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Predicting Solvency of Non-Banking Financial Institutions in Bangladesh by Using Springate & Fulmer Model

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Abstract

Prediction of financial distress is a significant issue for any company. At present Non-Banking Financial Institutions (NBFIs) represent one of the most important parts of a financial system in Bangladesh. NBFIs contribute a lot to the GDP growth of Bangladesh. So, it has become very essential for the companies to predict the insolvency in advance for taking their important decisions for the betterment. The purpose of this paper is to predict the solvency and the factors that have an impact on the solvency by analyzing the financial statements for a period of 5 years(2013 to 2017) of 20 Dhaka Stock Exchange (DSE) listed Non-Banking Financial Institutions (NBFIs) including asset finance or leasing companies, investment finance companies and housing finance companies of Bangladesh by using Fulmer H score model and Springate Z score model. The findings indicate that according to Fulmer Model few sample NBFIs are in risky zone and according to Springate model all the sample NBFIs are in distress zone. The study suggests that according to the context of Bangladesh Fulmer H Score model is more appropriate compared to Springate Z Score model for predicting solvency.

Keyword: Solvency, Non- Banking Financial Institution, Z score, H score.

Introduction:

Non-Banking Financial Institutions (NBFIs) are the financial institutions those do not have full banking license but provide financial services to the people including banking but are not termed as bank because NBFIs are not permitted to perform all the tasks which banks can perform like issuing cheques, pay-orders or demand drafts, receiving demand deposits and involving in foreign exchange financing. NBFIs started their journey by leasing but now they are doing other businesses like term lending, housing finance, merchant banking, equity financing, venture capital financing, giving loans, giving advances for manufacturing and industry, real estate, agriculture, carry on underwriting or taking over businesses or investing or reinvesting in share businesses, bonds, debenture or debenture stocks or securities issued by the government or any regulatory bodies. This industry plays a vital role in the capital market, industrial sector and the real estate sector of Bangladesh. According to Goldsmith (1969), financial development in a country starts with the development of banking institutions. As the development process

proceeds, Non-Banking Financial Institutions (NBFIs) have become prominent alongside the banking sector (Ahammed & Mohammad, 2017). Non-Banking Financial Institutions (NBFIs) are set up to fill a gap in the financial system which helps in rotation of resources, asset distribution and regulation of income in increasing the economic development. NBFIs have become an integral part of development of the financial system of the Bangladesh. Nowadays the weight of NBFIs is more important as their activities in the financial system are increasing day by day and this industry is considered the higher secondary source of providing the financial services behind the banking sector (Eliona & Valbona, 2016). According to Ahmed and Chowdhury (2007), Non-Banking Financial Institutions (NBFIs) intensify the country's financial systems; contribute to the economic development of the country through diversified financial services in the market (Ahmed & Chowdhury, 2007). Islam and Osman (2011) reported that there is a long term as well as stable association between per capita real GDP and the NBFIs investment, trade openness and employment (Islam & Osman, 2011). By creating new marketable securities NBFIs can provide long term financial resources and a strong stimulus to the development of the capital market (Vittas, 1997). In Bangladesh NBFIs are monitored and controlled by Bangladesh Bank under the guideline of Financial Institution Act 1993. At present there are 35 NBFIs in Bangladesh. At the end of December 2018, the total portfolio of Non-Banking Financial Institutions (NBFIs) was tk850 billion (Hasan J. , 2018). NBFIs have contributed a lot to the economy of Bangladesh. So, it has become important to predict the solvency of Non-Banking Financial Institutions (NBFIs) for the sake of the country's economic development.

Solvency is the ability by which it is measured that the company can meet its long-term debt and obligations. When the current liabilities of a country exceed its current asset, the company is called insolvent. Insolvency measures if a company is not able to pay off its debt in the long term. According to Ross, Westerfield, & Jaffe (2007) insolvency is a situation when a firm's operating cash flows are not sufficient to satisfy current obligations. The study of solvency is becoming more relevant and important. When a company becomes solvent, it can achieve its long-term growth and expansion. The large companies across the world are failing and resulting in economic and social problems to the society. Using Financial distress models to predict failure in advance is becoming more essential for most business in their decision- making process. By predicting failure in advance managers can find out the causes and its possible remedies. Predicting Solvency has become a significant concern for corporate governance. Many researchers have studied on solvency throughout the world such as Edmister (1972), Jide Lewis (2013), Sudip Datta, Mai E and Iskandar Datta (1995), Richard Taffler (1983), Arun R & Kasilingam R (2011), S C Bardia, Shweta Kastiya, Garima Bardia (2011), S.Thomas Ng, James M.W.Wong, Jiajie Zhang (2011), Temoudi, Ghourabi, Limam (2011), R.Kasilingam & G.Ramasundaram (2012) and so on. In Bangladesh there are lots of research studies or analysis have been done on banking sector, insurance companies, capital market, ceramic companies, SME, pharmaceutical companies but only one study has been done on the distress level of Non-Banking Financial Institutions (NBFIs) for fifteen NBFIs by Tania Hamid, Farzana Akter & Naharin Binte Rab (2016) using the Altman's Z score Model. They have found that most of the Non-Banking Financial Institutions (NBFIs) have been in the distress zone and failed to attain the minimum score as per Z score model.

In the developing country like Bangladesh the importance of predicting the solvency of NBFIs is essential to stakeholders. That's why this study is conducted for predicting the solvency of Dhaka Stock Exchange (DSE) listed Non-Banking Financial institutions (NBFIs) of Bangladesh using famous Fulmer H-score model and Springate Z-score model. These two models are routinely used to analyze the financial well-being of the companies. This study is covered on twenty listed NBFIs including housing finance companies, asset finance companies and investment finance

companies. The primary objective of this study is to predict the solvency of these twenty NBFIs using Fulmer H score model and Springate Z score model based on financial statement of five years (2013 to 2017) and to comment on usefulness of these two models for predicting solvency of Non-Banking Financial Institutions (NBFIs). Another purpose of this study is to find out the factors that have an impact on solvency position of Non-Banking Financial Institutions (NBFIs) in Bangladesh and to draw a comparison on the performance of five years (2013-2017) of these twenty NBFIs. By doing this study financial distress can be predicted and the main factors of insolvency can be analyzed in advance which should be beneficial for both shareholders and stakeholders because insolvency involves direct and indirect cost for both shareholders and stakeholders.

Literature Review:

Solvency prediction has been a major research topic in Finance and accounting. The importance of solvency analysis or predicting solvency has a long history in the literature. Financial longevity of a business is a concern to internal and external stakeholders. Internal stakeholders might be interested in whether skills are transferable while external stakeholders might be concerned directly with their investments and profits (E.Mossman, G.Bell, Swartz, & Turtle, 1998). According to Dugan and Zavgren (1988), a prediction can be made without making a decision, but a decision cannot be made without at least implicitly, making a prediction. Non-Banking Financial Institutions (NBFIs) are getting more competitive sector in Bangladesh. Solvency analysis is the most popular trend to evaluate a NBFI's performance over years or with other companies in the industry. The solvency of NBFIs is major concern in modern economy. The important aspect of long-term solvency is earning power which reflects the recurring ability of a company to generate cash from its operations. Stability in earnings helps company in procurement of funds by way of debt in times of need (S.C.Bardia, 2012). Nowadays big, successful and promising companies are seen going insolvent due to lack of prediction of future financial status. Solvency prediction of NBFIs helps other companies to know the financial status of NBFIs before doing business with them.

