

## IS THE GENERAL INSURANCE BUSINESS IN BANGLADESH FINANCIALLY DISTRESSED?

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### ABSTRACT

Nowadays, the forecast of the financial crisis is a significant concern for all companies and stakeholders. As a fast-growing economy, the insurance industry in Bangladesh is also a significant concern. Nevertheless, the performance and contribution of Bangladeshi insurance companies are highly criticized by scholars. Therefore, with the motivation to provide a comprehensive overview of the financial health of the general insurance industry in Bangladesh, we have done secondary research on a total of 18 general insurance companies in Bangladesh from 2014-2018. Throughout the study, we tested the widely accepted Altman Z Score model to predict a major financial concern called bankruptcy. We found that 95% of the selected companies secured the safe but not in the highly satisfactory calculated value of the Altman Z score model. Therefore, as expected, this finding highlights the success of the growing nature insurance business in Bangladesh. Also, as the Z score model has high predictive power in the case of predicting financial distress, our findings could be valuable path for stakeholders in making the right decision for investment.

**JEL classification:** G22, G33.

**Keywords:** Altman's Z-Score, financial position, distress analysis, general insurance industry, Bangladesh.

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### 1. INTRODUCTION

Insurance is a formal arrangement of reducing the risk, generally used to hedge against potential losses. It protects individuals and businesses by transferring the risk of loss from one entity to another by making periodic payments or premiums. Dorfman MS (2008) defined insurance as a kind of money transfer scheme by putting money into a pool where loss is paid to the pool members. It described the insurance services as a product in the form of a written legal contract and a bundle of services associated with it.

Insurance is a significant part of the service industry. Nowadays, it provides more comprehensive financial services like Life and various kinds of non-life insurance,

marine, fire, property insurance, etc. (Nguyun, 2006). It is a contractual link between two parties, i.e., insured and insurer. Insured generally pay the premium to the insurer periodically by transferring the chance of expected future losses.

Insurance was a prevalent business in Bengal during the British regime. Before the independence of Bangladesh, the Insurance business also achieved the milestone in East Pakistan, including 49 companies with both Life and general insurance schemes. After independence, those insurance companies were nationalized under “the Bangladesh Insurance (Nationalization) Order, 1972”. Concerning the order, those 49 companies and organizations transacting insurance business in the country were placed under five corporations. These corporations were: the Jatiya Bima Corporation, Tista Bima Corporation, Karnafuli Bima Corporation, Rupsa Jiban Bima Corporation, and Surma Jiban Bima Corporation. The Jatiya Bima Corporation was the regulatory authority to supervise and control other insurance corporations' activities. It was also responsible for regulating the companies that involve in underwriting activities. Tista and Karnafuli Bima Corporations were categorized under a general insurance corporation, and Rupsa and Surma were categorized under Life Insurance Corporation. According to the central bank of Bangladesh (Bangladesh Bank), out of 62 companies, 44 general insurance companies, including one state-owned company, are operating under the Insurance Act 2010.

BarNiv & McDonald (1992) stated that the problem of financial distress in the insurance industry is well recognized as the financial soundness of a company. It describes an insurer's position in experiencing liquidation, receivership, conservatorship, restraining orders, rehabilitation, etc. According to the view of (J. & T., 2015) a firm is said to be bankrupt when its real net worth defines the negative value. The author also stated that managerial incompetence is the best possible reason for being financially insolvent.

A significant number of empirical studies (Alali, 2018; Hamid et al., 2016; Jan & Marimuthu, 2015; J. & T., 2015; Siddiqui, 2012; Al-Manaseer & Al-Oshaibat, 2018; Parvin et al., 2016) have been found that Altman Z score Bankruptcy model was applied to measure the financial distress for Bank, Non-bank financial institutions and Insurance organizations. No studies were found where the bankruptcy model was used to predict the financial soundness of Insurance companies in Bangladesh. Therefore, this study's primary objective is to find out the applicability of the Altman Z score to forecast the bankruptcy of insurance companies in Bangladesh from 2014 to 2018. Finally, the study reveals that 95% of the insurance companies were in a safe zone during the study period.

This research study is designed in the following ways: Firstly, we reviewed the significant contribution of the literature regarding the Altman Z score and its implication in different countries all over the world. Secondly, we applied the Altman Z score model for several insurance companies of Bangladesh as well as the descriptive statistics and Pearson correlation matrix to show the correlation among each variable to measure the Altman Z score model. Finally, we notified the conclusion with the recommendation for future research.

