstanding at firm-year end. [7, 48, 56, 79, 83]
Institutional ownership	INSO	Institutional ownership, another monitoring device to reduce agency problems, is measured by the number of shares held by the institutions/companies divided by the total number of shares outstanding at firm-year end. [7, 56, 79, 80, 83]
Foreign ownership in equity	FORO	Foreign ownership with diversified expertise is calculated by the number of shares held by foreign individuals or institutions divided by the total number of shares outstanding at the firm-year end. [7, 48, 79, 83]
<i>Control variables</i>		
Board size	B_SIZE	The natural logarithm of the number of directors on the company board denotes board size. [22, 80, 87, 88]
Board independence	B_IND	The natural logarithm of the number of independent directors on the corporate board measures board independence. [22, 80, 83, 88]
Audit committee size	AC_SIZE	Audit committee size is calculated as the natural logarithm of the number of directors on the audit committee. [22, 88]
Firm size	F_SIZE	Total asset presents the growth and size of a firm. To reflect company size, the total asset is scaled by the natural log of the total asset for a particular period. [7, 80]
Leverage (debt to asset)	LEV	Leverage is the proportion of total debt to total assets at the end of the accounting period. [48, 79, 80]
Return on asset	ROA	It is the ratio of net income to total assets at the end of the accounting period [15]
Business trend	GDP_GR	It is measured by the rate of yearly gross domestic product (GDP) change. [1, 2]
Inflation rate	INFR	It is scaled by the average yearly inflation rate [2]

Source: Compiled by author



**Fig. 1** Altman Z-score

the research is performed on financial institutions in an emerging economy, Bangladesh.

The Altman Z-score formula is written as follows:

$$Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

where:

X1: Working Capital/Total Assets;

X2: Retained Earnings/Total Assets;

X3: EBIT/Total Assets;

X4: Book Value Equity/Total liabilities.

For this model, a firm is considered in the distressed zone when the Z-score is less than 1.10, in the gray zone when it ranges from 1.10 to 2.60, and in the safe zone when it touches 2.60 or more (Fig. 1).

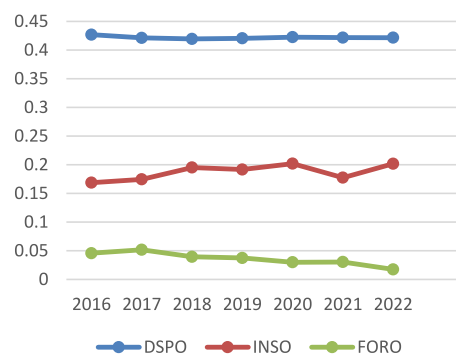
**Model specification**

Our study uses multiple linear regression models to examine secondary data collected from annual reports. Earlier studies also apply this statistical technique to explore significant predictor(s) of a particular variable and analyze the association between two or more variables [7, 56, 87, 88]. This study explores the association of financial distress with different types of ownership and investigates what kind of ownership works as a significant predictor of the likelihood of corporate failures. That's why the multiple linear regression model best describes the purpose of the study. In this case, the Altman Z-value quantifies financial distress developed for the service industry and emerging economies. In contrast, financial distress is a function of ownership structure, i.e., [Alman Z-score = f (ownership structure)]. To explore what types of ownership work as significant predictors of financial distress, this research develops the following model:

$$\begin{aligned} \text{Model : } Z - \text{Score}_{it} = & \beta_0 + \beta_1\text{DSPO}_{it} + \beta_2\text{INSO}_{it} \\ & + \beta_3\text{FORO}_{it} + \beta_4\text{B\_SIZE}_{it} \\ & + \beta_5\text{B\_IND}_{it} + \beta_6\text{AC\_SIZE}_{it} \\ & + \beta_7\text{F\_SIZE}_{it} + \beta_8\text{LEV}_{it} \\ & + \beta_9\text{ROA}_{it} + \beta_{10}\text{GDP\_GR}_{it} \\ & + \beta_{11}\text{INFR}_{it} + \epsilon_{it} \end{aligned}$$

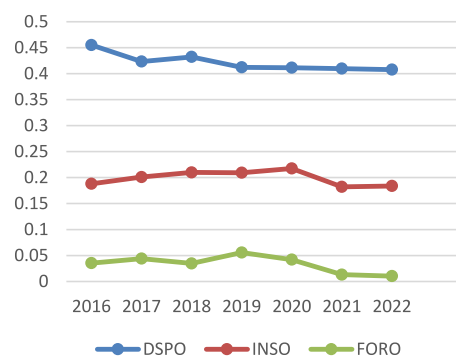
Correspondingly, *i* and *t* represent the cross-sectional units and the periods. We applied statistical methods such as regression, correlation, and descriptive statistics

**Average Ownership Structure of Financial Institutions**



**Fig. 2** Average ownership structure of financial institutions in Bangladesh

**Average Ownership Structure of NBFIs**



**Fig. 3** Average ownership pattern of listed NBFIs in Bangladesh

analysis. The data are analyzed using STATA 16 and MS Excel (Figs. 2, 3 and 4).

**Analysis and findings**

**Trend of ownership pattern of financial institutions in Bangladesh**

The ownership structure of FIs is shown in the graphs. The study observes that directors hold the most significant stake, followed by institutional and foreign investors. On average, directors had a 42% share of FIs in



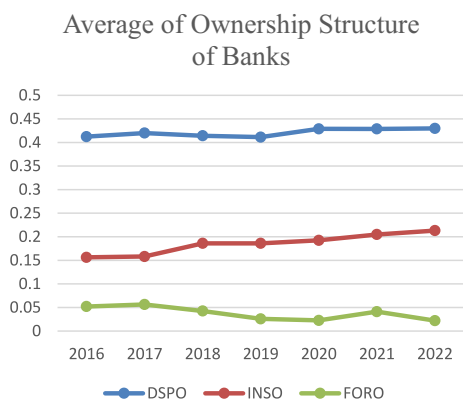


Fig. 4 Average ownership pattern of listed banks in Bangladesh

Bangladesh from 2016 to 2022. This study is supported by the findings of Reza and Faysal [65]. They pointed out an average of 39.65% director ownership in 19 listed NBFIs in Bangladesh for 2016–19. Institutional ownership, which is in second place, follows a growing trend, showing an average of 16.87% in 2016 and 20.18% in 2022. Meanwhile, the study finds a decreasing trend in foreign ownership throughout the period, noting 4.57% in 2016 and 1.75% in 2022.

While observing banks and NBFIs separately, directors' stockholding in banks and NBFIs was more than 40% during the study period. Sobhan [75] also found 44.37% director ownership in NBFIs for 2012–18. Still, NBFIs experienced a decreasing trend in director ownership, while banks had an increasing trend. Institutional ownership increased in banks from 15.64% in 2016 to 21.31% in 2022, while the institutional investors in NBFIs have had an upward trend for the first 5 years and a downward trend for the last 2 years. Foreign investment decreased for both Banks and NBFIs (Fig. 5).