In the late 1960's, several studies were developed for several model for failure prediction. Researchers have examined some of these models to identify their ability to predict corporate failure. Al Rawi, Kiani and Vedd (2008) predicted a firm's condition by using Altman's Z score model and found that the firm has increased its debt consequently and facing bankruptcy in near future. Gerantonis et al. (2009) examined the ability of Altman's Z score model to predict failure before it occurs and found that the model considered an accuracy way to predict corporate and financial failure. Hayes, Hodge, Hughes (2010) applied Z score model for 17 U.S. firms from retail industry and found that the model correctly predicted the bankruptcy level of 94%. Mamo (2011) applied this model on 43 banks in Kenya for predicting the financial distress level and the got 80% valid result. Again, the Edward Altman's financial prediction model was proved 90% valid when it was used on non-failed firms (Altman, 1993). Alareeni and Branson (2012) investigated the failure prediction for Jordanian industrial companies to identify the accuracy of Z score model before it occurs and the rate of accuracy of the Z score was 73.40% at first year, at the second year 74.46% and at the third year 70.21%. Jaisheela, B (2015), researched on 27 leasing company of India and found that 22% were in grey zone and 27% had very strong probability to get sick.

In Bangladesh, Tahmina Ahmed and Shah Alam used Z score model on 15 commercial banks found that 7% were in healthy position in 2009 but after 2011 there was none. In 2016 Z score model was applied on 25 conventional and non-conventional commercial banks to predict the solvency and the possibility to be bankrupted by Md. Mostofa, Sonia Rezina and Md. Hasan. Their findings indicated that 20% sample banks were in distress zone and 24% were out of danger. (Md.Mostofa, Rezina, & Md.Hasan, 2016). To predict insolvency and the probability of

bankruptcy Z score model was applied on 53 Dhaka stock Exchange listed Z category companies by Anup Chowdhury and Suborna Barua and according to the result 5 companies were in safe zone and 41 were in danger zone. (Chowdhury & Barua, 2009). A research was conducted on Shadharon Bima Corporation of Bangladesh based on the information of 2007 to 2011 by Kamrul Hasan and Feroza Akter Khanom. The result indicated that long term solvency and liquidity were dissatisfactory to determine the insolvency. (Hasan & Khanom, 2013). In 2016 Altman's Z score model was used to conduct a research on 15 publicly traded Non-Banking Financial Institutions (NBFI's) of Bangladesh based on the information from 2011 to 2015 by Tania Hamid, Farzana Akter and Naharin Binte Rab. Their findings indicated that most of the NBFIs have been in distress zone. They also suggested that Altman's Z score model might not be appropriate for Bangladesh. (Hamid, Akter, & Rab, 2016).

Mohamed (2013) applied Altman's Z score model for predicting bankruptcy of firms listed in NSE and the result indicated that Altman's Z score model was not sufficient to differentiate between failed firms and non-failed firms (Mohammed & Kim-Soon, 2012). Altman's model has limitations in its applicability to different business entities with the same prediction accuracy (Anjum, 2012). According to Doukas (1986) Springate modified Altman's MDA formula for Canadian use (Doukas, 1986). Springate continued Altman's studies and the use of audit analytical for selecting 4 appropriate financial ratios including working capital to total assets, profit before interest and taxes to total assets, profit before tax to current debt and sales to total assets among the 19 ratios which had the best ratio to find out the healthy and bankrupt companies. Then 40 companies were tested by using this Springate model and this model got 92.5% accurate result (Imanzadeh, Maran-Jouri, & Sepehri, 2011). Botheras (1979) tested the Springate model on 50 companies and found 88% accurate result. Again, the model was used on 24 companies with the average asset size of $63.4 million and found the accuracy of 83% (Arasu, Balaji, Kumar, & Thamizhselvi, 2013). For predicting solvency Fulmer's model is considered more reliable and it is proved that it gives more accuracy rate than any other model. The Fulmer Model is reported to have 98% accuracy rate one year before failure and 81% accuracy rate more than one year before insolvency (Fulmer, Moon, Gavin, & Erwin, 1984).

R.Kasilingam and G.Ramasundaram have conducted a study in 2012 on predicting solvency of 25 (2005 to 2009) Non-Banking Financial Institutions (NBFIs) in India using Fulmer and Springate model and concluded that both Fulmer and Springate models show the financial soundness of the NBFIs based on the financial data and the Z and H scores represent the actual solvency status of the company.

Methodology:

The methodology used in this research study require key financial data from audited and published annual reports containing balance sheets, profit and loss account statements and cash flow statements of Non-Banking Financial Institutions (NBFIs). The data used in this study is primarily of secondary in nature. Published annual reports of the companies containing audited financial results were collected from the respective company websites and also from Dhaka Stock Exchange (DSE). For this research study famous solvency prediction models Fulmer and Springate models were used.

Sample Size:

A total of 100 annual reports of 20 Non-Banking Financial Institutions (NBFIs) for the year of 2013 to 2017 were collected and analyzed for financial data accuracy. So, the sample size for the research is 100. The samples have been selected based on the availability of financial data of different companies from the company websites and Dhaka Stock Exchange (DSE). The sampling technique adopted for the study is convenience sampling.

Springate Model:

$Z = 1.03X1 + 3.07X2 + 0.66X3 + 0.4X4$ Failed $Z < 0.862$

Here,

X1 = Working Capital / Total Assets
X2 = Net Income before Interest and Taxes (EBIT) / Total Assets
X3 = Net Income before Taxes (EBIT) / Current Liabilities
X4 = Sales / Total Assets

Fulmer Model:

$H = 5.528v1 + 0.212v2 + 0.073v3 + 1.270v4 – 0.120v5 + 2.335v6 + 0.575v7 + 1.083v8 + 0.894v9 – 6.075$
Failed $H < 0$

Here,

v1 = Retained Earnings / Total Assets
v2 = Sales / Total Assets
v3 = Net Income before Taxes (EBIT) / Equity
v4 = Cash Flow / Total Debt
v5 = Total Debt / Total Assets
v6 = Current Liabilities / Total Assets
v7 = Log Tangible Total Assets
v8 = Working Capital / Total Debt
v9 = Log EBIT / Interest

Table 1. The Listed Non-Banking Financial Institutions:

