



Ownership Structure and Financial Distress: Investigating the Moderating Effect of Audit Quality

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ABSTRACT

The study examines the effect of ownership structure and the moderating role of audit quality on the likelihood of firms' financial distress. 144 DSE-listed manufacturing companies were chosen to design the sampling frame for performing the research. Tenn manufacturing industry categories were selected, and data from 1310 firm-year observations were collected during the research period 2012-2021 from several sources, including annual reports of the companies, the World Bank Database etc. Using the Two-stage-least-square (2SLS) model estimation technique, the study disclosed that managerial ownership, foreign ownership, ownership concentration, and government ownership have a significant negative influence on the likelihood of firms' financial distress, whereas institutional ownership and public ownership are positively correlated with the financial distress. It is also evidenced that firms' shareholders' influence and GDP growth rate have a noteworthy negative influence on distress possibilities. In contrast, firm size is positively correlated with the financial distress of the firms. No significant effect of firm age and inflation rate on financial distress was identified. The study period covered only 12 years, from 2012-2021, and focused on the manufacturing industries of Bangladesh. The study offers robust evidence on the role of ownership structure on the stability of manufacturing companies using a multidimensional approach of ownership structure and moderating effect of audit quality, which has financial, legal, and social implications in the context of emerging economies like Bangladesh.

Keywords: Financial Distress, Ownership Structure, Altman's Z Score, Audit Quality, Manufacturing Firm

JEL Classifications: M410, M480

1. INTRODUCTION

At present, the research on financial distress sparked much fascination among academics and researchers because of its significance to shareholders, lenders, business executives, and related stakeholders. Beaver et al. (2011) characterized financial distress as the incapacity of a company to pay its immediate debts owing to an inadequate cash flow, whereas Altman (1968) defined it as a circumstance where a company seeks legal protection from lenders. Brealey et al. (2011) argued that financial distress happens when commitments to lenders are disregarded. According to Keasey and Watson (2019), financial distress occurs when a company's operating revenues are insufficient to pay its present liabilities. Baldwin and dan Mason (1983) viewed financial distress

as a situation when a company faces a state of financial difficulty to the extent that it can no longer pay its debts. When a firm falls into financial distress, it faces various direct and indirect costs. Direct cost includes the increasing of legal and managerial costs. On the other hand, indirect cost includes disruption of regular business activities, lower faith of the suppliers in case of credit transactions, customer switching to the competitor's product, declining sales and market share, loss of experienced employees, and so forth.

Many firms from both developed and developing economies have experienced financial distress since the start of the 21st century. Particularly, the developing economies have seen a decline in their economic expansion due to the yearly financial distress in many businesses. According to earlier research conducted in

Bangladesh (Barua et al., 2022), many Z-category shares traded on the Dhaka Stock Exchange (DSE) have fallen into financial distress which is profitable but do not pay a dividend or have a negative cumulative loss after adjusting for revenue reserve. Bangladesh is still a developing country with a weak corporate governance system in which the manufacturing industry plays a significant role in the country's economic growth. Bangladesh, as a developing nation, observed several incidents of financial distress by the firms over the last few years, including the collapse of Adamjee Jute Mills Corporation Ltd., in 2002. The earlier researchers disclosed so many reasons for firms' financial distress. Among them, the poor governance structure is one of the prime reasons. Rehman and Mangla (2010) argued that better adherence to corporate governance rules may boost a company's financial performance while lowering the likelihood of financial distress. Poor corporate governance standards, on the other hand, ultimately obstruct investment prospects and capital market growth, and raise the risk of financial distress. Many of the researchers namely, Elloumi and Gueyie (2001), Lee and Yeh (2004), Wang and Deng (2006), Shahwan (2015), Manzaneque et al. (2016) unearthed similar findings. From the standpoint of emerging nations like Bangladesh, empirical study on this subject is still in its early phases. Although there have been a few studies on financial distress in Bangladesh, these studies have primarily targeted financial institutions. However, very few studies have been found on the financial distress of the manufacturing industry in Bangladesh.

Considering the limitations in the literature, we designed the study to explore the effect of the ownership structure of the firms on their possibility of going into financial distress. We also investigate the moderating effect of the audit qualities on the relationship between ownership structure and firms' financial distress. Our study will contribute in many ways, and it has several novelties. Firstly, it will enhance the literature on financial distress in the context of Bangladeshi manufacturing companies, as very few studies were conducted earlier. Secondly, the study considers different categories of the manufacturing industry, which may help to understand the overall scenario compared to considering a single industry. Thirdly, through this study, we investigate both the linear and non-linear effects of ownership structure on distress levels. Fourthly, we will explore the moderating effect of audit quality on the relationship between ownership structure and financial distress of the firms, which is rare in the literature specially, from the context of Bangladesh. The remainder of the article is structured as follows: The review of the relevant literature is presented in section 2, the study's methodology is described in section 3, the empirical findings and related discussions are presented in section 4, and the study's conclusions and research directions are revealed in section 5.

2. LITERATURE REVIEW

2.1. Ownership Structure and Financial Distress

2.1.1. Managerial ownership and financial distress

Several earlier researchers found a negative effect of managerial ownership on the likelihood of firms' financial distress, supported by the agency theory. According to the theory, agency conflicts between the principal and agent can be minimized through increasing managerial ownership because in such kind of ownership,

the interests of both principal and agents are fulfilled (Jensen and Meckling, 1976). In such kind of ownership, shareholders can offer incentives by holding shares to encourage the directors and prevent disputes over the agency (Dirman, 2020). When the management partially holds ownership of a firm, it will ensure the regular monitoring and supervision of the firm's policies to increase its performance, mitigate agency problems, and work for the sake of the organization (Hatane et al., 2019). Widhiadnyana and Ratnadi's (2019) investigation revealed that managerial ownership is more effective at avoiding bankruptcy. Thus, managerial ownership is thought to effectively place shareholders' and management's goals into the exact alignment to improve the firm's financial health and avert the risk of financial distress. On the contrary, Dongker et al. (2009) claim a positive influence of managerial ownership on financial distress. Findings of their research claim that, in a managerial ownership structure, managers may take illogical decisions without being concerned about losing their employment or having their salary lowered because they enjoy the same voting privileges as like as the other shareholders, which may increase the possibility of financial distress. Shleifer and Vishny (1989) argued that high managerial ownership in any firm can reduce the bargaining power of other shareholders. Therefore, managers can work to fulfill their interests without thinking about others, and this kind of situation may create agency problems and lead to the firm's financial distress. On the other side, several studies, including Wang and Deng (2006,), could not justify any influence of managerial ownership on the financial distress of firms.

H_1 = Ceteris Paribas, managerial ownership has a negative effect on firms' financial distress.

2.1.2. Institutional ownership and financial distress

Tarighi et al. (2022) claimed that institutional investors have more expertise than individual shareholders and can monitor managerial activities cheaply, minimizing information asymmetry and lowering agency problems. In a similar vein, institutional ownership and a firm's financial distress have been shown to have a negative and significant association by McConnell and Servaes (1990), Uwuigbe and Olusanmi (2012), and Alfaraih et al. (2012). Institutional investors emphasize the long-term performance of their business in comparison to the short-term performance (Donker et al., 2009). As a result, institutional investors actively monitor management operations, enhancing the company's financial health and lowering the risk of financial distress. On the other hand, many earlier researchers, including Gillan and Starks (2000) and Donker et al. (2009) claimed that the lack of expertise of the institutional investors in advising management of their incentives to act passively against management in case of close business relationships may lead to increase the possibility of occurring financial distress of the firms. No significant influence of institutional ownership on the possibility of firms' financial distress is found by Udin et al. (2017), Gregory and Wang (2013), and Al-Najjar (2015), etc.

