

Assessing Financial Distress and its Association with Leverage, Liquidity and Profitability: Evidence from Textile Industry of Bangladesh

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ABSTRACT

Objective: The study is aimed to determine the occurrence of financial distress and its interconnections with leverage, liquidity and profitability in the listed textile companies of Bangladesh prevailing for the period of 2011 to 2021.

Design/methodology: This empirical study is based on the secondary data. The data for this study is retrieved from the annual financial statements of textile companies listed in Dhaka stock exchange (DSE). The analysis examines 33 firms over a period of 11 years stretching from 2011 to 2021. Altman Z score model is used here as a barometer for assessing financial distress in Bangladeshi textile industry. Considering the financial distress as a categorical variable forward (stepwise) logistic regression model is used to address the association of leverage, liquidity and profitability with the financial distress.

Results: Results of Z score confirmed that seventeen firms were in safe zone during the whole study period when nine firms showed a distressing tendency during the whole study period. Further the study concluded that liquidity (in model III) and profitability (in model II & III) have significant negative influence on the probability of financial distress. Where, leverage held significant negative influence on the financial distress throughout estimated model I, model II and model III.

Significance: This study may be used as an effective tool for the firm's management, policy makers, stockholders, government and other interested parties of Bangladeshi textile industry. This study can serve as valuable evidence for firm's managers regarding any

financial decisions or to detect early signal of financial distress. The revealed influences of leverage, liquidity and profitability on financial distress will serve as a benchmark for the managers to set up various controlling measures.

Keywords: Altman Z score, Bangladesh, Bankruptcy, Financial distress, Leverage, Liquidity, Logistic regression, Profitability, Textile industry

INTRODUCTION

Financial distress, one of the harbingers of bankruptcy, is a situation where the company experiences insufficiency to satisfy the creditor's obligations through its existing cash inflows or where the company is unable to fulfill the regular operating expenses. According to Ray (2011) a firm experience corporate financial distress where there is violation of loan contracts and when organization incur constant losses and fails to honor obligation as when it becomes due. A firm is termed as a financially distressed firm if it faces operating, investing and financial difficulties to the extent that it is not able to settle its obligation when it becomes due (Adeyemi, B., 2012). As the world economy is experiencing a hard time ever, the competitiveness and survival issues are also seeking more concerns from the policy makers and all other stakeholders.

In Bangladesh, the textile industry being the leading sector in its economy generates largest amount of export earnings. In the

fiscal year 2020-2021, this sector has contributed about 81.82% of total export. Even this contribution was more during 2018-2019 & 2019-2020 i.e., 84.21% & 83% respectively. (Source: Comparative Statement on Export of RMG & Total Export of Bangladesh, BGEMA). Consequences of Covid-19 and rising prices including fuel and food, especially due to Ukraine war is putting stress on this sector. The situation is getting worse recently due to possible global recession, unfavorable trade policies and higher cost of inputs etc. If the crisis goes far then many firms in this sector will face financial distress certainly. This widespread alarming situation triggers this study to be focused on this sector. Hopefully early prediction of financial distress and proper identifications of its factors may relief its stakeholders through putting some light on their dark shadows. If a company cannot overcome the distressing situation, then this will lead the company to bankruptcy. Therefore, an early identification of financial distress is crucial for a firm. An early assessment of financial distress may open a ground for the management to avoid potential bankruptcy. Fundamentally, a company constitutes an organized effort to earn profit by keeping eyesight on its survival concern. This survival largely depends on the liquidity and level of leverage. A low liquidity and high leverage may put a firm in trouble in crisis times. A decline in profit for long run or during downfall firms borrow more funds in order to pay off debts as they mature which are likely to increase potential risk of financial distress. As trade-off theory (Modigliani & Miller, 1963) state there is a trade-off between the tax advantages of leverage and the cost of potential financial distress, many empirical studies also report the same relationships. This combined nexus of leverage, liquidity and profitability may move forwards a firm toward financial distress. The empirical results relating to financial distress is mixed and debated. Numerous studies also have conducted on financial distress in Bangladesh. Some

studies postulated the financial distress conditions in some selected sectors; others examined the micro and macro factors of financial distress. Those studies revealed partial results on this issue to some extent. With an urge to fill the gaps in prior empirical evidence and validate theoretical evidences too, this study mainly considering three firm specific factors i.e., leverage, liquidity and profitability as potential predictors of financial distress. Therefore, this study will try to answer two questions: (a) is the textile sector experiencing any financial distress? (b) Is there any association of financial distress with firm's leverage, liquidity and profitability?

