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# Why Companies Default in Pakistan? Empirical Evidence from Textile Sector

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***Abstract***

***Bankruptcy or default is most undesirable satiation in companies' life. Managers and researchers always looking for to find out factors which lead companies towards default. This study focuses on multilevel variables (firm, sector and county) and found on which level of variables are more important factor for causing default. This study used data from 41 non-financial textile firms 25 non-defaulted and 16 defaulted firms listed in PSX for 10 years from 2009 to 2018. Logistic regression and artificial nested testing procedure are employed to find our result. According to finding textile, firm level factors are most significant factors behind financial distress and defaults. For instance, profitability, activity, ownership concentration and chairman duality are main factors. Whereas none of sector level variables and country level variables are reported significant in defaults. As far as multi-level variables are concern, firms' level are most influential factors for on financial health and performance of companies followed by sector level and country level variables. This study recommends that in future, under developing countries like Pakistan there are also many county level governance related variables e.g. like role of law, control of corruption and political instability may also affect companies performance and cause financial distress and default. Therefore, in future these variables may be incorporate with logit or other computer base tools like artificial neural networks.***

***Keywords: Bankruptcy, logistic regression, financial performance, default prediction***

## 1. INTRODUCTION

Bankruptcy is one of the most important events in a company's life that can place shareholders in serious financial trouble. In financial distress phase, management feels difficulty in repaying its obligations, (Platt & Platt, 2006). Moreover, financial distress is a serious situation in a company's life which can lead not only shareholders but also suppliers and lending institutions into financial trouble (Tano & Nainggolan, 2019). The focus of early

studies of financial distress was only based on financial and accounting information. However, several researchers argue that financial data alone do not provide better predictive quality of financial distress. Therefore, it is necessary to add non-financial information like variable related to corporate governance for building better models (Chen, 2008; Fich & Slezak, 2008; Lee & Yeh, 2004).

Furthermore, it is also well established from a variety of studies that business activities are significantly influenced by external factors like macroeconomic variables. The economic and political condition of any county affects business activities. It is expected that the general economic condition is the foremost issue affecting the business failure rate. According to Altman (1973), financial distress increases during financial crises due to tough financial policies by the government. During the recession time of the economy, the chances of business failure are high (Mensah, 1984). In the light of above discussion, several studies concluded that firm-specific variables alone cannot predict financial distress so there is also a need to incorporate country-level variables (Altman, 1968; Johnson, 1970; Mensah, 1984). In this regard, many scholars developed several models for predicting financial distress by incorporating macroeconomic variables (Goudie & Meeks, 1991; Smith & Liou, 2007; Taffler, 1984). Many important variables have been used by several researchers including GDP, interest rate, stock market index, and inflation.

Another strand of documented literature is that every firm operates in its specific sector and each sector is different from each other due to different sizes and nature. Therefore, financial distress varies among different sectors in a single economy. In this regard, few researchers have investigated the effects of industrial variables on financial distress (Mirzaei *et al.*, 2016; Ramakrishnan *et al.*, 2016). In the case of developed economies, a little amount of literature highlighted the importance of sector-level determinants of financial distress. These sector-related variables were formulated based on price competition, uniqueness, and R&D (Frank & Goyal, 2009; MacKay & Phillips, 2005). Furthermore, Kayo and Kimura (2011) pointed out that the effect of the sector-level variables was ignored in previous studies. However, in limited studies, dummy variables were used to define sector characteristics but failed to clear the illustration of the sectoral effect on a firm's capital structure. Moreover, in the case of developing economies, researchers faced problems related to the availability of data and variables measurements.

The direct impact of firm-level, sector-level, and country-level variables have been discussed in detail. However, very little attention has been given to indirect effect of each level of variables on financial distress. There are multi-level variables e.g. firm level, sector level and country-level. As firms are nested in a single specific sector and several sectors are nested in a single country. Therefore, in order to determine the importance of each level of variables, this study also highlights the explanatory power of each level of variables (firm-level, sector-level, and country-level) in explaining the financial distress of non-financial firms listed in the Pakistan Stock Exchange (PSX).

