# THE IMPACT OF FINANCIAL DISTRESS ON FINANCIAL PERFORMANCE OF MANUFACTURING FIRMS LISTED AT PAKISTAN STOCK EXCHANGE

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**ABSTRACT**
The matter of firm financial performance and financial distress has prevailed in ample rational discussion in the last two decades. Financial performance is the company's ability to manage and control its resources. The financial robustness of the firm is determined by its financial performance over a specific period of time. The main purpose of this study is to determine the impact of financial distress on the financial performance of manufacturing firms listed on the Pakistan Stock Exchange. This research is conduct to assess the financial distress condition in the manufacturing sector of Pakistan. The random effect regression model and the KMV (distance to default) model are use in this study to investigate the impact of financial distress on firm financial performance from 2016 to 2020 by using an unbalanced panel data set. The data used in this study is secondary data involving 130 manufacturing firms listed at PSX. Statistically, the hypothesis claims that financial distress has a negative and significant impact on firm financial performance, and other control variables such as firm size, net profit margin, and sales growth have a positive and significant impact on firm financial performance, or market to book value has a positive but insignificant impact on financial performance. This study concludes that financial distress has a negative impact on manufacturing sector firm financial performance by using the KMV (distance to default) model in the case of Pakistan. The consequences of this research is beneficial for the management of manufacturing sector, and also adds up value in existing body of literature. For the shareholders and creditors of the manufacturing organization, this study add value by providing the information regarding financial health of the organizations. Policy makers would be better able to frame effective policies regarding manufacturing sector financial performance.

**Keywords:** Firm financial performance, financial distress, KMV model, Distance to Default, Net profit margin,
**JEL Codes:** G32, P17

## I. INTRODUCTION
The manufacturing sector of Pakistan is a dominant section of its industry for steady and rigorous growth and plays a dynamic role in bringing prosperity to the lives of the population of the country. Consequently, the financial performance of manufacturing sector firms plays a vital role in the development of the country. In the current era, organisations face many challenges to ensure their sustainability and financial performance. According to IAI (2007), financial performance is the company's ability to manage and control its resources effectively and efficiently. Pakistan is a developing country facing various obstacles in maintaining the growth and stability of its economy, in which the rapid failure of the organisation is a big problem (Ahmad et al., 2020). Asian marketplaces are weaker in nature and more susceptible to financial difficulties; e.g., in Pakistan, 105 out of 570 listed firms got delisted during 2012-2016 due to default (Waqas and Rus, 2017). A wide range of firms have confronted financial distress in the last few years. There are many reasons behind this: the extreme extension of risk lines for the shareholding ratio of block shareholders, the interest transmission of non-arm's-length related party transactions, or insider trading, which ultimately causes financial distress (Chen et al., 2020; Yin et al., 2022). The study shows that financial distress grabs the attention of researchers for a long time (Mahmood et al., 2018; Arshad and Ali, 2016; Ashraf and Ali, 2018). "Financial distress" is a condition where a firm's financial capacity is declining bit by bit and its incompetence to pay current obligations to creditors" (UFO, 2015).The transparency and accountability of

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financial statement disclosure has been a great issue among accounting consultants, managers, and financial analysts, especially after the list of notorious accounting scandals and frauds committed by well-known organisations such as Enron and Worldcom (US), One Tel (Australia), Nortel (Canada), and many others (Mohan and Chandramohan, 2018; Kao and Chen, 2004; Bhagat and Bolton, 2007; Gulzar and Wang, 2011). Hence, it is also necessary to identify the problems causing corporate failure and take the necessary steps for their mitigation. Financial distress (FD) is one of them, and its prediction is necessary for the organisation (Kibuchi, 2018). The four types of financial distress are: the first one is performance deterioration; the second is collapse of the organization; liquidation; and insolvency; in which the first two influence the existence of the firm, whereas the latter two impact on its liquidity (Outecheva, 2007).Extensive research has been conducted on the effect of FD on firm financial performance, but there are still conflicts among prevailing research results. Based on the previous research to analyse a financial distress state, a financial distress state is when an organisation is unable to pay its current liabilities and becomes bankrupt (Madhushan and Kawshala, 2018). The probability of financial distress or difficulties increases as a result of the performance efficiency of a firm's decreasing, either directly or indirectly (Ahmad et al., 2020). The foremost cause of firm failure is the deficiency of management expertise, but the vital reason is often a shortage of firm liquid money (Aasen, 2011). Previous study examined the various scenarios of going away from financial distress and taking the necessary measures. Many organisations also deal with financial distress by altering their capital structures and by changing their dividend pay-out policies on the basic of their cash flow volatility (Ali et al., 2021). However, the study also shows that the life cycle phase of the organisation does not have as much influence on financial distress as one might think (Chang, 2016).