H_2 = Ceteris Paribas, institutional ownership has a negative effect on firms' financial distress.

2.1.3. Foreign ownership and financial distress

Foreign investors tend to be more profit-driven and observe how their invested companies are managed therefore, a number of earlier studies claimed that foreign ownership and business performance is

strongly correlated (Ongore and Kusa, 2013; Jusoh, 2015). According to an investigation by Setiawan et al. (2019), organizations with foreign ownership structures have a propensity to uphold their brand reputation in their native countries. Agency conflicts can be decreased when foreign investors contribute capital through shares, their management knowledge, and a monitoring system (Jusoh, 2015). Greenaway et al. (2020) evidenced that foreign investors helped improve the management system and resource access. In this way, many of the prior researchers claimed that foreign ownership structure can enhance firm performance and financial health and reduce the possibilities of financial distress. On the other direction, Rus et al. (2013) Didn't find any significant effect of foreign ownership on the likelihood of firms' financial distress.

H_3 = Ceteris Paribas, foreign ownership has a negative effect on firms' financial distress.

2.1.4. Ownership concentration and financial distress

Various theoretical studies like Jensen and Meckling (1976), Shleifer and Vishny (1997) show that block holders' desire to supervise managers increases as interest in ownership rises. This mitigates the issue of free-riders related to scattered shareholding (Hart, 1995; Burkart et al., 1997). Furthermore, large shareholders have a stronger position to take collective action against the executives than the scattered shareholders, which leads to increased firm value and lowers the possibility of financial distress. Wu and Cui (2002) disclosed the similar findings. On the contrary, there is some scientific evidences for the notion that major equity holders have a detrimental effect on a company's performance. Based on German firms, Lehmann and Weigand (2000) discovered that ownership concentration has a detrimental impact on firm financial health. Leech and Leahy (1991) claimed that in the case of the high ownership concentration in a firm, there is a possibility that the powerful stockholders will utilize their authority over the company to their advantage. Therefore, researchers, including Zeitun and Tian (2007), also identified the positive effect of ownership concentration on firms' financial distress possibilities.

H_4 = Ceteris Paribas, ownership concentration has a negative effect on firms' financial distress.

2.1.5. Government ownership and financial distress

The government ownership and possibility of financial collapse were studied by De Alessi (1980), Vickers and Yarrow (1988), Shapiro and Willig (1990), Shleifer and Vishny (1997), Wang and Dang (2006), Li and Zhang (2010), Zeitun (2009), Donker et al. (2009), Alfaraih et al. (2012), and Rus et al. (2013) and found a variety of results. Alfaraih et al. (2012) showed a substantial positive association between government ownership and a firm's financial success. Therefore, Wang and Deng (2006) claimed that firms' financial distress negatively correlates with governmental ownership. On the other hand, according to Shleifer and Vishny's (1997) argument, state-owned companies are heavily impacted by the political government with large public shareholdings. These public shareholders do not, however, have a direct claim to residual revenue. These private shareholders gave up ownership rights to the management (i.e., bureaucracy), which may negatively affect firms' performance and increase the chance of financial disaster. H_5 = Ceteris Paribas, government ownership has a negative effect on firms' financial distress.

2.1.6. Public ownership and financial distress

Another significant ownership structure is public ownership. Many earlier researchers Ramamonjariavelo et al. (2015), Malau and Murwaningsari (2018) claimed that companies which are mostly owned by the general public faced more possibility of financial distress due to several investors from different backgrounds holding different viewpoints and perceptions. In such kind of ownership firm, the investors are more responsive to any message, whether it may be actual or rumor, which may lead to the vulnerable position of the company. Findings with inverse direction are also available in the literature.

H_6 = Ceteris Paribas, public ownership has a negative effect on firms' financial distress.

2.2. Audit Quality and Financial Distress

In evaluating internal control, the auditor is essential. Competent auditors quickly find errors in control mechanisms. Doyle et al. (2007) found a correlation between financial distress and inadequate internal control of firms. Li et al. (2018) investigated whether internal control may successfully lower the incidence of financial distress using data from China. They discovered that internal control significantly influenced financial distress, which is ensured by the audit quality. Many of the prior studies, namely, Lu and Ma (2016), Chang and Hwang (2020), Santosa et al. (2020), etc. evidenced that firms having a lack of internal control systems due to poor audit quality may suffer from financial difficulties and have a high chance of being financially distressed. Therefore, in this study, we tried to explore the moderating effect of the audit quality on the relationship between ownership structure and possibilities of financial distress by developing the following hypothesis:

H_7 = Ceteris Paribas, there is a statistically significant moderating effect of audit quality on the relationship between ownership structures and firms' financial distress.

3. METHODOLOGY

We conducted the research in order to investigate the effect of ownership structure and the moderating effect of audit quality on the likelihood of financial distress in reference to the manufacturing companies in Bangladesh. To attain the research objectives and quantitative nature of data, we use an explanatory research approach where the cause-and-effect relationship between ownership structure and financial distress with the moderating effect of audit quality is tested. Presently, 204 manufacturing companies are operating their business, enlisted in the Dhaka Stock Exchange (DSE). Among them, we collected data from 144 companies under ten different industries using the sampling technique of Yamane (1967). A number of total 1310 firm-year observations over the period 2012-2021 are considered for doing the research. The study is primarily based on secondary data sources. Data regarding companies' attributes like ownership structure, audit quality, financial distress, firm levels data, etc., are collected from the audited annual reports of the companies. In contrast, the macroeconomic data like GDP growth rate, inflation rate, etc., are collected from the World Bank Database (WDI). The distribution of the samples across the manufacturing industries is shown in Table 1.

Table 1: Sample size of manufacturing companies in Bangladesh

Sectors	Listed companies	Sampled companies	Representation of population (%)
Engineering Industries	42	34	80.95
Pharmaceuticals Industries	34	22	64.71
Fuel and Power Industries	23	20	86.96
Food and Allied Industries	21	12	57.14
Cement Industries	07	06	85.71
Ceramics Industries	05	05	100.00
Tannery Industries	06	03	50.00
Textiles Industries	58	38	65.52
Paper and Printing	06	02	33.33
Jute Industries	03	02	66.67
Total	205	144	70.24

Source: Dhaka Stock Exchange

We use descriptive statistics and different econometric tools to analyze data. Descriptive statistics include the calculation of the mean, variance, minimum, and maximum of variables used in the study, enabling us to understand the current scenario about the variables and their general trends over the period. We also perform univariate analysis by doing a Pearson correlation test to observe the association among the variables. Before conducting the multivariate analysis and fixing the regression model estimation technique, we do several preliminary diagnoses to make our result robust. To check the multilinearity issue we conduct VIF test. Using the VIF thumb rule, we do not find any multicollinearity problem in our data set. To see the data normality, we run the Jarque-Bera test. Test. Rejecting the null hypothesis, we conclude that the data are normally distributed and appropriate for further analysis. We also check the endogeneity issue in our research and find the existence of data endogeneity. Considering the preliminary diagnosis, we use the Two-Stage-Least-Square (2SLS) method as our model estimation technique to overcome the endogeneity issue and make the result more robust.

