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Financial Distress and Forewarning Bankruptcy: An Empirical Analysis of Textile Sector in Pakistan

^a Nosheen Rasool, ^b Muhammad Sohail, ^c Muhammad Usman, ^d Muhammad Mubashir Hussain

^a Chairperson, Department of Commerce & Finance, GC University, Lahore, Pakistan

Email: nosheen.rasool@gcu.edu.pk

^b Faculty Member, Department of Commerce & Finance, GC University Lahore, Pakistan

Email:sohailgculahore@gmail.com

^c Assistant Professor, Hailey College of Commerce University of the Punjab, Lahore, Pakistan

Email: usman@hcc.edu.pk

^d Assistant Professor, Management Studies Department, GC University, Lahore, Pakistan

Email: mhdm.hussain@gcu.edu.pk

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ABSTRACT

This study aims to measure the financial distress and forewarn bankruptcy in Textile Sector of Pakistan using popular statistical measures i.e., Z-Score, O-Score, Probit and D-Score. First, applicable financial ratios (profitability, liquidity, leverage, market ratios) and scores (Z-Score, O-Score, Probit and D-Score) of all 77 textile companies were calculated then estimated scores were compared with cut-off point of respective model. Based on findings, models are categorized in two groups: (a) Group-I (Z-Score and O-Score), (b) Group-II (Probit and D-Score). Results indicate that some of the textile firms are about to face financial distress in near future, which could ultimately lead those firms to bankruptcy. The findings of Group-I indicate that about 43% - 44% companies in the textile sector are in the phase of financial distress; whereas the results of Group-II reveal that about 8% - 16% companies are in financial distress phase. Thus, we could draw two conclusions: (1) the two models (Z-Score and O-Score) in Group-I were found to be robust for assessing financial distress and (2) the two models (Probit and D-Score) in Group-II were found to be less rigorous in forecasting financial distress. The previous studies attempted to compare the prediction accuracy of various models by examining the data of both financially distress firms and financially stable firms. But this study is aimed to foretell bankruptcy using comprehensive models (Z-Score, O-Score, Probit and D-Score), to compare the consistency of results across all four models of the study and to categorize financially stable and financially distress companies under each model. The findings of the study are expected to be beneficial at country level, firm level and individual level such as government and regulatory bodies of Pakistan can intervene to avert bankruptcy rate, management can devise appropriate strategies to reduce financial distress. Moreover, investors can safeguard their investment by making right decisions based on the findings.

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Corresponding author's email address: nosheen.rasool@gcu.edu.pk

1. Introduction

Financial distress in a company is seen as a cumbersome economic hurdle in the way of its financial growth (Lizares & Bautista, 2020) because this usually ends up with economic losses to stakeholders including customers, creditors, shareholders, and employees resulting in high social and economic costs to the company and to the country at macro level (Farooq & Qamar, 2019; Muñoz-Izquierdo et al., 2020a). Past few decades have witnessed many bankruptcy (Chen et al., 2020) and these bankruptcies can destabilize social and economic areas of a country such as high unemployment and crime rate (Jiang & Jones, 2018) . Thus, there is pressing need to assess and predict financial distress accurately not only on firm level but also on industry and country level (Cybinski, 2001) .

There are different reasons for corporate bankruptcy including variations in socio-economic, demographic, political factors, and complex structure of capital and accounting policies (Newton, 2009). And an organization goes through several stages before filing a bankruptcy, one of these phases is the financial distress. At this stage, the organization faces difficulties in paying its financial obligations. If financial distress is not relieved, it will lead to bankruptcy (Garlappi et al., 2006; and Khan, 2016).