Research on the impact of financial distress on the firm performance has been conducted extensively (Ahmad et al., 2020). However, there are still inconsistencies among existing research results. The variation of preceding research outcomes motivates us to reconsider the impact of financial distress on firm financial performance in the case of manufacturing sector of Pakistan because this sector is a key pillar of the economy and contributes 20% of total output produced in the national economy. Moreover, previous studies mostly used Altman's Z-score model for the measurement of Financial Distress (Malik et al., 2017). But this study aims to use M-distance to default (KMV) model for the measurement of financial distress. Therefore, this study used the 130 manufacturing sector's firms listed at the Pakistan stock exchange to forecast the effect of financial distress on firm financial performance by using both the fixed-and-random effect model. This study used ROA as a measure of financial performance and the distance to default model as a measure of financial distress and other control variables such as firm size, net profit margin, sales growth, and market to book value of the firm for the period 2016 to 2020.

## II. LITERATURE REVIEW
### II.I. FINANCIAL DISTRESS AND FIRM FINANCIAL PERFORMANCE

Forecasting financial distress has long been a major issue for numerous stakeholders in an increasingly complex corporate environment. Financial distress is a big problem for almost all the markets in the world. An organisation showing signs of financial distress creates a problem for the people engaging with the firm, such as employees, shareholders, lenders, and other stakeholders. It severely affects the job safety of administrators and employees or stakeholders' equity positions and the claims of lenders because their privileges are not guaranteed and also affects the financial performance of the firms (Baimwera and Muriuki, 2014; Sulehri and Ali, 2020; Ahmad et al., 2022; Audi et al., 2020; Alim et al., 2022). For several decades, academics have been interested in financial distress research (such as Beaver, 1966; Altman, 1968; Ohlson, 1980; Zmijewski, 1984; Zavgren, 1985; Lau, 1987; Johnsen, and Melicher, 1994; Haider and Ali, 2015; Kassem et al., 2019; Sajid and Ali, 2018; Roussel et al., 2021; Senturk and Ali, 2021; Mehmood et al., 2022). This area of research caught the attention of researchers after the 2008-09 global financial crisis. Because the word "financial distress" refers to a broad topic, it needs an extensive study to fully characterise it. Various researchers have shed light on financial distress based on their individual perspectives on the subject. Sudarsanam and Lai (2001) examine the variety of techniques for financial distress prediction in UK firms. Hall (2002) forecasts the likelihood of financial distress by using various ratios. Dahiya (2003) examines the impact of financial distress on bank lending relationships. Jones (2004) forecasts the financial distress in the case of Australia by using a Mixed Logit Model. Pindado and Rodrigues (2005) examine the factors of financial distress costs. Wang et al. (2006) examine the impact of corporate governance on financial distress. High financial decomposition measures were associated with corporate failure, according to Entropy theory (Opler & Titman, 1994).

Other theories such as Corporate Risk Management Theory, Option Pricing Theory, and Credit Risk Theory also explain the FD role in firm financial performance. Smith & Liou (2007) examine the impact of financial distress on the large sample of US industrial firm. This study uses financial ratio as an independent variable and firm performance as a dependent variable. The result of the study shows that model is weak to predict error. Rashid & Abbas (2011) forecast insolvency in case of Pakistan by using financial ratios that is more important in insolvency calculation for the non-financial segment based on a sample of corporations that became to be bankrupt.

Discriminant Analysis Model is used for data analysis. The result of the study shows that organisations having Z-value below zero fall into the bankruptcy however, the firms with Z-value above zero falls into the non-bankrupt category.