Textile is the most vital manufacturing sector of Pakistan as it acts as backbone in the economic development of Pakistan (Mansoor, 2019). This sector plays an important role in Pakistan's economy, both for its contribution to trade balance and employment. It contributes around 60 percent of the country's total exports and provides approximately 40 percent of employment to the manufacturing labor force (Ministry-of-Finance, 2017; Sareen, 2020; Shah, 2015). International statistics report indicated certain signs of recovery after political instability and the global financial crisis in 2008. An increase of 8.03 percent is recorded as the exports of textile and cloth trading have risen from US $709 billion to US $766 billion in the ear 2012 to 2013 respectively (Ministry-of-Finance, 2015). This study is intended to answer the following questions.

a) Which level of determinants (i.e. firm-level, sector-level, and country-level) that best explain the issue default of textile companies listed in the Pakistan Stock Exchange (PSX)?
b) Which level of determinants (i.e. firm-level, sector-level, and country-level) that best explain the issue of default across textile sector of Pakistan?

## 2. LITERATURE REVIEW

Many empirical studies were carried out for financial distress prediction but could not succeed to determine any established grounded theory related to financial distress. However, financial distress and its implication faced the fundamental question of defining distress. In this regard, being a pioneer in financial distress investigations, Beaver (1966), Altman (1968) and Olson (1980) developed their accounting-based models to predict financial distress. Another school of thought is based on market information. Merton (1974) developed a predictive model based on market data. Different models have their aspects to measure and predict financial distress. Mostly of studies used capital market theory proposed by Markowitz (1952) and predict financial distress by using market-based information. However, the current study used accounting-based and corporate governance related information, therefore, the current study includes different theories, some of these theories (static trade-off theory and signaling theory) are available in finance literature which is discussed in specific and some theories of corporate governance and business sustainability (agency theory, stewardship theory and stakeholder theory) which are discussed in general.

Financial distress is a broad concept that includes several conditions in which companies face a certain form of financial difficulties. The most common terms to define these financial problems are bankruptcy, failure, default, insolvency, and financial distress. These terms may have slightly different explanations under different conditions of business (Altman, Marco, & Varetto, 1994), these studies explained that "insolvency" is frequently associated with the lawful description of financial distress. Whereas "failure" is defined as when realized return on investment of a firm is continuously lower than the prevailing comparable rate of return on investment. Bankruptcy refers to a net negative value and lastly, the default is a situation where the company breaches the contract with creditors and can cause legal action.

The term "Failure" was defined by Beaver (1966) as an inability of a company to pay its obligation as they mature. Altman (1968) defined it as companies that are legally bankrupt and either placed in receivership or they have been granted the right to recognize under the provisions of the National Bankruptcy Act. Many studies have used Altman's definition (Begley, Ming, & Watts, 1996; Mossman, Bell, Swartz, & Turtle, 1998). However, due to criticism of the validity of bankruptcy as a measurement of financial distress (Scott, 1981). This study does not use bankruptcy as a proxy for financial distress. This study used financial distress definition as used by Ramakrishnan, Nabi, and Anuar (2016). If the firm's earnings before interest and taxes (EBIT) are negative for two consecutive years then it is considered as distressed and if EBIT is a positive value, then it is considered as non-distressed.
Financial ratios have always been the best predictors for financial distress. Many published studies are describing the significant role of financial ratios in financial distress prediction models. During the past 50 years, the application of financial ratios has been the subject of several studies. According to Lincoln (1984), both business success and business failure factors are mostly related to financial statements. The first, systematic study was carried out by FitzPatrick (1932). This study used 13 ratios but highlighted two significant ratios (net worth to debt and net profit to net worth) as distress predictors. Later on, many researchers used financial ratios to predict financial distress (Blum, 1974; Deakin, 1972; Edmister, 1972; Merwin, 1942; Meyer & Pifer, 1970; Norton & Smith, 1979). However, Beaver (1966) conducted notable work to find out the predictive ability of individual ratio to classify distress and non-distress firms. The current study selected those ratios which are mostly and commonly used in financial distress studies, these ratios are profitability, liquidity, leverage, and activity.

In early studies of prediction financial distress, researchers used only accounting and economic variables as predictors. However, in 1985 Chaganti, Mahajan, and Sharma used non-financial variables like corporate governance. Since 1980s, there is a large body of literature available that pointing out the importance of corporate governance and financial distress (Chaganti, Mahajan, & Sharma, 1985; Ciampi & Gordini, 2013; Daily & Dalton, 1994; Elloumi & Gueyie, 2001; Lee & Yeh, 2004; Manzaneque, Priego, & Merino, 2016; Polsiri & Sookhanaphibarn, 2009; Wang & Deng, 2006)

Across the developed and developing economies, the main part of the literature on financial distress is based only on firm-level and country-level variables (Alifiah, 2014; Filipe, Grammatikos, & Michala, 2016; Frank & Goyal, 2009; Karbhari & Muhamad Sori, 2004; Kayo & Kimura, 2011; Rashid & Abbas, 2011). In the case of developed economies, quite a few research studies are carried out and highlighted the importance of sector-level determinants on a firm's decision about capital structuring. These sector-related variables were formulated based on price competition, uniqueness, and R&D (Frank & Goyal, 2009; MacKay & Phillips, 2005).