### Financial stability of financial institutions based on Altman Z-score

The above figure shows that, on average, 97.94% of financial institutions (both banks and NBFIs) are distressed firms, only 1.03% of firms are in the safe zone, and the rest, 1.03%, are in the gray area. Even though the financial sector denotes the economy's resilience and contributes significantly to its growth, the study observed that the banks and NBFIs in Bangladesh delineate an identical scenario of financial instability based on the Altman Z-score. This outcome is in line with the findings of earlier studies. Ahmed and Alam [3] assessed the likelihood of financial distress in 15 Bangladeshi commercial banks from 2009 to 2013 and observed that, on average, only 7% of banks fell in the safe zone, 22.6% in the gray area, and 70.8% in the distress zone. Besides, Hamid et al. [27] analyzed the financial distress risk of 15 NBFIs listed in DSE for 2011–2015. Results showed that 92% are in the distress zone, 6.6% in the gray zone, and only 1.4% in the safe zone. On the other hand, Mostofa et al. [51] pointed out that the majority banks out of 25 conventional and non-conventional commercial banks fall into the distress and gray zone. However, the banking industry has slightly more gray and safe firms than NBFIs.

### Descriptive statistics

The study uses descriptive statistical data to determine the lowest, maximum, average, and standard deviation of each variable indicator, as shown in the table (Table 2).

In the ownership structure, Altman Z-score represents the likelihood of financial distress, and other firm-specific control factors are shown in general in the descriptive statistics. The financial distress (Altman Z-score) value ranges from -15.1031 to 4.192, with an average of -0.33, indicating that most companies fall in the distress zone, and the maximum value of 4.192 suggests that certain enterprises are financially sound. Considering three

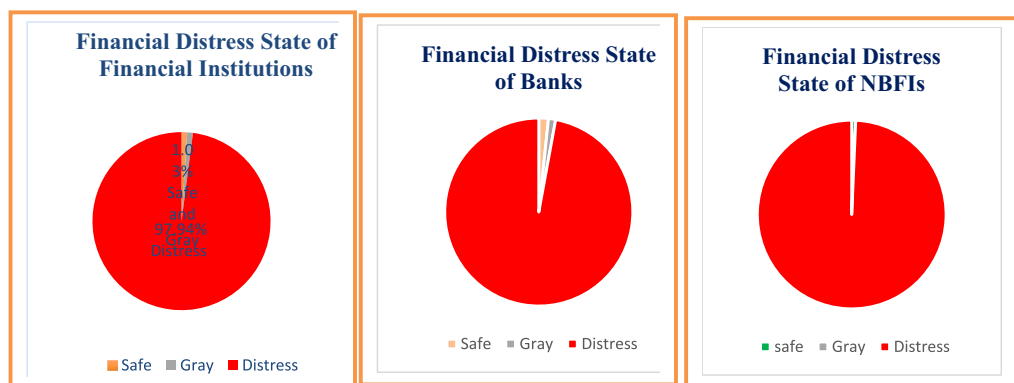


Fig. 5 Pie chart of financial distress of financial institutions in Bangladesh (Source: compiled by authors)

**Table 2** Descriptive Statistics

Variable	Obs	Mean	Std. dev	Min	Max
Altman Z score	390	-0.330	2.120	-15.103	4.192
DSPO	390	0.422	0.190	0	1
INSO	390	0.190	0.108	0	0.594
FORO	390	0.036	0.095	0	0.53
B_SIZE (ln number)	390	11.746	4.027	4	20
B_IND (ln number)	390	2.490	1.115	0	8
AC_SIZE (ln number)	390	4.415	0.840	2	6
F_SIZE	390	11.028	.609	9.91	12.264
LEV	390	0.949	0.201	0.647	2.183
ROA	390	-0.002	0.057	-0.724	0.035
GDP_GR	390	0.001	0.022	-0.044	0.035
INFR	390	0.059	0.007	0.055	0.077

ownership types, director, institutional, and foreign ownership, the study observed that the average for DSPO is the highest. Family businesses and associations, typically the promoters, own a sizable portion of the enterprises. The range of the DSPO is from 0.00 to 100%, with an average of 42.2%. Hossain [31] studied listed banks in Bangladesh and observed an average of 37.35% director ownership for 2013–17. The average director ownership concentration percentage among the banking and non-banking listed companies on the DSE is considerably higher than 26.2% in Pakistan [16] and lower than 53.32% in India [42]. So, large stockholdings by company directors help reduce agency problems and improve firm performance.

Institutional ownership dominates the market with an average of 19.01%, ranging from 0.0% to 59.41. Rashid [63] also found an average of 18.47% of 527 Bangladeshi

listed firms for 2015–2017 and Das et al. [15] observed 18.3% for the top 50 listed firms in Bangladesh. Institutional stockholding shows an average of 19.67% in India [73], 2.16% in Taiwan [39], and 12.8% in Pakistan [16]. Foreign ownership is the lowest, comprising 3.61% on average, below the average of 5.9% of top 50 listed firms in Bangladesh [15]. The insignificant portion of foreign investment in Bangladesh’s stock market implies that the capital market lacks sound CG, and the country’s social and political issues raise negative attitudes in their minds [79]. Compared with other countries, foreign ownership is less than the average foreign equity holdings of 3.90% in Pakistan [16] and 9% in Taiwan [39].

The average number of directors on the corporate board is 11.746 (around 12), ranging from 4 to 20. Sobhan [75] also found an average 11.26 board size for NBFIs, while Masum and Khan [47] observed an average number of directors of 9.72 for 101 companies from all sectors in DSE. With a mean value of 2.490, board independence shows a significant variation among sample firms, ranging between 2 and 8. This outcome is in line with the findings of Sobhan [75] and Masum and Khan [47], observing an average of 2.26 independent directors for NBFIs and an average of 2.27 for 101 listed Bangladeshi companies, respectively. Though all firms must have one-fifth of the total board members as independent directors, the study noted 3 firms having no independent directors. The average number of directors on the audit committee is 4.415. The average log of assets is 11.028 among the sample firms, with a minimum of 9.910 and a maximum of 12.264. Das et al. [15] observed an average log of assets of 10.677 for the top 50 listed firms in Bangladesh. The average leverage of 0.949 implies that sample firms are highly dependent on external financing rather than equity.

**Table 3** Pairwise Correlation

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Altman Z-score	1.00											
(2) DSPO	0.12**	1.00										
(3) INSO	-0.12**	-0.40***	1.00									
(4) FORO	-0.12**	-0.09*	-0.07	1.00								
(5) B_SIZE	0.25***	0.02	-0.02	0.02	1.00							
(6) B_IND	-0.34***	-0.07	0.09*	0.13**	-0.50***	1.00						
(7) AC_SIZE	0.08	0.03	-0.08	0.04	0.37***	-0.16***	1.00					
(8) F_SIZE	0.19***	-0.08	-0.02	0.15***	0.39***	-0.25***	-0.18***	1.00				
(9) LEV_A	-0.79***	-0.03	0.14***	0.10**	-0.23***	0.31***	-0.04	-0.16***	1.00			
(10) ROA	0.54***	0.08	-0.16***	0.03	0.12**	-0.29***	-0.05	0.23***	-0.47***	1.00		
(11) GDP_GR	0.06	-0.001	-0.02	0.01	0.01	-0.01	0.02	0.01	-0.02	-0.007	1.00	
(12) INFR	-0.04	-0.001	0.05	-0.08	-0.05	0.06	-0.003	0.07	0.03	-0.04	-0.05	1.00

\*, \*\*, and \*\*\* represent statistical significance at the 0.10, 0.05, and 0.01 level respectively

On the other hand, Das et al. [15] observed an average leverage of 0.621 for the top 50 listed firms in Bangladesh. A variation in leverage between these two studies entails that financial firms have more leverage than all types of firms. The mean GDP growth rate is 0.7%, while the mean inflation rate is 5.89%. Bangladesh experienced negative GDP growth in the COVID-19-affected period in 2020 while observing a massive inflation rate in 2022. The Russia-Ukraine war may play a role in inflation as Ukraine is one of the essential markets for Bangladesh to import multifarious items. In 2021, Bangladesh imported US\$250.57 million from Ukraine.