3.1. Model Specifications

The study investigates the influence of ownership structure on the likelihood of financial distress with the moderating effect of audit quality of the studied firms. The baseline model is expressed as:

Financial Distress = f (Ownership Structure)

The variables description is shown in Table 2. We use Altman's Z score to represent the firm distress. The Altman Z score is employed to assess the financial stability of a firm by estimating the risk that a company would go out of the firm in 2 years (Eboiyehi and Ikpesu, 2017; Dirman, 2020; Kristanti et al., 2016; Gillan and Starks, 2003 etc.). According to Altman (1968), a firm is in a secure position when the z score is larger than 2.9, a grey zone when the z score is between 1.23 and 2.9, and a distress zone when the z score is less than 1.23. A number of independent variables used in this study are managerial ownership, institutional ownership, foreign ownership, ownership concentration, government ownership, and public ownership. Furthermore, we have tried to see the moderating effect of firms' audit quality on the financial distress of the sampled firms.

To attain the objectives of the study, the following econometric models are developed from the baseline model:

$$ZSCORE_{it} = \alpha + \beta_1 MO_{it} + \beta_2 MOSq_{it} + \beta_3 MO * AQ_{it} + \beta_4 SIZE_{it} +$$

$$\beta_5 AGE_{it} + \beta_6 LEV_{it} + \beta_7 SHI_{it} + \beta_8 GDPG_{it} + \beta_9 INF_{it} + \varepsilon_{it} \quad (1)$$

$$ZSCORE_{it} = \alpha + \beta_1 IO_{it} + \beta_2 IOSq_{it} + \beta_3 IO * AQ_{it} + \beta_4 SIZE_{it} + \beta_5 AGE_{it} + \beta_6 LEV_{it} + \beta_7 SHI_{it} + \beta_8 GDPG_{it} + \beta_9 INF_{it} + \varepsilon_{it} \quad (2)$$

$$ZSCORE_{it} = \alpha + \beta_1 FO_{it} + \beta_2 FOSq_{it} + \beta_3 FO * AQ_{it} + \beta_4 SIZE_{it} + \beta_5 AGE_{it} + \beta_6 LEV_{it} + \beta_7 SHI_{it} + \beta_8 GDPG_{it} + \beta_9 INF_{it} + \varepsilon_{it} \quad (3)$$

$$ZSCORE_{it} = \alpha + \beta_1 OC_{it} + \beta_2 OCSq_{it} + \beta_3 OC * AQ_{it} + \beta_4 SIZE_{it} + \beta_5 AGE_{it} + \beta_6 LEV_{it} + \beta_7 SHI_{it} + \beta_8 GDPG_{it} + \beta_9 INF_{it} + \varepsilon_{it} \quad (4)$$

$$ZSCORE_{it} = \alpha + \beta_1 GO_{it} + \beta_2 GOSq_{it} + \beta_3 GO * AQ_{it} + \beta_4 SIZE_{it} + \beta_5 AGE_{it} + \beta_6 LEV_{it} + \beta_7 SHI_{it} + \beta_8 GDPG_{it} + \beta_9 INF_{it} + \varepsilon_{it} \quad (5)$$

$$ZSCORE_{it} = \alpha + \beta_1 PO_{it} + \beta_2 POSq_{it} + \beta_3 PO * AQ_{it} + \beta_4 SIZE_{it} + \beta_5 AGE_{it} + \beta_6 LEV_{it} + \beta_7 SHI_{it} + \beta_8 GDPG_{it} + \beta_9 INF_{it} + \varepsilon_{it} \quad (6)$$

Where ZSCORE stands for Altman's Z score, MO stands for Managerial Ownership, IO stands for Institutional Ownership, FO stands for Foreign Ownership, OC stands for Ownership Concentration, GO stands for Government Ownership, PO stands for Public Ownership, SIZE stands for firms' size, AGE stands for firms' age, LEV stands for firms' leverage, SHI stands for shareholders' influence, GDPG stands for GDP growth rate, INF stands for annual inflation rate. β_1, β_2, \dots , are the corresponding coefficient vectors. ε is the idiosyncratic error term. The subscripts i and t range from 1 to N and 1 to T , correspondingly, where N is the number of firms and T is the number of periods in the dataset.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics

The descriptive summary of the variables employed in this study is shown in Table 3. The firms' financial distress measured in terms of Altman's Z score has a mean score of 4.342 with minimum and maximum values of -5.031 and 20.172, respectively. According to the thumb rule of Altman's Z score¹, most companies are in a safe

1 The Altman's Z-score analysis was developed by prof. Edward Altman with the intent to predict the financial health of a company and the possibility of experiencing a bankruptcy. According to Altman's Guideline, if the Z score is below than 1.80 then the company said to be in distress zone, score ranging from 1.80 to 3.00 denotes company's position in gray zone whereas, if the Z score is more than 3.00 then the company is said to be in safe zone (Panigrahi, 2019).

Table 2: Variables description

Variables	Legends	Descriptions	Expt. Signs	Sources
Dependent Variable	ZSCORE	Altman's Z Score		Bhuvanekumar et al. (2022), Manaseer and Al-Oshaibat (2018), Swalih et al. (2021) etc.
Independent Variables	MO	Number of shares held by CEOs, directors, and their immediate family members divided by the number of total outstanding shares	±	Hatane et al. (2019); Widhiadnyana and Ratnadi's (2019); Diman (2020); Shleifer and Vishny (1989); Dongker et al. (2009) etc.
	IO	Number of shares held by the institution divided by the number of total outstanding shares	±	Tarighi et al. (2022); Uwuigbe and Olusanmi (2012); Alfaraih et al. (2012); Udin et al. (2017), Gregory and Wang (2013); Al-Najjar (2015) etc.
	FO	Number of shares owned by foreigners divided by the number of total outstanding shares	±	Ongore and Kusa (2013); Jusoh (2015); Greenaway et al. (2020); Rus et al. (2013) etc.
	OC	Number of shares owned by the major shareholders divided by the number of total outstanding shares	±	Hart (1995); Burkart et al. (1997); Wu and Cui (2002); Zeitun and Tian (2007); Leech and Leahy (1991) etc.
	GO	Number of shares owned by the government divided by the number of total outstanding shares	±	Wang and Dang (2006); Li and Zhang (2010); Zeitun (2009); Donker et al. (2009); Alfaraih et al. (2012); Rus et al. (2013); Alfaraih et al. (2012)
	PO	Number of shares owned by the general public divided by the number of total outstanding shares	±	Ramamonjjarivelo et al. (2015); Malau and Murwaningsari (2018) etc.
Control Variables	SIZE	Logarithm of total assets	±	Drakos et al. (2019); Hossain et al. (2021); Laeven and Levine (2009); Uzun and Webb (2007); Chaibi and Ftiti, (2015) etc.
	AGE	Number of years from the listing into DSE	±	Laeven and Levine (2009); Uzun and Webb (2007); Drakos et al., (2019); Hossain et al. (2021); Chaibi and Ftiti, (2015); Khaled et al., (2020) etc.,
	LEV	Total liabilities divided by the total assets	±	Drakos et al. (2019); Hossain et al. (2021); Chaibi and Ftiti, (2015); Khaled et al., (2020), Zeitun (2009) etc.
	SHI	Total equity divided by the total assets	±	Nazir and Afza (2018), Johl <i>et al.</i> (2015), Rizzotti and Greco (2013) etc.
	GDP	Annual GDP growth rate	±	Chaibi and Ftiti, (2015); Hossain <i>et al.</i> (2021); Unite and Sullivan (2003); Coibion <i>et al.</i> (2012); Herman (2021); Basse (2013).
	INF	Annual Inflation Rate	±	Chaibi and Ftiti, (2015); Hossain <i>et al.</i> (2021); Unite and Sullivan (2003); Coibion <i>et al.</i> (2012); Herman (2021); Basse and Reddemann (2011).