## **2. LITERATURE REVIEW**

### **2.1 Insurance and insurance industry**

Insurance is an instrument of distributing a particular risk of an individual among many where the first party is called insured and the second party is the insurer. Insured is an individual person, group, or organization that reduces their life or property risk by providing a certain sum of money under the insurance policy. An insurer is a person or

company who ensures to indemnify any loss of life or properties by receiving a certain sum of money under an insurance policy (Sinha & Vaughan, 1994). According to Mishra & Mishra. (2010), insurance can be divided from two points of view: First is the business point of view and second is risk point of view. From a business point of view, insurance can be divided into three types such as i) Life Insurance, ii) General Insurance, and iii) Social Insurance. From a risk point of view, insurance can be divided into four types such as i) Property Insurance, ii) Liability Insurance, iii) Personal Insurance, and iv) Guarantee Insurance. Insurance companies can be categorized into seven types i) Self Insurance ii) Individual Insurance iii) Partnership Insurance iv) Joint-Stock Insurance Companies v) Mutual Insurance Companies vi) Co-operative Insurance Organization and vii) Lloyd's Association.

Stojakovic & Jeremic(2016) conducted an empirical study on the relationship between the development of the insurance sector and economic growth in the transition of a country with an aim to find out the impact of the insurance industry on a country's economy. Data were collected from 3 countries in a transition period over the period from 2010 to 2014. The research shows a positive impact of the insurance industry development in economic growth where Life Insurance companies and Non-Life Insurance companies individually and collaboratively contribute to economic growth. The study concluded with the statement that Insurance development is a big part of economic development. There are many researchers who also found similar findings in their study (Ductor & Grechyna, 2015; Gokmenoglu et al., 2015; Hsueh et al., 2013; Komal & Abbas, 2015; Menyah et al., 2014; Pradhan et al., 2014; Samargandi et al., 2015; Seven & Yetkiner, 2016; Simion et al., 2015; Uddin et al., 2013; Zhang et al., 2012; Zhuang et al., 2009).

Peleckienė et al.(2019) analyzed descriptive statistics and econometric methods on the relationship between insurance and economic growth. Evidence from the European Union countries with the objectives to determine the development of the insurance sector impacts the economic growth of European Countries. Data were collected from Eurostat and European Insurance Industry for the period of 2004 to 2015. The study examined that the development of the insurance industry is higher in economically developed countries. There is a significant positive correlation between insurance company penetration and economic development in Luxemburg, Denmark, and Finland and The Netherlands. On the other side, there is a significant negative relationship found between insurance company penetration and economic growth in Estonia, Malta, Belgium, Austria, and Slovakia. Many researchers studied to evaluate the relationship between insurance sector development and economic growth (Olayungbo & Akinlo, 2016; Richterkoval & Korab, 2013; Yinusa, 2013).

A random effect regression model was used to conduct explanatory research and quantitative analysis to examine financial insolvency and its impact on the insurance industry in Ethiopia (Isayas, 2021). Covering secondary data from 2008 to 2019 on eleven insurance industries in Ethiopia, the study found that firm size, leverage, company age, and profitability had a significant positive relationship with the financial solvency of the insurance industry. On the other side, asset loss ratio and asset tangibility had a significant negative impact on financial solvency in insurance companies of Ethiopia. The study concluded with the statement that the Ethiopian insurance industry should have concentrated on internal policies and strategies to prevent the insurance industry from financial distress. Many studies worldwide also found similar findings; some mentionable

studies are (Wesa & Otinga, 2018; Ullah & Bagh, 2019; Saha & Navila, 2018; Setegn, 2021; Hasan et al., 2021), etc.

The insurance sector is equally important, like the Banking and Securities sector, to develop an economy. Still, it's not getting suitable attention from the researchers in their study from the beginning of this sector. Though many researchers argue that the insurance sector is different from the banking and securities sector, special attention is needed to extend internationally and help the Government for better policymaking. As it's already proved about the insurance industry's contribution to economic growth, in this research, our aim is to evaluate the performance of the insurance sector and measure the financial bankruptcy of the insurance industry of Bangladesh.

## **2.2 Insurance industry in Bangladesh**

According to the document of World Bank on the Bangladesh Insurance Sector Development Project 2017, The insurance penetration is very low, total assets announced 3% of GDP, and the gross written premium ratio were only 9% of GDP in 2014. Private limited companies dominate the insurance sectors, and non-life insurance companies contribute more than life insurance companies in Bangladesh's economy.`

Siddiqua & Parvin (2017) examined the performance of five private non-life insurance companies in Bangladesh where they collected information from respected company's financial statements from 2012 to 2014 and used seven variables such as total asset, investment, net premium, profit after tax, total insurance policy, earnings per share (EPS) and return on asset (ROA). The research found that each of the seven variables was positive growth during the study. So, non-life insurance companies have a significant expectancy in Bangladesh.