Firms are not operating their activities in isolation. Business activities are significantly influenced by external factors like sector and country-level variables. The economic and political condition of any county affects business activities. Therefore, it is expected that that general economic condition may foremost issue that affecting the business failure rate. According to Altman (1973) financial distress increases during financial crises due to tough financial policies by the government. During the recession time of the economy, the chances of business failure are high (Mensah, 1984).

## 3. METHODOLOGY

To carry out vigorous and valid research analysis, this section presents the conceptual summary of explanatory variables (firm-level, sector-level, and country-level) and dependent variables. The selection of the research method depends on the formulation of independent and dependent variables, source of data, and finally model specification and its estimation. In this regard, this study emphasizes on 41 non-financial textile firms (25 non-defaulted and 16 defaulted) listed in Pakistan Stock Exchange (PSX). Ten years of unbalanced panel data is used from 2009 to 2018. To investigate that how firm level variables, and other selected sector and country-level variables affect financial distress, this study employed multiple binary logistic regression and Artificial Nested Tested Procedure (ATNP) and Nesting Statistics.

## 4. RESULTS AND DISCUSSION

The study performs descriptive statistics to introduce some basic characteristics of the variables. This section provides a comprehensive descriptive analysis of the firm, sector, and country-level variables across Pakistani listed textile companies.

### 4.1 Descriptive Statistics of Independent Variables

The mean value of profitability of non-default and default firms is 7.120 and -31.78 respectively. Deviation in the profitability of non-default and default firms is 4.990 and 132.355 respectively. Likewise, the average value of the liquidity ratio of non-default and default firms is 1.289 and 1.024 respectively and the standard deviation in liquidity ratio of non-default and default firms is 0.674 and 1.410 respectively. Furthermore, the mean values of the leverage ratio of non-default and default firms are 40.330 and 55.067 respectively. The standard deviation in leverage of non-default and default firms is 15.511 and 30.296 respectively. Finally, as far as the activity ratio is concerned it can be analysed that the mean values of activity ratio of non-default and default firms are 1.373 and 0.814 respectively. Standard deviation in the liquidity of non-default and default firms are 0.809 and 0.598 respectively.

Similarly, the descriptive statistic of ownership structure explains as it can be analysed that the mean value of ownership concentration in the non-default firm is 0.597 and in the default firm is 0.620 which reflects that ownership concentration exists more in the non-default firm

while deviation in no. of ownership concentration around its mean value in non-default and default firms are 0.213 and 0.215 respectively. Secondly, it can be observed that the mean value of institutional ownership in the non-default firm is 0.073 and in the default firm is 0.051 which reflects that ownership concentration exists more in the non-default firm while deviation in institutional ownership around its mean value in non-default and default firms are 0.079 and 0.058 respectively. Lastly, the mean value of managerial ownership in the default firm is 0.390 and in the default firm is which reflects that ownership concentration exists less in the non-default firm while deviation in managerial ownership around its mean value in non-default and default firms are 0.296 and 0.320 respectively. Secondly, it can be observed that the mean value board size in the non-default firm is 7.398 and in the default firm is 7.333 which reflects that board size is smaller in non-default firms while the deviation in board size around its mean value in non-default and default firms are 0.796 and 0.674 respectively. Moreover, it can be examined that the mean value no. of independent directors/ board independence in the non-default firm is 0.867 and in the default firm is 0.851 which reflects that no. of independent directors exist more in the default firm while deviation in no. of independent directors/board independence around its mean value in non-default and default firms are 0.973 and 0.844 respectively. It can be observed that the mean value CEO duality in the non-default firm is 0.204 and in the default firm is 0.421 which reflects that CEO duality exists more in the default firm while deviation in CEO duality around its mean value in non-default and default firms are 0.404 and 0.496 respectively.