Asset-Finance Company/Leasing Company	***Investment Finance Company***	***Housing Finance Company***
United Finance	Bangladesh Finance and Investment Company Limited	National Housing Finance and Investment Limited
People's Leasing Financial Service Limited	Fareast Finance and Investment Limited	
Premier Leasing and Finance Limited	FAS Finance and Investment Limited	
IDLC Finance Limited	Islamic Finance and Investment Limited	
First Finance Limited	Prime Finance and Investment Limited	
Bay Leasing and Investment Limited	Uttara Finance and Investment Limited	
Bangladesh Industrial Finance Co. Limited	Union Capital Limited	
GSP Finance Company (Bangladesh) Limited	Lanka Bangla Finance Limited	
IPDC Finance Limited	Phoenix Finance and Investment Limited	
International Leasing and Financial Services Limited		

Table 1 shows the sample count of Non-Banking Financial Institutions (NBFIs) based on their classification. For this research purpose Non-Banking Financial Institutions (NBFIs) were divided

into three segments such as Asset or Leasing Finance Company, Investment Finance Company, Housing Finance Company. Total 20 companies, data were used for predicting the solvency of Non-Banking Financial Institutions (NBFIs) among them 10 were Asset or Leasing Finance Companies, 9 were Investment Finance Companies and 1 was Housing Finance Company.

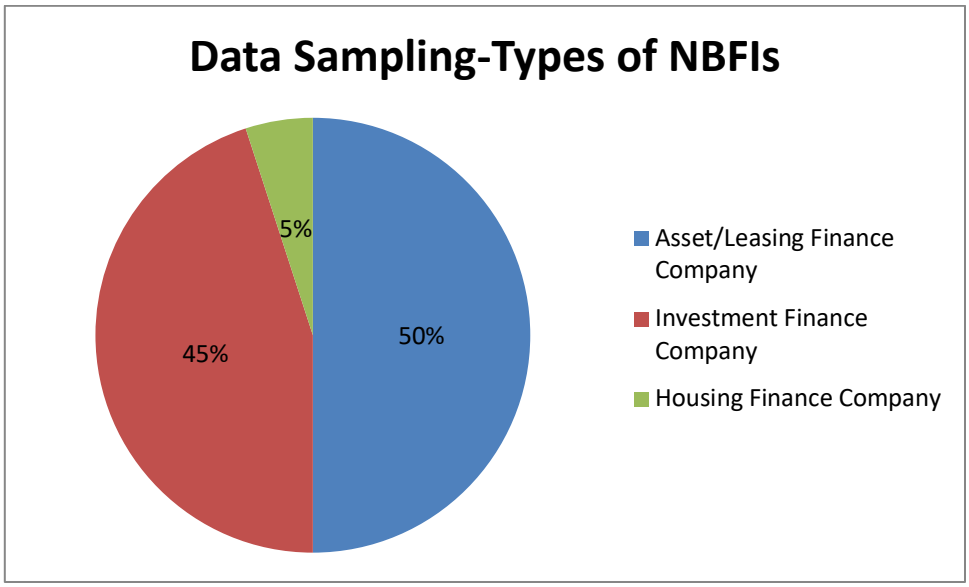

Figure 1. Data Sampling-Types of Non-Banking Financial Institutions (NBFIs)

From figure 1, it can be seen that there is 50% of Asset or Leasing Finance Companies, 45% of Investment Finance Companies and the rest 5% of Housing Finance Companies. Among these three segments the sample size is more for Asset or Leasing Finance Companies because they enjoy the huge market share.

Solvency Analysis:

Solvency status of the Non-Banking Financial Institutions (NBFIs) has been analyzed using Springate and Fulmer models. Solvency analysis is carried for each category of Non-Banking Financial Institution (NBFI) separately.

Housing Finance Company:

In the Housing Finance segment, the company taken for the study purpose is National Housing Finance & Investment Limited (NHFIL). Z scores and H scores have been calculated by using Springate and Fulmer models.

Table 2. Z & H Scores of Housing Finance Company

Z Score	2017	2016	2015	2014	2013	H Score	2017	2016	2015	2014	2013
National Housing Finance & Investment Limited	0.634	0.788	0.981	0.903	0.720		0.755	0.621	-0.06	0.064	0.351

Table 2 shows the Z scores and H scores of the Housing Finance Company. In 2014 and 2015 the Z scores are higher than the required minimum score of 0.862 because in 2014 & 2015 the current liabilities were 2,751,876,313 and 2,991,809,216 respectively which were low compared to the rest of the years 2013, 2016 and 2017. Again, the H scores in 2017, 2016, 2014, 2013 were higher than the required minimum score of 0.

On the other hand, the Z scores of National Housing Finance & Investment Limited (NHFIL) in 2017, 2016 and in 2013 were below the required minimum score of 0.862. The H score of National Housing Finance & Investment Company Limited (NHFIL) in 2015 was also below the required minimum score of 0.

Table 3. Z & H Scores of NHFIL (Below the Required Minimum Score)

Z Score	2017	2016	2013	H Score	2015
National Housing Finance & Investment Limited	0.634	0.788	0.720		-0.06

National Housing Finance and Investment Company (NHFIL) has not performed well in 2013, 2016 and in 2017 according to the Z scores. This is for the current liabilities of those years because the current liabilities of 2013, 2016 and 2017 were 3,412,798,410, 5,210,540,337 and 8,502,288,793 respectively which were high compared to the rest of two years 2014 and 2015. In 2014 and 2015 the current liabilities were 2,751,876,313 and 2,991,809,216 which were low compared to those three years. That's why Z scores of 2014 and 2015 are higher than the required minimum score of 0.862.

The H score of National Housing Finance & Investment Company Limited (NHFIL) in 2015 was also below the required minimum score of 0. This is due to the fact that the cash flow in 2015 was on the negative side. On the other hand Z score of NHFIL in 2015 is higher than the required minimum score of 0.862 as cash flow is not an independent variable required in Springate, the Z score did not report this problem but for predicting the solvency of Housing Finance Company Z and H scores both are considered so it can be said that National Housing Finance and Investment Company (NHFIL) has not performed well in 2013, 2015, 2016 and in 2017 according to the Z and H scores which have been calculated by using Springate and Fulmer models. But the company NHFIL has performed very well in 2014 as the Z and H scores are both higher than the required minimum scores.