Hasan, Kamrul & Khanam (2013) conducted research on Performance Evaluation of Public Sector General Insurance Company in Bangladesh- A Case Study on Shadharon Bima Corporation (SBC) with the aim to examine the organization structure, liquidity performance, long term financial performance, activity performance, profitability, and productivity performance. Data were collected from public sector general insurance company Shadharon Bima Corporation (SBC) over the period from 2007 to 2011. The research found that SBC's profitability & activity were satisfactory, but solvency, liquidity, and productivity were unsatisfactory.

A few types of research have been found on performance evaluation and bankruptcy prediction of Non-life Insurance companies of Bangladesh. To contribute to the literature on this topic, this study selected 18 listed Non-life insurance companies from Dhaka Stock Exchange (DSE) to evaluate performance and predict bankruptcy.

## **2.3 Altman Z-score**

Many researchers were working on bankruptcy models in the late 1960s. Beaver developed the first bankruptcy model in 1966, where Beaver defined bankruptcy as an inability of a company to meet financial obligations (Thai et al., 2014). In the Beaver model, only one ratio is used; Altman noticed Beaver's model limitation and introduced the first bankruptcy prediction model in 1968, which was only for manufacturing companies. He upgraded the Z-score model for the second time in 1983 and finally updated the Z-score model in 1998 for non-manufacturing companies (Altman et al., 2017). Altman's Z-score model is a multivariate model that can be used to predict financial distress and insolvency for both manufacturing and non-manufacturing companies before two years of its bankruptcy (Hayes et al., 2010).

Altman et al. (2017) examined Altman's Z-score original model on Corporate Financial Distress: A Complete Guide to Predicting, Avoiding, and Dealing with Bankruptcy (1983) on Financial Distress Prediction in an International Context: A Review and Empirical Analysis of Altman's Z-Score Model. The objective is to evaluate the validity of Altman's Z-score model to predict the financial bankruptcy of different institutions using the meta dataset of multi countries. Data were collected from 31 European and three non-European countries (Colombia, China, and the USA). The research showed that Altman's Z-score significantly measures financial distress in the international context. In addition, the four ratios are well balanced; however, Book Value of Equity/Total liability found small contributions to predict the financial bankruptcy of Institutions.

Vaziri et al. (2012) analyzed Altman's Z-score model on Comparative predictability of failure of financial institutions using multiple models with Aim to find out comparative forecasting ability of financial distress of 100 financial institutions from different countries and economies by Moody's financial ratios, Vaziri's model, Z-score model, Logit analysis. Data were collected from 2001 to 2010. Samples included 100 banks of Asia, Europe, and the USA from which 3 banks were acquired, 20 banks were bankrupted, 17 banks were helped by the government, and the remaining 60 banks were active. The research shows that S&P's model has an average of 20% predictability before two years of bankruptcy, Vaziri's model has 45% predictability which is almost equal to the Logit analysis, Moody's model is much better than S&P's, Vaziri's, and Logit analysis where average predictability is 72.5%, and Altman's Z-score has the best 75% accurate predictability before two years of actual failure. The study concluded that Altman's Z-score is the most reliable bankruptcy model to predict the financial distress of financial institutions.

To research Potential application of Altman's Z-score in Islamic banks' emerging market to predict financial distress and measure financial performance of emerging Islamic banking sector in UAE, Saif H. Al Zaabi, (2011) collected data from UAE banks for the years 2004 to 2007. The research found that Altman's Z-score model is the adopted model to predict the financial bankruptcy of Islamic Banks in UAE. As a result, Islamic banks should improve their Altman's ratio for better performance in the future.

Analyzing Altman's Z-score model, Rahman et al., (2020) studied the Measuring Financial Distress of Non-Bank Financial Institutions of Bangladesh. Data were collected from 20 NBFIs for 2014 to 2018 to measure the financial bankruptcy of NBFIs in Bangladesh. The study showed that 90% of NBFIs were in distress zones, 5% were in safe zones, and the remaining 5% were in distress zones. The research concluded with the statement that without prompt actions, this sector can be bankrupted very soon.

Research is conducted by (Gerantonis, 2009) to test the validity of Altman's Z-score model for predicting the financial institutions in Greece. Data were collected from the companies listed in the Athens Stock Exchange from 2002 to 2008. The study found that Altman's Z-score model performed significant results in the company's financial performance. Moreover, it can predict up to 2 years before the financial distress. The study concluded that the company with satisfactory performance in the short run but is dissatisfied in the long run can predict its financial condition by using Altman's Z-score and can be merged with other companies to sustain in the long run.

