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An investigation of costs of financial distress in case of ongoing manufacturing firms of Pakistan

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ABSTRACT

The core objective of cureent study is to investigat the costs of financial distress of ongoing manufacturing sector of Pakistan. A panel of 146 manufacturing firms Pakitan are selected for this study for the period of 2001-2011. Two most applicable panel data teachniques (fixed effects and random effects models) are utilized to investigate the costs of financial distress and Hausman's specification test recommended that fixed effects model is most appropriated model in this study. The results of fixed effects model suggest that financial distress of onging firms of Pakistan has significant direct impact on opportunity losses in case of Pakistan after control average collection period, total assests growth, fised to total assets ratio, tangibility of aessts and sector distresssed. The upcoming studies msut explore direct costs of financial distress and bankruptcy in case of manufacturing as well as service sector of Pakistan.

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Introduction

Financial distress means companies' failure to meet their operating as well as financial requirements on due date or to the complete extent these companies are facing difficulties in liquidity and other short term obligations (Altman, 1984; Davydenko, 2005; George & Hwang, 2007; Gordon, 1971; Pindado & Rodrigues, 2005). In literature researches point of view towards financial distress is that they treat financial distress as insolvency of firm, or firms restructuring in case of any default (Andrade & Kaplan, 1997; Wruck, 1990). Purnanandam (2008) had suggested that the vital factors that cause insolvency of the firm is financial distress. Most of the researchers claimed that financial distress inversely effect the value of the firm (Pindado & Rodrigues, 2005; Stulz, 1990). As financial distress has very high influence on the performance and value of the firm, that is way today lot of firms are incurring a lot of costs in case of financial distress.

All over the world financial distress is view as very costly process as it has significant impact firms' performance while on the other hand it's inversely affects the firm's capital structure. In literature researchers categories these costs into two major categories first one is direct cost of financial distress in the form of bankruptcy like lawful or organizational costs that suffer only in case of default while the second category includes indirect hidden costs or losses such as opportunity losses and may be losses of productivity (Altman & Hotchkiss, 2006).

Frist category of cost of financial distress is direct costs are normally incur during bankruptcy either in the process of liquidation or in case of any default made by the management of the company. The major heads of these costs includes remunerations or fee of legal advisors, auditors, accountants, experts in the field of management or administration and many others that are major parties during liquidation or any default situation. Although these costs are significant lower than from indirect costs but in literature in case of these costs firm bear losses around 3% to 25% in its value. While Warner (1977) claimed that the costs in case of any default are sufficiently lower than the costs that incur in the case of bankruptcy. Second category of costs of financial distress is indirect costs which are not possible to measure empirically such as opportunity costs and productivity costs. But in literature most of the studies had operated through different approaches to measure these costs. The major problem during measurement that had suffered by many researchers is the separation between financial distress and economic distress. Altman and Hotchkiss (2006) claimed that bad performance of a firm is occur due to its financial distress or due to few economic aspects that leads the firm into financial distress. So the performance of the firm reveals either the financial distress losses or economic distress losses but sometime it is the combination of the both.

The work done on costs of financial distress is normally done in developed countries while very few studies had been done in developing countries in this regard. According to best knowledge of author current study is aims to fill this gap in perspective of Pakistan. The main objective of this study is to investigate indirect costs financial distress in case of Pakistani manufacturing firms. The remaining structure of paper focuses on the followings; the section 2 covers literature review, section 3 highlights the issues of data and methodology, section 4 puts lights on results and discussion while last section is conclusion of the study.

Literature review

In literature earlier studies had defined the financial distress in terms of company's inability to pay its financial obligations at due date (Altman, 1984; Andrade & Kaplan, 1997; Wruck, 1990). Andrade and Kaplan (1997) had categorized the financial distress mainly into two kinds: first one is firm's inability to pay its financial obligations when they actual date and the second category is restructuring of firm's capital structure in order to avoid form default situation or bankruptcy. Turetsky and McEwen (2001) had termed financial distress as a multi stage process that was shared into some continuous following stages

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that must cover few specific injurious financial features. During these unfavorable conditions businesses shift towards following stage until touched their completion point. They claimed that this process begins from dividend reductions, operating losses which leads towards negative profits then subsequently this problem is become so large which can harm the firms in the form of bankruptcy or default. Purnanandam (2008) had defined the financial distress with the help of theoretical model in which they claimed that financial distress is mainly a position which lies within the solvency of the firm and insolvency of the firm.

