CHAPTER III

REVIEW OF LITERATURE

3.1 Introduction
The credit risk management in the banking sector has been an important research topic during the last three decades and had produced ongoing debate in the literature of banking finance. However, it needs to be recognized that the “credit risk” per se of the lending institutions is directly linked to the distressed financial position of the corporates to whom the funds have been lent. Further, perpetual increase in the quantum of distress impacts the financial stability of the country as a whole and brings about social and economic costs to the nation. This has been rightly acknowledged in the Economic Survey of 2015-16, which states that Indian economy is presently confronted with the issue of “twin balance sheet”. The balance sheet of the over-leveraged corporates and the bad-loan encumbered credit institutions are intertwined and have become one of the major economic issues and a stumbling block for further investment and growth. This in turn leads to increase in non-performing assets, higher provisioning on the doubtful debts which tantamount to lower profitability and reduction in capital of the credit institutions. This discourages further financing and hence, lack of credit dampens the economic growth. Therefore, this twin balance sheet problem as is being faced by India today is actually a vicious circle. Hence, if this is not addressed at the appropriate time the possible consequences from the corporates’ side would be further increase in wilful defaults, absconding businessmen and bankrupt companies. This in turn will lead to further deterioration on recovery of the existing loans and thus would have serious ramifications on the “credit risks” of the banking institutions.

As stated in Chapter I, the objective of the research is to mitigate the credit risks of the lending institutions by developing a prediction model which would pre-empt the corporate distress grown due to wilful defaults. This chapter will, therefore, comprehensively review the literature available on various corporate distress prediction models, the literature on “strategic defaults” as
3.2 Studies on Corporate defaults using prediction models

Beaver, W. (1966) is one of the pioneer authors who studied the corporate failure and constructed an accounting-based model for predicting the distress for the period 1954-1964. His paper applied a univariate model based on 30 financial ratios for the 79 pair of distressed and non-distressed firms and found that working capital funds flow to total assets ratio and net income to total assets ratio are the best discriminators for the distress prediction. He also proposed the four assumptions in relation with the firms’ distress positions with relation to the liquidity, outstanding debt and amount expended. The paper states that probability of the failure is less if the firm has more liquidity flowing from the operations and when the firm maintains a large reserve. Conversely, if the firm holds a large amount of debt or large amount of expenditure is incurred on operations then there is a greater probability of failure.

Altman, E. (1968), in his pioneering research work proposed a multiple discriminant analysis method (MDA). The default measurement score, Altman’s z-score, or zeta model, integrated various types of measures of profitability and also demonstrated a company’s risk of default as regards to normal business period. Based on the seven financial ratios; return on assets, stability of earnings, debt service, cumulative profitability, liquidity, capitalization and size applied to 33 pairs of distressed / non-distressed firms for the period 1946-1968, Altman correctly classified 90% of the firms one year prior to failure or default.

Altman et al. (1977) built an improvised version of his original “Z-score” model. This revised model was named as the “ZETA model”. This model proved to be a robust approach for classification of the bankrupt companies with the non-bankrupt ones. This significantly improved the level of accuracy over the then existing failure classification models. The model could predict bankruptcy much ahead, on a new set of sample selected which comprised the manufacturing companies and the retailing ones. The authors of the “ZETA model” had taken into consideration both the linear and the non-linear discriminate models. The improved model’s classification of bankruptcy was ranging with accuracy of 93% on the holdout sample one year prior to bankruptcy.
and to 70% up to a period of five years prior to bankruptcy. Subsequently, the modified Altman’s Z-score model to emerging market firms enhanced the predictability of default as he dropped few variables to make it more suitable for developing countries.

Ohlson (1980) employed a parametric method i.e., a conditional logit model to predict bankruptcy in U.S. companies. He was the pioneer in proposing the application of a “logit model” in predicting the corporates’ default. The author sampled 105 distressed and 2,058 non-distressed firms for the period 1970 to 1976. As a conclusion of his work, he created three different Logistic models. These models had the capability to predict the failure one, two and three years’ before the event. The author had employed fourteen financial ratios in his model. These ratios were a combination of the accounting ratios, few dummy variables incorporated based on balance sheets and a variable which represented the change in the net income from the previous year. Few researchers’ have stated that the outcome from his model were not very promising however the author has argued that the “Logistic model” developed by him is effective empirically and also easier to interpret.

Zmijewski (1984) was the pioneer to apply the “probit model” for predicting the corporates’ failure. He examined two methodological issues while investigating the bankruptcy model used by him. This study had examined three independent variables i.e., the ratio of net income to total assets, the ratio of total liabilities to total assets and the ratio of current assets to current liabilities. The model was based on 40 bankrupt and 800 non-bankrupt firms. The author defined bankrupt firms as the “act of filing petition for bankruptcy”. Hence, bankrupt firms are identified as bankrupt if it filed a bankruptcy petition during this period and non-bankrupt if it did not. The population of firms for the study consists of all firms listed on the American and New York Stock Exchanges during the period 1972 through 1978. Thus the author tried to avoid the choice-based sample bias as he felt that earlier studies suffered from this bias. The accuracy rate of the model for the estimation sample was 99%. The probit model of Zmijewski is preferred in comparison with MDA because the probit function maps the value to a probability bounded between 0 and 1, and this value is easy to interpret.

