THE DETERMINANT OF FINANCIAL DISTRESS IN INDIAN REAL ESTATE AND CONSTRUCTION INDUSTRY

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ABSTRACT

This study attempts to determine the factors accountable for probability of financial distress in the context of real estate and construction industry of India. Financial ratios covering four broad categories namely Liquidity, Solvency, Activity and Profitability have been used as predictor variables. Further this study has applied the linear probability, probit and logit models in order to scrutinize the preeminent predictor of financial distress. The results conclude that there is slight impact of selected predictors on financial distress happening. The profitability measure return on equity (ROE) is a significant predictor which is negatively related to the probability of financial distress. This implies that return on equity (ROE) is the most preeminent predictor that classifies the financially healthy and financially weak real estate and construction companies. Hence, to avoid financial distress, the real estate and construction industry must improve return on equity (ROE). Furthermore, the study also indicates that the real estate and construction industry are not adopting conservative capital structure.

KEYWORDS: Profitability, financial distress, financial ratios, capital structure, India

INTRODUCTION

The element of risk exists in every business, which may take the form of business failure. The financial distress is an important sign of business failure. The prior knowledge of the presence of financial distress in a company is very helpful to prevent the company from going to bankruptcy stage. Financial distress is defined as a low cash flow state in which a company incurs losses without being insolvent (Purnanandam, 2008). The company has not enough cash to repay its debt obligation, interest and even its day to day expenses. Financial distress results into business failure. A company can stay away from moving financial distress to business failure but it is possible if one can predict financial distress so that corrective actions can be taken in order to improve the financial position of the distressed company.

Every economy is divided into three sectors of actions namely primary, secondary and tertiary. This study is concerned with analyzing financial distress phenomenon in the tertiary (service industry) that is the real estate and construction industry of India. The construction industry has different features from any other industry as it consists of large projects having huge investments. The present study attempts to analyze the determinants of financial distress in real estate and construction industry of India. It would be of immense worth if the industrialist in the construction industry got a prior sign of causes of financial distress. This information can prevent real estate and construction industry from going towards financial distress. The real estate and construction industry is an integral part of India's economy.

Statistics of real estate and construction industry[1]:

According to National Skill Development Corporation (NSDC), Real estate and Construction industry is set to become the prime employment generator in India, registering the maximum rise in human resource requirement during 2013-2022.

India will become the world's third largest construction market by 2025, adding 11.5 million homes a year to become a $1 trillion a year market, finds a new study by Global Construction Perspectives (GCP) and Oxford Economics.

The construction industry attracted $40,399 million as foreign direct investment (FDI) between 2000 and 2013, and is expected to get further inflow of $180 billion by 2020. The industry grew at a Compound Annual Growth Rate (CAGR) of 9.42 percent between 2003-04 and 2012-13.

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In context of financial distress prediction different researchers have conducted different studies and try to develop various models to predict it. The models used to predict the financial distress are categorized into three main heads namely Statistical models, Artificially Intelligent Expert System models and Theoretical models. There are some models which are frequently used namely Altman-Z score, Springate, Logistic regression, Probit and many more. These models are very helpful to find out the major predictors of probability of financial distress. Financial distress characteristics of any company differ from the other company. There are various factors that lead a company towards financial distress.

The real estate and construction industry is supposed to be more risky if we compare it with other industries. So this study explains the relationship between company specific variables and financial distress of the real estate and construction industry in India and likely to contribute towards literature about the determinants of financial distress of the real estate and construction industry.

REVIEW OF LITERATURE

Research on financial distress prediction received attention in finance literature. There is lot of studies available in literature covering different sectors.

Nouri and Soltani (2016) conducted a study in order to design a bankruptcy prediction model by using accounting, market and macroeconomic variables. The sample of the study includes 53 companies listed in Cyprus Stock Exchange. The study period is of 6 years i.e. from 2007-2012. The authors applied logistic regression method by comprising all set of three types of selected variables. The results show that accounting and market variables are better predictors of bankruptcy as compared to macroeconomic variables.

Almansour (2015) in his study try to find out the major ratios which are better predictor of financial distress in Jordanian public listed companies. The sample of the study consists of 22 bankrupt and 22 non bankrupt companies which are studied for a period of 4 years i.e. from 2000-2003. The author has applied regression to accomplish the objective. The study conclude that working capital to total assets, current asset to current liabilities, market value of equity to market value of debt, retained earnings to total asset and sales to total asset are the ratios which have a significant relationship with the probability of failure in Jordan.