**Correlation analysis**

The pairwise connection between ownership patterns, control factors, and financial distress is shown in Table 3. The study observes that director ownership has a weak positive correlation with the Altman Z-score and that affinity is statistically significant at the 5% significance level. On the other hand, institutional ownership and foreign ownership have a negative but weak relationship with Altman Z-Score. Those ties are statistically significant for both types of ownership. Board size and ROA have positive and significant associations with the Altman Z-score, while board independence and leverage have negative and significant bivariate affinity with the Altman Z-score. The audit committee size, GDP growth rate, and inflation rate have a negligible association with the dependent variable.

**Results of empirical models**

After controlling the effects of several company-oriented factors, such as board size, board independence, audit committee size, leverage, and firm size and macro factors, such as GDP growth rate and inflation rate, a multiple linear regression analysis has been conducted to assess the direct association between the predictors and criterion variable [50]. Table 4 shows the results of empirical models measuring the association between ownership patterns and financial distress. *F*-test is significant and ensures the fitness of the model. The value of Durbin–Watson is 2.059, representing that no autocorrelation exists within the variables in the model. Along with our regression results, the variance inflation factor (VIF) column presents the value to identify multicollinearity issues among independent variables. The 1/VIF value confirms that no multicollinearity exists. The R-squared values of baseline model (model 1) and alternative model (model 3 with alternative measure of foreign ownership-dummy variable of foreign ownership) are 68.1% and 68%, respectively, reflecting the influence of explanatory variables on the dependent variable. This study also considers year and industry

**Table 4** Regression Results

Variables	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	1/VIF
DSPO	1.149*** (0.363)	1.198*** (0.362)	1.189*** (0.363)	0.947*** (0.335)	0.816
INSO	1.084* (0.652)	1.220* (0.647)	1.142* (0.663)		0.748
FORO	−1.111 (0.730)				0.669
D_FORO			0.075 (0.139)	0.128 (0.136)	
B_SIZE	0.120 (0.599)	0.051 (0.599)	0.091 (0.604)	0.230 (0.600)	0.509
B_IND	−0.357 (0.503)	−0.489 (0.497)	−0.539 (0.506)	−0.571 (0.507)	0.652
AC_SIZE	1.503* (0.803)	1.419* (0.802)	1.386* (0.805)	1.191 (0.799)	0.708
F_SIZE	0.089 (0.212)	−0.024 (0.199)	−0.056 (0.208)	−0.070 (0.208)	0.599
LEV	−7.099*** (0.420)	−7.263*** (0.407)	−7.278*** (0.408)	−7.206*** (0.407)	0.707
ROA	7.686*** (1.333)	7.397*** (1.321)	7.294*** (1.336)	7.109*** (1.335)	0.706
GDP_GR	1.084 (8.093)	2.456 (8.057)	2.839 (8.096)	3.924 (8.092)	0.125
INFR	−9.678 (11.92)	−6.810 (11.79)	−6.138 (11.87)	−4.159 (11.85)	0.508
Year dummy	Yes	Yes	Yes	Yes	
Industry dummy	Yes (0.270)	Yes (0.258)	Yes (0.261)	Yes (0.261)	
Constant	4.369* (2.464)	5.568** (2.339)	5.853** (2.400)	6.100** (2.402)	
Observations	390	390	390	390	
R-squared	0.681	0.679	0.680	0.677	

Standard errors are in parentheses

\*, \*\*, and \*\*\* represent statistical significance at the 0.10, 0.05, and 0.01 level respectively

dummy to control the impact of year and industry in the models.

The coefficients estimate and *p*-value of DSPO elicit the positive and significant impact on the increase of Altman Z-score of the listed banking and non-banking financial institutions in Bangladesh, representing the less likelihood of corporate bankruptcy. It is consistent with the core concept of agency theory. The interest of directors will be more aligned with the interest of shareholders if the stockholding of directors increases [17, 82]. The outcome is in line with the findings of Patriandari et al. [56]. They noted that “as the owner, management will be more careful in making decisions because of the consequences

of every decision, management also bears losses. In other words, if the proportion of managerial ownership is large, management will be more active in meeting the interests of shareholders, including itself. So that it will reduce the possibility of financial distress”.

Our study also finds a negative and significant affinity between institutional ownership and financial distress risk. The estimated coefficients ( $\beta$ ) for INSO are 1.084, 1.220, and 1.142 for model 1, model 2, and model 3, respectively. The findings imply a positive influence of institutional ownership on the Altman Z-score, ultimately delineating a negative tie between the chances of financial hardship. Institutional investors have emerged as corporate management watchdogs, helping management to operate the organization prudently. The monitoring role of institutional investors in management actions may cause this outcome. Another reason may be that they contribute to creating links to external resources that help firms avoid cash flow crises and meet long-term obligations duly. The prior studies also support the findings [56, 69, 84].

Although foreign investors bring positive things, including a sound governance system, modern technology, and broad networks, foreign investment in the Bangladesh capital market is relatively small and has decreased gradually. Interestingly, our study found an insignificant affinity between foreign ownership and Altman Z-score. It describes that foreign ownership does not play a pivotal role in corporate distress risk. Though the estimated coefficients ( $\beta$ ) for FORO are  $-1.111$  in model 1 and  $0.075$  and  $0.128$  for alternative measurement of foreign ownership in models 3 and 4, respectively, no model shows a statistically significant tie with financial distress. The reason may be due to the dominance of directors or managerial ownership in making strategic decisions and controlling management activities. Most of the businesses of emerging economies are family-centered [67], or at least highly connected people become the sponsors of the companies. Their massive control and lopsided influence squeeze the scope of contribution from foreign owners.

Additionally, a substantial number of sponsor directors of business firms in Bangladesh are highly politically connected to get multifarious favors to operate their businesses. Rashid et al. [62] found that 30% of banks in Bangladesh have strong political connections. Having political considerations in getting multifarious benefits from different authorities may create obstacles for foreign investors to actively engage in Bangladesh as they may need to become acquainted with such an environment.

Among control variables, audit committee size and return on assets show a negative and statistically significant tie with corporate instability. That tie was expected as well. As the audit committee continuously monitors the activities of management and investigates any susceptible activities, it prevents management from making any capricious decisions. As a result, firm performance increases. Increased return on assets implies that firms are capable of utilizing the assets efficiently, resulting in a decrease in the chance of corporate vulnerability. Higher leverage incurs a higher interest cost. If a highly leveraged firm cannot perform better for any micro or macro factors, it would be difficult to survive as interest has to be paid duly. Board size indicates a positive direction but has an insignificant association with the Z-score. Although the influence of board independence on Altman Z-score is expected to be positive in reducing the chance of financial distress, our study finds a negative but insignificant association. The reason may be that independent directors have failed to play their roles effectively and independently in Bangladesh.