Many studies propose a derivation of Merton's (1976) for estimating the implied likelihood of default using stock and option market prices. For this purpose, the study takes a look at worldwide financial organizations' trading options in the United States during the crisis. The result of the study compares the performance of the KMV model's implied likelihood of default to the predicted default frequencies. Camara et al. (2012) examine the comparison of the likelihood of default for major financial organizations. Hussain et al. (2014) scrutinise whether the Altman Z score model is helpful in the prediction of organisation failure in the case of Pakistan's textile sector or not. The result of the Z score model is accurate, which shows that a firm can predict bankruptcy condition through the Altman Z Score model in Pakistan. Shaukat and Affandi (2015) determine the financial distress impact on a firm's financial performance with relevance to the corporate sector of Pakistan. The data is analysed through a Z-score model and regression analysis. There is a positive and significant relationship between financial performance and financial distress. The increase in EPS shows a decrease in financial distress and vice versa is also true. Everyone wants to know about the organization's financial health over the period. The financial performance of the organisation is totally dependent on the policies, plans, and activities put in place by management for the achievement of organisational goals. As the probability of financial distress or troubles increases, the financial performance of a firm's decreases in terms of efficiency and effectiveness, either directly or indirectly. Liang & Pathak (2016) evaluate the association between financial health and corporate performance in the case of listed manufacturing firms in India and China. The result of the study shows that there is a positive and significant relationship between these two variables in both markets. Waqas & Rus (2017) review the financial distress by using O-score and logit models in the case of Pakistani firms. The research gives significant insights on the part of diverse financial ratios in forecasting financial distress and demonstrates that the estimated logit model produces a higher accuracy rate in predicting financial distress.

Prediction of financial distress is very important for the long-term survival and growth of firms. In Mahmood et al. (2018), they determine the association between financial flexibility, financial distress, and firm performance in the case of Pakistan. The result of the study shows that financially flexible firms face less financial distress; in other words, the probability of financial distress decreases and the performance of the firm increases. Ashraf et al. (2019) examine whether traditional models of financial distress prediction are helpful in forecasting the early signs of financial distress in the case of the emerging market of Pakistan. The findings of the study show that the D-score model, logit model, and hazard model performed poorly compared to the Z score and Probit model. These two models perform well in the case of an emerging market. Ahmad et al. (2020) review the financial distress effects on firm financial performance of non-financial organisations listed on the Pakistan Stock Exchange. The results of the study indicate that the performance of listed non-financial Pakistani organisations is negatively affected by financial distress and that the relationship between the two variables is significant. Dinh et al. (2021) predict organisation financial distress in the case of Southeast Asian nations using a market-based Distance to Default model. The result of the study shows that the market-based distance-to-default approach is usually a good model for an initial warning indicator of financial distress during these years, but that forecasting accuracy differs among single countries in the Southeast Asian country. Li et al., (2021) examine the impact of financial distress on firm performance during COVID-19 in the case of Malaysia. The result of the study shows that financial distress has a negative impact on firm performance during the COVID-19 period. Moreover, the study of Shair et al. (2021) for the case of Pakistan suggest that Pakistan' stock market is more sensitive (volatile) to global shock than the domestic shock amid the COVID-19.
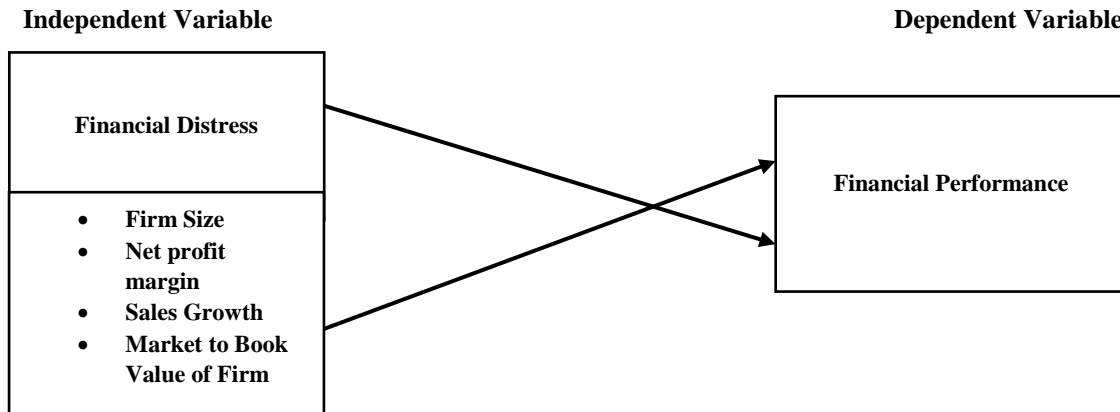
**II.II. KMV MODEL**
In 1993, Moody's KMV devised a technique based on Merton's model for the estimation of a firm's default probability at some specified point in time. According to their proposed approach, when the market value of any particular firm assets declines in such a way that it becomes less than the book value of the firm liabilities (short term plus half of the long-term liabilities value), default occurs. Subtraction of the face value of firm debt from firm estimated market value results in default probability. The resulting value is then divided by the firms estimated volatility which results in a figure like Z score. This score is called distance to default (DD). The distance to default is, in essence, the number of standard deviations of market value a particular firm is away from the point of default. The Merton (1974) model is the foundation of Moody's KMV model. If Merton's model is considered in the context of manufacturing firms in the setting of the present study, then equity of a firm can be treated as a call option on the firm assets, provided the fact that shareholders have the residual claim on firm asset after the settlement of all liabilities. The book value of the firm liabilities is the strike price of the call option. If the firm asset value fall below than the strike price, then the value of the equity would be zero. There are two important assumptions of the model to take into account. First, the total market value of a firm assets follow a geometric Brownian motion. Second, a