Source: Developed by the Authors

Table 3: Descriptive statistics

Variable	Observation	Mean	SD	Min	Max	1/VIF
ZSCORE	1310	4.342	4.956	-5.031	20.172	-
MO	1310	41.295	20.762	0	90	0.27
IO	1310	16.535	10.348	0	39.75	0.31
FO	1310	1.246	4.129	0	19.85	0.23
OC	1309	57.814	19.883	0	99.89	0.41
GO	1310	4.578	16.066	0	79.1	0.43
PO	1310	35.797	18.786	0.65	98.93	0.32
SIZE	1308	21.884	1.568	17.803	26.609	0.25
AGE	1304	16.742	12.125	1	46	0.55
LEV	1308	0.526	0.75	-8.16	8.87	0.42
SHI	1304	0.485	0.703	-7.87	8.745	0.29
GDPG	1310	6.501	1.589	2.376	8.153	0.24
INF	1310	5.996	0.632	5.514	7.53	0.48

Legend: ZSCORE: Altman's Z Score, MO: Managerial Ownership, IO: Institutional Ownership, FO: Foreign Ownership, OC: Ownership Concentration, GO: Government Ownership, PO: Public Ownership, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate.

Source: Author's Calculation

zone and have no financial distress. Although there is a long-range between the smallest and largest score, the mean score is focused on the minimum score, suggesting that some extreme scores for particular organizations contribute to the maximum limit. The standard deviation has a relatively low value, which indicates

less volatility in the financial distress data across the period. Managerial ownership has an average percentage of 41.29% with a large variance whereas the minimum percentage was 0% and the maximum percentage was 90%. The result reveals that the percentages of the ownership held by the managers/directors vary

greatly within the companies. In the case of institutional ownership, the minimum and maximum ranges from 0% to 39.75%, with a mean percentage of 16.53% disclosing that some companies have a high level of institutional investors, whereas others do not. The average percentage close to the minimum value reveals that some companies have extreme-level institutional ownership percentages, leading to the maximum value. The mean percentage of foreign ownership is 1.24%, which highlights the poor percentage of foreign investment in the sampled companies. It is also observed that the mean percentage of ownership concentration is 57.81%, along with the minimum and maximum percentages of 0% and 99.89%, respectively. The result indicates that more than 50% of shareholders control and influence the firm's management to safeguard their interests. The high volatility indicates that companies' ownership concentration is imbalanced over time.

The mean percentage of government ownership is 4.57%, which signifies that the study considers both the government and non-government firms to identify the significant differences in the financial distress level according to the firms' categories. Furthermore, the average percentage of public ownership is 35.79%, with minimum and maximum percentages of 0.65% and 98.93%, respectively, indicating that the study considers public-owned and privately-owned firms to explore the scenario. In the case of the firm size, the minimum and maximum sizes are 17.80 and 26.60, with a standard deviation of 1.56. A lower standard deviation indicates that the study considers homogeneous or parallel firms in the case of their size. The descriptive statistics of age reveal that the study considers young and old firms for researching to get the best output. Regarding the leverage and shareholders' influence, the study considers almost homogeneous companies denoted by the low volatility in the data set. The growth rate of the GDP over the period is good. In the case of the inflation rate, the result discloses that the lowest and highest inflation rates during the time period are 5.51% and 7.53%, respectively, with an average rate of 5.99%. The result depicts inflationary pressure in the economy over this period, where the standard deviation value is 0.63 over the study period. In addition, the 1/VIF scores for all the independent and control variables are less than 0.70, indicating there is no multicollinearity issue in the data set. In order to check the data normality, the Jarque Bera (JB) test is done (results are not tabulated), which reveals that data are normally distributed, free from outliers, and suitable for further testing.

4.2. Correlation Test

The values of correlation coefficients are shown in Table 4. Using the Pearson correlation test, the matrix demonstrates the association among the study's dependent, independent, and control variables. The matrix shows that the ownership structure variables, namely, managerial ownership, foreign ownership, ownership concentration, and government ownership, have a significant positive correlation with Altman's Z score whereas institutional ownership and public ownership negatively correlate with Altman's Z score. The result reveals that firms with high managerial ownership, foreign ownership, ownership concentration, and government ownership have a higher Z-score a lower likelihood of financial distress. On the other hand, the firms with higher percentage of institutional ownership and

public ownership have lower Z-score, the higher likelihood of financial distress of the sampled firms. Among the control variables, firms' size and leverage are inversely correlated with the Z-score, whereas the shareholders' influence, GDP growth rate, and inflation rate are significantly and positively correlated with Z score. No significant correlation is identified between firm age and Z score. The findings disclose that firms with large size and high leverage have lower Z scores and a high possibility of being financially distressed. On the other hand, firms with a great influence on shareholders possess higher z scores and the possibility of low financial distress. The GDP growth rate also has a positive correlation with the Z score.

4.3. Regression Analysis

The study uses the Two-Stage Least Square (2SLS) model estimation technique for conducting the regression analysis to investigate the influence of ownership structure and the moderating effect of audit quality on the firms' financial distress. The results of regression analysis investigating the effects of managerial ownership on financial distress are presented in Table 5. The adjusted R squares of the regression vary from 67.4% to 68.3%, and the *F*-statistics are significant ($P < 0.01$). Model I demonstrate a significant positive effect of managerial ownership on the financial distress of the sampled companies ($P < 0.05$). In model II, it is evidenced that managerial ownership also has a statistically significant and non-linear relationship with firms' financial distress, whereas, in model III, it is observed that the moderating effect of audit quality on the relationship between managerial ownership and financial distress is statistically significant and positive. The regression result of the effect of institutional ownership on financial distress is shown in Table 6. The result depicts that institutional ownership has the linear and non-linear inverse effect on the financial distress measured in terms of Altman's Z score ($P < 0.005$) whereas the moderating effect of audit quality on the relationship between institutional ownership and financial distress is statistically significant and positive. In the case of the effect of foreign ownership on financial distress shown in Table 7, the result reveals a significant and positive effect of foreign ownership on firms' financial distress. A significant and positive non-linear effect of foreign ownership on firms' distress also exists. The moderating effect of audit quality on the relationship between foreign ownership and financial distress is found to be significantly positive, as shown in Table 7, Model XI. The regression results investigating the effect of ownership concentration on financial distress represented in Table 8 discloses that the linear and non-linear effect of ownership concentration on firms' financial distress is significantly positive, and the moderating effect of audit committee is also positive and statistically significant on the relationship between ownership concentration and firms' financial distress (Model- XIII to XV). The regression result is shown in Table 9 does not find any significant linear or non-linear effect of government ownership on firms' distress, and the moderating effect of audit quality on financial distress is not statistically significant. Regarding public ownership, the regression result shown in Table 10 demonstrates a significantly negative linear and non-linear effect on firms' financial distress. The analysis in Model XXIII identifies no significant moderating effect of audit quality on the relationship between public ownership and financial

Table 4: Correlation among the variables of ownership structure, control variables and financial distress