**Robustness test**

To make our empirical outcomes robust, this study used lag model in all regression models [80]. We used 1-year lag of all independent variables that represent our ownership patten, i.e., director ownership, institutional ownership, and foreign ownership. This lag method helps to address possible endogeneity issues that can be generated by reverse causation between dependent and independent variables. We modify our models as follows:

Baseline model:

$$Z - Score_{it} = \beta_0 + \beta_1 DSPO_{it-1} + \beta_2 INSO_{it-1} + \beta_3 FORO_{it-1} + \beta_4 B\_SIZE_{it} + \beta_5 B\_IND_{it} + \beta_6 AC\_SIZE_{it} + \beta_7 F\_SIZE_{it} + \beta_8 LEV_{it} + \beta_9 ROA_{it} + \beta_{10} GDP\_GR_{it} + \beta_{11} INFR_{it} + \epsilon_{it}$$

Alternative Model:

$$Z - Score_{it} = \beta_0 + \beta_1 DSPO_{it-1} + \beta_2 INSO_{it-1} + \beta_3 D\_FORO_{it-1} + \beta_4 B\_SIZE_{it} + \beta_5 B\_IND_{it} + \beta_6 AC\_SIZE_{it} + \beta_7 F\_SIZE_{it} + \beta_8 LEV_{it} + \beta_9 ROA_{it} + \beta_{10} GDP\_GR_{it} + \beta_{11} INFR_{it} + \epsilon_{it}$$

**Table 5** Regression Results (Lag Model of Independent Variables)

Variables	(1) Model 1	(2) Model 2
LD_SPO	1.252*** (0.386)	1.267*** (0.385)
LINSO	1.567** (0.701)	1.484** (0.705)
LFORO	-0.609 (0.758)	
LD_FORO		0.186 (0.148)
B_SIZE	-0.455 (0.658)	-0.346 (0.665)
B_IND	-0.668 (0.518)	-0.840 (0.520)
AC_SIZE	2.174** (0.883)	2.034** (0.884)
F_SIZE	0.0222 (0.225)	-0.116 (0.218)
LEV	-7.388*** (0.429)	-7.467*** (0.420)
ROA	7.135*** (1.337)	6.788*** (1.335)
GDP_GR	3.545 (6.072)	4.665 (6.032)
INFR	-4.061 (10.79)	-2.071 (10.79)
Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Constant	4.988* (2.666)	6.292** (2.554)
Observations	333	333
R-squared	0.707	0.708

Standard errors in parentheses

\*, \*\*, and \*\*\* represent statistical significance at the 0.10, 0.05, and 0.01 level respectively

The findings of the empirical models are presented in Table 5 and those outcomes support our prior outcomes. Director ownership shows a negative and significant affinity with the likelihood of financial distress at 1% significance level. In our robustness test, institutional ownership presents a statistically negative tie with the chances of corporate failures at 5% significance level while shows a negative and significant relationship at 10% significance level. Following the outcome of empirical result, the lag models also find an insignificant association between foreign ownership and the probability of corporate failures. All these outcomes match with the outcomes presented in Table 4.

To better reflect the states of our hypotheses and the outcomes of our study, we summarized the study findings in response to hypotheses and the outcomes of related prior studies in the following table:

## Discussion and policy implications

### Discussion

The ownership pattern of the firms plays a significant role in maintaining an effective governance mechanism that contributes to corporate measures. To investigate the strikes of stockholding patterns on the likelihood of financial distress in Bangladesh's financial sector, the study considers three types of ownership: director/managerial ownership, institutional ownership, and foreign ownership. The study observes the significant portion of director stockholdings, on average 42.20%, among sampled firms, aligning with minimum stock-holding rules of 30% aggregate director and sponsor ownership prescribed by the Bangladesh Securities and Exchange Commission. This outcome is supported by the average 49.2% director ownership of the top 50 listed companies in DSE for 2015–19 [15], 37.35% for 29 listed banks in DSE [31], and 39.65% for 19 listed NBFIs in DSE. We found that director ownership plays a positive and significant role in the Altman Z-score, suggesting a negative affinity between director ownership and the likelihood of financial distress (Table 6).

A significant stake in stockholdings motivates directors to operate the firm efficiently and monitor management functions closely, increasing the firm's performance and reducing the likelihood of financial distress. That harmony also reduces the agency cost. This outcome is consistent with the findings of Donker et al. [17]. They posit that managerial ownership negatively influences financial distress. Financial distress primarily and negatively impacts the income or wealth of director ownership when director stockholding is notable in a firm. Prior studies tuned the same propositions as well [7, 56, 69, 82]. Santoso and Nugrahanti [69] delineate that "with the ownership of shares by the management, there will be supervision of the policies that will be taken by the company's management to improve financial performance, reduce agency conflicts, and make decisions that do not harm the company. Alignment of these interests can prevent the occurrence of financial distress". The ownership pattern in Bangladesh is more concentrated than in developed countries like the USA and the UK. Schulze et al. [70] stated that the ownership pattern of Bangladeshi firms is highly family-controlled, incurring less agency cost. The significant stake in stockholdings motivates directors to supervise and direct the managerial functions to reduce the agency problem, which, in



**Table 6** Study outcome and review of literature

Hypothesis	Outcome	Prior Literature
Firms with higher proportion of director/managerial ownership have less likelihood of financial distress	Accepted	<i>Similar Outcome:</i> Donker et al. 1992–2002, Netherlands [17]; Patriandari et al. 2018–2020, Indonesia [56]; Santoso and Nugrahanti 2018–2020, Indonesia [69]; Yuli and Choisi [87] <i>Dissimilar Outcome:</i> Gerged et al. 2014–2019, UK [22]; Lee and Yeh 1996–1999, Taiwan [44]; Udin et al. 2003–2012, Pakistan [79]; Yusra and Bahtera, 2017–2019, Indonesia [87]
Firms with higher proportion of institutional ownership have less likelihood of financial distress	Accepted	<i>Similar Outcome:</i> Patriandari et al. 2018–2020, Indonesia [56]; Santoso and Nugrahanti 2018–2020, Indonesia [69]; Gerged et al. 2014–2019, UK [22] <i>Dissimilar Outcome:</i> Annither et al. 2015–2017, Indonesia [7]; Udin et al. 2003–2012, Pakistan [79]; Yusra and Bahtera, 2017–2019, Indonesia [87]
Firms with higher proportion of foreign ownership have less likelihood of financial distress	Rejected	<i>Similar Outcome:</i> Santen and Donker [68] <i>Dissimilar Outcome:</i> Annither et al. 2015–2017, Indonesia [7]; Santoso and Nugrahanti 2018–2020, Indonesia [69]; Udin et al. 2003–2012, Pakistan [79]

turn, contributes to advancing the firm's performance and reducing the vulnerability condition of a firm. So, the outcome of our study supports the underpinning of agency theory. Furthermore, having a direct interest in the firm's net worth, the interest of directors and shareholders could be aligned that help to improve corporate measures [15], ultimately resulting in less likelihood of corporate bankruptcy. By providing access to external resources, directors ensure a competitive advantage for the firm, and that competitive advantage gears up the achievement of efficiency and minimizes financial distress risk. So, the negative effect of director ownership on financial distress also supports the core concept of resources dependency theory.

We pointed out notable stock holdings by institutional investors, with an average of 19.01%. They have enough stakes to play a pivotal role in corporate managerial activities. Our study, conducted over a 7-year period, documented a negative significant association between institutional ownership and the likelihood of corporate failures. The reason for this negative association may be the active engagement in the management process and the preference for long-term performance rather than short-run interests and that result is supported by Nugrahanti et al. [54]. On the other hand, effective overseeing process is a deterrent to making capricious decisions that increase corporate failure risk. This result is in line with the outcome of Nugrahanti et al. [54], Widhiadnyana and Ratnadi [82], Gerged et al. [22] and Indriastuti et al. [33].