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single discount bond with a maturity of T time periods is issued by the firm. The firm equity is considered a call option on the underlying assets' value of the firm.

## III. CONCEPTUAL FRAMEWORK

This study used a causal-effect research design to assess the impact of financial distress on the firm financial performance in case of manufacturing sector of Pakistan.

**Independent Variable**　　　　　　　　　　　　　　**Dependent Variable**



**Financial Distress**

- **Firm Size**
- **Net profit margin**
- **Sales Growth**
- **Market to Book Value of Firm**

**Financial Performance**

## III.I. ECONOMETRICS MODEL

$$FFP_{it} = \beta_{0it} + \beta_1 FD_{it} + \beta_2 MBV_{it} + \beta_3 SIZE_{it} + \beta_4 NPM_{it} + \beta_5 SG_{it} + e_{it}$$

Where,

FFP= firm financial performance (dependent Variable)

FD = Financial distress (Independent Variable)

MBV= Market to Book Value of Firm (Control Variable)

SIZE= Firm Size (Control Variable)

NPM= Net Profit Margin (Control Variable)

SG= Sales Growth (Control Variable)

### Table A: Variables Measurements

| Variable | Description | Measurement |
|---|---|---|
| Firm Financial performance (FFP) | "The ability of the organization to manage and control its assets" | ROA =Net income/Total assets |
| Financial Distress (FD) | "Is a state in which a corporation or individual cannot produce income or unable to pay its financial obligations." | KMV (M-distance to default Model:-<br>1) Value of equity (Market capitalization) $E_t =$ Stock price × Number of outstanding shares.<br>2) Volatility of equity $\sigma E$ = Annualized volatility of stock prices with daily frequency.<br>3) Total liabilities $L_t$ = Short term liabilities + half of long term liabilities.<br>4) Risk free rate r = Treasury bill rate<br>5) Horizon (T-t)= one year<br>6) Market Asset Value $A_t = E_t + L_t$<br>7) Asset Volatility $\sigma A = E_t + L_t/ A_t$<br>8) $d1 = \dfrac{\ln (A_t/L)+(r- \sigma 2/2)(T-t)}{\sigma \sqrt{T-t}}$<br>9) $d2 = d1 - \sigma \sqrt{T - t}$<br>10) Equity value $E_t =$ $A_t \cdot N(d1) - Le - r(T-t)\ N(d2)$<br>11) equity Volatility $\sigma E = VA/ VE \blacktriangle \sigma A$<br>11) Prob of default =normdist(-d2) |
| Market to Book Value of Firm (MBV) | The Market to Book ratio (also called the Price to Book ratio), is a financial valuation metric used to evaluate a company's current market value relative to its book value | M/B= Market Capitalization / Total book value |

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| Firm Size (SIZE) | Company size measured by market capitalization. | Natural log of Total Assets |
|---|---|---|
| Net Profit Margin (NPM) | It calculates a company's net profit per dollar of revenue. | Calculated Figure |
| Sales Growth (SG) | Sales growth is a metric that reflects your sales team's ability to raise revenue over a set period of time. | Calculated Figure |

## IV. METHODOLOGY AND DATA SOURCES

This study's sample is made up of firm-level unbalanced panel data. This study considers the sample of 130 manufacturing sector firms listed at the Pakistan Stock Exchange for the period of 2016 to 2020. For this study, the data was collected from secondary sources only. The collection of data from secondary sources is easier and less time consuming than collection of data from primary source. For analysis, data were collected from annual reports and from different websites such as Investor Lounge, Standard Capita and PSX data portal from FY 2016 to FY 2020. The annual reports of the firms was downloaded from the open door websites of the selected firms. The annual report of the firms was includes all financial information regarding the firm and all relevant data was collected. It was accumulate 660 observations at a minimum, however owing to #Num errors encountered during financial distress measurement, 100 observations was deleted from the overall data. Descriptive statistics, Correlation Analysis, Hausman Test, Variance Inflation Factors, Fixed-and-Random Effect model and KMV model are used to examine the data.