Grice & Dugan (2001) studied the generalizability of Altman's original Z-score financial insolvency model (1968). The study examined three research questions. 1) Is Altman's unique Z-score model useful to predict insolvency in the recent period? 2) Is

Altman's Z-score model valid to predict the bankruptcy of non-manufacturing firms? 3) Is this model useful to predict financial stress situations other than insolvency? The research found that the results of the first two questions are negative, and the result of the last question is positive and suggested that Altman's original model (1968) should be used cautiously, and for non-manufacturing firms, Altman's final model can be used.

In order to predict the bankruptcy of the companies (Hamid et al., 2016; Jaisheela, 2015; Mostofa, Md. Shahnawaz; Rezina, Sonia Rezina; Hasan, 2016; Panigrahi, 2019; Rim & Roy, 2014; Chouhan et al., 2014; Mohammed, 2016; Jawabreh, Omar A.A; Al rawashdeh, Firas; Senjelawi, 2017; Martin et al., 2011; Thomas Ng et al., 2011; Grice, John Stephen; Ingram, 2010; Kiaupaite-Grushniene, 2016; Al-Manaseer & Al-Oshaibat, 2018; Kivuvo & Olweny, 2014) used Altman's Z-score model.

Sanjaya et al. (2015) analyzed Altman Z-Score Model on bankruptcy analysis of banking companies in Indonesia from 2001 to 2012. Data were collected from four banking companies with the Sought to provide empirical evidence related to Altman's Z-score. The study showed that Altman's Z-score has significant predictability in Indonesia's banking companies, and this model can be used to determine financial institutions' financial positions.

To Predict Bankruptcy in Banks Listed in Indonesia Stock Exchange (Muammar 2017) Analyzed Altman's Z-score. Data were collected from 29 banks of Indonesia for the years 2011 to 2013. Using Altman's Z-score the study found that among 29 public banks of Indonesia, about 40% banks in safe zones, 50% banks in distress zones, and 10% banks in grey zones during the study year.

Qamruzzaman (2014) applied Altman's Z-score model on Predicting Bankruptcy: Evidence from Private Commercial Banks in Bangladesh to find out the financial condition of some private banks of Bangladesh. Data were collected from 20 listed banks in Dhaka Stock Exchange for the years 2008 to 2012. The research shows the average position of the banking industry was in the safe zone in 2008, 2009, and 2010 but in the grey zone in 2011 and 2012.

Most researchers applied Altman's Z-score model on manufacturing, banking, and NBFI sectors in Bangladesh; a few of the studies cover the Insurance Sector. In this study, we will predict financial bankruptcy and evaluate the performance of the Insurance sector of Bangladesh.

### **3. RESEARCH METHODOLOGY**

This study selected 18 (50%) general insurance companies from A and B categories (A and B category is differentiated on the basis of holding Annual General Meeting (AGM) and a fixed percentage of dividend declaration regularly) out of 36 insurance companies listed in Dhaka Stock Exchange (DSE). The company was selected based on information available on their respective website to ensure reliability, validity, and coverage can be ensured in the research data set.

**Table 1: Details of the sample.**

Sl. No	Company Name	Company Symbol in DSE	Listing Year in DSE	Category in DSE
1.	Asia Insurance Limited	ASIAINS	2009	A
2.	Central Insurance Company Limited	CENTRALINS	1995	A
3.	United Insurance Company Limited	UNITEDINS	1990	A
4.	Continental Insurance Limited	CONTININS	2008	A
5.	Dhaka Insurance Limited	DHAKAINS	2010	A
6.	Janata Insurance Company Limited	JANATAINS	1994	A
7.	Pioneer Insurance Company Limited	PIONEERINS	2001	A
8.	Pragati Insurance Limited	PRAGATIINS	1996	A
9.	Reliance Insurance Limited	RELIANCINS	1995	A
10.	Rupali Insurance Company Limited	RUPALIINS	1995	A
11.	Sonar Bangla Insurance Limited	SONARBAINS	2006	A
12.	City General Insurance Company Limited	CITYGENINS	2007	B
13.	Agrani Insurance company Limited	AGRANINS	2005	B
14.	Green Delta Insurance Limited	GREENDELTA	1989	A
15.	Nitol Insurance Company Limited	NITOLINS	2005	A
16.	Purabi General Insurance Company Limited	PURABIGEN	1995	A
17.	Global Insurance Limited	GLOBALINS	2005	B
18.	Takaful Islami Insurance Limited	TAKAFULINS	2008	A

Source: www.dsebd.org (Dhaka Stock Exchange, Bangladesh).

This paper mentioned sample details in Table 1, where 15 companies from A categories and 3 companies from B categories were selected in this research. Table 1 also represented the company symbol in DSE and the company listing year with the company name and category in DSE. To use Altman Z-score (1995) ratio for predicting bankruptcy, a total of five years of data from 2014 to 2018 were collected from the company's financial statement.