Pakistan, like some other developing countries, is facing the issue of business failures because of several reasons such as insurgency, security threats, power shortages, political instability, corruption, and global financial crisis. In the last few years, there have been financial failures of several Pakistani companies (Annoor Textile Mills Limited, Azmat Textile Mills Limited) and some corporate entities seek government to intervene and reforms in order to minimize risk and fear to fail in the near future (Hasanain and Shah, 2012). Such events of bankruptcy have adverse impact on society as it inculcates an environment of uncertainty. To avoid more business collapse and massive bankruptcy costs, it is necessary to employ proper indicators in order to predict financial distress and foretell bankruptcy. There have been few studies undertaken in context of Pakistan to envisage the financial distress. Moreover, the studies conducted in Pakistan confined to small sample size, few techniques (MDA or logit) such as Rashid and Abbas (2011), Ijaz et al. (2013), Wagan et al. (2016) and Jaffari and Ghafoor (2017).

This study focuses on examining the financial health of textile sector in Pakistan. Because, despite substantial contribution in Pakistan economy, textile sector is facing compliance issues coupled with financial crisis for the last few years. During 2015-19 almost 50% of the defaulters are from textile sector. A lot of manufacturing companies in Pakistan have already become bankrupt, and many other are also likely to be in the queue. The reasons of corporate financial distress and bankruptcy include high interest rates, insufficient financial control, production of inferior products, export raw material, unhealthy competition, staff turnover, poor record keeping system and financial reporting practices, lesser access to formal financing and credit, shortage of skilled labor, frequent change in government policies, complicated and imbalance regulations (Jahur & Quadir, 2012).

Therefore, the reasons of financial distress should remain under review by senior management so that the management can: (1) take some appropriate alternate financial and investment decisions well in time (Davydenko, 2010; and Venkata Ramana et al., 2012) and; (2) avert falling rate of manufacturing products for a nation like Pakistan (Davydenko, 2005). In the current era, the financial sustainability and stability of manufacturing sector is a challenging target because

of several factors including growing incidences of fraud, mismanagement, unhealthy rivalry, non-compliance with the regulatory requirements, and external factors like foreign currency risk, and interest rate risk etc. (Campbell et al., 2008). Thus, the signs of distress need to be addressed timely because earlier distress signals would enable a company to predict its prospective health (Khan & Aslam, 2019).

Thus, this study is expected to provide novel contribution to the literature in many ways. Firstly, accessing the distress prediction ability of four models from the sample of Pakistan Textile sector. Secondly, providing nation specific and industry specific results that are less frequent (Cultrera & Brédart, 2016) . Thirdly, comparing pre-bankruptcy result of four different models (Altman 1968 Z-Score, Ohlson 1980 O-Score, Zmijewski 1984 Probit and Blums 2003 D-Score) and identifying which model is more rigorous in classifying financially distressed and stable companies. The above stated developments in predicting financial distress accurately can be helpful for policy makers in devising and implementing prudential strategies.

Although, the stakeholders can use auditor's report to assess the financial health of a company, but studies indicate that auditor's assessment do not perform well while identifying financially distressed companies compared to the financial distress prediction models (Altman and Saunders, 1998). Therefore, it is important to examine which ratios may more accurately predict the corporate failure. Previous studies to predict financial distress reveal mixed results about the predictive ability of traditional financial distress models. In recent years various artificial intelligence techniques have also been developed and employed in addition to traditional models like decision tree, neural network and genetic algorithms. But according to the Jones et al. (2017), simple statistical models are a better predictor of financial distress. Therefore, this study too was kept confined to analysis through statistical techniques.

Rest of the paper explains theoretical and empirical literature review, sampling and data collection, financial distress prediction models, results and finally conclusion, implication and limitations of the study.

2. Literature Review

Companies normally use internal or external sources of finance (equity or debt financing) to meet their financial needs and in case of external debt financing, the companies have to pay the finance cost. If a company is unable to earn enough money to meet its financial obligations timely, it may lie under the state of financial distress and face bankruptcy. Some of the theoretical review about financial distress is given below:

According to cash management theory whenever cash inflows exceed cash outflows, there is a positive cash balance. However, when cash outflows exceed cash inflows, there is a negative cash balance. In the later scenario, there is probability of distress which can ultimately lead to bankruptcy (Pandey, 2005). And Gambler's Ruin theory proposed by Feller, W in 1968 states equity capital as a reserve, and cash flows were to be either added to or subtracted from the fund. The equity reserve fund is used up in the case of bankruptcy (Lim et. al., 2012). Liquidity, profitability and wealth theory states that financial ratios are indicator of financial health. An entity is perceived healthy if indicators are good whereas the same entity is perceived unhealthy if indicators are poor.