## V. RESULTS AND DISCUSSION

This study examines the impact of financial distress on the financial performance of Pakistan stock exchange listed manufacturing firms over the period of 2016 to 2022. Financial performance is taken as a dependent variable and financial distress is taken as an independent variable; other variables such as size, net profit margin, sales growth, and market to book value are taken as control variables. Table 1 presents the descriptive statistics of the model. The results of Table 1 reveal that the:

**Table 1**

| Descriptive Statistics | | | | | | |
|---|---|---|---|---|---|---|
| | ROA | FD | SIZE | NPM | SG | MBV1 |
| Mean | 0.051301 | 0.059740 | 9.206307 | 3.988291 | 8.154055 | 0.315292 |
| Median | 0.049500 | 0.000104 | 9.157865 | 5.250000 | 7.115000 | 0.064691 |
| Maximum | 0.531023 | 1.000000 | 17.35114 | 479.9900 | 229.0000 | 6.448718 |
| Minimum | -0.546920 | 0.000000 | 5.071542 | -681.3800 | -81.42000 | -0.371681 |
| Std. Dev. | 0.095141 | 0.179846 | 1.790261 | 41.52927 | 30.96468 | 0.661216 |
| Skewness | -0.653128 | 4.023246 | 0.643460 | -6.107314 | 1.797184 | 3.842609 |
| Kurtosis | 10.27290 | 19.33818 | 5.523655 | 170.3790 | 13.18696 | 23.04313 |
| | | | | | | |
| Jarque-Bera | 1251.281 | 7601.051 | 183.9062 | 645446.6 | 2674.228 | 10559.76 |
| Probability | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| | | | | | | |
| Sum | 28.21550 | 32.85692 | 5063.469 | 2193.560 | 4484.730 | 173.4104 |
| Sum Sq. Dev. | 4.969415 | 17.75713 | 1759.564 | 946849.3 | 526387.5 | 240.0261 |
| | | | | | | |
| Observations | 550 | 550 | 550 | 550 | 550 | 550 |

The mean is the average of the given data set, which, actually, is the sum of all the observations divided by the number of observations of data. The mean of Return on Assets is (0.051301), the mean of Financial Distress is (0.059740), and the mean of Size is (9.206307), and so on. Median is the central value of a series of data. The maximum is the highest value in a given set of data, while the median is the middle value. Is the smallest or lowest value of data, so the median of return on assets is (0.049500), the median of financial distress is (0.000104), and so on. The maximum mean and median of return on assets is (0.531023), the maximum mean and median of financial distress is (1.000000), and so on. The minimum mean and median of return on assets is (-0.546920), the minimum mean and median of financial distress is (0.000000), the minimum mean and median of size is (5.071542), and so on. Standard deviation is the dispersion of data around the mean and is denoted by sigma. Standard deviation of Return on Assets is (0.095141), Standard deviation of Financial Distress is (0.179846), and Standard deviation of

Size is (1.790261), and so on. Skewness measures the degree of symmetry, and Kurtosis measures the degree of sharpness. The skewness of return on assets is (-0.653128) that is negatively skewed, the skewness of financial distress is (4.023246) that is positively skewed, the skewness of size is (0.643460) that is normally skewed, the skewness of net profit margin is (-6.107314) that is negatively skewed, the skewness of sales growth is (1.797184) that is positively skewed, the skewness of market to book value is (3.842609) that is positively skewed. The Kurtosis of Return on Assets is (10.27290), the Kurtosis of Financial Distress is (19.33818), the Kurtosis of Size is (5.523655), and the Kurtosis of Net Profit Margin is (170.3790). The kurtosis of sales growth is (13.18696). The results show that the Kurtosis of all variables in the model is positive. Clearly, the value of Jarque-Bera probability of return on assets is (0.000000), and Jarque-Bera probability of financial distress is (0.000000), which is less than 0.1, which suggests that data is not normally distributed.