### 3.1 Altman Z-score statistical model for predicting bankruptcy

We selected Altman Z-score model to predict general insurance company of Bangladesh because Altman Z-score model has provided high predictability for financial institution in different countries. As Altman Z-score variables are available in selected company's financial statement, this model is very relevant for our study.

Altman developed his first model to predict financial distress of manufacturing companies in 1968. First model outline:

$$Z_1 = 0.012 X_1 + 0.014 X_2 + 0.033 X_3 + 0.006 X_4 + 0.999 X_5$$

Later, Altman upgraded Z score model for manufacturing companies to draw better results (Altman, 1983). Second upgraded model outline:

$$Z_2 = 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.420X_4 + 0.998X_5$$

Where,

- 
- X1 = Current assets-current liabilities/Total assets;
  - X2 = Retained Earnings/Total assets;
  - X3 = Earnings before interest & taxes (EBIT)/Total assets;
  - X4 = Market value of equity/Book value of debt;
  - X5 = Sales/Total assets;
-

Finally, Altman developed the Z-score model for non-manufacturing companies (Altman, 1995). This model is used to predict financial distress & future bankruptcy. Later, he excluded a ratio that was used for the model of manufacturing firms. So, the final model was:

$$Z_3 = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Where,

Dependent Variable	Independent variables	
<b>Altman's Z-score:</b> It's a ratio based high predictive bankruptcy model used in financial institutions to ensure early direction.	<b>X1</b>	<i>Working capital/Total assets</i> This ratio is used to identify liquid assets of a company from its total assets. Liquidity is used to meet firm's short-term obligations. Higher the ratio, more the liquid assets to the company.
	<b>X2</b>	<i>Retained Earnings/Total assets</i> After distributing dividend from net income, the money which is left for meeting new investment opportunities is called retained earnings. Higher the ratio, more the investment possibility.
	<b>X3</b>	<i>EBIT/Total assets</i> EBIT is the result of company's total assets utilization. Optimum utilization of assets ensures higher EBIT. Higher the ratio, more the company's ability to use its total assets.
	<b>X4</b>	<i>Market value of equity/Book value of debt</i> Market value of equity means the market capitalization. This ratio is used to measure shareholders' actual wealth in a company. Book value of debt means both short term and long-term liabilities. Higher the ratio, more the shareholders' wealth.

#### Decision Rules Regarding Altman's Z score Model:

Z score	Decision Rules	Area
Below 1.81	Distress	Inefficient
Above 1.81 to below 2.99	Grey	At Risk
Above 2.99	Safe	Efficient

#### 4. FINDINGS & ANALYSIS

Asia Insurance Limited						
Year	X1	X2	X3	X4	Z	Zone
<b>2018</b>	0.42612	0.18857	0.05802	1.23025	5.091742	Safe
<b>2017</b>	0.41906	0.18413	0.07590	1.29154	5.215462	Safe
<b>2016</b>	0.25448	0.14076	0.06840	1.29814	3.950961	Safe
<b>2015</b>	0.37495	0.14766	0.05097	1.12866	4.468655	Safe
<b>2014</b>	0.66646	0.14947	0.04244	1.22639	6.432156	Safe



**Central Insurance Company Ltd.**

Year	X1	X2	X3	X4	Z	Zone
2018	0.24520	0.32681	0.07400	1.74066	4.998886	Safe
2017	0.24582	0.32115	0.06577	1.70775	4.89464	Safe
2016	0.25078	0.32265	0.06665	1.74965	4.981976	Safe
2015	0.23438	0.29934	0.05996	1.56236	4.55679	Safe
2014	0.23722	0.30509	0.08534	1.53101	4.731802	Safe

**United Insurance Company Ltd.**

Year	X1	X2	X3	X4	Z	Zone
2018	0.75096	0.58337	0.07127	5.15495	12.71972	Safe
2017	0.74863	0.56062	0.08515	5.30276	12.87874	Safe
2016	0.84683	0.55964	0.10472	6.13699	14.52719	Safe
2015	0.84449	0.54718	0.11895	5.92188	14.34098	Safe
2014	0.83964	0.52015	0.12266	5.67789	13.98979	Safe

**Continental Insurance Ltd.**

Year	X1	X2	X3	X4	Z	Zone
2018	0.49006	0.26840	0.07805	2.96816	7.730842	Safe
2017	0.44104	0.24709	0.07600	2.56259	6.900175	Safe
2016	0.43180	0.23184	0.07379	2.27016	6.467943	Safe
2015	0.39115	0.20784	0.07495	2.37705	6.243069	Safe
2014	0.36024	0.18587	0.08320	2.23619	5.876214	Safe