Westgaard and Wijst (2001) identified key determinants of bankruptcy including solvency,

liquidity, financial coverage, firm age and size. Later, some other researchers including Campbell et al. (2008), Edwards (2013), Jones et al., (2015 ; 2017) and Sun et al. (2014) used Logistic Regression for predicting financial distress. Edwards (2013) suggested that the businesses, which were suffering from financial distress, would unexpectedly have to face higher capital costs, decline in credibility and many other difficulties in obtaining credit. Consequently, leading the managers to invest in highly risky projects which will disturb the company's financial position and may lead toward bankruptcy.

Muhammad et al., (2017) compared the performance of listed banks of Pakistan and India using Altman's Z-score technique. The empirical evidences revealed that all banks in the sample were in gray zone. Findings proved that the Z-score model had predicted financial distress accurately. Manalu, Octavianus and Kalmadara (2017) analyzed the financial distress of shipping companies listed on Indonesian Stock Exchange and concluded that 80% of the firms were financially stable. The findings of both (Z-Score and Zmijewski) models were found to be consistent. Ijaz et al. (2017) found that after the research of both Altman and Beaver, several other failure predictive models were also introduced by researchers. Many other scholars such as, Agarwal and Taffler (2007), Grice and Ingram (2001) and Rim and Roy (2014) used Multiple Discriminant Analysis (MDA). Despite some shortcomings, now-a-days MDA is a widely used model globally to signalize the financial distress of an entity more accurately and promptly (Altman, 2018).

Muñoz-Izquierdo et al., (2019) studied that how far financial reports were helpful in measuring financial distress besides Z-score model. After examining the sample of 1,821 distress companies of Spain, they suggested that while measuring the financial distress, Z-score model accuracy could reach up to 77%. Whereas the same was considerably higher upto 87% using the auditor's report. Similarly, Saji (2018) investigated the relationship between financial distress and stock failure by analyzing the 10 year data of Indian companies. The empirical evidences of Z-score model provided valuable enlightenment to the stakeholders for making investment decisions in real estate firms of India. The results suggested that Z-score had ability to alert about the financial distress or stock failure two-to-five years in advance.

Whenever businesses face financial distress and goes bankrupt, its stakeholders face losses. Empirical evidences shows that efforts have been made for predicting financial distress and bankruptcy like Ashraf, Félix and Serrasqueiro (2019) analyzed the financial distress and compared the accuracy of various statistical models on the listed companies operating in Pakistan. It was concluded that Z-score Model proved to be a good predictor while determining a firm's bankruptcy than other statistical models.

3. Methodology and Sampling

The study has collected secondary data from 77 textile companies listed on Pakistan Stock Exchange (PSX). The selection of sample was made based upon the following criteria: (1) companies are from textile sector either composite, spinning or weaving; (2) companies are listed on PSX during 2015-19; (3) financial statements are published and publicly available; and (4) selected company is not in the defaulter list of PSX during February 2020. The annual financial statements and other historical data of firms were obtained from different available sources including audited financial reports, PSX historical data and World Bank (price level indices) for a period of five years (2015-19).

During February 2020, out of 549 companies PSX put 124 listed companies on the defaulter

counter (default companies). Surprisingly, out of 124 defaulter companies almost 50% of the defaulters were from textile sector. The textile is an important sector of Pakistan as it contributes approximately 9% to the country’s GDP, and employs around 45% of Pakistan’s total workforce (38% of manufacturing labor force). According to the Pakistan Economic Survey for the year 2018-19, textile industry remained the largest export industry. Despite substantial contribution in Pakistan economy, Textile industry is one of the industries, which is facing compliance issues coupled with financial crisis for the last few years. Thus, the sudden outbreak of financial risk and uncertainty in Pakistan's textile sector must be evaluated in order to predict chances of default or bankruptcy.