The remaining part of this paper is proceeded as follows: "Literature review" section provides a brief of relevant studies, "Methodology" section explains the data and methodology, "Results and discussions" section presents the results and related discussions and "Conclusion" section elicits the ending remarks.

LITERATURE REVIEW

In the dynamism of global business, measuring the financial health is widespread in empirical and theoretical literature. As a consequence, extensive amounts of research have conducted on financial distress throughout the world. Aziz and Dar (2006) evaluated 89 studies on probability of bankruptcy conducted between 1968 and 2003 and admired the effectiveness of Z-Score model. Zhang et al. (2006) and Sandin & Porporato (2007) valued the Z-score as an effective tool for financial distress prediction. Many other studies like (Gunathilaka, 2014), (Alexeev & Kim, 2008), (Foo, 2015), (Mizan et al., 2011), (Agarwal & Taffler, 2007) & (Pradhan, 2014) used the Z-score model for distress prediction and reported feasibility of the Z-Score model.

Isayas (2021) summarized that with other studied variables, leverage is negatively correlated with financial distress. Wesa & Otinga (2018) noted that as leverage significantly influence financial distress,

firms should ensure payment of short term obligations keeping the firm's ROI satisfactory. Gathecha (2016) stated that leverage has a positive as well as statistically significant impact on financial distress. Chancharat (2008) performed an analysis based on a sample of 1,117 publicly listed Australian companies for a period of 1989 to 2005. Results of this analysis states that corporate financial distress raises when firm use more and more leverage in its capital structure. Khaliq, et al. (2014) stated that as liquidity increases, firm's ability to pay short term obligations increases and as such firm will be less likely to be distressed. In contrary to this, high leverage may force a firm to be distressed.

Study conducted by Gathecha (2016) summarized that liquidity has a negative as well as statistically significant impact on the distress of the NSE listed non-financial companies. Thim et al. (2011), Platt & Platt (2002) and Hashi (1997) also reported a negative association between firm's liquidity and financial distress; as liquidity crisis create a risk of financial distress. Distress situation can force a firm to sell assets less than original value which triggers the situation in bad ways. Enough liquidity can be protective as firms are not bound to sell the assets to fulfill obligations stated by (Shleifer & Vishny, 1992). But Kristanti et al. (2016) indicated that liquidity has a positive link with financial distress. Studies like Tesfamariam (2014), Ikpesu & Eboiyehi (2018) also reported that liquidity has a significant positive influence on financial distress. Wesa & Otinga (2018) noted that liquidity significantly influences financial distress emphasizing that firm should maintain optimal liquidity and debt level. However, research work by (Baimwera & Murinki, 2014) revealed that liquidity had no significant influence on corporate financial distress. Liquidity assists a firm to avoid higher cost of financing and protect the firm from financial distress stated by (Mikkelson & Partch, 2003). Papoulias & Theodossiou (1992) and Zhang, et al. (1999) also reported that

financial distress decreases as liquidity increases.

Chang-e (2006) stated that financially distressed firm should take actions to reorganize the business to increase profitability. It indicates a positive influence of profitability on firm's financial distress. Higher profitability dignifies a firm as a financially healthy firm. Accordingly, any negative signal in firm's profitability treated as unhealthy and creates a risk of financial distress (Hashi, 1997). Campbell et al. (2005) conducted a study on corporate failure and the pricing of financially distressed stocks and revealed that poor profitability provokes the level of financial distress. Platt & Platt (2002) stated that profitability is negatively related with the probability of financial distress. Isayas (2021) summarized that profitability is negatively correlated with financial distress. Many other studies like (Gombola, et al., 1987; Ohlson, 1980; Papoulias & Theodossiou, 1992 & Theodossiou, 1991) reported negative influence of profitability on firm's financial distress. Rohmadini (2018) and Simanjuntak et al. (2017) both studies reveal that profitability has no effect on financial distress. Moreover, (Pranowo et al, 2010) found that profitability ratio has no significant impact but leverage has a significant negative impact on financial distress.