**Dhaka Insurance Ltd.**

Year	X1	X2	X3	X4	Z	Zone
2018	0.17214	0.04638	0.06522	0.93971	2.705411	Grey
2017	0.01632	0.04862	0.06063	0.97466	1.696387	Distress
2016	0.19739	0.04801	0.06274	0.81850	2.732429	Grey
2015	0.19747	0.04808	0.07711	0.82848	2.840227	Grey
2014	0.12269	0.06619	0.10137	0.88810	2.634337	Grey

**Janata Insurance Company Ltd.**

Year	X1	X2	X3	X4	Z	Zone
2018	0.43216	0.12128	0.07204	1.47992	5.268367	Safe
2017	0.41256	0.10450	0.03536	1.47687	4.835396	Safe
2016	0.44513	0.09010	0.02273	1.66015	5.109682	Safe
2015	0.43216	0.10477	0.04796	1.83058	5.42092	Safe
2014	0.40931	0.08056	0.01947	1.66521	4.827008	Safe

**Pioneer Insurance Company Ltd.**

Year	X1	X2	X3	X4	Z	Zone
2018	0.57850	0.51394	0.07398	2.35143	8.436552	Safe
2017	0.57938	0.50835	0.07584	2.50923	8.60229	Safe
2016	0.53822	0.43213	0.08172	2.31974	7.924352	Safe
2015	0.49402	0.40644	0.09804	2.25871	7.59624	Safe
2014	0.35341	0.30207	0.12226	1.48982	5.689016	Safe

**Pragati Insurance Ltd.**

Year	X1	X2	X3	X4	Z	Zone
2018	0.12382	0.58058	0.05205	2.41768	5.59329	Safe
2017	0.10783	0.60317	0.04879	2.82613	5.969004	Safe
2016	0.13427	0.59694	0.04435	2.69465	5.95425	Safe
2015	0.06681	0.57235	0.02994	2.43781	5.065032	Safe
2014	0.09201	0.56518	0.02755	2.39271	5.143554	Safe

<b>Reliance Insurance Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.09167	0.55117	0.07519	1.94450	4.945171	Safe
2017	0.07031	0.56787	0.08033	2.06218	5.017596	Safe
2016	0.08137	0.52072	0.07930	1.78111	4.634396	Safe
2015	0.12473	0.54960	0.07670	1.92770	5.149434	Safe
2014	0.13405	0.57854	0.08448	2.15298	5.593743	Safe

<b>Rupali Insurance Company Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.50232	0.33888	0.06825	2.66056	7.652196	Safe
2017	0.46164	0.33694	0.07834	2.57955	7.361755	Safe
2016	0.45319	0.33178	0.08153	2.49463	7.221772	Safe
2015	0.44785	0.33077	0.08314	2.45417	7.151786	Safe
2014	0.44832	0.34462	0.08370	2.48399	7.235094	Safe

<b>Sonar Bangla Insurance Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.50255	0.28095	0.10492	2.60795	7.656035	Safe
2017	0.46701	0.27026	0.10122	2.75614	7.518779	Safe
2016	0.46726	0.26250	0.11357	2.79677	7.620775	Safe
2015	0.45224	0.24933	0.11211	2.57571	7.237385	Safe
2014	0.39454	0.22407	0.10485	1.90354	6.02196	Safe

<b>City General Insurance Company Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.80666	0.23637	0.10959	4.44920	11.47036	Safe
2017	0.61411	0.17555	0.10149	4.15469	9.645292	Safe
2016	0.61929	0.14905	0.10708	3.67805	9.129976	Safe
2015	0.59075	0.15059	0.07158	3.68101	8.712322	Safe
2014	0.63515	0.12304	0.08534	4.16994	9.519616	Safe

<b>Agrani Insurance company Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.69979	0.29078	0.08071	1.83909	8.011981	Safe
2017	0.68418	0.29191	0.09029	2.02879	8.176826	Safe
2016	0.67664	0.27514	0.10529	1.94896	8.089672	Safe
2015	0.66755	0.26204	0.11141	1.98935	8.070871	Safe
2014	0.63560	0.22746	0.11085	1.75384	7.4975	Safe

<b>Green Delta Insurance Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.12408	0.50071	0.03137	1.61816	4.356154	Safe
2017	0.11691	0.53678	0.03127	1.86854	4.688934	Safe
2016	0.13515	0.52885	0.03534	1.91639	4.860329	Safe
2015	0.18810	0.59751	0.03649	2.89206	6.463694	Safe
2014	0.20599	0.65036	0.04404	2.77877	6.685125	Safe

<b>Nitol Insurance Company Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.41862	0.03792	0.07995	0.99089	4.447465	Safe
2017	0.37513	0.03974	0.08858	1.48206	4.741826	Safe
2016	0.43452	0.03991	0.08555	1.55886	5.192257	Safe
2015	0.39586	0.03741	0.08984	1.57463	4.975885	Safe
2014	0.36665	0.04121	0.11104	1.46666	4.82575	Safe