4. Models for predicting Financial Distress

According to the Jones et al. (2017), simple statistical models were found to be a better predictor of financial distress. Laitinen and Kankaanpaa (1999) concluded that low profitability could be associated to bankruptcy. The literature review depicts that several models for predicting financial distress have been developed and used by researchers. But under this research, we employed four commonly used statistical models for predicting financial distress, and used financial ratios for determining the same. Financial distress prediction models applied in the study are: Z-Score (Altman 1968), O-Score (Ohlson 1980), Probit (Zmijewski 1984) and D-Score (Blums 2003). We first calculated the financial ratios specifically profitability and liquidity using data given in the annual reports of these companies. Then we employed the statistical models to predict the financial distress. Ultimately, we compared the findings of all these four models in order to check the consistency of results among models and to predict distress more accurately.

(i) Altman (1968), Z-Score discriminant model:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + .999X_5 \tag{1}$$

(ii) Ohlson (1980), O-Score Model

$$O = \begin{cases} 1 \\ + \exp\left(-\left[\begin{array}{l} -1.3 - 0.4 OSIZE + 6.0 TLTA - 1.4 WCTA + 0.1 CLCA \\ -2.4 OENEG - 1.8 NITA + 0.3 FUTL - 1.7 INTWO - 0.5 CHIN \end{array} \right]\right) \end{cases} \tag{2}$$

(iii) Zmijewski (1984), Probit Model

$$P = \Phi(-4.336 - 4.513 NITA + 5.679 TLTA + 0.004CACL) \tag{3}$$

(iv) Blums (2003), D-Score Model

$$D = -4.907 - 2.11 NITA + 0.0006 TDTE - 1.734 TETA - 0.016\Delta P + 0.005\Delta S + 5.885CLTA \tag{4}$$

The list of all variables and techniques used for each model in forecasting financial distress and bankruptcy is shown in Table 1. Using most recent data of textile companies, we tried to estimate the probability of financial distress of the companies for the selected sample.

Table 1: Summary of all variables employed, and most adopted models for distress prediction

Variables	Description	Analysis Techniques	Model
X1 X2 X3 X4 X5	working capital divided by total assets retained earnings divided by total assets earnings before interest and taxes divided by total assets market value of equity divided by total liabilities sales divided by total assets	MDA	Altman (1968), Z-Score
O/SIZE TL/TA WC/TA CL/CA OE/NEG NI/TA FU/TL IN/TWO CH/IN	Log (Total assets/GNP price-level index) Total liabilities divided by Total assets. Working capital divided by Total assets Current liabilities divided by Current assets One if total liabilities exceed total assets, zero otherwise Net income divided by Total assets Funds provided by operations to Total liabilities One if net income was negative for the last two years, zero otherwise $\{NI_t - NI_{t-1} \text{ divided by } NI_t + NI_{t-1} \}$ where NI_t and NI_{t-1} is the net income for the most recent and the preceding year respectively.	Logit	Ohlson (1980), O-Score
NI/TA TL/TA CA/CL	Net income divided by Total assets Total liabilities divided by Total assets Current assets divided by Current liabilities	Probit	Zmijewski (1984), Probit
NI/TA TD/ME ME/TA ΔP ΔS CL/TA	Net income divided by Total assets Total Debt divided by Market equity Market Equity divided by Total assets 6-month Stock Price change 3-year Sales Growth Current liabilities divided by Total assets	Logit	Blums (2003), D-Score

The study approach includes (a) measuring the model scores of sampled firms (b) comparing with the respective models cut-off points. Tabel 2 shows the cut-off points of all models employed in the analysis. The research approach also includes measuring and comparing important ratios of financially stable and distress companies (See Table 3).

Table 2: Cut-off points of proposed models

Model	Safe Zone	Gray Zone	Stressed Zone
Altman (1968), Z-Score	Z-Score > 2.99	1.91 < Z-Score > 2.99	Z-Score < 1.91
Ohlson (1980), O-Score	O-Score < 0.5		O-Score > 0.5
Zmijewski (1984), Probit	P-Score < 0		P-Score > 0
Blums (2003), D-Score	P-Score < 0		P-Score > 0

Source: Autors' own Working

5. Result Summary

Descriptive statistics presented in the Table 3 reveals that there is significant difference in the standard deviation of stable and distress companies under each model of the study.