Nurhayati et al. (2018) used logistic regression and reported a negative influence of liquidity and profitability on firm's financial distress. Waqas & Md-Rus (2018) reported profitability and liquidity has significant negative relationship with probability of financial distress whereas leverage shows significant positive relationship with financial distress. Rafatnia et al. (2020) found statistically significant profitability, liquidity and leverage in distinguishing distressed from non-distressed firms. It states a negative influence of profitability but positive influence of liquidity and leverage on probability of financial distress. Contrast to this, Chabachib et al. (2019) states no

significant relationships of profitability and liquidity with financial distress. Moch et al. (2019) conducted a study on a number of variables to explore the significance on financial distress. The result states that profitability and liquidity have negative contribution and leverage has positive contribution on the occurrence of financial distress.

METHODOLOGY

Objectives:

The study is intended to accomplish the following objectives:

- To elicit the existence of financial distress in Bangladeshi textile firms;
- To disclose whether there is any association of financial distress with firm's leverage, liquidity and profitability;

Sampling:

From the total population of 58 textile firms listed in DSE, 33 companies those have 12 years of audited financial statement from 2010 to 2021 are considered as a sample. Financial statements of 2010 are also used as this year's data is required for calculating the variables for the year 2011. The data were strongly balanced panel types, which captured both cross-sectional and time-series behaviors. The sampling criteria are as follows:

- Textile Companies listed in the Dhaka stock exchange and not out (delisting) of the stock exchange during the study period.
- Companies that published financial reports during the study period

Methods:

The study is conducted into two stages. In the first stage, financial distress of the sampled firms is calculated using Altman's Z-score model (1968) for each sampled firms for each year. This model is developed by Edward I. Altman professor in 1968 for publically manufacturing companies. Altman used a multiple discriminant analysis which combines ratios in a

multivariate context. Altman examined a list of twenty two possible ratios on a sample of 66 public manufacturing companies located in America out of which there were 33 companies that went bankrupt and 33 companies selected randomly that never went bankrupt and finally chose five after performing numerous tests for the discriminant function. The Z-Score model of 1968 for publically manufacturing companies is:

$$Z = 1.2 X_1 + 1.4 X_2 + 3.3 X_3 + 0.6 X_4 + 1.0 X_5$$

Where:

X₁: Working Capital / Total Assets

X₂: Retained Earnings / Total Assets

X₃: Earnings before Interest and Taxes / Total Assets

X₄: Market Value Equity / Total Liabilities

X₅: Annual Sales / Total Assets

Where a value of $Z \geq 2.99$ indicates a "Financially Healthy Zone", a score of $2.99 > Z > 1.81$ indicates "Grey or Safe Zone" and a score of $Z \leq 1.81$ indicates "Distress Zone".

In the second phase, logistic regression is used to find out the association of leverage, liquidity and profitability with financial distress. These financial ratios are selected on the basis of their significance in prior literature. Stepwise Logistic regression is used to determine the effects of these predictor variables on financial distress through adding these variables one by one, initially starting with a null variable model. Here financial distress is considered as binary variable; Z-score value less than or equal to 1.81 is considered as financial distress and Z-score value greater than 1.81 is considered as No Financial Distress. In logistic regression model "Financial Distress" is coded as "1" where "No Financial Distress" is coded as "0". This method verifies the strengths and associations of the selected predictor variables in predicting financial distress. "-2 Log Likelihood" value and "Omnibus tests of model coefficients" is considered to

evaluate the feasibility of logistic regression results. “Cox & Snell’s R²” and “Nagelkerke’s R²” values are used to indicate how much variation in the dependent variable is explained by this model.