<b>Purabi General Insurance Company Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.52001	0.07777	0.08154	1.62518	5.919184	Safe
2017	0.40987	0.08132	0.10965	1.45228	5.215592	Safe
2016	0.19024	0.08631	0.08030	1.48453	3.627718	Safe
2015	0.22195	0.04442	0.09051	1.64740	3.938798	Safe
2014	0.21079	0.01480	0.09810	1.32435	3.48083	Safe

<b>Global Insurance Ltd.</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.36733	0.02268	0.03927	1.16475	3.970504	Safe
2017	0.41224	0.02252	0.03445	1.38567	4.464167	Safe
2016	0.38141	0.03563	0.04116	1.23818	4.194888	Safe
2015	0.37432	0.05578	0.07592	1.33120	4.545324	Safe
2014	0.36630	0.05759	0.09110	1.50573	4.78388	Safe

<b>Takaful Islami Insurance Limited</b>						
Year	X1	X2	X3	X4	Z	Zone
2018	0.45832	0.28161	0.06963	2.15301	6.653202	Safe
2017	0.43094	0.29850	0.08540	2.30028	6.789258	Safe
2016	0.43220	0.27545	0.07178	2.13804	6.460503	Safe
2015	0.46411	0.27450	0.08994	2.40875	7.073016	Safe
2014	0.44357	0.26992	0.07702	2.12726	6.540956	Safe

**Table 2: Result summary.**

Zone	2014		2015		2016		2017		2018	
	No.	%	No.	%	No.	%	No.	%	No.	%
Safe	17	95%	17	95%	17	95%	17	95%	17	95%
Grey	01	05%	01	05%	01	05%	Nil	00%	01	05%
Distress	Nil	00%	Nil	00%	Nil	00%	01	05%	Nil	00%
Total	18	100%	18	100%	18	100%	18	100%	18	100%

Through the Table 2 of Z-score analysis of 18 randomly selected general insurance companies from the Dhaka Stock Exchange, we found that companies' overall scenario is moderately satisfied. Here in 2014, 95% of companies are in the Safe Zone, and 05% company is in the Grey zone. In the case of 2015, 2016, and 2018 same scenario was found in this analysis, but in 2017 we found that no company is in the Grey Zone, 17 companies are in a Safe Zone, and only a company is found in the distress zone.

**Table 3: Descriptive analysis of the study's variable.**

	X1	X2	X3	X4	Z
Minimum	0.01632	0.0148	0.01947	0.8185	1.696387
Maximum	0.84683	0.65036	0.12266	6.13699	14.52719
Mean	0.39531	0.27740	0.075842	2.218257	6.336433
Median	0.41559	0.26916	0.07758	1.94673	5.782615
Standard Deviation	0.20201	0.19014	0.024899	1.10758	2.499406
Kurtosis	-0.47100	-1.0996	-0.448764	3.49736	2.502145
Skewness	0.212102	0.37893	-0.32960	1.79601	1.374558

From the Table 3, we found that the mean of X1(Working capital/Total assets) is 0.3953, X2 represents the ratio (Retained Earnings/Total assets) is 0.27740, X3 also describes the ratio of (EBIT/Total assets) and mean value is 0.075842, X4 also represents the ratio of

(Market value of equity/Book value of debt) mean value is 2.218257. The mean of the Z value score is 6.336433, which is in a safe zone and satisfactory. However, the Z value's standard deviation is 2.499406, and the maximum value of the Z score is 14.52719, and the minimum value is 1.696387.