As described earlier direct and indirect costs or losses of financial distress, Ang, Chua, and McConnell (1982); Stanley and Girth (1971) had worked on direct costs as bankruptcy of the firm and they proved that the average costs or losses bear by firm ranging from 7.5% to 24.9% reduction in the value of the firm. Altman (1984) had worked on direct cost in the form of bankruptcy and he claimed that the average bankruptcy losses that bear by the firm are 1.8 million and this losses are almost 3.5% of the market value of the sampled firms. Gilson, John, and Lang (1990) had worked on direct losses by panel of 169 firms from 1978 to 1987as a final sample of those firms that want restructuring the direct losses of the default firms are almost 65% of the sampled firms book value. All these evidence are the proof that direct losses in case of bankruptcy and default can inversely effects the value of the firm.

While on the other hand the indirect losses in case of bankruptcy or default have also negative affects the value or performance of the firm. These indirect losses normally include the opportunity losses and productivity losses and these losses can results in decreasing the value or performance of the firm (Sanz & Ayca, 2006). The first main component of indirect losses is the opportunity costs or losses and due to these costs or losses the probability of losing customer loyalty is established which in fact enhance the chance of default of a particular firm as its sales or profit is significantly reduces (Altman & Hotchkiss, 2006). Likewise in respect of productivity losses the George and Hwang (2007) claimed that whenever a firm uses debt financing as their source of fund then financial institutions can impose restrictive regulations and these regulations can inversely effects performance of the operations of a firm which leads to productivity losses.

Throughout the world, researcher scholars claimed that they were enabled in measuring empirically the indirect losses due to their subjectivity and complex nature (Andrade & Kaplan, 1997; Gilson et al., 1990). Altman (1984) had worked on indirect losses first time and he evaluated the extent of bankruptcy losses while he also made a comparison of tax benefits with the present value of bankruptcy losses. He found that the ways to measure His research provides basic information to measure indirect costs and also proves that costs of distress are enough significant that the indirect costs of distress which is very useful in decision making. Ofek (1993) had worked studied on high leveraged firms with perspective to financial distress and he claimed that the high leveraged firms normally force to implement the operational restructuring option in case of financial distress otherwise these firms survive in business through downsizing. Opler and Titman (1994) had also worked on measuring the indirect losses of distress. They distributed their work into 3 major heads. The first main head was the constantly reduction in the number of customers due to higher risks of default of firm which can lower down customers loyalty and sales volume of the firm. They also claimed the problems of operations can reduce customers and their loyalty as firms unable to deliver the quality products on due dates. The second major head was attacked of competitors to gain the market share in case of distress either it is financial or operational through different pricing strategies and tactics. While last major head was losses to the leveraged firms due to their inefficient management which results due to their poor performance in case of distress. Babenko (2004) had worked on indirect costs of distress and he claimed that default situation has inverse impact on customer loyalty and confidence.

Chen and Merville (1999) had investigated the costs of distress in case of ongoing firms. At that time that study was the only effective in terms of measuring the losses of financial distress by choosing the sample of all successful ongoing firms. They debated that in the panel of ongoing firms, the time variable also had a significant impact on the value of the firms. The classified the indirect losses in terms of opportunity losses to the firms by losing their customers, key supplier, cherished workforce and firms sacrificed investment opportunities. They found that the ongoing firms which had high chances of distress would tolerate their value on average 10.3%. Pindado and Rodrigues (2005) had worked on panel data of 186 German firms, 1704 American firms and 491 British firms to explored the indirect losses of distress. They found that there is direct relationship between the chances of firm's financial distress and its opportunity losses. While George and Hwang (2007) had explored the losses of distress with perspective of operating profit and the returns on the stocks. They found that higher leverage firms normally faced more losses or negative profits as compered lower leverage firms. The above literature shows the importance of indirect losses of financial distress in the world. While the current study is also wants to check the opportunity losses faced by the ongoing manufacturing firms of the Pakistan while keeping in view the probability of financial distress,

Data and Methodology:

Current study is primarily focuses on to investigate costs of financial distress in manufacturing sector of Pakistan. Pakistan's manufacturing sector is select for current study. A random sample of 146 manufacturing firms ongoing is picking through simple random sampling approach for the time period of 2001 to 2011. Current study excludes the remaining manufacturing firms as they do not have sufficient data for analysis and also those which are default firms. Simple random sampling approach utilize because this approach provides equal opportunity for selection to every firm, keep away from sampling error and at last it facilitates in inferring conclusion from whole population (Castillo, 2009).