Marcinkevicius and Kanapickien (2014) in their study test the applicability of various bankruptcy prediction models in Lithuanian construction sector. The sample of the study consists of 521 companies analyzed for a period of 5 years i.e. from 2009-2013. The author has tested the applicability of Altman, Springate, Taffler & Tisshaw, Chesser and Zavgren model. The results concludes that only Springate and chesser model have highest classification accuracy in construction sector of Lithuania.

Vieira et al., (2013) conducted a study to determine the factors of financial distress in construction sector of Portugal. The sample of the study consists of 150 healthy and 150 unhealthy companies. The period is of three years that is from 2009-2011. The authors have applied linear probability model, Probit model and logit model to find out the predictor of financial distress in Portuguese construction industry. The authors have tested 8 financial and economic variables as predictor of financial distress. The result concludes that cash flow to total asset ratio is a predictor of probability of financial distress in construction sector. There is a negative relation between cash flow to total asset ratio and financial distress.

Alfan and Zakaria (2013) in their study analyze the financial performance and distress in construction sector of Malaysia. The sample of the study consists of 5 construction companies studied for a period of 6 years. The authors have applied 6 financial ratios in order to assess the financial performance and further Altman's Z score model is used to predict the financial distress. The study concludes that the selected construction companies are in financial distress position. By doing financial analysis the study shows that the Malaysian construction companies are not in a good financial position.

Dikmen et al., (2010) conducted a study to find out the determinant of business failure in construction sector. Further the study also tries to predict financial distress in selected companies. The authors have designed a model to predict the financial distress and Delphi method is applied to find out the predictor variables of financial distress. The study concludes that organizational and managerial factors including presence of intangible assets and correct decisions are the major for the survivability of the construction sector.

Wang and Li (2007) conducted a study on Chinese listed companies for analyzing financial distress by applying rough set methodology. The authors have applied both financial and non financial ratios to estimate the model. The sample of the study consists of 212 financial distress and 212 healthy firms studied for a period of 8 years i.e. from 1998-2005. The study concludes that the model which contains both financial and non financial ratios outperforms the model containing only financial ratios. Further growth ratio

per share of equity, net return on assets, earning per share, interest coverage, ownership concentration coefficient, net profit margin pledge, retained earnings ratio and total assets turnover ratios has significant relation with probability of financial distress.

Ugurlu and Aksoy (2006) have done an empirical study in Turkey to find out the major predictor of financial distress. The authors have applied discriminant and logit model and also compare the same. The sample of the study consists of 27 failed and 27 non failed listed manufacturing companies which are studied for a period of 8 years i.e. 1996-2003. The results show that logistic regression model has better classification accuracy as compared to MDA. Further result indicates that profitability; liquidity and solvency ratios are significant in predicting financial distress.

Elloumi et al., (2001) conducted a study to examine the relation between corporate governance and financial distress of selected Canadian companies. The authors have applied logit regression model by taking the sample of 46 financially distressed and financially healthy companies. The study concludes that the corporate governance variables are the better predictors of financial distress as compared to accounting variables. On the basis of above stated literature, we hypotheses that:

H_{01}: Quick Ratio is not a significant determinant of financial distress of selected real estate and construction companies.

H_{02}: Current Ratio is not a significant determinant of financial distress of selected real estate and construction companies.

H_{03}: Debt equity ratio is not a significant determinant of financial distress of selected real estate and construction companies.

H_{04}: Interest coverage ratio is not a significant determinant of financial distress of selected real estate and construction companies.

H_{05}: Debtor turnover ratio is not a significant determinant of financial distress of selected real estate and construction companies.

H_{06}: Asset turnover ratio is not a significant determinant of financial distress of selected real estate and construction companies.

H_{07}: Return on asset is not a significant determinant of financial distress of selected real estate and construction companies.

H_{08}: Return on equity is not a significant determinant of financial distress of selected real estate and construction companies.

OBJECTIVE

This study attempts to determine the factors accountable for probability of financial distress in the context of real estate and construction industry of India.

RESEARCH METHODOLOGY

The present study is concerned with the relationship between financial distress and financial variables. Since the dependent variable (financial distress) is a dummy variable, the study has applied conditional probability models. There are three approaches of conditional probability models namely Linear probability model, Probit model and Logit model. Linear probability model is estimated by Ordinary least square method and the rest of the two models are estimated by Maximum likelihood estimation method.

These models have been used in order to find out the major factors responsible for the probability of financial distress in real estate and construction industry.

Data Description

The planned study uses secondary source for data. The period of the study consists of 12 years i.e., from 2005-2016. The sample of the study consists of 42 BSE listed real estate and construction companies as per availability of the required data. The dependent variable of the study is financial distress while the independent variables consist of quick ratio, current ratio, debt equity ratio, interest coverage ratio, debtor turnover ratio, asset turnover ratio, return on equity and return on asset. The measurement of financial distress is negative earnings per share (Elloumi and Gueyie, 2001). The dependent variable (financial distress) is dummy variable in this study, which is coded 1 if the company is in financial distress that is, having negative earnings (Elloumi and Gueyie, 2001) and coded 0 if not. The data of the study have been collected from CMIE PROWESS data base.