Financial Heath	N	Minimum	Maximum	Mean	Std. Deviation
*Z-Stressed	34	-29.661	1.732	-0.204	5.294
Z-Stable	43	1.818	17.922	3.257	2.637
*O-Stressed	33	.482	88.733	5.311	15.549
O-Stable	44	-2.366	0.341	-0.698	0.718
*D-Stressed	6	0.00	8.150	1.608	3.217
D-Stable	71	-25.328	-0.348	-3.701	2.911
*Probit-Stressed	12	0.103	71.162	7.196	20.181
Probit-Stable	65	-50.117	-0.005	-2.232	6.100
Valid N (listwise)	6				

*Z = Z-Score, *O = O-Score, *D = D-Score, *Probit = Probit-Score
 *Stressed = Financially distress firms, *Stable = Financially stable firms

The ratios of stabilized and distress companies are calculated for the last five years and descriptive analysis of these ratios also shows that the companies, which are going through financially distress time, have lower sales, profitability, level of growth and quality in the products that enable the companies to get stabilized.

Table 4: Profitability Ratios of Distress and Stable companies						
<i>Altman (1968), Z-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 43</i>			Companies in Distress Zone <i>N = 34</i>		
Profitability Ratios	Mean	Med	SD	Mean	Med	SD
TSTA	1.17	1.13	0.62	0.82	0.83	0.60
NITA	0.18	0.06	0.30	0.43	0.01	6.11
deltaS	15.09	0.01	177	-21.12	-0.02	215
CHIN	-0.01	0.09	0.73	-0.08	0.05	1.06
EBIT	1071	338	1858	315	47	863
<i>Ohlson (1980), O-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 44</i>			Companies in Distress Zone <i>N = 33</i>		
Profitability Ratios	Mean	Med	SD	Mean	Med	SD
TSTA	1.02	0.96	0.65	1.02	1.08	0.62
NITA	0.10	0.05	0.31	0.46	0.01	6.20
deltaS	17.75	0.03	175	-25.79	-0.02	218.31
CHIN	0.02	0.09	0.67	-0.13	0.05	1.11
EBIT	1227	349	1899	218	62	560
<i>Zmijewski (1984), Probit</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 65</i>			Companies in Distress Zone <i>N = 12</i>		
Profitability Ratios	Mean	Med	SD	Mean	Med	SD
TSTA	1.04	1.02	0.62	0.91	0.84	0.73
NITA	0.32	0.04	4.42	-0.09	-0.06	0.19
deltaS	12.13	0.00	146	-70.37	-0.13	354
CHIN	-0.01	0.07	0.86	-0.19	-0.03	0.99
EBIT	870	272	1633	18	-2	561
<i>Blums (2003), D-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 71</i>			Companies in Distress Zone <i>N = 06</i>		
Profitability Ratios	Mean	Med	SD	Mean	Med	SD
TSTA	1.06	1.04	0.63	0.59	0.56	0.57
NITA	0.28	0.04	4.23	-0.07	-0.01	0.24
deltaS	-0.17	-0.01	204	-8.58	0.00	22.9
CHIN	-0.03	0.06	0.87	-0.12	0.14	1.15
EBIT	793	214	159	860	7.43	628