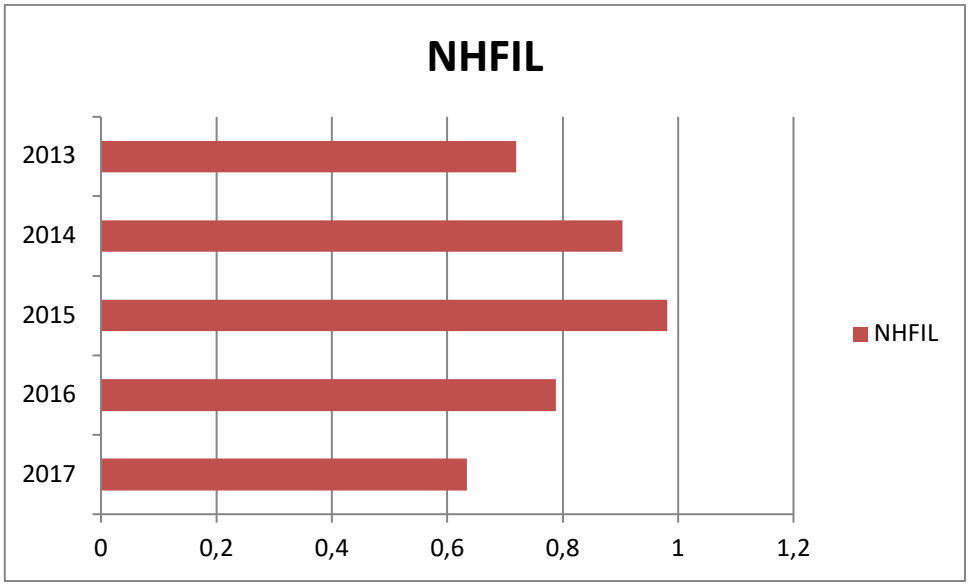

Figure 2. Z score of Housing Finance Company (NHFIL)

This graph helps to identify easily the higher and the lower Z scores. According to figure 2, it can be said that in 2015 the Z score of National Housing Finance and investment company (NHFIL) was 0.981 which was higher compared to the rest of the years because in 2015 the current liability was lower than the rest of the four years and in 2017 the Z score of National Housing Finance and investment company (NHFIL) was 0.634 which was lower compared to the rest of the years because in 2017 the current liability was higher than the rest of the four years.

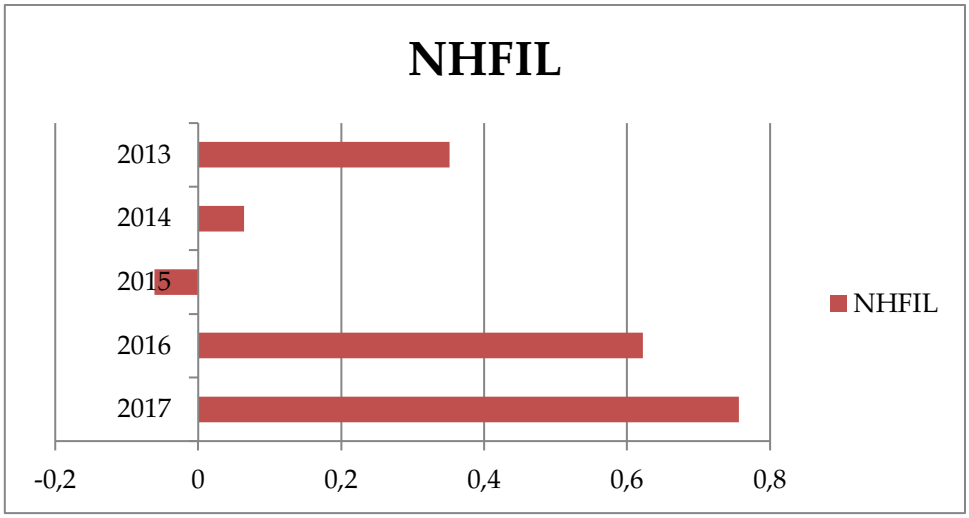

Figure 3. H score of Housing Finance Company (NHFIL)

This graph helps to identify easily the higher and the lower H scores. According to figure 3, it can be said that the H score of National Housing Finance and Investment Company (NHFIL) in 2017 was 0.755 which was higher compared to the rest of the four years and in 2015 the H score was on the negative side -0.06 which was lower compared to the rest of the years because the cash flow was on negative side.

Table 4. Z & H scores of Investment Finance Companies

Z Score	2017	2016	2015	2014	2013	H Score	2017	2016	2015	2014	2013
FASFIN	0.441	0.512	0.447	0.492	0.656		0.791	0.737	0.802	0.79	0.83
LANKA	0.721	0.602	0.764	0.871	0.624		0.956	1.056	0.895	0.42	0.58
PRIMEFIN	0.429	0.085	0.244	0.742	0.456		-0.16	0.242	0.751	0.69	0.90
UNION	0.677	0.802	0.796	0.740	0.468		-0.16	-0.31	-0.41	-0.2	0.06
UTTARA	0.532	0.578	0.758	0.491	0.632		0.619	0.514	0.410	0.68	0.86
BDFinance	0.731	0.795	0.771	0.748	0.813		0.553	0.431	0.415	0.38	0.42
Phoenix	0.710	0.716	0.654	0.664	0.70		0.609	0.646	0.750	0.77	0.67
FAREAST	0.439	0.763	0.871	0.947	0.879		-0.64	-0.19	-0.16	-.15	-.39
ISLAMIC	0.461	0.509	1.036	0.753	0.732		0.758	0.788	0.201	0.45	0.37

Table 4 shows the Z and H scores of all the companies under Investment Finance. For the Lanka Bangla Finance the Z score of 2014 is 0.871, for the Fareast the Z score of 2015, 2014 and 2013 are 0.871, 0.947 & 0.879 respectively and for the Islamic Finance the Z score of 2015 is 1.036 which are above the required minimum score of 0.862. On the other side, for the year 2013 to 2017 the H scores of FAS Finance and Investment Limited, Lanka Bangla Finance Limited, Uttara Finance and Investment Limited, Islamic Finance and Investment Limited, Phoenix Finance and Investment Limited, Bangladesh Finance and Investment Company Limited are above the required minimum score of 0. So, it can be said that based on Springate Model in 2014 Lanka Bangla Finance, in 2013 to 2015 Fareast Finance and Investment Company Limited and in 2015 Islamic Finance and Investment Limited have performed well as the Z scores are above the required minimum score 0.862. Based on Fulmer Model from 2013 to 2017 FAS Finance and Investment Limited, Lanka Bangla Finance Limited, Uttara Finance and Investment Limited, Islamic Finance and Investment Limited, Phoenix Finance and Investment Limited, Bangladesh Finance and Investment Company Limited have performed well as the H scores are above the required minimum score 0.