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) ZSCORE	1.000												
(2) MO	0.130*** (0.000)	1.000											
(3) IO	-0.111*** (0.000)	-0.241*** (0.000)	1.000										
(4) FO	0.165*** (0.000)	0.015 (0.578)	-0.005 (0.850)	1.000									
(5) OC	0.096*** (0.000)	0.310*** (0.000)	0.093*** (0.001)	0.249*** (0.000)	1.000								
(6) GO	0.167*** (0.000)	-0.552*** (0.000)	0.025 (0.360)	-0.060*** (0.031)	0.167*** (0.000)	1.000							
(7) PO	-0.016*** (0.003)	-0.479*** (0.000)	-0.324*** (0.000)	-0.248*** (0.000)	-0.609*** (0.000)	-0.241*** (0.000)	1.000						
(8) SIZE	-0.143*** (0.000)	0.064* (0.020)	0.240*** (0.000)	0.276*** (0.000)	0.374*** (0.000)	0.300*** (0.000)	-0.534*** (0.000)	1.000					
(9) AGE	-0.005 (0.844)	-0.120* (0.000)	-0.005 (0.870)	0.147*** (0.000)	0.015 (0.600)	0.102*** (0.000)	-0.005 (0.855)	-0.209*** (0.000)	1.000				
(10) LEV	-0.373*** (0.000)	-0.119* (0.029)	-0.060*** (0.029)	-0.116*** (0.000)	0.003 (0.927)	0.216*** (0.000)	0.015 (0.579)	-0.128*** (0.000)	0.189*** (0.000)	1.000			
(11) SHI	0.399*** (0.000)	0.120* (0.000)	0.141*** (0.000)	0.069*** (0.013)	0.003 (0.907)	-0.238*** (0.000)	-0.028 (0.306)	0.114*** (0.000)	-0.212*** (0.000)	-0.793*** (0.000)	1.000		
(12) GDPG	0.032*** (0.203)	0.010 (0.721)	-0.017 (0.534)	0.022 (0.435)	0.001 (0.977)	0.004 (0.899)	-0.012 (0.657)	-0.007 (0.809)	-0.032 (0.246)	-0.004 (0.876)	0.017 (0.537)	1.000	
(13) INF	0.074*** (0.002)	0.048 (0.082)	-0.128*** (0.000)	-0.052 (0.061)	-0.010 (0.715)	0.041 (0.137)	0.000 (0.998)	-0.106*** (0.000)	-0.057*** (0.038)	-0.052 (0.062)	0.030 (0.274)	-0.180*** (0.000)	1.000

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. Legend: ZSCORE: Altman's Z Score, MO: Managerial Ownership, IO: Institutional Ownership, FO: Foreign Ownership, OC: Ownership Concentration, GO: Government Ownership, PO: Public Ownership, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate. Source: Author's Calculation

Table 5: Effect of managerial ownership

Variables	ZSCORE			Model-IV
	Model-I	Model-II	Model-III	
L.ZSCORE	0.724*** (0.034)	0.719*** (0.034)	0.711*** (0.034)	0.702*** (0.035)
MO	0.008* (0.004)			0.045*** (0.013)
MOsq		0.005*** (0.003)		0.001*** (0)
MO*AQ			0.018*** (.004)	0.015*** (.004)
SIZE	-0.256*** (0.059)	-0.281*** (0.059)	-0.353*** (0.063)	-0.41*** (0.07)
AGE	0.007 (0.006)	0.007 (0.006)	0.004 (0.006)	0.002 (0.006)
LEV	0.255 (0.241)	0.25 (0.24)	0.231 (0.235)	0.185 (0.226)
SHI	1.663*** (0.216)	1.676*** (0.214)	1.68*** (0.207)	1.735*** (0.195)
GDPG	0.086** (0.041)	0.084** (0.041)	0.084** (0.041)	0.08* (0.041)
INF	0.062 (0.126)	0.041 (0.126)	0.039 (0.125)	-0.005 (0.127)
CONST	4.497*** (1.669)	5.17*** (1.642)	6.979*** (1.71)	9.297*** (2.028)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.674	0.676	0.68	0.683
F Statistics	877.92***	917.89***	1027.88***	1091.03***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, MO: Managerial Ownership, MOsq: Squared of Managerial Ownership, MO*AQ: Composite of Managerial Ownership and Audit Quality, IO: Institutional Ownership, IOSq: Squared of Institutional Ownership, IO*AQ: Composite of Institutional Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate

Table 6: Effect of institutional ownership

Variables	ZSCORE			
	Model-V	Model-VI	Model-VII	Model-VIII
L. ZSCORE	0.721*** (0.034)	0.723*** (0.034)	0.725*** (0.034)	0.719*** (0.034)
IO	-0.025*** (0.008)			-0.061** (0.026)
IOSq		-0.001*** (0.002)		-0.001*** (0.001)
IO*AQ			0.019** (0.001)	0.026*** (0.009)
SIZE	-0.215*** (0.062)	-0.229*** (0.061)	-0.294*** (0.068)	-0.258*** (0.069)
AGE	0.007 (0.006)	0.006 (0.006)	0.003 (0.006)	0.004 (0.006)
LEV	0.275 (0.232)	0.281 (0.234)	0.241 (0.239)	0.256 (0.236)
SHI	1.759*** (0.208)	1.742*** (0.208)	1.668*** (0.214)	1.766*** (0.207)
GDPG	0.082** (0.04)	0.083** (0.04)	0.086** (0.041)	0.08** (0.04)
INF	0.032 (0.125)	0.052 (0.125)	0.065 (0.125)	-0.003 (0.123)
CONST	4.486*** (1.657)	4.452*** (1.66)	5.609*** (1.815)	5.887*** (1.812)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.675	0.674	0.674	0.677
F Statistics	857.98***	850.89***	872.87***	908.23***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, MO: Managerial Ownership, MOsq: Squared of Managerial Ownership, MO*AQ: Composite of Managerial Ownership and Audit Quality, IO: Institutional Ownership, IOSq: Squared of Institutional Ownership, IO*AQ: Composite of Institutional Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate

Table 7: Effect of foreign ownership

Variables	ZSCORE			
	Model-IX	Model-X	Model-XI	Model-XII
L.ZSCORE	0.717*** (0.035)	0.72*** (0.034)	0.724*** (0.034)	0.714*** (0.035)
FO	0.065*** (0.02)			0.273*** (0.081)
FOsq		0.003*** (0.001)		0.011*** (0.004)
FO*AQ			0.068*** (0.024)	0.016*** (0.03)
SIZE	-0.308*** (0.064)	-0.289*** (0.062)	-0.283*** (0.063)	-0.34*** (0.066)
AGE	0.001 (0.006)	0.002 (0.006)	0.003 (0.006)	0.001 (0.006)
LEV	0.224 (0.242)	0.23 (0.242)	0.243 (0.238)	0.218 (0.241)
SHI	1.651*** (0.218)	1.655*** (0.218)	1.669*** (0.213)	1.653*** (0.216)
GDPG	0.083** (0.041)	0.085** (0.041)	0.089** (0.041)	0.082** (0.041)
INF	0.082 (0.126)	0.075 (0.125)	0.074 (0.125)	0.102 (0.126)
CONST	5.919*** (1.732)	5.522*** (1.706)	5.343*** (1.715)	6.455*** (1.762)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.675	0.674	0.674	0.677
F Statistics	1046.82***	999.87***	940.65***	1125.52***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept.

Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, FO: Foreign Ownership, FOSq: Squared of Foreign Ownership, FO*AQ: Composite of Foreign Ownership and Audit Quality, OC: Ownership Concentration, OCsq: Squared of Ownership Concentration, OC*AQ: Composite of Ownership Concentration and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual inflation rate

Table 8: Effect of ownership concentration

Variables	ZSCORE			
	Model-XIII	Model-XIV	Model-XV	Model-XVI
L.ZSCORE	0.715*** (0.034)	0.711*** (0.035)	0.714*** (0.034)	0.703*** (0.035)
OC	0.022*** (0.005)			0.025*** (0.02)
OCsq		0.013*** (0.004)		0.011*** (0.003)
OC*AQ			0.015*** (0.003)	0.01*** (0.003)
SIZE	-0.371*** (0.07)	-0.386*** (0.07)	-0.394*** (0.071)	-0.453*** (0.076)
AGE	0.002 (0.006)	0.003 (0.006)	0.003 (0.006)	0.002 (0.006)
LEV	0.19 (0.234)	0.196 (0.233)	0.225 (0.233)	0.206 (0.231)
SHI	1.668*** (0.201)	1.671*** (0.2)	1.688*** (0.204)	1.687*** (0.197)
GDPG	0.082** (0.042)	0.082** (0.042)	0.08** (0.041)	0.079* (0.041)
INF	0.043 (0.124)	0.052 (0.124)	0.023 (0.125)	0.037 (0.124)
CONST	6.313*** (1.74)	7.08*** (1.797)	7.973*** (1.873)	9.329*** (1.983)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.679	0.681	0.679	0.684
F Statistics	1024***	1065.54***	978.76***	1125.32***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept.

Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, FO: Foreign Ownership, FOSq: Squared of Foreign Ownership, FO*AQ: Composite of Foreign Ownership and Audit Quality, OC: Ownership Concentration, OCsq: Squared of Ownership Concentration, OC*AQ: Composite of Ownership Concentration and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual inflation rate

Table 9: Effect of government ownership

Variables	ZSCORE			Model-XX
	Model-XVII	Model-XVIII	Model-XIX	
L.ZSCORE	0.727*** (0.034)	0.727*** (0.034)	0.727*** (0.034)	0.727*** (0.034)
GO	0.002*** (0.005)			0.039* (0.024)
GOsq		0.014 (0.023)		0.001 (0.017)
GO*AQ			0.001 (0.007)	0.001 (0.009)
SIZE	-0.258*** (0.067)	-0.252*** (0.066)	-0.249*** (0.067)	-0.255*** (0.068)
AGE	0.005 (0.006)	0.005 (0.006)	0.005 (0.006)	0.003 (0.006)
LEV	0.237 (0.239)	0.242 (0.24)	0.243 (0.24)	0.22 (0.233)
SHI	1.674*** (0.213)	1.669*** (0.215)	1.668*** (0.215)	1.691*** (0.208)
GDPG	0.087** (0.041)	0.088** (0.041)	0.088** (0.041)	0.087** (0.041)
INF	0.068 (0.127)	0.072 (0.127)	0.074 (0.126)	0.07 (0.127)
CONST	4.807*** (1.83)	4.667** (1.817)	4.587** (1.819)	4.771** (1.863)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.673	0.673	0.673	0.673
F Statistics	849.50***	853.69***	886.33***	992.78***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept.

Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, GO: Government Ownership, GOsq: Squared of Government Ownership, GO*AQ: Composite of Government Ownership and Audit Quality, PO: Public Ownership, POsq: Squared of Public Ownership, PO*AQ: Composite of Public Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual inflation rate

Table 10: Effect of public ownership

Variables	ZSCORE			
	Model-XXI	Model-XXII	Model-XXIII	Model-XXVI
L.ZSCORE	0.724*** (0.034)	0.727*** (0.034)	0.726*** (0.034)	0.704*** (0.036)
PO	-0.01*** (0.004)			-0.081*** (0.018)
POsq		-0.26*** (0.004)		-0.393*** (0.08)
PO*AQ			-0.005*** (0.003)	-0.002*** (0.004)
SIZE	0.208 (0.243)	0.238 (0.241)	0.244 (0.239)	0.179 (0.25)
AGE	1.651*** (0.214)	1.666*** (0.214)	1.672*** (0.213)	1.634*** (0.224)
LEV	0.084** (0.041)	0.087** (0.041)	0.085** (0.041)	0.079* (0.041)
SHI	0.052 (0.127)	0.07 (0.127)	0.045 (0.123)	0.051 (0.123)
GDPG	0.083** (0.041)	0.08** (0.038)	0.071*** (0.021)	0.001*** (0.003)
INF	0.082 (0.126)	0.023 (0.125)	0.012 (0.008)	0.013 (0.008)
CONST	6.672*** (2.159)	4.878** (1.968)	5.328*** (1.71)	9.564*** (2.326)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.674	0.673	0.673	0.68
F Statistics	907.54***	858.71***	844.01***	1153.31***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept.

Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, GO: Government Ownership, GOsq: Squared of Government Ownership, GO*AQ: Composite of Government Ownership and Audit Quality, PO: Public Ownership, POsq: Squared of Public Ownership, PO*AQ: Composite of Public Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual inflation rate

distress. Furthermore, the effects of the control variables on the firms' financial distress in all kinds of ownership structures are almost in the same direction. The result reveals a significant, and positive effect of firms' shareholders' influence and GDP growth rate on financial distress. In the contrary, a significant negative effect of firms' size is evidenced by the firms' financial distress of the sampled companies. Firms' age, leverage, and inflation rate have no noteworthy effects on the likelihood of firms' financial distress.

4.4. Results of Fixed Effects and Random Effects Models

To assess the appropriateness of the fixed effect or the random effect model, the study used the Hausman test. From Table 11, a χ^2 statistic from the Hausman test is significant, indicating that the fixed effect estimation is preferred to the random effect. Tables 12-17 reveals the regression results of fixed effect models. According to the results, the effects of ownership structures on firms' financial distress are in the same direction disclosed in the earlier models. Similar findings are discovered

Table 11: Hausman (1978) specification test

Particulars	Coef.
Chi-square test value	87.212
P-value	0

Table 12: Effect of managerial ownership (Fixed Effect)

Variables	ZSCORE			Model-IV
	Model-I	Model-II	Model-III	
MO	0.029*** (0.009)			0.043 (0.029)
MOsq		0.015*** (0.002)		0.013 (0)
MO*AQ			0.003*** (0.004)	0.001 (0.007)
SIZE	-1.636*** (0.2)	-1.615*** (0.199)	-1.568*** (0.199)	-1.642*** (0.2)
AGE	0.015 (0.043)	0.015 (0.043)	-0.002 (0.043)	0.014 (0.043)
LEV	-0.728*** (0.257)	-0.725*** (0.257)	-0.715*** (0.258)	-0.729*** (0.257)
SHI	1.738*** (0.226)	1.742*** (0.227)	1.755*** (0.227)	1.738*** (0.227)
GDPG	0.076 (0.048)	0.077 (0.048)	0.078 (0.048)	0.076 (0.048)
INF	0.062 (0.177)	0.067 (0.177)	0.086 (0.178)	0.06 (0.177)
CONST	37.357*** (4.555)	37.434*** (4.559)	37.136*** (4.575)	37.312*** (4.562)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.168	0.167	0.161	0.168
F Statistics	33.06***	32.71***	31.49***	25.70***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, MO: Managerial Ownership, MOsq: Squared of Managerial Ownership, MO*AQ: Composite of Managerial Ownership and Audit Quality, IO: Institutional Ownership, IOsq: Squared of Institutional Ownership, IO*AQ: Composite of Institutional Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate.

for the moderating effect of the ownership structure and control variables used in the study.