Table 5: Liquidity Ratios of Stable and Distress Companies						
<i>Altman (1968), Z-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 43</i>			Companies in Distress Zone <i>N = 34</i>		
Liquidity Ratios	Mean	Med	SD	Mean	Med	SD
WCTA	0.12	0.07	0.30	-0.30	-0.17	0.47
FUTL	0.14	0.11	0.29	0.03	0.04	0.14
INTWO	0.13	0.00	0.34	0.28	0.00	0.46
CLCA	0.87	0.81	0.59	31	1.56	110
CLTA	0.34	0.35	0.19	0.61	0.54	0.41
<i>Ohlson (1980), O-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 44</i>			Companies in Distress Zone <i>N = 33</i>		
Liquidity Ratios	Mean	Med	SD	Mean	Med	SD
WCTA	0.12	0.07	0.30	-0.30	-0.17	0.47
FUTL	0.14	0.11	0.29	0.03	0.04	0.14
INTWO	0.13	0.00	0.34	0.28	0.00	0.46
CLCA	0.87	0.81	0.59	31	1.56	110
CLTA	0.34	0.35	0.19	0.61	0.54	0.41
<i>Zmijewski (1984), Probit</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 65</i>			Companies in Distress Zone <i>N = 12</i>		
Liquidity Ratios	Mean	Med	SD	Mean	Med	SD
WCTA	0.04	0.03	0.29	-0.63	-0.54	0.61
FUTL	0.11	0.09	0.24	-0.04	-0.03	0.20
INTWO	0.13	0.00	0.33	0.57	1.00	0.50
CLCA	9.79	0.91	49.57	35	3.14	145
CLTA	0.37	0.37	0.19	0.89	0.78	0.54
<i>Blums (2003), D-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 71</i>			Companies in Distress Zone <i>N = 06</i>		
Liquidity Ratios	Mean	Med	SD	Mean	Med	SD
WCTA	-0.01	0.01	0.32	-0.79	-0.62	0.79
FUTL	0.10	0.08	0.24	-0.02	-0.01	0.25
INTWO	0.17	0.00	0.37	0.50	0.50	0.51
CLCA	9.29	0.96	47.46	65.71	2.59	201.11
CLTA	0.41	0.39	0.22	1.06	0.86	0.69

The Table 7 presents the comparative information of results using four models of distress prediction relating to Pakistan's textile industry. The Table 7 also provides the details of both financially distress companies and stable companies evaluated by each model. We have categorized the results in two groups. The results of Group-I indicates that 44% firms in the textile industry are in the phase of financial distress (34 firms out of 77 firms) and Group-II reveals that 8% - 16% companies are in the distress phase (6-12 firms out of 77 firms). The result of Group-I (Z-Score and O-Score) shows same findings and result of Group-II (Probit and D-Score) provides almost same

findings.

Table 6: Leverage Ratios of Stable and Distress Companies						
<i>Altman (1968), Z-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 43</i>			Companies in Distress Zone <i>N = 34</i>		
Leverage Ratios	Mean	Med	SD	Mean	Med	SD
D/E	1.16	0.95	0.85	13.25	1.89	139.05
CL/TA	0.35	0.35	0.19	0.58	0.53	0.41
NCL/TA	0.14	0.12	0.09	0.38	0.13	1.46
OC/TA	0.56	0.50	0.60	0.32	0.32	0.27
TL/TA	0.49	0.48	0.23	0.97	0.68	1.79
<i>Ohlson (1980), O-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 44</i>			Companies in Distress Zone <i>N = 33</i>		
Leverage Ratios	Mean	Med	SD	Mean	Med	SD
D/E	1.17	0.98	0.86	13.60	1.97	141.14
CL/TA	0.34	0.34	0.18	0.61	0.54	0.41
NCL/TA	0.13	0.11	0.10	0.40	0.14	1.48
OC/TA	0.54	0.48	0.59	0.33	0.32	0.29
TL/TA	0.47	0.47	0.21	1.01	0.70	1.82
<i>Zmijewski (1984), Probit</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 65</i>			Companies in Distress Zone <i>N = 12</i>		
Leverage Ratios	Mean	Med	SD	Mean	Med	SD
D/E	1.37	1.16	0.97	34.26	2.60	233.86
CL/TA	0.37	0.37	0.18	0.90	0.78	0.54
NCL/TA	0.14	0.12	0.10	0.79	0.13	2.42
OC/TA	0.49	0.43	0.50	0.22	0.14	0.39
TL/TA	0.52	0.54	0.20	1.68	0.93	2.90
<i>Blums (2003), D-Score</i>						
Independent Variables	Companies in Stable/Gray Zone <i>N = 71</i>			Companies in Distress Zone <i>N = 06</i>		
Leverage Ratios	Mean	Med	SD	Mean	Med	SD
D/E	1.44	1.22	2.65	66.36	3.18	330.23
CL/TA	0.40	0.39	0.21	1.05	0.85	0.69
NCL/TA	0.15	0.13	0.11	1.42	0.10	3.32
OC/TA	0.48	0.42	0.49	0.15	0.07	0.43
TL/TA	0.55	0.56	0.24	2.46	0.98	3.97