Table 5. Z & H Score of Investment Finance Company (Below the Required Minimum Scores)

Z Score	**2017**	**2016**	**2015**	**2014**	**2013**	**H Score**	**2017**	**2016**	**2015**	**2014**	**2013**
FASFIN	0.441	0.512	0.447	0.492	0.656						
LANKA	0.721	0.602	0.764		0.624						
PRIMEFIN	0.429	0.085	0.244	0.742	0.456		-0.16				
UNION	0.677	0.802	0.796	0.740	0.468		-0.16	-0.31	-0.41	-0.2	
UTTARA	0.532	0.578	0.758	0.491	0.632						
BDFinance	0.731	0.795	0.771	0.748	0.813						
Phoenix	0.710	0.716	0.654	0.664	0.70						
FAREAST	0.439	0.763					-0.64	-0.19	-0.16	-.15	-.39
ISLAMIC	0.461	0.509		0.753	0.732						

From the table 5, it can be said that the separate list of the companies of Z and H scores which are below the required minimum score of 0.862 and 0. The table shows that the Z scores of FAS finance and Investment Limited are below the required minimum scores for 2013 to 2017. The reason that has been worked behind this was the higher current liabilities compared to the other companies under the investment finance. Again, the working capital, EBIT and sales of 2013 to 2017 are lower compared to the other companies. That's why the value of the Z score is low. For

the Lanka Bangla Z scores of 2017, 2016, 2015 and 2013 are below the required minimum score of 0.862 because the current liabilities of 2017, 2016, 2015 and 2013 were 32,357,205,908, 30,044,109,653, 17,590,129,357, 14,405,095,288 respectively which were higher comparatively to the current liability of 2014 because in 2014 the current liability was 10,043,616,801**.** That's why the calculated Z score of 2014 is 0.871 which is above the required minimum score of 0.862 and Z scores of the rest of the four years are below the required minimum score of 0.862. Again in 2014 the Z score of Lanka Bangla Finance is above the required minimum score of 0.862 because the working capital, EBIT and sales are higher compared to the 2013, 2015, 2016 and 2017.

For the Prime Finance and Investment Company Limited, Union Capital Limited, Uttara Finance Limited, Bangladesh Finance and Investment Company Limited and Phoenix Finance and Investment Limited the Z scores of all 5 years are below the required minimum score because their current liabilities were high and the sales, EBIT and working capital are low compared to the other companies. The Z score of the Fareast Company of 2017 and 2016 were below the required minimum score and in 2013 to 2015 the Z scores are above the minimum required scores because the current liabilities of 2013 to 2015 were low compared to the current liabilities of 2016 and 2017 and the sales and EBIT of 2013 to 2015 were low compared to 2016 and 2017. Again, the Z scores of Islamic Finance and Investment Limited for 2017, 2016, 2014 and 2013 are below the required minimum score 0.862 and for 2015 it is above the required minimum score for lower current liabilities compared to the current liabilities of 2017, 2016, 2014 and 2013 and the total assets of 2015 was low compared to the rest of the four years that's why the Z score is high compared to the other years.

According to the Springate Model, Lanka Bangla Finance has performed well in 2014, Fareast Finance and Investment Limited has performed well in 2013 to 2015 and Islamic Finance and Investment Limited has performed well in 2015.

According to the H scores of FAS Finance and Investment Limited, Lanka Bangla Finance Limited, Uttara finance and investment Limited, Phoenix Finance and Investment Limited and Bangladesh Finance and Investment Company Limited have performed well in 5 years 2013 to 2017. Prime finance and investment Limited has performed well in 2013 to 2016 but in 2017 it has not performed well as the H score is below the minimum required score 0. This is due to the following reasons

Net Income before Taxes and Interest (EBIT) was on the negative side.

Retained Earnings was on the negative side.

Union Capital Limited has performed well in 2013 as the H score is the above the required minimum score of 0. But it has not performed well in 2014 to 2017 as the H scores of those four years are below the required minimum scores of 0 because in 2014 to 2017 total liabilities of Union Capital are higher than the total liability of 2013. That's why the H score in 2013 is positive but according to the calculation H scores are negative from 2014 to 2017.

The performance of Fareast Finance and investment Limited was not so well in past 5 years according to the Springate and Fulmer Models. In 2017 the H score is below the required minimum score because the cash flow and the retained earnings are on the negative side. In 2013 the H score was negative because the retained earnings are on negative side. In 2014 to 2016 the H scores become negative because the current liabilities were high that why the calculated v5 is high and the H score is negative which is below the required minimum score 0.

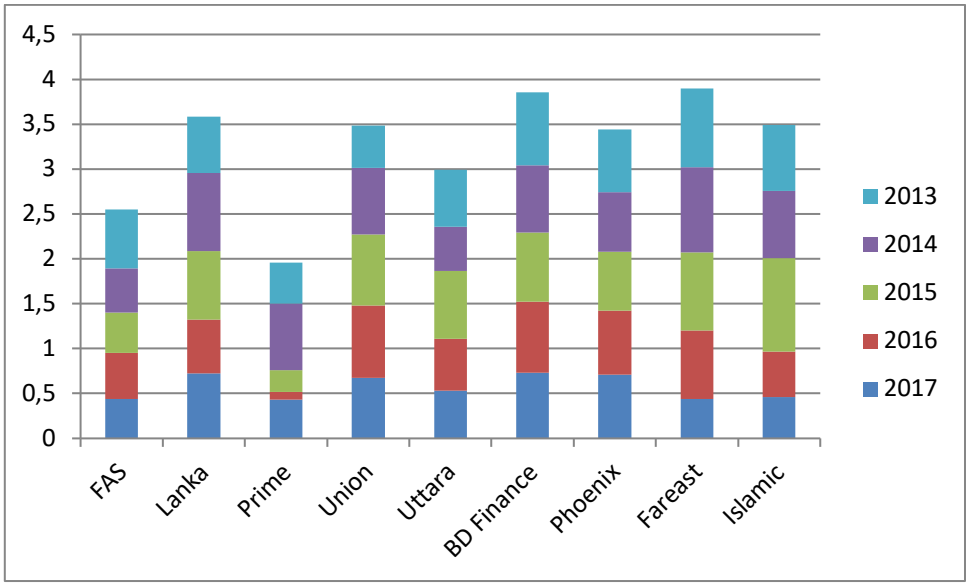

Figure 4. Z scores of Investment Finance Companies

Figure 4 helps to identify the higher and lower Z score of the investment company. With the help of this graph the comparison of the performances of all the Investment Finance Companies over years or with the other investment companies can be made easily. From the graph it can be seen that for 2015 the Z score of Islamic Finance and Investment Limited is 1.036 which is higher than other 8 companies and for 2016 the Z score of Prime Finance and Investment Limited is 0.085 which is lower than other 8 companies.