Contrarily, Annither et al. [7] pointed out that institutional investors enhance the chance of corporate failures. This outcome may be due to the passive monitoring role of institutional investors and their focus on short-term capital gain in that context. The core concept of the agency theory supports the theoretical interpretation of

our findings. Since institutional investors play their role as agents to oversee the management activities to maximize the best interest of shareholders, they can reduce agency problems, thereby increasing the firm's performance and decreasing financial distress risk. From the lens of resource dependency theory, institutional shareholders contribute to creating links with external resources that help to operate the business efficiently. The significant stake in institutional stockholdings results in the prudent utilization of a firm's assets due to its prudence and capabilities. As a result, the possibility of financial distress can be lessened.

Foreign stockholdings may enable business firms to get access to alternative markets for funds, updated technology, resources for human development, and other intangibles to improve firm performance, but Bangladesh still needs to attract foreign investors. The reasons may be weak corporate governance mechanisms, the business environment, the corrupt influence of directors, and managerial ownership. Foreign equity stockholdings have the lowest among the three types of ownership, with 3.61% ownership on average. Udin et al. [79] mentioned the lack of sound corporate governance in the stock market and social and political context of Bangladesh as the cause of the ascending negative approach on their minds. The average foreign equity of the banking and non-banking financial industry is less than the average foreign equity holdings of the top 50 listed companies in Bangladesh, with a 5.9% on average [15]. Besides, it is also less than the foreign stockholding portion of Pakistan, having 3.90% [16], 20.28% in India [38], and 9% in Taiwan [39].

Our study documented a positive insignificant tie between foreign ownership and financial distress, suggesting a negative role of foreign equity holdings on the

likelihood of corporate failures. Though that association is not statistically significant, the reason for this positive outcome may be the one-sided control of businesses by sponsor-director/managerial owners. The lopsided influence of managerial ownership compresses foreign investors' scope to contribute to the firm with effective governance, cutting-edge technology, alternative financing sources, and many other intangibles that increase firm performance and decrease the possibility of corporate failures even in distressed periods. In Bangladesh's social and political context, sometimes undue benefits from multifarious authorities can maximally be grabbed by highly politically connected directors and sponsors, implying a need for foreign investors to adjust and play a pivotal role in this environment. In the context of emerging economies like Bangladesh, they mostly fail to play their desired strategic role effectively.

On the other hand, their distant monitoring role creates a loophole for the management executives to maximize their self-interest by deteriorating the firms' outcomes, ultimately increasing the probability of corporate distress. The operation of foreign institutions may also aggravate instability, especially during economic downturns. Research has indicated that foreign investors may be more prone to sudden withdrawals of funds from host countries during periods of crisis [8], resulting in increased liquidity deficit in the domestic monetary system, contributing to a credit crunch, and squeezing loan facilities to firms and individuals. As a result, the more expansive economy may face significant challenges, such as reduced investment, lower consumption, and slower economic growth. In the context of an emerging economy like Bangladesh, understanding the implications of foreign ownership on financial distress is particularly crucial. The outcome is not consistent with the findings of prior studies, which observed a negative affinity between foreign ownership and financial distress risk [7, 48, 69]. The theoretical concept of resource dependency theory is not aligned with this outcome. Based on the underpinnings of RDT, foreign ownership helps to create links with external resources including updated technology, strategic decision-making techniques, business ideas, and new sources of funds, etc. that result in increasing firm performance while decreasing financial distress risk. So, why foreign stockholdings in Bangladesh have been failing to play a pivotal role in reducing corporate distress risk that should be investigated deeply.

### **Policy implications**

The study conveys various theoretical and practical policy implications. This research finds a negative and significant impact of directors' ownership on the possibility of financial distress. This outcome delineates

that director equity holdings play an essential role in maintaining sound corporate governance, especially in a context where corporate governance practices are weaker, like Bangladesh. This evidence implies that director/managerial ownerships enable firms to utilize their resources optimally, enhancing firm performance and reducing the risk of financial distress. So, regulatory authorities such as the Bangladesh Securities and Exchange Commission, Bangladesh Bank, and Ministry of Finance can increase the ceiling of the total percentage of directors' shareholding, which is currently 30% in Bangladesh. By performing better and serving the best interest of all stakeholders, director/managerial ownership can align their interests with the interests of firms. Therefore, the study findings would contribute to resolving the agency conflict by reducing agency costs. Based on the underpinnings of RDT, directors can provide their external linkages to acquire the required resources and information. This article offers a message to the shareholders that the increased director ownership increases the active involvement of directors in diligently monitoring business activities that can effectively stimulate robust corporate governance practices, leading to enhanced company performance within an emerging country such as Bangladesh. Family dominance is an established culture in our corporate board that may demotivate institutional and foreign investors to engage themselves actively. So, regulators may restrict the number of people as directors from a particular family and their relatives so that diversified people with varied qualifications, expertise, and experiences may positively increase firm performance and reduce the probability of corporate failures. Besides, the study urges strict monitoring of the compliance of present minimum stockholding requirements for sponsor directors. Material reform should be taken in the capital market so sponsor directors can take more shareholdings.

We noted that institutional ownerships exhibit a significant negative role in the likelihood of a firm's distress risk. More interest in long-term capital gains, with a vast investment and expertise, would motivate institutional investors in emerging countries to actively monitor managerial actions. This insight could inspire corporate policy planners to make strategic policies. The government should encourage institutional and foreign investors by creating a proper business environment and giving different incentives (for example, tax benefits) so that they will be interested in long-run bonding with firms rather than short-term capital gain and actively contributing to increasing firm performance and firm value. RDT posits that foreign stockholding should enhance firm performance in emerging countries like Bangladesh. However,

our study documented a positive but insignificant tie between foreign stockholding and the likelihood of financial distress.

In most cases, foreign investors fail to play influential strategic roles due to the lopsided influence of managerial ownership and the political and social context of emerging economies. Finally, Bangladesh needs to develop an attractive business environment and its investment policies in such a way that could help attract foreign investment. Firms should ensure proper use of laws and fair appraisal for all stakeholders, bypass political force, and deliver corruption-free services to inspire foreign investors to invest in Bangladesh. The outcome of our study urges the introduction of cutting-edge technology and infrastructure with legal protection to keep existing and get new overseas investments. Above all, close and proper monitoring by regulators, effective enactment of CG codes, and accountability of directors and institutions are imperative to avoid the likelihood of financial distress in Banks and NBFIs.

### Conclusion

The study assessed the likelihood of financial distress in DSE-listed Bangladeshi banks and NBFIs. Most publicly traded banks and NBFIs in Bangladesh are in the distress zone. This study also examined the impact of ownership patterns on the possibility of financial distress of the sample banks and NBFIs. Based on multiple linear regression, the study finds that ownership structure statistically impacts the likelihood of corporate failures of banks and NBFIs listed in DSE. Not all types of ownership have a similar association with Altman Z-score. We observed a positive and statistically significant association of director ownership with Z-score, implying that more stock holdings by directors motivate them to effectively control and closely monitor the management functions that ultimately mitigate agency costs, increase firm performance, and reduce the likelihood of corporate failures.

Since institutional ownership could enrich board expertise, create more links with external resources, and critically analyze a firm's investment and strategic moves, our study observed a negative direction of institutional ownership with financial distress risk. Focused on long-term capital gains and close monitoring, institutional owners pressurize the management of banks and NBFIs to refrain from engaging in freaky actions that can potentially increase the likelihood of financial distress in the both short run and long run. Their role as a watchdog contributes to improving corporate performance and stability. Foreign investors fail to play influential strategic roles due to the lopsided influence of managerial ownership. They may be inclined to suddenly retake their investments from host countries, especially

during economic downturns. In an emerging economy like Bangladesh, learning the implications of foreign ownership on financial distress is particularly crucial.