The logistic regression model is shown in the following formula:

$$P(Y_i) = \beta_0 + \beta_1 X_{i,t} + \beta_2 X_{i,t} + \dots + \beta_n X_{i,t} + \epsilon_{i,t} \quad \dots \dots \dots (i)$$

Where:

X_i: Explanatory variable(s)

Y_i: Binary dependent variable; Value “1” if the financial distress (event) occurs or “0” if the financial distress (event) does not occur

Equation (i) can be written in the logistic regression functional form as:

$$P(Y_i) = \ln \frac{1}{(1-P)} = \beta_0 + \beta_1 X_{i,t} + \beta_2 X_{i,t} + \dots + \beta_n X_{i,t} + \epsilon_{i,t} \quad \dots \dots \dots (ii)$$

Here, P is the probability of occurring financial distress. The formula can be revised as follow:

$$P = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_{i,t} + \beta_2 X_{i,t} + \dots + \beta_n X_{i,t} + \epsilon_{i,t})}} \quad \dots \dots \dots (iii)$$

For the dependent and explanatory variables considered in this study equation (ii) can be written as follow:

$$P(\text{Financial Distress } i) = \ln \frac{1}{(1-P)} = \beta_0 + \beta_1 \text{Leverage }_{i,t} + \beta_2 \text{Liquidity }_{i,t} + \beta_3 \text{Profitability }_{i,t} + \epsilon_{i,t} \quad \dots \dots \dots (iv)$$

Cox & Snell’s R² formula:

$$R^2_{CS} = 1 - \exp \left[\frac{(-2LL(New)) - (-2LL(baseline))}{n} \right] \quad \dots \dots \dots (v)$$

Nagelkerke’s R² formula:

$$R^2_N = \frac{R^2_{CS}}{1 - \exp \left[\frac{-2LL(baseline)}{n} \right]} \quad \dots \dots \dots (vi)$$

Variables:

Here the dependent is a categorical variable and independent variables are continuous variables calculated in ratio scale. The descriptions of these variables are summarized below:

Table-1: Variables in Logistic Regression

Variables	Formula	Definition
Financial distress	$Z = 1.2 X_1 + 1.4 X_2 + 3.3 X_3 + 0.6 X_4 + 1.0 X_5$ Where: X ₁ : Working Capital / Total Assets X ₂ : Retained Earnings / Total Assets X ₃ : EBIT / Total Assets X ₄ : MV of Equity / Total Liabilities X ₅ : Annual Sales / Total Assets	Financial distress is a condition of financial difficulties when firm is unable to pay off its obligations. There are two groups: firms with probability of financial distress and firms with no probability of financial distress.
Leverage	$\frac{\text{Total liabilities}}{\text{Total equity}}$	Leverage ratio measures the long-term solvency of a firm considering its ability to meet long-term debt obligations
Liquidity	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	Liquidity ratio measures the firm’s ability to fulfill its short-term obligations and reflect its short-term financial strength.
Profitability	$\frac{\text{Net Income}}{\text{Average Shareholder's equity}}$	Profitability ratio measures the ability of a firm to generate earnings.

RESULTS AND DISCUSSIONS

This section is divided into two sub-sections: Z score results and logistic regression results. Z-score results of table-2

summarize the findings regarding the current state of financial distress of selected firms. All the subsequent tables contain the

results of logistic regression. The study has employed the Altman Z-score model to identify the degree of financial distress in selected firms.