5. DISCUSSION AND POLICY IMPLICATIONS

The study has a number of findings and practical implications. Firstly, we find that the managerial ownership of the firms has a significant positive effect on increasing Altman's Z score and decreasing the likelihood of financial distress in the sampled firms. The agency theory supports the finding. According to the theory, agency conflicts between the principal and agent can be minimized through increasing managerial ownership because in such kind of ownership, the interests of both principal and agents are fulfilled (Jensen and Meckling, 1976). When the management partially holds ownership of a firm, it will ensure the regular monitoring and supervision of the firm's policies to increase its performance, mitigate agency problems, and work for the sake of the organization (Larasati and Wahyudin, 2019). In the manufacturing industries of Bangladesh, the managerial ownership structure is satisfactory in almost 41.29% of the total ownership. Policymakers, regulators, and practitioners should be aware of keeping the balance in such kind of ownership percentage, as a low percentage of managerial ownership may lead to financial distress.

Table 13: Effect of institutional ownership (fixed effect)

Variables	ZSCORE			
	Model-V	Model-VI	Model-VII	Model-VIII
IO	-0.045*** (0.011)			-0.086*** (0.031)
IOsq		-0.001*** (0.004)		0.001 (0.001)
IO*AQ			-0.006*** (0.003)	0.022 (0.015)
SIZE	-1.505*** (0.199)	-1.506*** (0.199)	-1.568*** (0.199)	-1.514*** (0.199)
AGE	0.01 (0.043)	0.004 (0.043)	-0.003 (0.043)	0.016 (0.043)
LEV	-0.637** (0.257)	-0.654** (0.257)	-0.714*** (0.258)	-0.634** (0.256)
SHI	1.763*** (0.226)	1.777*** (0.226)	1.754*** (0.227)	1.745*** (0.226)
GDPG	0.074 (0.048)	0.073 (0.048)	0.078 (0.048)	0.076 (0.048)
INF	0.049 (0.177)	0.071 (0.177)	0.088 (0.178)	0.047 (0.177)
CONST	36.536*** (4.546)	36.153*** (4.565)	37.157*** (4.574)	36.872*** (4.569)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.172	0.169	0.161	0.175
F Statistics	34.07***	33.18***	31.47***	26.97***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, MO: Managerial Ownership, MOsq: Squared of Managerial Ownership, MO*AQ: Composite of Managerial Ownership and Audit Quality, IO: Institutional Ownership, IOsq: Squared of Institutional Ownership, IO*AQ: Composite of Institutional Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate.

Table 14: Effect of foreign ownership (fixed Effect)

Variables	ZSCORE			Model-XII
	Model-IX	Model-X	Model-XI	
FO	0.031*** (0.003)			0.098 (0.121)
FOsq		0.002*** (0.002)		0.007 (0.006)
FO*AQ			0.02*** (0.003)	0.023 (0.048)
SIZE	-1.579*** (0.2)	-1.578*** (0.199)	-1.572*** (0.2)	-1.566*** (0.201)
AGE	-0.004 (0.043)	-0.004 (0.043)	-0.003 (0.043)	-0.003 (0.043)
LEV	-0.706*** (0.258)	-0.706*** (0.258)	-0.714*** (0.258)	-0.714*** (0.258)
SHI	1.752*** (0.227)	1.75*** (0.227)	1.753*** (0.227)	1.747*** (0.227)
GDPG	0.076 (0.048)	0.076 (0.048)	0.078 (0.048)	0.078 (0.048)
INF	0.09 (0.178)	0.089 (0.177)	0.086 (0.178)	0.081 (0.178)
CONST	37.392*** (4.58)	37.365*** (4.573)	37.278*** (4.576)	37.157*** (4.588)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.162	0.162	0.161	0.163
F Statistics	31.53***	31.63***	31.48***	24.65***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, FO: Foreign Ownership, FOsq: Squared of Foreign Ownership, FO*AQ: Composite of Foreign Ownership and Audit Quality, OC: Ownership Concentration, OCsq: Squared of Ownership Concentration, OC*AQ: Composite of Ownership Concentration and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate

Table 15: Effect of ownership concentration (fixed effect)

Variables	ZSCORE			
	Model-XIII	Model-XIV	Model-XV	Model-XVI
OC	0.026*** (0.009)			0.046 (0.038)
OCsq		0.014*** (0.004)		0 (0)
OC*AQ			0.004*** (0.005)	0.003 (0.005)
SIZE	-1.622*** (0.199)	-1.61*** (0.199)	-1.568*** (0.199)	-1.628*** (0.2)
AGE	-0.001 (0.043)	-0.004 (0.043)	-0.001 (0.043)	0.003 (0.043)
LEV	-0.726*** (0.257)	-0.711*** (0.257)	-0.716*** (0.258)	-0.739*** (0.258)
SHI	1.749*** (0.226)	1.75*** (0.227)	1.756*** (0.227)	1.749*** (0.227)
GDPG	0.076 (0.048)	0.075 (0.048)	0.076 (0.048)	0.077 (0.048)
INF	0.092 (0.177)	0.094 (0.177)	0.085 (0.178)	0.092 (0.177)
CONST	36.815*** (4.56)	37.3*** (4.56)	37.135*** (4.576)	36.352*** (4.617)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.167	0.167	0.161	0.168
F Statistics	32.87***	32.67***	31.47***	25.62***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, FO: Foreign Ownership, FOsq: Squared of Foreign Ownership, FO*AQ: Composite of Foreign Ownership and Audit Quality, OC: Ownership Concentration, OCsq: Squared of Ownership Concentration, OC*AQ: Composite of Ownership Concentration and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate

On the other hand, a high percentage of managerial ownership may decrease the firm value as depicted by earlier researchers, namely, Mandacı and Gumus (2010), Din and Javid (2011), etc. Secondly, we find a significant positive effect of institutional ownership on the possibilities of firms' financial distress.

Many earlier researchers, including Gillan and Starks (2000) and Donker et al. (2009), claimed that the lack of expertise of the institutional investors in advising management of their incentives to act passively against management in case of close business relationships may lead to increase the possibility of occurring financial distress of the firms. According to the agency theory, when large institutional ownership exists in a firm, it denotes the existence of an effective monitoring system and efficient utilization of the firm's resources in business. Although agency theory suggests that institutional ownership reduces financial distress, the finding in this study is the opposite and don't support the theory. The practical implication of the finding is that more research needs to be conducted to understand the reasons for the positive influence of institutional ownership on firm distress. Thirdly, foreign ownership is found to have a positive effect on the Z score, which implies that the higher the percentage of foreign ownership, the lower the possibility of financial distress for the firm. Under the foreign ownership structure, the organization carefully follows the monitoring process to ensure transparency in every transaction (Uddin et al., 2019). Foreign investors are more focused on making a profit and possess more

advanced technologies than local investors/owners. Such kinds of competitive advantages facilitate the minimization of agency conflicts and increase the efficiency of the organizations, which can reduce the possibility of financial distress. The study's argument agrees to the agency theory, which outlines the existence of foreign investors as effective overseers and regulators who give managers more incentives to uphold the company's performance in order to reduce the likelihood of financial distress. The study's findings are evidenced by other researchers, namely, Khan and Rehman (2020) and Annither et al. (2020). In the case of the manufacturing industry in Bangladesh, the percentage of foreign ownership is still very poor, almost 1.24% of the total ownership, which indicates that foreign investors are reluctant to invest their money in local firms. Therefore, the government and policymakers should pay attention to the reasons for low investment and formulate foreign investors' friendly policies to attract more foreign direct investment. Fourthly, we find that the ownership concentration of the firms negatively influences firms' distress levels.