As directors' ownership is negatively related to financial distress, regulators can increase the ceiling of the total percentage of directors' shareholding in Bangladesh and ensure that all listed firms maintain the existing ceiling. Investment policies should be revised in such a way that motivates institutional and foreign investors to invest more. Family dominance is an established culture in our corporate board that may demotivate institutional and foreign investors to engage themselves actively. So, the government should establish a fair business, social, and political environment so that institutional and foreign investors can play a pivotal role in managerial decisions as watchdogs that motivate management to act in the best interest of shareholders and ensure more accountability and transparency, that ultimately increase firm performance as well as stability and decrease the chance of financial distress. Close monitoring is required to oversee the trading of large volumes of shares so that gambling can be avoided. Restriction on the holding, buying, and selling of more than a certain number of shares can reduce the unrest in the share price, creating a positive approach for investors regarding the stability of a company.

Though specific suggestions, such as enforcing more rigid regulatory measures and diversifying ownership patterns, have been provided in the context of Bangladesh, this study also contributes to similar other economies, such as emerging countries with similar business environments and ownership patterns. Since the ownership pattern in south Asia is almost similar, by observing the outcomes of the study and applying the given directions other south Asian countries especially southeast Asian countries may be benefitted from this outcome. The findings of the study can motivate other researchers from emerging countries to examine the states of financial resilience of their financial sectors. Finally, our outcomes help the regulators and stakeholders especially shareholders to realize the vulnerable condition of the financial sector in Bangladesh and motivate them to take proper action.

### Limitations and future research directions

This study considers only the Altman Z-score model to predict financial distress risk. Other models, such as F-score and O-score can be used to assess the likelihood of corporate failures in context of Bangladesh. Market conditions, corporate governance practices, and industry growth opportunities have not been included as predictors of financial distress. As this study is based on the financial sector, it motivates interested researchers to

explore the association between ownership structure and financial distress in the context of manufacturing companies in Bangladesh. In addition, future research could study in-depth board attributes such as foreign directors, board meetings, and the critical mass of women, as the explanatory variables of financial distress risk. Last but not least, our research did not create any grouping within the types of ownership pattern, for example 0–15%, 15–30%, and more than 30% for each type of ownership. Future research could fill this gap by analyzing which ceiling of a particular type of ownership plays a pivotal role in reducing the risk of corporate failures.

#### Abbreviations

CG	Corporate governance
DSE	Dhaka Stock Exchange
FIs	Financial institutions
NBFIs	Non-banking financial institutions
NPLs	Non-performing loans
RDT	Resource dependency theory
VIF	Variance inflation factor

#### Acknowledgements

Not applicable

#### Author contributions

S Alam develops the conceptualization and writes the original draft while SK Das analyzes the results by using statistical techniques. SK Das also contributes to the conception of the work and gives his meaningful observations to develop the quality of research. UR Dipa collects the data and design the work while SZ Hossain concludes the draft as well as edits and reviews the draft. All authors have read and approved the manuscript.

#### Funding

This research has been funded by the Research Cell, Noakhali Science and Technology University, Noakhali-3814, Bangladesh.

#### Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

#### Declarations

##### Ethics approval and consent to participate

Not applicable.

##### Consent for publication

Not applicable.

##### Competing interests

The authors declare that they have no competing interests.

Received: 12 March 2024 Accepted: 17 July 2024

Published online: 02 August 2024

#### References

- Abbas F, Ali S, Yousaf I, Wong W-K (2022) Economics of risk-taking, risk-based capital, and profitability: empirical evidence of Islamic banks. *Asian Aca Mgt J Acc Fin* 18(1):1–31
- Abbas F, Masood O, Ali S (2021) Financial development and bank risk-taking: empirical evidence from the USA. *Intellect Econ* 15(1):64–87
- Ahmed T, Alam S (2015) Prediction of financial distress in banking companies of Bangladesh and a need for regulation by FRC. *Cost Mgt* 43(6):13–19
- Alam S, Haq MM, Kader A (2015) Nonperforming loan and banking sustainability: Bangladesh perspective. *Int J Advan Res* 3(8):1197–1210
- Al-Tamimi HAH (2012) The effects of corporate governance on performance and financial distress: the experience of UAE national banks. *J Fin Regul Compl* 20(2):169–181. <https://doi.org/10.1108/13581981211218315>
- Altman EI, Hartzell J, Peck M (1998). Emerging market corporate bonds: a scoring system. In: *Emerging market capital flows: proceedings of a conference held at the stern school of business, New York University on May 23–24(1996)*, Springer USA, Boston, MA, pp 391–400
- Annitha A, Johann MK, Hidayat AA, Farhana S (2020) The impact of ownership structure on the indicator of financial distress in Indonesian companies. *J Akunt Dan Bisnis* 20(2):223–236
- Beck T, Jonghe OD, Schepens G (2013) Bank competition and stability: cross-country heterogeneity. *J Financ Intermed* 22(2):218–244. <https://doi.org/10.1016/j.jfi.2012.07.001>
- Bhagat S, Moya N, Suh I (2005) Investment and internal funds of distressed firms. *J Corp Fin* 11(3):449–472. <https://doi.org/10.1016/j.jcorpfin.2004.09.002>
- Black BS, Kim W, Jang H, Park KS (2015) How CG affect firm value? Evidence on a self-dealing channel from a natural experiment in Korea. *J Bank Fin* 51:131–150. <https://doi.org/10.1016/j.jbankfin.2014.08.020>
- Bose S, Hossain S, Sobhan A, Handley K (2022) Does female participation in strategic decision-making roles matter for corporate social responsibility performance? *Acc Fin* 62(3):4109–4156. <https://doi.org/10.1111/acf.12918>
- Byron RK (2023) Banking sector: risky loans stand at TK 3,77,922cr. *The daily star*. <https://www.thedailystar.net/business/banking/news/banking-sector-risky-loans-stand-tk-377922cr-3393496>. Accessed 21 Oct 2023
- Chiang J (2013) Verifying the validity of Altman's Z" Score as a predictor of bank failures in the case of the Eurozone (Doctoral dissertation, Dublin, National College of Ireland)
- Chowdhury A, Barua S (2009) Rationalities of z-category shares in Dhaka Stock Exchange: Are they in financial distress risk? *BRAC Univ J V I*(1):45–58
- Das SK, Alam S, Islam MJ, Bobby F, Begum R (2023) Does ownership pattern affect firm performance? Empirical evidence from an emerging market. *Int J Discl Govern*. <https://doi.org/10.1057/s41310-023-00204-5>
- Din SU, Khan MA, Khan MJ, Khan MY (2021) Ownership structure and corporate financial performance in an emerging market: a dynamic panel data analysis. *Int J Emerg Mkts* 17(8):1973–1997. <https://doi.org/10.1108/IJOEM-03-2019-0220>
- Donker H, Santen BPA, Zahir S (2009) Ownership structure and the likelihood of financial distress in the Netherlands. *Appl Financ Econ* 19(21):1687–1696. <https://doi.org/10.1080/09603100802599647>
- Dwivedi N, Jain AK (2005) Corporate governance and performance of Indian firms: the effect of board size and ownership. *Employ Respon Rights J* 17:161–172. <https://doi.org/10.1007/s10672-005-6939-5>
- Edmans A (2009) Blockholder trading, market efficiency, and managerial myopia. *J Fin* 64(6):2481–2513. <https://doi.org/10.1111/j.1540-6261.2009.01508.x>
- Fitri MA, Dillak VJ (2020) Arus Kas Operasi, leverage, sales growth TERHADAP financial distress. *J Riset Akunt Kontem* 12(2):60–64. <https://doi.org/10.23969/jrak.v12i2.3039>
- Foss N, Klein P, Lien L, Zellweger T, Zenger T (2020) Stockholdings competence. *Strateg Manage J* 42(2):302–328. <https://doi.org/10.1002/smj.3222>
- Gerged AM, Yao S, Albitar K (2022) Board composition, ownership structure and financial distress: insights from UK FTSE 350. *Corp Govern: Int J Bus Soci* 23(3):628–649
- Goldberg LG, Saunders A (1981) The Determinants of foreign banking activity in the United States. *J Bank Fin* 5(1):17–32. [https://doi.org/10.1016/0378-4266\(81\)90005-4](https://doi.org/10.1016/0378-4266(81)90005-4)
- Greenaway D, Guariglia A, Yu Z (2012) The more the better? Foreign ownership and corporate performance in China. *Euro J Fin* 20(7–9):681–702
- Guluma TF (2021) The impact of corporate governance measures on firm performance: the influences of managerial overconfidence. *Futur Bus J* 7(1):1–18. <https://doi.org/10.1186/s43093-021-00093-6>