Table-2: Status of Financial Distress in Bangladeshi Textile Industry

Company Name	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average Tendency
ADL	<i>0.529</i>	<i>0.612</i>	<i>0.816</i>	<i>0.894</i>	<i>0.980</i>	<i>0.946</i>	<i>0.833</i>	<i>0.921</i>	<i>0.924</i>	<i>0.839</i>	<i>0.855</i>	Distress
AHTML	<i>1.447</i>	2.064	2.313	<i>1.694</i>	<i>1.721</i>	2.002	1.900	<i>1.532</i>	<i>0.390</i>	<i>0.336</i>	<i>0.525</i>	Mixed
APEXSPINN	2.827	3.021	2.590	2.797	2.621	2.803	2.933	2.991	3.110	2.877	3.177	Safe
ARGONDENIM	<i>1.284</i>	<i>0.870</i>	1.820	2.154	2.907	2.907	2.702	2.822	2.757	2.529	2.079	Safe
DSHGARME	<i>1.347</i>	<i>0.828</i>	<i>0.861</i>	<i>0.746</i>	<i>1.537</i>	2.033	2.443	2.228	2.330	2.755	1.829	Mixed
DSSL	3.713	3.713	2.609	3.092	2.782	3.842	4.031	4.570	4.861	3.713	3.713	Safe
ENVOYTEX	2.183	1.826	<i>1.670</i>	<i>1.332</i>	<i>1.459</i>	<i>0.993</i>	<i>0.949</i>	<i>1.025</i>	<i>1.298</i>	<i>1.173</i>	<i>1.145</i>	Distress
FAMILYTEX	6.807	4.397	6.624	8.274	7.381	7.784	7.367	7.228	8.455	6.386	6.639	Safe
FEKDIL	2.710	2.819	2.998	1.009	3.890	3.514	3.480	4.532	3.377	3.219	3.245	Safe
GENNEX	<i>1.776</i>	2.035	2.250	4.484	4.632	3.783	3.750	3.627	2.337	1.909	1.813	Safe
HFL	2.540	2.540	2.067	2.802	3.453	2.476	2.311	2.414	2.938	2.920	2.237	Safe
HRTEX	2.070	1.929	2.050	<i>0.467</i>	<i>1.039</i>	<i>1.049</i>	<i>1.450</i>	<i>0.950</i>	<i>1.470</i>	<i>1.075</i>	<i>1.312</i>	Distress
HWAWELLTEX	5.251	5.251	5.062	5.300	4.983	4.448	5.431	4.840	5.228	7.541	5.577	Safe
MAKSONSPIN	2.107	2.326	2.174	2.172	<i>1.765</i>	<i>1.642</i>	<i>1.786</i>	<i>1.534</i>	<i>1.332</i>	<i>1.437</i>	1.912	Mixed
MALEKSPIN	2.082	1.913	<i>1.547</i>	<i>1.666</i>	<i>1.725</i>	<i>1.732</i>	<i>1.749</i>	3.369	2.554	2.024	1.986	Mixed
MATINSPINN	<i>1.667</i>	1.863	2.269	3.515	2.586	2.034	<i>1.668</i>	2.227	2.170	2.318	2.427	Safe
METROSPIN	<i>1.520</i>	<i>1.099</i>	<i>1.349</i>	<i>1.475</i>	<i>1.406</i>	<i>1.286</i>	<i>1.268</i>	<i>1.415</i>	<i>1.611</i>	<i>1.453</i>	2.069	Distress
MHSML	<i>1.449</i>	2.190	2.290	4.212	4.408	4.965	5.266	3.376	<i>0.150</i>	<i>0.135</i>	<i>0.706</i>	Safe
PRIMETEX	<i>1.740</i>	<i>1.324</i>	<i>1.458</i>	<i>1.363</i>	<i>1.351</i>	<i>1.308</i>	<i>1.308</i>	<i>1.179</i>	<i>1.223</i>	<i>1.021</i>	<i>1.316</i>	Distress
PTL	<i>1.364</i>	<i>1.527</i>	<i>1.536</i>	2.451	2.129	<i>1.739</i>	<i>1.480</i>	<i>1.286</i>	<i>1.447</i>	<i>1.434</i>	<i>1.299</i>	Distress
RAHIMTEXT	<i>0.723</i>	<i>0.671</i>	<i>1.080</i>	<i>0.835</i>	<i>1.270</i>	<i>1.531</i>	<i>1.096</i>	<i>0.989</i>	<i>0.988</i>	<i>1.065</i>	<i>1.093</i>	Distress
RNSPIN	3.728	4.512	6.429	7.092	6.770	4.290	4.290	5.273	-1.849	-12.207	-14.756	Safe
SAFKOSPINN	<i>0.732</i>	<i>1.312</i>	<i>1.519</i>	<i>1.735</i>	<i>1.117</i>	<i>1.309</i>	<i>1.143</i>	<i>0.813</i>	<i>0.881</i>	<i>0.523</i>	<i>0.775</i>	Distress
SAIHAMCOT	1.998	2.693	2.614	1.834	2.025	<i>1.675</i>	<i>1.690</i>	<i>1.510</i>	<i>1.516</i>	<i>1.277</i>	<i>1.391</i>	Mixed
SAIHAMTEX	2.543	5.258	<i>1.384</i>	<i>1.662</i>	<i>1.482</i>	2.242	<i>1.518</i>	<i>1.411</i>	1.962	<i>1.453</i>	1.975	Mixed
SIMTEX	2.016	<i>1.735</i>	2.156	2.488	2.507	3.682	3.726	3.515	3.343	2.153	7.057	Safe
SHASHADNIM	<i>1.629</i>	<i>1.629</i>	1.866	<i>0.754</i>	2.079	<i>1.638</i>	2.256	1.956	1.926	<i>1.543</i>	<i>1.553</i>	Mixed
SONARGAON	<i>1.178</i>	<i>1.275</i>	<i>1.365</i>	<i>1.186</i>	<i>0.943</i>	<i>1.248</i>	<i>1.207</i>	<i>1.386</i>	<i>1.451</i>	<i>1.562</i>	2.871	Distress
SQUARETEXT	3.239	3.529	3.434	3.466	5.431	5.431	3.359	2.963	2.370	1.860	2.334	Safe
STYLECRAFT	3.139	4.721	4.269	4.265	4.387	3.789	3.064	2.881	3.075	1.959	<i>1.042</i>	Safe
TOSRIFA	2.491	2.069	3.192	3.849	6.271	5.001	2.297	<i>1.452</i>	<i>1.186</i>	<i>0.980</i>	<i>1.373</i>	Safe
ZAHEENSPIN	4.187	4.187	5.209	6.409	6.437	6.876	6.503	6.809	7.052	2.021	<i>1.221</i>	Safe
ZAHINTEX	1.800	2.149	2.310	2.215	2.256	2.351	2.010	<i>1.638</i>	<i>1.187</i>	<i>0.672</i>	<i>0.291</i>	Safe