Table 2 reports the correlation matrix of variables" Result shows that Financial distress has (-0.117441) negative and significant correlation with Return on Assets. Size has (0.181444) positive and significant correlation with Return on Assets,  Net Profit Margin has (0.493100) positive and significant correlation with Return on Assets, Sales Growth has (0.303793) positive and significant correlation with Return on Assets, Market to Book value has (0.153914) positive and significant correlation with Return on Assets. Size has (-0.041747) negative and insignificant correlation with Financial distress, Net Profit Margin has (-0.007732) negative and insignificant correlation with Financial distress, Sales Growth has (-0.018492) negative and insignificant correlation with Financial distress, Market to Book value has (-0.065061) and negative insignificant correlation with Financial distress. Net Profit Margin has (0.148503) positive and significant correlation with Size, Sales Growth has (0.063849) positive and insignificant correlation with Size, Market to Book value has (0.335736) and positive significant correlation with Size. Sales Growth has (0.241746) positive and significant correlation with Net Profit Margin, Market to Book value has (0.053181) and positive insignificant correlation with Net Profit Margin. Market to Book value has (0.007864) and positive insignificant correlation Sales Growth.

**Table 2**

| Correlation Matrix | | | | | | |
|---|---|---|---|---|---|---|
| Variables | ROA | FD | SIZE | NPM | SG | MBV1 |
| ROA | 1.000000 | | | | | |
| | | | | | | |
| FD | -0.117441*** | 1.000000 | | | | |
| SIZE | 0.181444*** | -0.041747 | 1.000000 | | | |
| NPM | 0.493100*** | -0.007732 | 0.148503*** | 1.000000 | | |
| SG | 0.303793*** | -0.018492 | 0.063849 | 0.241746*** | 1.000000 | |
| MBV1 | 0.153914*** | -0.065061 | 0.335736*** | 0.053181 | 0.007864 | 1.000000 |
| ***, 1 percent level of significance | | | | | | |

If it is supposed that there is cross sectional heterogeneity but there is no correlation between independent variables in the representations and the cross-sectional heterogeneity then random effect representation is used. **Table 3** shows the result of random effect model. The coefficient of financial distress shows that there is negative and significant relationship between financial distress and Return on Assets.

The results show 1 percent increase in financial distress creates (-0.039707) percent decrease in financial performance and that is measured by Return on Assets in Pakistan stock exchange listed manufacturing firms and this relationship is significant at 5 percent level of significance. The coefficient of Size shows that there is positive and significant relationship between Size and Return on Assets. The results show 1 percent increase in Size creates (0.004519) percent increase in financial performance that is measured by Return on Assets in Pakistan stock exchange listed manufacturing firms and this relationship is insignificant at 5 percent level of significance. The coefficient of Net Profit Margin shows that there is positive and significant relationship between Net Profit Margin and Return on Assets. The results show that 1 percent increase in Net Profit Margin creates (0.000886) percent increase in financial performance that is measured by Return on Assets in Pakistan stock exchange listed manufacturing firms and this relationship is highly statistically significant at 1 percent level of significance. The coefficient of Sales Growth shows that there is positive and significant relationship between Sales Growth and Return on Assets. The results show that 1 percent increase in Sales Growth creates (0.000660) percent increase in financial performance that is measured by Return on Assets in Pakistan stock exchange listed manufacturing firms and this relationship is highly statistically significant at 1 percent level of significance.

The coefficient of Market to Book value shows that there is positive and insignificant relationship between Market to Book value and Return on Assets. The results show that 5 percent increase in Market to Book creates (0.009756)

percent increase in financial performance that is measured by Return on Assets in Pakistan stock exchange listed manufacturing firms and this relationship is insignificant at 5 percent level of significance.These results also disclose that coefficient of FD, SIZE, NPM, SG, are significant at 1 % and 5 % level of significance while MBV1 is not. R-square and Adjusted R-squared are acceptable by statistical standards (the fitted regression equation explains 33.38 % of the variation of FFP) and overall model is also significant as per significance rule of F-Statistics. Durbin-Watson stat is (1.54) that is near to 2 and it shows that there is no auto correlation exists between variable. **Table 4** indicates the Hausman statistic which is insignificant reveals that the appropriateness of random effect model as contrast to fixed effect model. So far, the Random effects model is finalized for obtaining the conclusions.