So, final sample of the study includes a strongly balanced panel data of 146 same manufacturing firms covering from same time period from 2001 to 2011. Data of these manufacturing firms are collected from the publications of State Bank of Pakistan (SBP), from firm's official websites and from annual reports of these manufacturing firms. As current study employing the panel data which take contains same cross-sectional units (firms) over a same time period (Wooldridge, 2009).

As panel data is a blend of both times series and cross-section data. In econometrics there is lot of techniques for conducting analysis with panel data but the two most important and widely used techniques are fixed effects model and random affects model. In literature different authors provided different justifications for adopting these techniques. The most appropriate usage of fixed effects model and random effects model in case of random sample. As in current study authors have drawn a random sample of 146 same Manufacturing firms over the same time period of 2001-2011. Dougherty (2007) had

recommended that in case of balanced panel of random sample one would apply both panel data approaches fixed and random effects and then applied the Hausman specification test in order to choose the best model among both of them.

Fixed effects model is that panel data model in which intercept of panel differs among the panel while the slope coefficients are always constant. While random effects model undertakes that a single cross sectional unit or firm's precise effects are not related with explanatory variables. Both of these models are as follows;

$OL_{it}^{1} = \beta_{0i} + \beta_1 FD_{it} + \beta_2 ACP_{it} + \beta_3 TAGrw_{it} + \beta_4 STTA_{it} + \beta_5 Tang_{it} + \beta_6 SecDist_{it} + u_{it}$

$OL_{it}^{2} = \beta_0 + \beta_1 FD_{it} + \beta_2 ACP_{it} + \beta_3 TAGrw_{it} + \beta_4 STTA_{it} + \beta_5 Tang_{it} + \beta_6 SecDist_{it} + u_{it} + e_{it}$

Where;

OL_{it} = Opportunity losses is measured as sector's sales growth minus particular firm's growth of firm i at time t.

FD_{it} = Financial distress calculated through a dummy variable and taken 1 in case firm have negative EBT and otherwise takes 0 of firm i at time t.

ACP_{it} = The ratio of average age of accounts receivables multiply by 365 to credit sales of firm i at time t

$TAGrw_{it}$ = it is the ratio of total assets growth of firm i at time t

$STTA_{it}$ = it is the ratio of sales to total assets of firm i at time t

$Tang_{it}$ = the ratio of fixed assets to total assets of firm i at time t

$SecDist_{it}$ = the sector distress measured as a dummy variable and take it 1 if a particular industry has negative EBIT or otherwise take 0 of firm i at time t

β_{0i} = y-intercept of firm i

u_{it} = Error Term of firm i at time tor between firms error

e_{it} = Within firms error

Losses: Opportunity

The opportunity losses as form of indirect costs of distress act as a dependent variable in this study. Pindado and Rodrigues (2005) had used the proxy of opportunity losses as the average sales growth of the sector minus average sales growth of a particular firm. In this study we use this proxy for measuring the opportunity losses which is as follows;

Opportunity Loss = $[(Sales_{it} - Sales_{it-1}) / Sales_{it-1}]_{sector} - [(Sales_{it} - Sales_{it-1}) / Sales_{it-1}]_{firm}$

Financial Distress:

The financial distress is act as an independent variable in this study. In literature research scholars has used different proxies to measure the financial distress. Asquith, Gertner, and Scharfstein (1994) had used the proxy for measuring the financial distress as any firms whose interest coverage is lower than 0.8 for current period. While DeAngelo and DeAngelo (1990) had calculated the financial distress in terms of losses bear by any firm in its 3 if that firm accounts losses for three sequential years. In this study financial distress (FD) measured as dummy variable equals to 1 if respected firm show negative EBT and 0 otherwise George and Hwang (2007) had used the proxy for calculating financial distress as a dummy variable and he taken 1 if any particular firm suffer losses or negative Earnings before Interest and Tax (EBIT) while he 0 if firm has positive EBIT. Researcher adopt the proxy of the George and Hwang (2007) to measure the financial distress in this study.