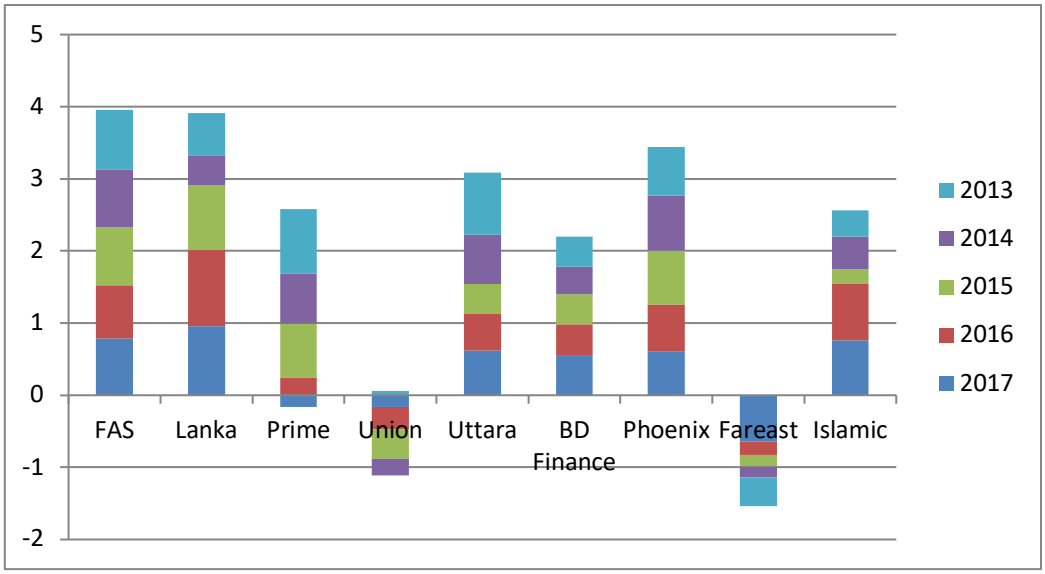

Figure 5. H scores of Investment Finance Companies

Figure 5 helps to identify the highest and the lowest H scores of the investment Finance company. The graph shows that for 2016 the H score of Lanka Bangla Finance Limited is 1.056 which is higher than other 8 companies and for 2017 the H score of Fareast Finance and Investment Limited is -0.64 which is lower than other 8 companies. Again, the graph shows that Union Capital Limited and Fareast Finance Limited have not performed well as the H Scores are negative.

Table 6. Asset or Leasing Finance Companies

Z Score	**2017**	**2016**	**2015**	**2014**	**2013**	**H Score**	**2017**	**2016**	**2015**	**2014**	**2013**
UNITED	0.677	0.679	0.674	0.599	0.646		0.434	0.09	.316	0.41	0.47
IPDC	0.555	0.558	0.782	0.832	0.716		0.629	0.69	1.02	0.95	0.85
IDLC	0.686	0.741	0.474	0.480	0.509		0.87	0.64	1.10	0.93	0.98
GSP	0.788	0.766	0.687	0.679	0.629		0.85	0.90	0.93	0.68	0.83
International Leasing	0.505	0.757	0.828	0.763	0.715		0.281	-.04	-.29	-.18	-.11
FIRST	0.464	0.427	0.591	0.725	0.835		1.45	0.64	0.37	0.37	0.32
BIFC	-.960	-0.13	0.09	0.453	0.461		-2.73	0.09	0.44	0.86	0.72
PREMIER	0.369	0.367	0.316	0.486	-0.30		1.099	0.72	0.76	0.45	0.71
BAY Leasing	0.656	0.616	0.567	0.678	0.643		0.768	0.73	0.81	0.85	1.13
PLFSL	0.423	0.651	0.240	0.812	0.841		0.020	-.40	0.14	0.14	0.17

From table 6, it can be seen that Z & H scores of all asset or leasing finance companies. According to the calculation based on Springate Model the Z scores of all the asset or leasing finance companies are below the required minimum score 0.862. But the Z scores of IPDC Finance and People's Leasing Financial Service Limited in 2013 and 2014 are nearly the required minimum score 0.862. The Z scores of Bangladesh Industrial Financial Co. Limited are very poor.

From the H scores, according to the calculation based on Fulmer Model all the companies have performed well except international Leasing Financial Service limited in 2013 to 2016, Bangladesh Industrial Finance Co. Limited in 2017 and People's Leasing Financial Service Limited in 2016.

Table 7. Z & H Scores of Asset/Leasing Finance Companies (Below the Required Minimum)

Z Score	**2017**	**2016**	**2015**	**2014**	**2013**	**H Score**	**2017**	**2016**	**2015**	**2014**	**2013**
UNITED	0.677	0.679	0.674	0.599	0.646						
IPDC	0.555	0.558	0.782	0.832	0.716						
IDLC	0.686	0.741	0.474	0.480	0.509						
GSP	0.788	0.766	0.687	0.679	0.629						
International Leasing	0.505	0.757	0.828	0.763	0.715			-.04	-.29	-.18	-.11

FIRST	0.464	0.427	0.591	0.725	0.835						
BIFC	-.960	-0.13	0.09	0.453	0.461		-2.73				
PREMIER	0.369	0.367	0.316	0.486	-0.30						
BAY Leasing	0.656	0.616	0.567	0.678	0.643						
PLFSL	0.423	0.651	0.240	0.812	0.841			-.40			

The reasons that work behind the low Z scores are in 2013 to 2017 EBIT and sales were lower than the other companies. That's why the Z score is low and it cannot cross the required minimum score 0.862. For, IPDC Finance Limited, IDLC Finance Limited, GSP Finance Company Limited, International Leasing & Financial Service Limited, First Finance Limited, Premier Leasing & Finance Limited, Bay Leasing & Investment same reason has worked behind the lower Z score than the required minimum score. The Z score of Bangladesh Industrial Finance Co. Limited in 2017 is negative because the current liability of 2017 was higher than the current assets. In 2016 the Z score in negative because EBIT was only on negative side. In 2013 to 2015 the EBIT was low that's why the calculated Z score is low.

Again, according to the calculation of H scores based on Fulmer Model all the companies have performed well except international Leasing Financial Service limited in 2013 to 2016, Bangladesh Industrial Finance Co. Limited in 2017 and People's Leasing Financial Service Limited in 2016. The reasons that work behind the negative H scores are retained earnings, sales and EBIT were low that's why the calculated value of v1, v2, v3 are low and liabilities were high that's why v5 is high and for all the values the calculated H score is low means negative.

The H score of Bangladesh Industrial Finance Co. Limited in 2017 is negative because the retained earnings and the cash flow were on negative side.

The H score of People's Leasing Financial Service Limited in 2016 is negative or below the required minimum score o because the cash flow, EBIT and the retained earnings were on negative side.