In the textile sector, Table 4.1 shows the mean value of munificence is 1.001. This signifies that on average sector growth is positive. The minimum value is 0.996 and the maximum value is 1.005 with a standard deviation of 0.003. The descriptive summary of sector dynamism shows that the average value of sector dynamism is 1.016. Sector dynamism shows the level of uncertainty within the sector.

Table 4.1 Descriptive Statistics of Independent Variables

| **Firm-level variables** | | | | | | |
|---|---|---|---|---|---|---|
| **Variables** | **Financial Distress** | **N** | **Minimum** | **Maximum** | **Mean** | **Std Deviation** |
| **PROF** | Non-Default | 194 | -9.850 | 37.030 | 7.120 | 4.990 |
| | Default | 138 | -988.600 | 35.630 | -31.781 | 132.355 |
| | Total | 332 | -988.600 | 37.030 | -9.050 | 87.372 |
| **LIQ** | Non-Default | 215 | 0.590 | 5.910 | 1.289 | 0.674 |
| | Default | 142 | 0.110 | 10.170 | 1.024 | 1.410 |
| | Total | 357 | 0.110 | 10.170 | 1.184 | 1.038 |
| **LEV** | Non-Default | 190 | 2.140 | 78.630 | 40.330 | 15.511 |
| | Default | 133 | 0.000 | 186.610 | 55.067 | 30.926 |
| | Total | 323 | 0.000 | 186.610 | 46.398 | 24.209 |
| **AVT** | Non-Default | 224 | 0.000 | 5.100 | 1.373 | 0.809 |
| | Default | 145 | 0.000 | 2.630 | 0.814 | 0.598 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Total | 369 | 0.000 | 5.100 | 1.154 | 0.782 |
| **OC** | Non-Default | 194 | 0.000 | 0.989 | 0.597 | 0.213 |
| | Default | 114 | 0.245 | 0.955 | 0.620 | 0.215 |
| | Total | 308 | 0.000 | 0.989 | 0.605 | 0.214 |
| **IO** | Non-Default | 194 | 0.000 | 0.450 | 0.073 | 0.079 |
| | Default | 114 | 0.000 | 0.320 | 0.051 | 0.058 |
| | Total | 308 | 0.000 | 0.450 | 0.065 | 0.073 |
| **MO** | Non-Default | 194 | 0.000 | 0.984 | 0.431 | 0.296 |
| | Default | 114 | 0.000 | 0.959 | 0.390 | 0.320 |
| | Total | 308 | 0.000 | 0.984 | 0.416 | 0.305 |
| **BS** | Non-Default | 196 | 5.000 | 11.000 | 7.398 | 0.794 |
| | Default | 114 | 7.000 | 10.000 | 7.333 | 0.674 |
| | Total | 310 | 5.000 | 11.000 | 7.374 | 0.752 |
| **NOID** | Non-Default | 196 | 0.000 | 5.000 | 0.867 | 0.973 |
| | Default | 114 | 0.000 | 5.000 | 0.851 | 0.844 |
| | Total | 310 | 0.000 | 5.000 | 0.861 | 0.926 |
| **CEOD** | Non-Default | 196 | 0.000 | 1.000 | 0.204 | 0.404 |
| | Default | 114 | 0.000 | 1.000 | 0.421 | 0.496 |
| | Total | 310 | 0.000 | 1.000 | 0.284 | 0.452 |
| **Sector-level variables** | | | | | | |
| | **N** | | **Minimum** | **Maximum** | **Mean** | **Std Deviation** |
| **MUN** | 370 | | .996 | 1.005 | 1.001 | .003 |
| **DYN** | 370 | | 1.007 | 1.025 | 1.016 | .007 |
| **HHI** | 370 | | 435.685 | 641.616 | 518.720 | 71.443 |
| **Country-level Variables** | | | | | | |
| | **N** | | **Minimum** | **Maximum** | **Mean** | **Std Deviation** |
| **INF** | 1220 | | 2.550 | 12.890 | 7.741 | 3.662 |
| **SI** | 1220 | | 9386.920 | 47806.970 | 26521.622 | 12884.538 |

*This Table shows the descriptive statistics of independent variables based on the unbalanced sample of the textile sector. The sample consists of 370 firm-year observations from 2009-2018. where profitability (PROF), liquidity (LIQ), leverage (LEV), activity (AVT), ownership concentration (OC), institutional ownership (IO), managerial ownership (MO), board size (BS), No of independent director (NOID), CEO duality (CEOD), munificence (MUN), dynamism (DYN), Herfindahl-Hirschman Index (HHI), inflation (INF) and stock index (SI).*