Control Variables:

To measure the exact impact of probability of financial distress on opportunity losses in Pakistan research include control variables. The Average collection period, total assets growth, ratio of sales to assets, tangibility and sector distress are the control variables in this study. These variables have direct and indirect relationship with opportunity losses (Pindado & Rodrigues, 2005). Three variables total assets growth, sales to assets ratio and tangibility has inverse relation with opportunity losses. While on the other hand average collection period has direct relationship with opportunity losses. As we earlier described that few economic issues in external environment may also leads to operational distress which ultimate converts into the financial distress. To control for such external factor researcher introduces the sector distress as a dummy variable and take it 1 if a particular industry has negative EBIT or otherwise takes 0.

Empirical Results and Discussion:

This part of study includes the descriptive statistics, Pearson correlation matrix and results of models. First of all the descriptive statistics is given in Table 1.

Table 1: Descriptive Statistics

Variables	Observations	Mean	SD	Minimum	Maximum
OL_{it}	1606	-0.0151083	0.2593276	-1.14	0.79
FD_{it}	1606	0.3100872	0.4626731	0	1
ACP_{it}	1606	30.22592	33.80375	0	259
$TAGrw_{it}$	1606	0.1323064	0.2781118	-.69	3.28
$STTA_{it}$	1606	124.8714	87.18756	2.2	691
$Tang_{it}$	1606	0.5355434	0.2157053	.02	0.97
$SecDist_{it}$	1606	0.5	0.5001557	0	1

This table contains the descriptive statistics of the panel for all variables. Number of observation in the panel is 186 for all variables as this data contains a strongly balance panel of 146 manufacturing firms for 6 years from 2001 to 2011. Average value of dependent variable opportunity loss is -1.51%. Standard deviation which is measure of dispersion shows that opportunity loss of the firm in panel is deviate from its mean around 25.93%. The least value of firm's opportunity loss is -1.14% while highest value of opportunity loss of the firm in panel is 79%. Likewise the average value, standard deviation, least value and highest value of each independent variable of panel is mentioned in this table.

Variables	Observations	Mean	SD	Minimum	Maximum
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$SecDist_{it}$	1606	0.5	0.5001557	0	1

Pearson's correlation coefficient matrix is shown in Table 3. Before running the panel data models it is essential to check the correlation between independent variables in order to confirm that there is no multicollinearty problem is present. The results in this table confirm that there is no chance of multicollinearty in the models as the values of correlation not exceeds from cut point 0.6.

Table 2: Pearson Correlation Coefficient Matrix

Variables	FD_{it}	ACP_{it}	$TAGrw_{it}$	$STTA_{it}$	$Tang_{it}$	$SecDist_{it}$
FD_{it}	1.0000					
ACP_{it}	0.0109 0.6625	1.0000				
$TAGrw_{it}$	-0.1293 0.0000*	-0.0656 0.0085*	1.0000			
$STTA_{it}$	-0.1933 0.0000*	-0.2302 0.0000*	-0.1030 0.0000*	1.0000		
$Tang_{it}$	0.2140 0.0000*	-0.2760 0.0000*	-0.1060 0.5216	-0.3537 0.0000*	1.0000	
$SecDist_{it}$	0.1023 0.0000*	-0.0900 0.0003*	-0.2070 0.2793	0.0232 0.3518	0.0845 0.0007*	1.0000

The next two tables depict the outcomes of both panel data approaches. Table 3 describes the results of fixed effects model under this model financial distress is highly significant at 1% level of significance while out of all control variables only sector distress is not significant. The within R^2 of this model is 13.08%, between R^2 is 0.36% while overall $R^2$of panel is 3.47%. Within R^2 means that independent variables explain 13.08% variations in the opportunity loss in this panel from year to year like 2004 to 2005. Between R^2 meant that independent variables explains the 0.36% variations in opportunity loss from firm (cross-sectional unit) to other firm. While overall R^2 shows that independent variables explains 3.47% variations in the whole panel. Model is a good fit as F test 36.48 is significant at 1% level of significance.