Note: Value in italic and bold font represents the distress situation

As it can be seen in the above table, the z values of all companies for 2011 to 2021 are presented here. In the last column the average tendency is calculated based on the frequency of occurrence. Results indicates that during 2011 to 2021, nine (9) firms experienced high frequency of distress tendency, seventeen (17) firms were in a safe trend and the rest firms experienced a mixed trends during the study period.

Table-3(a): Case Processing Summary:

Unweighted Cases		N	(%)
Selected Cases	Included in analysis	363	100%
	Missing Cases	0	0%
	Total	363	100%
Unselected Cases		0	0%
Total		363	100%

Table-3(b): Dependent Variable Encoding:

Original Value	Internal Value
No Financial Distress	0
Financial Distress	1

Table-3 (a) simply tells us about how many samples are included in our analysis and how many samples are excluded. Here all the sample cases are considered in the analysis. Table- 3 (b) informs about how the procedure handled with the dichotomous dependent variable, which helps you to interpret the values of the parameter coefficients. Here the dependent variable is a binary variable where “Probability of financial distress” is coded as “1” and Probability of no financial distress” is coded as “0”.

Block 0: Beginning Block (without independent variables):

Table-4 (a): Iteration History^{a,b,c}

Iteration		-2 Log likelihood	Coefficients
			Constant
Step 0 (Null/ baseline model)	1	496.036	-.281
	2	496.036	-.283
	3	496.036	-.283

a. Constant is included in the model. b. Initial -2 Log Likelihood: 496.036 c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Table-4 (b): Classification Table^{a,b}

Step 0 (Null/ baseline model)	Observed		Predicted		
			Financial Distress		Percentage Correct
	Financial Distress	No Financial Distress	No Financial Distress	Financial Distress	
	Financial Distress	No Financial Distress	207	0	100.0
		Financial Distress	156	0	.0
	Overall Percentage				57.0

a. Constant is included in the model. b. The cut value is .500

Table-4 (c): Variables in the Equation

		B	S.E.	Wald	df.	Sig.	Exp. (B)
Step 0 (Null/ baseline model)	Constant	-.283	.106	7.118	1	.008	.754

Table-4(a), 4(b) & 4(c) describe results of the baseline model that doesn't include the explanatory variables. The initial -2 Log likelihood value is 496.036 which is used later to compare the model significance. The results of this baseline model are solely made based on the frequency of occurrence of categories in our dataset. In the classification table the overall percentage tells us that this approach to prediction has an accuracy of 57%. But the baseline model doesn't predict any financially distressed firm. Table-4(c) signifies that model with just the constant is also statistically significant at 1% level of significance (p

<.01). It reveals that our baseline model also has some predictive power.