The minimum value is 1.007 and the maximum value is 1.025 with a standard deviation of 0.007. Similarly, the descriptive summary about HHI illustrates, that the average value of HHI is 518.720. The high value of HHI shows that there are low competition and the highest level of monopoly within the sector. However, the low value of HHI shows the perfect

competition within the sector. The minimum and maximum values are 435.685 and 641.616 respectively, with a standard deviation of 71.443. Lastly, descriptive summary of the country-level variables. The country-level variables include inflation and stock index. The average inflation in Pakistan during the sample period 2009-2018 is observed at 7.741. The minimum and maximum inflation values are 2.550 and 12.890 respectively with a deviation of 3.662. Likewise, the average value of the stock index of the Pakistan Stock Exchange during the sample period is 26521.62. The minimum and maximum stock index values are 9386.92 and 47806.97 respectively with a deviation of 12884.53 which represents the stock market volatility as a whole.

### 4.2 Correlation Analysis

In the textile sector, the firm-level financial factors like profitability are observed that having significantly correlated with leverage and activity moreover, leverage has also a significant correlation with liquidity and activity. secondly, firm-level non-financial variables e.g. CEO duality has a significant relationship with managerial ownership. ownership concentration has a significant relationship with board size. Similarly, no. of independent directors has a significant relationship with ownership concentration moreover, ownership concentration and managerial ownership, institutional ownership and managerial ownership have also a significant relationship with each other. Lastly, all non-financial variables e.g. munificence, dynamism, and HHI have a significant correlation with each other.

Table 4.2 Correlation Matrix

| **Variables** | **PROF** | **LIQ** | **LEV** | **AVT** | **CEOD** | **BS** | **NOID** | **OC** | **IO** | **MO** | **MUN** | **DYN** | **HHI** | **INF** | **SI** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PROF** | 1.000 | | | | | | | | | | | | | | |
| **LIQ** | 0.099 | 1.000 | | | | | | | | | | | | | |
| **LEV** | -0.237* | -0.525* | 1.000 | | | | | | | | | | | | |
| **AVT** | 0.234* | -0.002 | -0.212* | 1.000 | | | | | | | | | | | |
| **CEOD** | -0.092 | -0.188* | 0.172* | -0.099 | 1.000 | | | | | | | | | | |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BS** | -0.008 | 0.334* | -0.158* | 0.003 | -0.076 | 1.000 | | | | | | | | | |
| **NOID** | 0.059 | -0.154* | 0.050 | -0.188* | -0.068 | 0.079 | 1.000 | | | | | | | | |
| **OC** | -0.017 | 0.063 | -0.043 | -0.281* | 0.104 | -0.125* | 0.134* | 1.000 | | | | | | | |
| **IO** | -0.022 | -0.013 | -0.052 | 0.043 | 0.003 | -0.069 | 0.019 | 0.067 | 1.000 | | | | | | |
| **MO** | 0.121* | -0.033 | -0.105 | 0.246* | 0.204* | 0.074 | 0.036 | 0.304* | -0.231* | 1.000 | | | | | |
| **MUN** | 0.054 | -0.021 | 0.055 | -0.199* | -0.081 | 0.145* | 0.158* | 0.057 | -0.216* | 0.091 | 1.000 | | | | |
| **DYN** | -0.017 | 0.029 | -0.081 | 0.171* | 0.044 | -0.124* | -0.172* | -0.046 | 0.206* | -0.056 | -0.818* | 1.000 | | | |
| **HHI** | 0.027 | -0.109* | 0.194* | -0.206* | -0.141* | 0.039 | 0.280* | 0.005 | -0.089 | -0.017 | 0.233* | -0.206* | 1.000 | | |
| **INF** | -0.048 | -0.002 | -0.029 | 0.164* | 0.050 | -0.144* | -0.108 | -0.052 | 0.230* | -0.087 | -0.946* | 0.875* | -0.080 | 1.000 | |
| **SI** | 0.044 | -0.022 | 0.055 | -0.182* | -0.064 | 0.150* | 0.143* | 0.055 | -0.230* | 0.082 | 0.908* | -0.829* | 0.126* | -0.929* | 1.000 |