Financial Variables

Based on previous studies and available theoretical evidence, present study utilized 8 financial variables. The researcher preferred these variables over other variables as they were concluded as significant determinants of financial distress in earlier studies. These financial variables are covered under four broad categories namely - Liquidity, Solvency, Activity and Profitability ratios.

Specification of the Model

In order to analyze the impact of selected predictors on the probability of financial distress, the researcher has estimated the LPM (Linear probability model), the probit and the logistic regression models. The general expression of the models used is as follows:

$$Prob_i = \beta_0 + \beta_1(QR)_i + \beta_2(CR)_i + \beta_3(DER)_i + \beta_4(INTCOV)_i + \beta_5(ATR)_i + \beta_6(DTR)_i + \beta_7(ROA)_i + \beta_8(ROE)_i + e_i$$

Where $Prob_i$ stands for anticipated probability of the financial distress of the ith company and it is coded 1 if the company is in financial distress and 0 if not.

Quick ratio(QR), Current ratio(CR), Return on asset(ROA), Return on equity(ROE), Debt equity ratio(DER), Interest coverage (INTCOV), Debtor turnover ratio(DTR), Asset turnover ratio(ATR) are the independent variables.

β_0 is constant term of the regression equation, β's are the coefficients of the model and e_i is the error term.

RESULTS & ANALYSIS

Correlation matrix in Table 1 exhibits the correlation value among independent variables and indicates that the variables are not violating the assumption of independence. In other words we can say that there is an absence of multicollinearity among the variables. If the correlation value for any two variables is more than 0.7 then there exists the problem of multicollinearity.

Table 1: Correlation Coefficient Analysis

	QR	CR	ROA	ROE	DER	IC	ATR	DTR
Quick Ratio	1							
Current Ratio	0.508	1						
Return on Asset	0.293	0.095	1					
Return on Equity	0.006**	0.012*	0.643	1				
Debt Equity Ratio	0.536	-0.077	0.061	-0.260	1			
Interest Coverage Ratio	0.035*	-0.006**	0.150	0.115	-0.052	1		
Asset Turnover Ratio	-0.057	-0.055	0.024*	0.119	0.045*	-0.015*	1	
Debtor Turnover Ratio	-0.140	-0.012*	0.005**	0.043*	-0.080	-0.010*	-0.050	1

*Significant at 0.05, ** Significant at 0.01

Descriptive Statistics

Table 2 represents the descriptive statistic of the selected variables. The mean of liquidity ratio of real estate and construction companies is less than standard norm of liquidity ratios. This shows the poor liquidity position. Further on an average the real estate companies are using 83% debt in their capital structure which is shown by the Table 2, indicates that mean of

solvency ratio i.e. debt equity ratio is .83 which shows that the companies are using more debt in their capital structure. Further interest coverage ratio is positive which shows that the companies are easily paying their interest expenses. The mean of profitability ratios, i.e. return on equity and return on asset is positive which shows that the companies are earning profit.

Table 2: Descriptive Statistics

	EPS	QR	CR	ROA	ROE	DER	INT COV	ATR	DTR
Mean	9.021	0.815	1.684	3.364	8.434	0.839	24.525	954.59	20.112
Median	4.475	0.69	1.25	2.795	7.97	0.705	2.575	594.005	3.465
Std. Dev.	24.747	1.732	1.757	7.351	33.119	2.468	125.041	1411.60	96.704
Minimum	-101.7	-26.41	0.03	-42.83	-539.06	-42.83	-39.03	-26.96	0
Maximum	390.2	19.16	19.35	71.52	138.63	22.97	1923.2	11661.11	1089.93

Analysis of Results

Table 3 shows the result of the LPM (Linear probability model), the Probit and the Logit models.

Linear probability model

The results of LPM model are specified by the following equation:

$Prob_i$ = 0.72 - 0.0016 QR - 0.0097CR + 0.0011DER - 0.0005 INT COV- 0.000 DTR - 0.0002ATR - 0.013 ROA - 0.0019 ROE

The results indicate that overall the model is statistically significant which is indicated by F-stat. - 13.828, with a probability value of 0.000, which is significant at 1% level. Further the R-squared value is 18.27%, which shows that there is only 18 % variation in dependent variable due to the selected independent variables. In other words the selected variables as predictor of financial distress affect only 18 % on the probability of financial distress. There are some other factors which are affecting the probability of financial distress.