Block 1: Method: Forward Stepwise (Likelihood Ratio) (Including Independent variables)

In logistic regression, a decrease in the Log-Likelihood value indicates that the hypothesized model fit with the new variables and data. Results of Table-5 state that the selected predictor variables are suitable to address the probability of financial distress. Log-Likelihood values and related conclusion are summarized in the following table:

Table-5: Iteration History^{a,b,c,d,e,f}

Iteration		-2 Log likelihood	Feasibility of model
Step 1 / Model-1	1	429.355	-2 Log likelihood is lower as compared to Null model Conclusion: Model-1 is feasible than Null model
	2	425.692	
	3	425.626	
	4	425.626	
Step 2 / Model-2	1	414.970	-2 Log likelihood is lower as compared to Model-1 Conclusion: Model-2 is feasible than Model-1
	2	398.460	
	3	396.992	
	4	396.980	
	5	396.980	
	6	396.980	
Step 3 / Model-3	1	407.477	-2 Log likelihood is lower as compared to Model-2 Conclusion: Model-3 is feasible than Model-2
	2	390.103	
	3	388.508	
	4	388.486	
	5	388.485	

a. Method: Forward Stepwise (Likelihood Ratio); b. Constant is included in the model; c. Initial -2 Log Likelihood: 496.036; d. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001; e. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001; f. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Table-6: Omnibus Tests of Model Coefficients

Step / Model		Chi-square	df	Sig.		Remarks
Step 1 / Model-1	Step	70.410	1	.000	Chi-square of model-1 > Chi-square of Baseline model	Better than Null model
	Block	70.410	1	.000		
	Model	70.410	1	.000		
Step 2 / Model-2	Step	28.647	1	.000	Chi-square of model-2 > Chi-square of model-1	Better than model-1
	Block	99.056	2	.000		
	Model	99.056	2	.000		
Step 3 / Model-3	Step	8.494	1	.004	Chi-square of model-3 > Chi-square of model-2	Better than model-2
	Block	107.550	3	.000		
	Model	107.550	3	.000		

The Omnibus Tests of Model Coefficients includes the chi-square statistic which uses the -2 Log likelihoods of the null model and the new models. Model significance indicates that there is a significant improvement in its fit as compared to the null / previous model. The results indicate that chi-square is significant at each model (chi-square -70.410 for model-1, chi-square-

99.056 for model-2, and chi-square value 107.550 for model-3; $p < 0.01$). Higher Chi-square value concludes that model-3 (with all explanatory variables) is significantly better to explain more of the variance in the financial distress than the baseline model. It is means that there is a mutual influence of the three predictors in explaining the occurrence of financial distress.

Table-7: Model Summary

Step / Model	-2 Log likelihood	Cox & Snell's R ²	Nagelkerke's R ²
1	425.626 ^a	.176	.237
2	396.980 ^b	.239	.321
3	388.485 ^c	.256	.344

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001;

b. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001;

c. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

The Model Summary provides the -2LL, Cox & Snell's R² and Nagelkerke's R² values for all three models. The Cox & Snell's R² and Nagelkerke's R² values reveal a range of variation in the dependent variable explained by a model. At each steps the -2LL value is decreasing indicates that model fitness is increasing due to adding the predictor variables in the model. The

statistical test results indicate that the values of Cox & Snell's R² and Nagelkerke's R² at model-3 are 0.256 and 0.344 which is an improvement compared to the previous two models. This suggests that 25.6% to 34.4% of the variation in the financial distress variability can be explained by the variation in leverage, liquidity and profitability through last model.

Table-8: Classification Table^a

Step / Model	Observed		Predicted		Percentage Correct
			Financial Distress		
	No Financial Distress	Financial Distress	No Financial Distress	Financial Distress	
1	Financial Distress	No Financial Distress	176	31	85.0
		Financial Distress	92	64	41.0
	Overall Percentage				66.1
2	Financial Distress	No Financial Distress	181	26	87.4
		Financial Distress	68	88	56.4
	Overall Percentage				74.1
3	Financial Distress	No Financial Distress	180	27	87.0
		Financial Distress	58	98	62.8
	Overall Percentage				76.6

a. The cut value is .500

Table- 8 summarizes how a model is able to predict the correct category of dependent variable. If we compare this with the null model we can understand that all the three models have higher classification accuracy than the null model without predictor variables. Classification has increased as leverage, liquidity and profitability variables

are added sequentially. Model-3 has highest classification accuracy i.e. 76.6%. So it can be summarized that leverage, liquidity and profitability of firm can detect the probability or non-probability of financial distress at an overall accuracy rate of 76.6%.