Various theoretical studies like Jensen and Meckling (1976), Shliefer and Vishny (1997) show that block holders' desire to supervise managers increases as interests in ownership rise. This mitigates the issue of free-riders related to scattered shareholding (Hart, 1995; Burkart et al., 1997). Furthermore, large shareholders have a stronger position to take collective action against the

Table 16: Effect of government ownership (fixed effect)

Variables	ZSCORE			Model-XX
	Model-XVII	Model-XVIII	Model-XIX	
GO	0.035* (0.02)			0.066 (0.071)
GOsq		0.001** (0.004)		0.001 (0.001)
GO*AQ			0.002 (0.012)	0.008 (0.013)
SIZE	-1.587*** (0.199)	-1.597*** (0.199)	-1.567*** (0.199)	-1.605*** (0.199)
AGE	-0.007 (0.043)	-0.009 (0.043)	-0.003 (0.043)	-0.01 (0.043)
LEV	-0.711*** (0.257)	-0.712*** (0.257)	-0.713*** (0.258)	-0.715*** (0.257)
SHI	1.747*** (0.227)	1.743*** (0.227)	1.755*** (0.227)	1.74*** (0.227)
GDPG	0.079 (0.048)	0.078 (0.048)	0.078 (0.048)	0.077 (0.048)
INF	0.082 (0.177)	0.078 (0.177)	0.084 (0.177)	0.073 (0.177)
CONST	37.863*** (4.582)	38.146*** (4.583)	37.191*** (4.574)	38.298*** (4.585)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.164	0.165	0.161	0.166
F Statistics	31.99***	32.28***	31.45***	25.30***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, GO: Government Ownership, GOsq: Squared of Government Ownership, GO*AQ: Composite of Government Ownership and Audit Quality, PO: Public Ownership, POSq: Squared of Public Ownership, PO*AQ: Composite of Public Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate

Table 17: Effect of public ownership (fixed effect)

Variables	ZSCORE			
	Model-XXI	Model-XXII	Model-XXIII	Model-XXVI
PO	-0.003*** (0.004)			0.001 (0.028)
POsq		-0.014*** (0.005)		0 (0)
PO*AQ			0.011 (0.012)	0.011 (0.011)
SIZE	-1.579*** (0.202)	-1.584*** (0.203)	-1.567*** (0.199)	-1.588*** (0.203)
AGE	-0.002 (0.043)	-0.001 (0.043)	0.001 (0.043)	0.004 (0.043)
LEV	-0.719*** (0.258)	-0.721*** (0.258)	-0.719*** (0.258)	-0.729*** (0.258)
SHI	1.752*** (0.227)	1.752*** (0.227)	1.757*** (0.227)	1.753*** (0.227)
GDPG	0.078 (0.048)	0.078 (0.048)	0.078 (0.048)	0.078 (0.048)
INF	0.086 (0.178)	0.085 (0.178)	0.079 (0.177)	0.081 (0.178)
CONST	37.543*** (4.67)	37.603*** (4.653)	37.106*** (4.572)	37.591*** (4.674)
Firms	144	144	144	144
Observation	1290	1290	1290	1290
Adj. R-Square	0.161	0.161	0.162	0.162
F Statistics	31.46***	31.48***	31.62***	24.60***

(***) indicates significance at 1% level; (**) indicates significance at 5% level; and (*) indicates significance at 10% level. The reported P values are all two tailed except intercept. Legend: ZSCORE: Altman's Z Score, ZSCORE_(t-1): 1 year lag of Altman's Z Score, GO: Government Ownership, GOsq: Squared of Government Ownership, GO*AQ: Composite of Government Ownership and Audit Quality, PO: Public Ownership, POSq: Squared of Public Ownership, PO*AQ: Composite of Public Ownership and Audit Quality, SIZE: Firms' Size, AGE: Firms' Age, LEV: Firms' Leverage, SHI: Shareholders' Influence, GDPG: GDP Growth Rate, INF: Annual Inflation Rate

executives than the scattered shareholders, which leads to increased firm value and lowers the possibility of financial distress. Fifthly, government ownership used in this study is found to have a significant positive effect on increasing Altman's Z score and decreasing the possibility of firms' financial distress. A company owned by the government will be better protected from the danger of financial distress (Manzanque et al., 2016). Government ownership will be beneficial in the form of cash infusions or tax relief that can assist businesses in maintaining business operations and lowering the likelihood of financial disaster (Udin et al., 2017). The practical implication of the result is that the companies should consider a certain percentage of government ownership to maximize the function of government to safeguard the firm, increase performance, and reduce the likelihood of financial distress. Sixthly, we observe that public ownership significantly positively affects the likelihood of firms' financial distress. The result implies that the companies, mostly owned by the general public, face more financial distress due to several investors from different backgrounds holding different viewpoints and perceptions. In such kind of ownership firm, the investors are more responsive to any message, whether it may be actual or rumor, which may lead to the vulnerable position of the company.

Among the control variables, shareholders' influence and GDP growth rate have significant negative effects on the possibilities

of firms' financial distress. The result implies that firms with large equity sizes are more stable than those with small ones. During economic growth, there is less possibility of the firms going into financial distress. On the other hand, firm size significantly positively affects the likelihood of financial distress. Chancharat (2008) found that when a firm size grows, there is a greater chance of experiencing financial difficulties. Similarly, research by Thim et al. (2011) shows a positive relationship between firm size and financial distress. The research of Parker et al. (2002), and Tesfamariam (2014) was likewise supportive of these conclusions. No significant effect of other control variables, namely, firms' age, leverage, and annual inflation rate, are identified in the research output.

6. CONCLUSION AND FUTURE RESEARCH DIRECTIONS

Several studies exist on ownership structure and the likelihood of firms' financial distress from the perspective of industrialized nations, but Bangladesh, particularly its manufacturing sector, clearly lacks academic research in this area. The current study is designed from the context of Bangladeshi manufacturing industry sector to address this research gap. We find that the firms' ownership structures have a noteworthy influence on their possibility to go into financial distress. Furthermore, the

moderating effect of audit quality is also notable, and shareholders' influence and GDP growth rate are positively associated with the likelihood of financial distress.

The research gives several policy implications, including increasing foreign ownership, studying institutional ownership and firm distress from the context of Bangladesh, identifying the reasons for the positive effect of firm size on distress, etc., for policymakers and practitioners. Our investigation has many shortcomings concerning time and budgetary issues. Firstly, only manufacturing enterprises were considered when creating the sampling design for the study. Secondly, our investigation is conducted entirely using secondary data. Thirdly, we concentrate on the context of a particular country. These restrictions have opened up the possibility for in-depth research in the future. Firstly, there is room to perform a more thorough study in the future, considering manufacturing and non-manufacturing enterprises to get more vibrant output. Secondly, future studies may undertake the study using primary data alongside secondary data. Thirdly, it is possible to undertake replication research using different country contexts with the same socio-political, economic, and legal cultures. Fourthly, the effects of other corporate governance variables like board structure and audit structure on firm distress may be tested.

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