Further the results show that only two variables that are, return on asset and return on equity are statistically significant at 1 % level. The results are indicating that both of these are negatively related to the probability of financial distress inferring that lesser the ratio higher the chances of financial distress.

Probit model

The following equation expresses the probit model:

$Prob_i = \phi$ (0.35 - 0.072QR - 0.056CR - 0.115DER - 0.002ICR - 0.005DTR - 0.0001ATR + 0.091ROA - 0.085ROE)

Where ϕ indicates the Cumulative distribution function (CDF) of standard normal distribution.

Overall, the model is statistically significant which is indicated by LR statistic - 131.003 with a probability value of 0.000, which is significant at 1% level. Further the R-squared value is 28.84%, which shows 28% variation in dependent variable due to the selected independent variables. In other words the selected variables as predictor of financial distress affect only 28% on the probability of financial distress. There are some other factors which are affecting the probability of financial distress. Further the results show that only two variables that are return on asset and return on equity are statistically significant at 1 % level. The results are interesting that among the two significant variables, return on asset is positively related to the probability of financial distress, inferring that higher the ratio higher the chances of financial distress. Further the return on equity is negatively related to financial distress, inferring that lesser the ratio higher the chances of financial distress.

Table 3: Regression Analysis

Variable	LPM	Probit Model	Logit Model
C	0.7296	0.3539	0.3925
Quick Ratio	-0.0016	-0.072	-0.069
Current Ratio	-0.0097	-0.056	-0.112
Debt Equity Ratio	0.0011	-0.115	-0.124
Interest Coverage Ratio	-0.0005	-0.002	-0.002
Debtor Turnover Ratio	-0.000	-0.005	-0.004
Asset Turnover Ratio	-0.0002	-0.0001	-0.000
Return on Asset	-0.013**	0.091**	0.031
Return on Equity	-0.0019**	-0.085**	-0.183**
R-squared	18.27%	28.84%	36.18%
Adj. R-squared	16.94%		
F-stat.	-13.83	131.003	164.33
Prob.	0.000**	0.000**	0.000**

**Significant at 0.01

Logit Model

The logit regression model is expressed in the following equation:

$$prob_i = \frac{1}{1+e^{-(0.39-0.069QR-0.112CR-0.124DER-0.002ICR-0.004DTR-0.000ATR+0.031ROA-0.183ROE)}}$$

The results of logit model in Table 3 indicates that overall basis the model is statistically significant which is indicated by LR statistic - 164.33, with a Probability value of 0.000000, which is significant at 1% level. Further the R-squared value is 36.18%, which shows 36 % variation in dependent variable due to the selected independent variables. In other words the selected variables as predictor of financial distress affect only 36 % on the probability of financial distress. There are some other factors which are affecting the probability of financial distress. Further the results show that only one variable that is return on equity is statistically significant at 1 % level. The results are indicating that return on equity is negatively related to the probability of financial distress. This shows that lesser the ratio higher the chances of financial distress.

Comparison among the models

Among Linear probability, Logit and Probit model it is concluded that logit model is better since the value of Mc Fadden's R- Squared is greater in logit model. So the logit model is a better predictor of financial distress in real estate and construction industry of India. Further the results of logit model indicate that only return on equity is a significant predictor of financial distress in the selected companies. The study concludes that return on equity is a better predictor of financial distress in real estate industry. Further the study also shows there are some other variables which are responsible for financial distress in real estate and construction industry since the selected variables have shown a little influence on financial distress.

CONCLUSION

The study analyzes the factors responsible for financial distress by applying conditional probability models namely Linear probability model, Probit model and Logit model. The result of linear probability model indicates that return on asset and return on equity are the variables which are negatively and significantly related to the probability of financial distress. Further the result of probit model also exhibits the same result except in this case return on asset is positively associated with the financial distress. The result of logit model exhibits that return on equity is significantly and negatively related to financial distress. So the study concludes that real estate and construction companies should

try to maintain their profitability ratios in order to sustain their financial health. The results also exhibits that the selected independent variables have a little impact on financial distress in real estate and construction companies. This shows that there are some other variables except return on equity and return on asset, which are affecting the financial health of these companies. So, there is a need to explore more in this context.

There are numerous opportunities for future research in this field as a few studies are there in literature on financial distress prediction in real estate and construction industry. Further the results of the present study also motivate to further investigate the financial distress phenomenon in context of real estate and construction industry. There are some limitations of every research study. The present study has used only internal variables (company specific variables) as predictor variables. There may also be external factors which are responsible for poor financial health of a company. So in future these external macro factors should also be considered to study the financial distress phenomenon.

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