Table-9: Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp. (B)	95.0% C.I. for EXP(B)	
								Lower	Upper
Step-1 / Model-1^a	Leverage	1.039	.150	47.848	1	.000	2.826	2.105	3.793
	Constant	-1.441	.194	55.248	1	.000	.237		
Step-2 / Model-2^b	Leverage	1.255	.174	51.908	1	.000	3.509	2.494	4.938
	Profitability	-6.813	1.467	21.577	1	.000	.001	.000	.019
	Constant	-1.146	.211	29.439	1	.000	.318		
Step-3 / Model-3^c	Leverage	1.033	.186	30.804	1	.000	2.810	1.951	4.046
	Liquidity	-.179	.082	4.735	1	.030	.837	.712	.982
	Profitability	-6.410	1.455	19.423	1	.000	.002	.000	.028
	Constant	-.566	.312	3.289	1	.070	.568		

a. Variable(s) entered on step 1: Leverage; b. Variable(s) entered on step 2: Profitability; c. Variable(s) entered on step 3: Liquidity.

Result of the above table shows that Model-1 contains only leverage as predictor variable, model-2 contains leverage and profitability and model-3 contains liquidity with the previous two variables. As model-3 is significant than the previous two models so it can be concluded that all the three predictor variables have statistically significant association with the probability of financial distress. The Exp(B) of 2.810 for leverage indicates that with an increase in leverage level; firms are 2.810 times more likely to face probability of financial distress. That means that leverage has a significant positive association with financial distress. If firm introduces more and more debt financing in its capital structure, then firm's long term debt obligations will increase. So propensity to financial distress will also increase. This result is consistent with the studies like (Rafatnia et al., 2020), (Wesa & Otinga, 2018), (Gathecha, 2016) and (Khaliq, et al., 2014). Exp(B) value of 0.837 for liquidity indicates a lower probability of financial distress if firm has high liquidity. It means that liquidity has a negative enforcement on financial distress. When a firm has higher liquidity then it can meet all the necessary

obligations. This in turn makes a financially healthy position to fight against any probability of distress. (Thim et al., 2011), (Hashi, 1997), (Shleifer & Vishny, 1992), (Platt & Platt, 2002) and (Papoulias & Theodossiou, 1992) all of these studies also reported similar results. Finally Exp(B) of 0.002 for profitability concludes that probability of financial distress decreases with an increase in profitability. Similar results also found by many others studies like (Campbell et al., 2005), (Hashi, 1997), (Platt & Platt, 2002), (Isayas, Y. N., 2021), (Papoulias & Theodossiou, 1992), (Gombola, et al., 1987), (Ohlson, 1980), (Papoulias & Theodossiou, 1992) & (Theodossiou, 1991). A lower level of profitability creates a shortage a cash inflow; as a consequence, deterioration occurs in firm's financial position.

CONCLUSION

This study unfolds the distressing tendency of Bangladeshi textile companies. The evidence is significant and seeks attention from the policymakers. Firms who have already passed through distressing period should pay more concerns on future policy formulation. As the Bangladesh economy is

experiencing hard time after Covid-19, government initiatives should be more precise to protect this sector from severe crisis and possible bankruptcy. Financial distress can fully deteriorate a firm's performance and if not managed properly can force a firm to be bankrupt. Numerous examples of corporate bankruptcy are available throughout the globe. External drawbacks like regional economic condition, global trend of business, government policy etc. can foster a company's performance in either ways: good or bad. All these issues are somewhat uncontrollable for a company. Only a good financial health can protect a company from being financially distressed. And financial health majorly depends on the company's decisions and can be assured mostly through enough profitability and optimum liquidity. A distressing situation can be avoided through enough cash inflows. This enables a company to honor short-term and long term obligations. As long as a company is able to settle down its entire obligation, there is no question of distress. But situation gets worst when company uses higher level of leverage without improving profitability and liquidity. That puts a firm in distressed situation. This study also concluded the same remarks and suggests for maintaining enough profitability and optimum liquidity against its leverage.

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