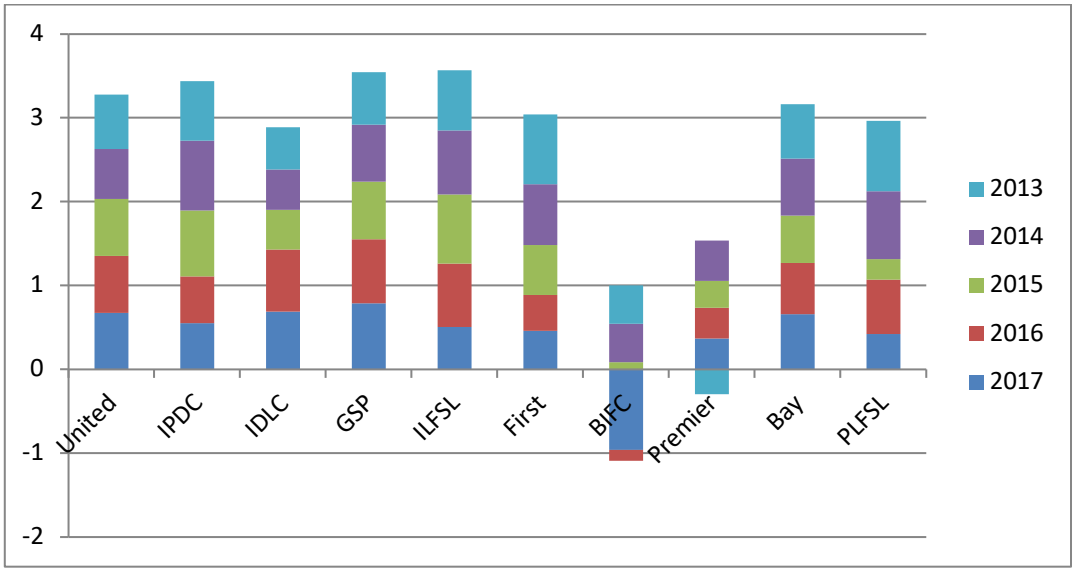

Figure 6. Z scores of Asset/Leasing Finance Companies

Figure 6 helps to identify the higher and lower Z scores of the asset or leasing finance company. From the graph it can be said for 2013 the Z score of People's Leasing and Financial Service Limited is 0.841 which is higher than other 9 companies and for 2017 the Z score of Bangladesh Industrial Finance Company Limited is -0.960 which is lower than other 9 companies. The performance of Bangladesh Industrial Finance Co. Limited in 2016, 2017 and Premier Finance and Investment Limited in 2013 is poor as the calculated Z scores are on negative side.

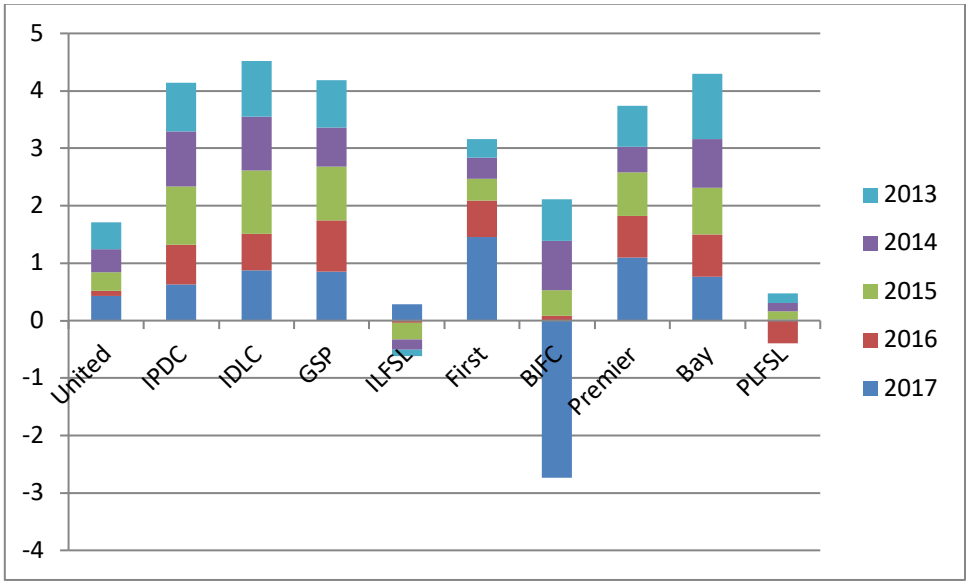

Figure 7. H scores of Asset/Leasing Finance Companies

Figure 7 helps to identify the higher and lower H scores of the asset or leasing finance company. For 2017 the H score of First Finance Limited is 1.45 which is higher than other 9 companies and for 2017 the Z score of Bangladesh Industrial Finance Company Limited is -2.73 which is lower than other 9 companies.

Segment Leaders:

The average value or the mean value of Z and H score of all the five years are taken for further analysis. The following table contains average Z score and average H score of different NBFIs.

Table 8. Average Z Scores of 20 listed NBFIs for the period 2013 to 2017

Housing Finance Companies		**Investment Finance Companies**		**Asset/Leasing Finance Companies**	
Company Name	*Average Z Scores*	*Company Name*	*Average Z Scores*	*Company Name*	*Average Z Scores*
NHFIL	0.805582504	FAS	0.510054201	UNITED	0.655052198
		LANKA	0.716568252	IPDC	0.688462007
		PRIME	0.391535515	IDLC	0.578306736
		UNION	0.696434908	GSP Finance	0.709853211
		UTTARA	0.598494758	International Leasing	0.713558876
		BD Finance	0.771549272	FIRST	0.608327195
		PHOENIX	0.688430886	BIFC	-0.01722768
		FAREAST	0.779994472	PREMIER	0.248563784
		ISLAMIC	0.698434973	BAY Leasing	0.632095211
				PLFSL	0.593367577

From the table 8, it is evident that the Z scores of National Housing Finance and Investment Limited (NHFIL) from housing finance segment, Fareast Finance and Investment Company from investment finance segment and International Leasing Financial Service Limited from asset or leasing segment are 0.805582504, 0.779994472, 0.713558876 respectively. So, it can be easily said according to the average Z scores that these three companies lead the market.

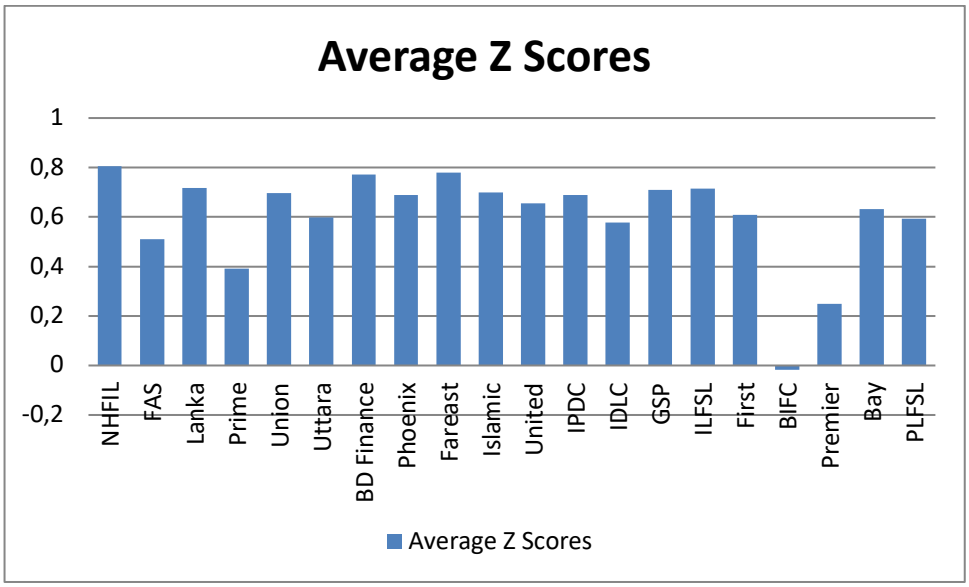

Figure 8. Average Z Scores of 20 listed NBFIs

From the figure 8, it is evident that National Housing Finance and Investment Limited (NHFIL), Fareast Finance and Investment Company and International Leasing Financial Service Limited are the leaders in Housing Finance, Investment Finance and Asset Finance segment respectively according to the average Z scores of the Springate Model. This means that these companies have very high level of solvency when compared to others based on average Z scores. Again, when a comparison is made between the 20 companies, it is easily understood from the graph that National Housing Finance Limited (NHFIL) has performed very well and the performance of Bangladesh Industrial Finance Co. Limited is poor among the 20 Non-Banking Financial Institutions based on the calculated average Z scores by using Springate Model.