Table 3: Fixed Effects Model

Variables	Coefficient	Std. Error	T	P-Value
FD_{it}	.0633788	.0160934	3.94	0.000*
ACP_{it}	.0020224	.0003731	5.42	0.000*
$TAGrw_{it}$	-.1520311	.0250025	-6.08	0.000*
$STTA_{it}$	-.0016913	.0001807	-9.36	0.000*
$Tang_{it}$	-.1322958	.075726	-1.75	0.081***
$SecDist_{it}$	-.0108886	.0133714	-0.81	0.416
C	.2117113	.0562093	3.77	0.000

Notes: R-square within = 0.1308, between = 0.0036, and overall = 0.0347

F statistics = 36.48, and Prob. >F = 0.000*

Variable is significant at * 1%, ** 5%, and * **10% level of significance (two-tailed).

Results of random effects model is provided in table 4. Again financial distress is significant at 1% level of significance while in control variables only sector distressed is highly insignificant. The within $R^2$of this model is 7.36%, between R^2 is 12.99% while overall R^2 of panel is 7.01%.

As both of the above model are significant at 1% level of significant it is very hard to choose which model is appropriate. To handle this problem authors run a Hausman's specification test in order to decide the 1 appropriate model from two possible options. The outcome of this table is provided in Table 5. This outcome suggest that most appropriate model is fixed effect model because Chi^2 value of this test 145.72 is significant at 1% level of significance according to the criteria of selecting a model describe earlier.

Table 4: Random Effects Model

Variables	Coefficient	Std. Err.	Z Stat.	P-Value
FD_{it}	.1026553	.0141682	7.25	0.000*
ACP_{it}	.000582	.0002087	2.79	0.005*
$TAGrw_{it}$	-.1031832	.0230615	-4.47	0.000*
$STTA_{it}$	-.0002298	.0000841	-2.73	0.006*
$Tang_{it}$	-.1067937	.0342853	-3.11	0.002*
$SecDist_{it}$	-.0061311	.0126467	-0.48	0.628
C	.0380722	.0299809	1.27	0.204

Notes: R-square within = 0.0736, between = 0.1299, and overall = 0.0701

Wald chi^2= 120.46, and Prob. >chi^2 = 0.000*

Variable is significant at * 1%, ** 5%, and * **10% level of significance (two-tailed).

Table 5: Hausman Specification Test

Variables	Fixed	Random	Difference
FD_{it}	.0633788	.1026553	-.0392765
ACP_{it}	.0020224	.000582	.0014403
$TAGrw_{it}$	-.1520311	-.1031832	-.0488479
$STTA_{it}$	-.0016913	-.0002298	-.0014615
$Tang_{it}$	-.1322958	-.1067937	-.0255022
$SecDist_{it}$	-.0108886	-.0061311	-.0047574

Notes: chi^2 = 145.72, and Prob. >chi^2 = 0.0000*

The outcome of fixed effects model suggest that our independent variable financial distress is highly significant and posive realted to opportunity losses. Due to ever increasing challenges of inflation, ploticial instalbility and sever energy crisis in Pakistan, the onging manufacturing firms of Pakistan unable to perform effectively. Their sales growth is decresing as a result of these challenges which leads to financial and operating distress in Pakistan. If these companies are unable to enhance their sales or earnings they can bear very high costs of financial distress in terms of opportunity losses.

Conculsion:

This study is conduct to explore the costs of financial distress of ongoing manufacturing sector of Pakistan. A panel of 146 manufacturing firms Pakitan are selected for this study for the period of 2001-2011. Two most applicable panel data teachniques (fixed effects and random effects models) are utilized to investigate the costs of financial distress and Hausman's specification test recommended that fixed effects model is most appropriated model in this study. The results of fixed effects model suggest that financial distress of onging firms of Pakistan has significant direct impact on opportunity losses in case of Pakistan after control average collection period, total assests growth, fised to total assets ratio, tangibility of aessts and sector distresssed. The upcoming studies msut explore direct costs of financial distress and bankruptcy in case of manufacturing as well as service sector of Pakistan.

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