26. Habib A (2023) 16 non-banks weighed down by high NPLs. *The Daily Star*. <https://www.thedailystar.net/business/economy/news/16-non-banks-weighed-down-high-npls-3403891>. Accessed 10 Nov 2023
27. Hamid T, Akter F, Rab NB (2016) Prediction of financial distress of non-bank financial institutions of Bangladesh using Altman's Z score model. *Int J Busi Mgt* 11(12):261–270
28. Hasan MS, Abdul Rahman R, Hossain SZ (2014) Monitoring family performance: family ownership and corporate governance structure in Bangladesh. *Proc: Social Behav Sci* 145(2014):103–109. <https://doi.org/10.1016/j.sbspro.2014.06.016>
29. Hasan MS, Hossain SZ, Abdul Rahman R (2014) Corporate governance and corporate accruals: the situation in Bangladesh. *AESTIMATIO IEn Int J Fin* 9:90–111
30. Hermalin BE, Weisbach M (2003) Boards of directors as an endogenously determined institution: a survey of the economic literature. *Econ Poli Rev* 9(1):7–26. <https://doi.org/10.3386/w8161>
31. Hossain MK (2020) Shareholding patterns and financial performance: Evidence from the banking sector in Bangladesh. *Manage Acc Rev (MAR)* 19(1):135–168
32. Hossain M, Moudud-UI-Huq S (2014) Analysis of credit-strength of cement industry in Bangladesh. *Mgt Stud Econ Sys (MSES)* 1(2):97–114. <https://doi.org/10.12816/0006209>
33. Indriastuti M, Kartika I, Najihah N (2021) Financial distress prediction: the ownership structure and managerial agency cost. *Indo J Acc Res* 24(2):243–258. <https://doi.org/10.33312/ijar.514>
34. Islam N, Mili S (2012) Financial diagnosis of selected listed pharmaceutical companies in Bangladesh. *Euro J Bus Mgt* 4(4):70–88
35. Jahur M, Quadir S (2012) Financial distress in small and medium enterprises (SMEs) of Bangladesh: determinants and remedial measures. *Econ Seria Mgt* 15(1):46–61
36. Jaisheela B (2015) A Study of financial health of leasing companies: Z score analysis. *J Busi Admin Mgt Sci Res* 4(1):15–19
37. Jensen M, Meckling W (1976) Theory of the firm: managerial behavior, agency costs and stockholdings structure. *J Fin Econ* 3(4):305–360
38. Kansil R (2019) Foreign ownership and corporate governance practices: a study of select indian companies. A PhD Thesis submitted to the Delhi Technological University
39. Kao M-F, Hodgkinson L, Jaafar A (2019) Ownership structure, board of directors and firm performance: evidence from Taiwan. *Corp Govern* 19(1):189–216. <https://doi.org/10.1108/CG-04-2018-0144>
40. Kazemian S, Shauri NA, Sanusi ZM, Kamaluddin A, Shuhidan SM (2017) Monitoring mechanisms and financial distress of public listed companies in Malaysia. *J Int Stud* 10(1):92–109. <https://doi.org/10.14254/2071-8330.2017/10-1/6>
41. Kim M-J, Kang D-K (2010) Ensemble with neural networks for bankruptcy prediction. *Exp Sys Appl* 37(4):3373–3379. <https://doi.org/10.1016/j.eswa.2009.10.012>
42. Kumar N, Singh J (2013) Effect of board size and promoter ownership on firm value: some empirical findings from India. *Corp Govern: Int J Bus Soci* 13(1):88–98. <https://doi.org/10.1108/14720701311302431>
43. La Porta R, Lopez-De-Silanes F, Shleifer A, Vishny R (2000) Investor protection and corporate governance. *J Financ Econ* 58(1–2):3–27. [https://doi.org/10.1016/S0304-405X\(00\)0065-9](https://doi.org/10.1016/S0304-405X(00)0065-9)
44. Lee TS, Yeh YH (2004) Corporate governance and financial distress: evidence from Taiwan. *Corp Govern: Int Rev* 12(3):378–388. <https://doi.org/10.1111/j.1467-8683.2004.00379.x>
45. Lückérath-Rovers M (2013) Women on boards and firm performance. *J Mgt Govern* 17(2):491–509. <https://doi.org/10.1007/s10997-011-9186-1>
46. Masum A, Johora F (2015) Performance evaluation of selected ceramic companies of Bangladesh. *Asian Bus Rev* 1(1):37–48. <https://doi.org/10.17613/ygp3-mf85>
47. Masum MH, Khan MM (2019) Impacts of board characteristics on corporate performance: evidence from Bangladeshi listed companies. *Int Bus Acc Res J* 3(1):47–57. <https://doi.org/10.15294/ibarj.v3i1.54>
48. Md-Rus R, Mohd KNT, Latif RA, Alassan ZN (2013) Ownership structure and financial distress. *J Advan Mgt Sci* 1(4):363–367
49. Megginson WL, Meles A, Sampagnaro G, Verdoliva V (2019) Financial distress risk in initial public offerings: How much do venture capitalists matter? *J Corp Fin* 59:10–30
50. Moghaddam RJ, Filsaraei M (2016) The impact of CG characteristics on the financial distress. *Int Fin Bank* 3(2):162–176
51. Mostofa M, Rezina S, Hasan M (2016) Predicting the financial distress in the banking industry of Bangladesh: a case study on private commercial banks. *Dhak Int Busi Soci Sci Res Conf*, Dhaka: Uttara University, pp 214–27
52. Nandi JK, Choudhary NK (2011) Credit risk management of loan portfolios by Indian banks: some empirical evidence. *IUP J Bank Mgt* 10(2):7–31
53. Nayak B, Nahak C (2012) Benchmarking performance of public sector banks in India. *IUP J Bank Mgt* 10(2):57–76
54. Nugrahanti YW, Sutrisno T, Rahman AF, Mardiaty E (2020) Do firm characteristics, political connection and corporate governance mechanism affect financial distress?(Evidence from Indonesia). *Int J Trade Global Mkts* 13(2):220–250
55. Ohlson JA (1980) Financial ratios and the probabilistic prediction of bankruptcy. *J Acc Res* 18(1):109–131. <https://doi.org/10.2307/2490395>
56. Patriandari P, Rianto R, Ristiandi A (2023) The impact of good corporate governance in financial distress in transportation sector companies in Indonesia. *Quant Econ Mgt Studi (QEMS)* 4(3):544–553. <https://doi.org/10.35877/454RI.qems1708>
57. Pfeffer J, Salancik GR (2003) The external control of organisations: a resource dependence perspective. *Stanford*
58. Piotroski JD (2000) Value investing: the use of historical financial statement information to separate winners from losers. *J Acc Res* 38:1–41. <https://doi.org/10.2307/2672906>
59. Pompe PPM, Feelders AJ (1997) Using machine learning, neural networks, and statistics to predict bankruptcy. *Comp Aid Civil Infrac Eng* 12:267–276. <https://doi.org/10.1111/0885-9507.00062>
60. Pustynick I (2009) Combined algorithm of detection of manipulation in financial statements. *Swiss Mgt Cent*. Available at SSRN 1422693
61. Rahman M, Sa CL, Masud MAK (2021) Predicting firms' financial distress: an empirical analysis using the F-score model. *J Risk Financ Mgt* 14(5):199. <https://doi.org/10.3390/jrfm14050199>
62. Rashid MHU, Begum F, Hossain SZ, Said J (2023) Does CSR affect tax avoidance? Moderating role of political connections in Bangladesh banking sector. *Soc Respon J* 20(4):719–739. <https://doi.org/10.1108/SRU-09-2022-0364>
63. Rashid MM (2020) Ownership structure and firm performance: the mediating role of board characteristics. *Corp Govern* 20(4):719–737. <https://doi.org/10.1108/CG-02-2019-0056>
64. Rawal A, Gopalkrishnan S (2024) Impact of financial distress on the dividend policy of banks in India: evidence using panel data. *Futur Bus J* 10(1):27. <https://doi.org/10.1186/s43093-024-00310-y>
65. Reza MMU, Faysal AI (2021) Ownership structure and firm performance: evidence from the listed financial institutions of Bangladesh. *Bangla Econ July-Dec* 2021:43–51
66. Rienda L, Claver E, Quer D, Andreu R (2019) Family businesses from emerging markets and choice of entry mode abroad: insights from Indian firms. *Asian Bus Mgt* 18:6–30. <https://doi.org/10.1057/s41291-018-00053-z>
67. Saha R, Maji SG (2023) Impact of board's educational diversity on firm performance: evidence from top listed Indian companies. *IUP J Corp Govern* 22(1):23–38
68. Santen B, Donker H (2009) Board diversity in the perspective of financial distress: Empirical evidence from the Netherlands. *Corp Board: Role Dut Comp* 5(2):23–35
69. Santoso L, Nugrahanti YW (2022) The effect of ownership structure on financial distress: evidence in Indonesian manufacturing companies. *JRAK* 14(1):55–64
70. Schulze W, Lubatkin M, Dino R, Buchholtz A (2001) Agency relationships in family firms: theory and evidence. *Organ Sci* 12(2):99–116. <https://doi.org/10.1287/orsc.12.2.99.10114>
71. Shahwan TM (2015) The effects of corporate governance on financial performance and financial distress: evidence from Egypt. *Corp Govern* 15(5):641–662. <https://doi.org/10.1108/CG-11-2014-0140>
72. Shan YG, Troshani I, Wang J, Zhang L (2024) Managerial ownership and financial distress: evidence from the Chinese stock market. *Int J Management Fin* 20(1):192–221
73. Singh A, Kansil R (2018) Institutional ownership and firm performance: evidence from Indian panel data. *Int J Bus Emerg Mkts* 10(3):250–269. <https://doi.org/10.1504/IJBEM.2018.092993>