Table 7: Comparison of Results (Z-Score, O-Score, Probit and D-Score)

Model	Safe Zone	%	Gray Zone	%	Stressed Zone	%	Total
*Z-Score	13	17%	30	39%	34	44%	77
*O-Score	44	57%			33	43%	77
**Probit	65	84%			12	16%	77
**D-Score	71	92%			06	08%	77

**Group-I (Z-Score and O-Score), ** Group-II (Probit and D-Score)*

Among these four models, Z-Score indicates that majority of the companies are facing distress and greater probability of bankruptcy in future whereas D-Score shows fewer companies in the distress zone. Based on the default history of textile sector in Pakistan, we can assume that Z-score and O-Score provide more reliable results than the results by Probit and D-Score. In other words, we can say that the models in Group-I were found to be more rigorous while assessing firm's financial health whereas other two models were found to be less rigorous in forecasting financial distress.

6. Conclusion, Implications and Limitations

Although both, manufacturing and non-manufacturing sector plays vital role in the development of country. But the current study focuses only on textile sector because textile is an important sector of Pakistan as it employs around 45% of Pakistan's total workforce. It contributes approximately 60% in exports, according to the Pakistan Economic Survey for the year 2018-19, textile sector remained the largest export industry. From last few years, Textile sector is facing compliance issues coupled with financial crisis despite substantial contribution in Pakistan economy.

The aim of study was to foretell distress and suggest robust model for assessing financial distress. We have used four financial distress prediction models (Z-Score, O-Score, Probit and D-Score) on balance sheet and income statement items of 77 textile companies which were listed on PSX during 2015-19. Empirical evidence of textile sector (Textile composite, Textile weaving, Textile spinning), reveals that textile sector of Pakistan is most probably in the phase of financial distress, which could lead some firms to bankruptcy. Currently, the financially distress companies have lower asset efficiency, lesser profitability and liquidity. The non-distress/stable companies have high profitability and growth ratios. The findings of study are consistent with previous studies such as Altman (1968), Beaver (1966), Deakin (1972), Blum (1974), Gu (2002) and Uğurlu and Aksoy (2006). And financially sound companies are also expected to remain intact and growing because of stronger financial and accounting indicators. The analysis also shows that all traditional models don't yield same findings but two of these models (Z-Score and O-Score) are more robust than others (Ijaz et al., 2017). Therefore, the recommendation is to use these two models for assessing financial health of manufacturing companies and prospects.

Our study is expected to have strong implication as it helps to identify fair value of the company. For Management, empirical evidences of study highlight the validated models to verify and compare financial health of company at any point of time. The findings of the study also uncover uncertainty associated with the company which is useful for better decision making and policy making process. For other stakeholders (Investors, lenders, customers) who sought to identify company's financial health can use the findings of this study as well. And based on the findings (textile sector is in the phase financial distress), it is also suggested that regulatory bodies such as security and exchange commission, chamber of commerce, state bank and psx of Pakistan should

take initiatives to (1) safeguard the interests of stakeholders and (2) ensure economic growth because most of the companies in the sample are in distress phase which could lead them towards bankruptcy.

The current study addresses financial distress using traditional models such as (Z-Score, O-Score, Probit and D-Score) and sample from specific sector (Textile sector). Therefore, future researchers are suggested to expand research by integrating cross-sector companies in the sample to ensure better findings and apply the latest econometric models or techniques in order to compare the pre- and post-analysis results. There is room for the future researchers to employ other techniques of predicting distress (Neural Networks, Genetic Algorithms) to compare the consistency of results between various techniques.

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