*This Table shows the correlation matrix between variables based on the unbalanced sample of the textile sector. The sample consists of 370 firm-year observations from 2009 to 2018. Where the independent variables are profitability (PROF), liquidity (LIQ), leverage (LEV),*

*activity (AVT), ownership concentration (OC), institutional ownership (IO), managerial ownership (MO), board size (BS), No of independent director (NOID), CEO duality (CEOD), munificence (MUN), dynamism (DYN), Herfindahl-Hirschman Index (HHI), inflation (INF) and stock index (SI). * shows significance at the .05 level.*

In the textile sector, the firm-level financial factors like profitability are observed that having significantly correlated with leverage and activity moreover, leverage has also a significant correlation with liquidity and activity. As far as moderating variables financial sustainability is reported a significant relationship with leverage and activity. secondly, firm-level non-financial variables e.g. CEO duality has a significant relationship with managerial ownership. ownership concentration has a significant relationship with board size. Similarly, no. of independent directors has a significant relationship with ownership concentration moreover, ownership concentration and managerial ownership, institutional ownership and managerial ownership have also a significant relationship with each other. Lastly, all non-financial variables e.g. munificence, dynamism, and HHI have a significant correlation with each other.

### 4.3 Multiple Binary Logistic Regression Based on Firm, Sector and Country-level Determinants

The following Equation 4.1 provides the impact of overall determinants (firm, sector and country-level) on financial distress using the multiple binary logistic regression analysis.

$$Log\ (FD_{it} / 1\text{-}FD_{it}) = \beta_0 + \beta_1 PROF_{it} + \beta_2 LIQ_{it} + \beta_3 LEV_{it} + \beta_4 AVT_{it} + \beta_5 OC_{it} + \beta_6 IO_{it} + \beta_7 MO_{it} + \beta_8 BS_{it} + \beta_9 NOID_{it} + \beta_{10} CEOD_{it} + \beta_{11} MUN_{it} + \beta_{12} DYN_{it} + \beta_{13} HHI_{it} + \beta_{14} INF_{it} + \beta_{15} SI_{it} + \varepsilon_{it} \quad (4.1)$$

**Tables 4.3 Estimation Results of Logit Analysis for Firm, Sector and Country-level Variables**

| **Variables** | (1) | (2) | (3) |
|---|---|---|---|
| | **Model (F)** | **Model (F+S)** | **Model (F+S+C)** |
| **PROF** | -0.083*** | -0.092*** | -0.094*** |
| | (0.019) | (0.021) | (0.021) |
| **LIQ** | -0.012 | -0.086 | -0.075 |
| | (0.197) | (0.216) | (0.214) |
| **LEV** | 0.004 | 0.004 | 0.005 |
| | (0.008) | (0.008) | (0.008) |
| **AVT** | -1.345*** | -1.574*** | -1.590*** |
| | (0.351) | (0.385) | (0.387) |

| | | | |
|---|---|---|---|
| **OC** | -1.080 | -1.186 | -1.193 |
| | (0.874) | (0.901) | (0.902) |
| **IO** | -5.703** | -6.731** | -6.618** |
| | (2.649) | (2.821) | (2.842) |
| **MO** | 0.099 | 0.261 | 0.270 |
| | (0.673) | (0.699) | (0.701) |
| **BS** | -0.175 | -0.040 | -0.048 |
| | (0.270) | (0.281) | (0.281) |
| **NOID** | -0.228 | -0.178 | -0.164 |
| | (0.177) | (0.174) | (0.177) |
| **CEOD** | -0.771** | -0.565 | -0.548 |
| | (0.355) | (0.375) | (0.378) |
| **MUN** | - | -10.580 | -130.326 |
| | - | (95.178) | (185.162) |
| **DYN** | - | 43.990 | 71.149 |
| | - | (42.072) | (54.822) |
| **HHI** | - | -0.003 | -0.002 |
| | - | (0.002) | (0.003) |
| **INF** | - | - | -0.162 |
| | - | - | (0.203) |
| **SI** | - | - | -0.000 |
| | - | - | (0.000) |
| **Constant** | 4.714** | -28.628 | 64.362 |
| | (2.059) | (131.939) | (181.651) |
| **Pseudo-$R^2$** | 0.342 | 0.357 | 0.359 |
| *Standard errors are in parenthesis* | | | |
| **** p<0.01, ** p<0.05, * p<0.1* | | | |