**Table 3**

| Dependent Variable: ROA | | | | |
|---|---|---|---|---|
| Method: Panel EGLS (Cross-section random effects) | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| FD | -0.039707 | 0.017594 | -2.256796 | 0.0244 |
| SIZE | 0.004519 | 0.002183 | 2.070582 | 0.0389 |
| NPM | 0.000886 | 7.48E-05 | 11.84532 | 0.0000 |
| SG | 0.000660 | 9.63E-05 | 6.855477 | 0.0000 |
| MBV1 | 0.009756 | 0.005759 | 1.694261 | 0.0908 |
| C | 7.61E-05 | 0.020522 | 0.003707 | 0.9970 |
| Effects Specification | | | | |
| | | | S.D. | Rho |
| Cross-section random | | | 0.047858 | 0.3652 |
| Idiosyncratic random | | | 0.063093 | 0.6348 |
| Weighted Statistics | | | | |
| R-squared | 0.333818 | Mean dependent var | | 0.026055 |
| Adjusted R-squared | 0.327695 | S.D. dependent var | | 0.077143 |
| S.E. of regression | 0.063253 | Sum squared resid | | 2.176509 |
| F-statistic | 54.51876 | Durbin-Watson stat | | 1.546263 |
| Prob(F-statistic) | 0.000000 | | | |
| Unweighted Statistics | | | | |

**Table 4**

| Correlated Random Effects - Hausman Test | | | |
|---|---|---|---|
| Test Summary | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob. |
| Cross-section random | 7.765685 | 5 | 0.1696 |

The test is performed to keep away prejudice from making outcome on interrelationship of dependent and independent variables. Variance inflation factor (VIF) of each independent variables is calculated in Multi-collinearity test (Kutner et al., 2004).

**Table 5**

| Variance Inflation Factors | | | |
|---|---|---|---|
| | Coefficient | Uncentered | Centered |
| Variable | Variance | VIF | VIF |
| FD | 0.000310 | 1.049545 | 1.010171 |
| SIZE | 4.76E-06 | 15.47890 | 1.090001 |
| NPM | 5.60E-09 | 1.083903 | 1.080728 |
| SG | 9.26E-09 | 1.093878 | 1.071925 |
| MBV1 | 3.32E-05 | 1.167589 | 1.050106 |
| C | 0.000421 | 15.00918 | NA |

The table 8 eliminates the chance of Multi-collinearity in the set of variables selected for the assessment, it is because the value of VIF is less than 10. Results of Correlation also verify the lack of multi-collinearity between the independent variables.

## VI. CONCLUSION AND LIMITATIONS

The overall goal of this research is to examine the impact of financial distress on the financial performance of Pakistan stock exchange-listed manufacturing firms from 2016 to 2020. A number of studies have been conducted around the world to examine the relationship between financial distress and financial performance using various models. This study uses the KMV (distance-to-default) model to forecast the risk of financial distress in Pakistan's

manufacturing sector listed firms. Financial distress has been a great problem all over the world and cannot be ignored it leads to bankruptcy which eventually leads to failure. Prediction of financial distress is very important for the long-term survival and growth of the firms. However, in this certain study, the aim is to analyze the impact of FD on firm financial performance by using 130 Pakistan stock exchange listed manufacturing firms as a benchmark. The study's major findings show that financial distress has a negative impact on the financial performance of listed manufacturing firms, and the association between the two variables is significant. It signifies that the outcome confirms the finding of Ahmad et al., (2020) that states financial distress negatively and significantly affect the firm performance. This research also examines the association between firm size, net profit margin, sales growth and market-to-book value findings. It shows that except MBV1, all other variables are significant at the 1% and 5% level of significance in explaining variations in ROA as a dependent variable. Financial distress has been a great problem all over the world and cannot be ignored it leads to bankruptcy which eventually leads to failure. Prediction of financial distress is very important for the long-term survival and growth of the firms. This study spans just 5 years from 2016 to 2020, covering the whole business cycle, despite the fact that a longer time would better explain the empirical results. Firm financial performance is important for everyone such as shareholder, investor, creditors or tax authorities. Everyone wants to know about the financial health of the sector over a given period of time. This research also provides the benefit to the government for the improvement of tax policy implementation laws and regulation on the manufacturing sector of Pakistan. General public is also able to understand the extensive view of the condition tackled by our domestic economy.

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