Table 9. Average H Scores of 20 listed NBFIs for the period 2013 to 2017

Housing Finance Companies		**Investment Finance Companies**		**Asset/Leasing Finance Companies**	
Company Name	*Average H Scores*	*Company Name*	*Average H Scores*	*Company Name*	*Average H Scores*
NHFIL	0.805582504	FAS	0.790687338	UNITED	0.343257697
		LANKA	0.781836521	IPDC	0.827506085
		PRIME	0.48408727	IDLC	0.904300548
		UNION	-0.209266625	GSP Finance	0.836741524
		UTTARA	0.617595136	International Leasing	-0.067513127
		BD Finance	0.439477335	FIRST	0.631438914
		PHOENIX	0.688661666	BIFC	-0.124469703
		FAREAST	-0.306767546	PREMIER	0.748572807
		ISLAMIC	0.513311264	BAY Leasing	0.858743765

				PLFSL	0.014397184

From the table 9, it is evident that the average H scores of National Housing Finance and Investment Company (NHFIL) from housing finance segment, FAS Finance and Investment Company from investment segment and Bay Leasing and Investment Limited from asset or leasing finance segment are 0.346322917, 0.790687338, 0.858743765 respectively. So, it can be easily said that these three companies lead the market according to the average H scores based on Fulmer Model.

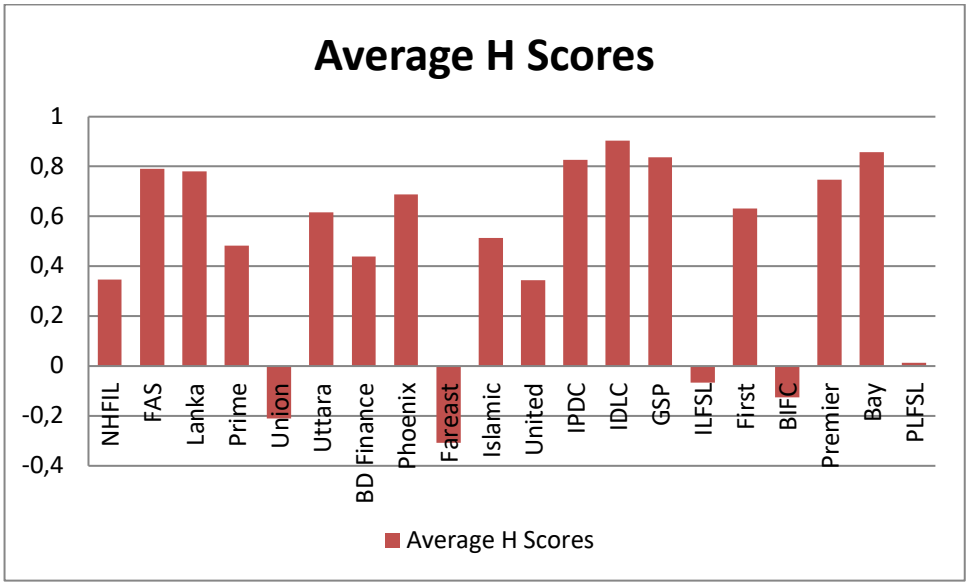

Figure 9: Average H Scores of 20 listed NBFIs

From the figure 9, National Housing Finance and Investment Company (NHFIL), FAS Finance and Investment Company and Bay Leasing and Investment Limited are leaders in Housing Finance, Investment Finance and Asset Finance respectively according to the average H scores of the Fulmer Model. This means that these companies have very high level of solvency when compared to others based on average H scores. Again, when a comparison is made between the 20 companies, it is understood from the graph that Bay Leasing and Investment Limited has performed very well and Fareast Finance and the performance of Investment Limited is poor among the 20 Non-Banking Financial Institutions based on the calculated average H scores by using Fulmer Model.

Findings of the Study:

The main purpose of this study is to predict the solvency of listed Non-Banking Financial Institutions (NBFIs) and also find out the factors that have an impact on solvency. With the help of this study two things can be understood. First of all, a comparison can be made of a NBFI's performance over years or with other NBFIs in an industry. From the Z scores of National Housing Finance and Investment Limited and from the performance of NHFIL over the years it can be easily understood that the performance is not so good but according to the H scores it has performed well.

Again, among 20 listed NBFIs National Housing Finance and Investment Limited has performed well based on the average Z scores. According to H scores among 20 listed Non-Banking Financial Institutions IDLC Finance Limited has performed very well as it has the highest H score.

In addition, based on Z scores no company can attain the minimum Z score 0.862 as per Springate Z score model. So according to Springate Z score model these 20 companies are insolvent or in risky zone. However, according to Fulmer H score model based on H scores except Union Capital Limited, Fareast Finance and Investment Limited, Bangladesh Industrial Finance Co. Limited and International Leasing and Financial Services Limited are insolvent as they have failed to attain the minimum H score but the rest 16 companies are solvent or in out of danger.

Both Springate and Fulmer models demonstrate the financial conditions of the companies based on the financial data but the results are different for both models. Fulmer model has identified few companies are insolvent while Springate model has indicated that all the companies are insolvent.

Limitations:

The Research has been conducted on Predicting Solvency of listed Non-Banking Financial Institutions (NBFIs) of Bangladesh based on last five years (2013 to 2017) using Springate and Fulmer Models. There are 23 listed Non-Banking Financial Institutions in Bangladesh. But in this paper 20 listed Non-Banking financial institutions have been covered. Because of the shortage of the information of other three NBFIs Delta Brac Housing Finance Corporation Limited, MIDAS Financing Limited and Investment Corporation of Bangladesh Limited (ICB) have not been included in this paper. So, it was a limitation of this study.

Conclusion:

The main focus of this study is to find out the financial solvency of publicly traded Non-Banking Financial Institutions (NBFIs). This study is effective for the both shareholders and the stakeholders in making decisions for future investments. From all the findings and analysis of twenty Non-Banking Financial Institutions (NBFIs) using Springate Z score model and Fulmer H score model, it can be understood that according to Z scores these twenty NBFIs are insolvent though some of them are nationally or internationally known for their outstanding performances and for their contribution to the economic development of our country. Again, Fulmer H score model gives the opposite result that sixteen Non-Banking Financial Institutions are solvent out of twenty companies. So, it can be concluded that may be Springate Z score model is not appropriate for Bangladesh. Fulmer H score model is more appropriate for our country for predicting solvency because in Fulmer model more variables are used compare to Springate Model.

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