74. Smarakoon LP, Hasan T (2003) Altman's Z-score models of predicting corporate distress: evidence from the emerging Sri Lankan stock market. *J Aca Fin* 1:119–125
75. Sobhan R (2021) Board characteristics and firm performance: evidence from the listed non-banking financial institutions of Bangladesh. *Int J Mgt Acc Econ* 8(1):25–41
76. Star Business Report (2023) Bangladesh 2nd in South Asia in bad loan ratio. *The Daily Star*. <https://www.thedailystar.net/business/economy/news/bangladesh-2nd-south-asia-bad-loan-ratio-3319251>. Accessed 4 Sept 2023
77. Stubelj I, Dolenc P, Biloslavo R, Nahtigal M, Laporšek S (2017) Corporate purpose in a small post-transitional economy: the case of Slovenia. *Econ Res* 30(1):818–835. <https://doi.org/10.1080/1331677X.2017.1311230>
78. Uddin AKMZ (2023) Higher NPL burden for banking sector. *The daily star*. <https://www.thedailystar.net/business/economy/banks/news/higher-npl-burden-banking-sector-3363006>. Accessed 14 Nov 2023
79. Udin S, Khan MA, Javid AY (2017) The effects of ownership structure on likelihood of financial distress: an empirical evidence. *Corp Govern: Int J Bus Soci* 17(4):589–612. <https://doi.org/10.1108/CG-03-2016-0067>
80. Ullah F, Jiang P, Shahab Y, Li H-X, Xu L (2019) Block ownership and CEO compensation: does board gender diversity matter? *App Econ*. <https://doi.org/10.1080/00036846.2019.1659490>
81. Varetto F (1998) Genetic algorithms applications in the analysis of insolvency risk. *J Bank Fin* 22(10–11):1421–1439. [https://doi.org/10.1016/S0378-4266\(98\)00059-4](https://doi.org/10.1016/S0378-4266(98)00059-4)
82. Waqas H, Md-Rus R (2018) Predicting financial distress: importance of accounting and firm-specific market variables for Pakistan's listed firms. *Cog Econ Fin* 6(1):1545739. <https://doi.org/10.1080/23322039.2018.1545739>
83. Widhiadnyana IK, Ratnadi NMD (2019) The impact of managerial ownership, institutional ownership, proportion of independent commissioner, and intellectual capital on financial distress. *J Econ Bus Acc Vent* 21(3):351–360. <https://doi.org/10.14414/jebav.v21i3.1233>
84. Widhiadnyana IK, Wirama DG (2020) The effect of ownership structure on financial distress with audit committee as moderating variable. *Int Res J Mgt, IT Socia Sci* 7(1):128–137
85. Yoo T, Rhee M (2013) Agency theory and the context for R&D investment: evidence from Korea. *Asian Bus Mgt* 12:227–252. <https://doi.org/10.1057/abm.2013.2>
86. Yoo T, Koh Y (2014) Agent or structure for principal–principal conflicts? Audit firms versus foreign ownership in the Asian context. *Asian Bus Mgt* 13(4):309–332. <https://doi.org/10.1057/abm.2014.11>
87. Yuli A, Choisi EA (2021) The Influence of corporate governance structures on financial distress: a study of coal mining companies in international research conference on economics and business. *KnE Socia Sci*. <https://doi.org/10.18502/kss.v5i8.9383>
88. Yusra I, Bahtera NT (2021) Prediction modelling the financial distress using corporate governance indicators in Indonesia. *J Kaji Manaje Bis* 10(1):18–32. <https://doi.org/10.24036/jkmb.11228400>
89. Zeitun R, Tian GG (2007) Does ownership affect a firm's performance and default risk in Jordan? *Corp Govern: Int J Bus Soci* 7(1):66–82. <https://doi.org/10.1108/14720700710727122>

## Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.