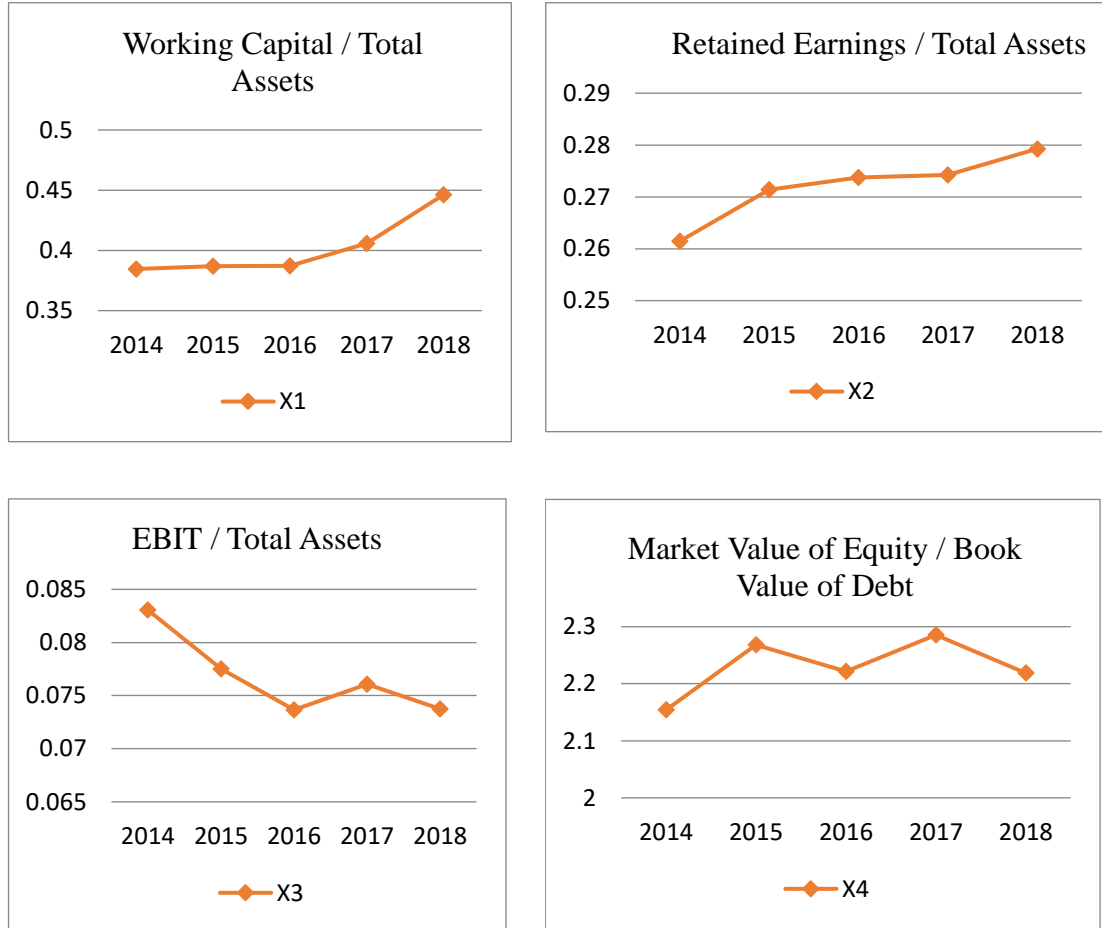


Figure 1: Graphical representation of the variables.

Table 4: Pearson correlation matrix.

	X1	X2	X3	X4	Z
X1	1				
X2	-0.08589	1			
X3	0.470311	-0.1114	1		
X4	0.591765	0.50982	0.314807	1	
Z	0.815758	0.43223	0.435168	0.926581	1

Table 4 shows the relationship of independent variables on the dependent variable. Here X1, X2, X3, and X4 are the independent variables, whereas Z value is the dependent variable on distress analysis. Here we found there is a strong positive correlation on the Z score value of the X1 ratio, which is a significant positive relationship of 0.815758, and the X2 ratio has a comparatively moderate positive correlation, which is 0.43223 and X3

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also has the same type of correlation impact on Z value. The ratio X4 also has a significant positive relationship on Z value, which is 0.926581.

## **5. CONCLUSION**

This paper tries to represent the current financial status of Bangladesh's general insurance industry and reflect the test of bankruptcy using the well-recognized model of Altman's Z score. The insurance sector has a significant positive impact on the growth and development of a country. But the insurance sector in Bangladesh has many limitations and insurance penetration, and insurance density is comparatively low with other south Asian countries. Insurance Development and Regulatory Authority (IDRA) and additional insurance-related organizations are trying to develop Bangladesh's overall insurance market condition. The paper's findings reveal that most of the general insurance companies of Bangladesh are in a safe zone but not at a highly satisfactory level of Z score value. To ensure a satisfactory level of financial performance and increase the Z score value of the general insurance industry, key stakeholders should take some prompt actions regarding cost efficiency, policy reformation, profitability enhancement, and other related activities.

## **6. RECOMMENDATIONS**

The Altman's Z score score distress prediction is not only the prediction model of bankruptcy in the world. There is also some other model like Springate, Fulmer, and Logit model can be used to predict companies' failure (Jaloudi, 2019; Mustofa & Fahad Noor, 2020). However, the Altman's Z score score model can be used widely by the investors and stakeholders to make the optimum decision regarding the company's financial performance and prediction of company failure.

The study also suggests that Altman's Z score model is used for financial failure prediction as a tool. The Z score is determining the failure based on quantitative data, but it's not analyzing the qualitative data. Some qualitative factors also very influential in predicting bankruptcy, and changing economic condition have a significant impact on the financial performance of any company.

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