*This table shows the firm-level, sector-level, and country-level determinants of financial distress across textile sector based on the binary logit regression model Where profitability (PROF), liquidity (LIQ), leverage (LEV), activity (AVT), ownership concentration (OC), institutional ownership (IO), managerial ownership (MO), board size (BS), No of independent director (NOID), CEO duality (CEOD), munificence (MUN), dynamism (DYN), Herfindahl-Hirschman Index (HHI), inflation (INF) and stock index (SI).*

### 4.4 Artificial Nested Testing Procedure and Nested Statistics

It is evident from the results of Table 4.4 (panel A), unrestricted model (UR) in the overall sample across firms is a preferred model against all the restricted models based on Pseudo-$R^2$. The results show that the value of Pseudo-$R^2$ for the unrestricted model is higher i.e. 0.359 as compared to restricted models. Moreover, based on chi-square and log-likelihood, the unrestricted model (UR) is the preferred model as compared to all restricted models. As such, the model with chi-square and high log-likelihood is considered as the preferred model (refer to chapter 3 for a detailed discussion). However, the results show that restricted model $R_1$ is a preferred model that outperformed the rest of the models based on AIC. The value of AIC for restricted model $R_1$ is less i.e. 290.031 as compared to the rest of the models. Additionally, the result of the P-values depicts that all the models are statistically significant at 5% level. Overall, based on model selection criteria, the results indicated that the unrestricted model (UR) is the preferred model against all the combinations of restricted models i.e. $R_1$, $R_2$, and $R_3$ in predicting financial distress in the textile sector.

Table 4.4 Artificial Nested Testing Procedure and Nested Model Statistics

| **Panel A: Artificial Nested Testing Procedure** | | | | | |
|---|---|---|---|---|---|
| **Model Selection Criteria** | **$R_1$= F+S** | **$R_2$= S+C** | **$R_3$= F+C** | **UR= F+S+C** | **Preferred Model** |
| Pseudo-$R^2$ | 0.357 | 0.335 | 0.348 | 0.359 | UR |
| Chi-square | 145.770 | 0.144.659 | 141.794 | 146.431 | UR |
| Log-Likelihood | -406.721 | -412.359 | -417.080 | -406.259 | UR |
| Akaike Info Criteria (AIC) | 290.031 | 291.251 | 292.007 | 293.370 | $R_1$ |
| p-value | 0.000*** | 0.002*** | 0.000*** | 0.000*** | |
| **Panel B: Nested Model Statistics** | | | | | |
| **Models** | **Wald-Chi$^2$** | | **Df** | **Pr > F** | |
| $M_1$ = F | 48.34 | | 10 | 0.0000 | |
| $M_2$ = F+S | 5.88 | | 3 | 0.1177 | |
| $M_3$ = F+S+C | 0.66 | | 2 | 0.7201 | |

*This Table shows the artificial nested testing procedure and nested model statistics for the default reasoning based on Pseudo-$R^2$, chi-square, Log-likelihood, and AIC. $R_1$, $R_2$, and $R_3$ are restricted models and UR is the unrestricted model. Whereas, "F" holds firm-level variables, "S" contains sector-level variables and "C" comprises of country-level variables. The p-value for each level is provided with its significant level *** significant at 5%.*

Based on Table 4.4, Panel B shows the nested model statistics for financial distress across firms based on models i.e. $M_1$, $M_2$, and $M_3$ . Whereas $M_1$ consists of firm-level variables, $M_2$ holds firm-level and sector-level variables while $M_3$ comprises of firm-level, sector-level, and country-level determinants. The result specifies that the result of wald-chi$^2$

signifies that change in Pseudo-$R^2$ for $M_1$ is only statistically significant at 5% level while $M_2$ and M3 are statistically insignificant.

## 5. CONCLUSION AND FUTURE RECOMMENDATIONS

In Pakistan textile sector, firm level factors are most significant factors behind financial distress and defaults. For instance, profitability, activity, ownership concentration and chairman duality are main factors. Whereas none of sector level variables and country level variables are reported significant in defaults. As far as multi-level variables are concern, firms' level are most influential factors for on financial health and performance of companies followed by sector level and country level variables. In this study firm level (ratios and corporate governance) variables, sector level and country level (only macroeconomic) variables are incorporated, but under developing countries like Pakistan there are also many county level governance related variables e.g., like role of law, control of corruption and political instability etc may also affect companies performance and cause financial distress and default. Therefore, in future these variables may be incorporate with logit or other computer base tools like artificial neural networks.

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