Altman, Marco, and Varetto (1994) found that the Logit and other approaches are comparable and can be used together for comparison and similarity. The study was undertaken on a sample of 213 unsound companies and was compared with the same number of companies which were healthy.
The prediction of distress were made two years’ prior to the time that the company was in distress. The system classified accurately, one year prior to distress 87.6% of healthy companies and 92.6% cases of unsound companies. During the same period, 1991, the research was then conducted into the use of neural networks (NNs) for the identification of companies which were showing financial and economic distress. The findings of NNs and the discriminant analysis were compared and it was found that the two systems can be used in tandem. The authors disagree with some of the earlier research findings which state that the NN approach is superior to the traditional techniques. This paper has demonstrated that the linear discriminant analysis compares rather well when compared to neural networks. However, the authors have concluded that neural networks have shown enough encouraging features which would provide incentive to further researchers for a more exhaustive and innovative testing.

Sheppard (1994) pointed out the loophole in the earlier models where the assumption about sample data to be normally distributed is not appropriate if variable is non normal. This paper states that most of the previous studies have tried to predict pairing the distressed and the non-distressed ones belonging to the same industry and as per the size. But Sheppard has argued that no two firms are exactly the same even within the industry. The present study has demonstrated that the diversified companies are dissimilar and hence it is not possible to match it with another firm. The author states that the effects of the industry conditions on the failing firms and surviving firms would be different. The paper has constructed a model by adjusting the ratios, with industry norms as standards, and by doing so all industries in which the firm competes could be compared. Thus in this proposed method the industry norms can be used for predicting the bankruptcy. The findings show an accuracy of 86% in differentiating the survival ones with that of the failed, one year prior to the failure. In this study, it has also been observed that the failing firms has a tendency to move more towards risky markets and the surviving ones tend to move to the secure ones.

Shumway (2001) has argued that hazard models are more appropriate for forecasting bankruptcy than the single-period models used previously and has emphasised the significance of financial ratios for predicting bankruptcy. The author has adopted a simple technique for estimating a discrete-time hazard model and applied a logit model estimation program. He has refuted some of the previously used accounting ratios and has proved that they are not statistically significant
bankruptcy indicators. The author has considered a firm as bankrupt if it has been delisted from the NYSE or AMEX within five years of listing. The sample contains 300 such bankruptcies observed over thirty one years i.e., between 1962 and 1992. The variable of interest in the model is the firm’s age. The author has developed a new bankruptcy model and has compared the forecasting accuracy of his hazard model in which he has used a set of five variables, comprising two accounting-based and three market-based variables. The findings show that the hazard model is more accurate than the earlier ones which had mainly used the specific accounting-based variables in their study. In a hazard model, a corporate’s risk for bankruptcy changes through time and its financial position is a function of its latest financial data and its age. In the case of a static model the bankruptcy probability assigned to a corporate does not vary with time. Hence, the author has concluded that the static models do not adjust for period at risk, but a hazard model adjusts for it and hence is more appropriate for forecasting bankruptcy.

Low, Nor and Yatim (2001) have examined the usefulness of the financial ratios in predicting the probability of financial distress in Malaysian companies. In this study, the authors have selected the financially troubled companies as those who have obtained court protection against their creditors under Section 176 of the Malaysian Companies Act, 1965 in the year 1998. The selection of the 26 distressed companies was done from 9 different industries. From the same industries, 42 non-distressed companies were randomly selected to form the sample for the study. The authors had undertaken a stepwise procedure using 11 independent financial variables to test the accuracy of distress prediction. The findings of this paper suggests that liquidity and profitability ratios are not very appropriate ones to predict distress in the companies as high ratios by themselves do not necessarily imply that the company is in good financial health and has sufficient fund to pay its commitments. As per this study the cash position of a company is a better predictor and signals a warning of the financial deterioration and therefore needs careful examination of these ratios. The model has been tested on a holdout sample and the overall accuracy rate for the estimation and the holdout samples are 82.4% and 90% respectively.

Ko., et. al. (2001) has used a composite rule induction system (CRIS) to frame rules for predicting corporate financial distress in Taiwan. The study has compared various prediction methodologies and interpretation of their results like CRIS, neural computing and the logit model. This paper
demonstrates that both CRIS and the neural computing outperforms logit model. Further amongst CRIS and neural computing it has been established that CRIS is advantageous as it is easy to understand and interpret. The study was conducted taking the most financially distressed companies listed in the Taiwan Stock Exchange during the period 1981 to 1985. 19 distressed and 19 non-distressed ones were taken as sample for conducting the research. This study has identified five financial variables that are found to be most effective in predicting the financial distress of the corporates. They are total liabilities/total assets, quick assets/current liabilities, sales/fixed assets, margin/sales and cash dividend per share. Thus the paper has attempted to apply an effective tool which could assist various stakeholders in predicting the corporate financial distress in Taiwan.

Jayadev M (2006) paper provides empirical evidence on the significance of financial risk factors in predicting default companies. The study had taken the defaulters’ list of five largest public sector banks in India. Three forms of Z-score models have been applied in this paper and in all the equations, the coefficients are estimated by using the development sample of 112 Indian companies. The analysis showed that the financial risk factors that the Indian banks consider in their internal rating models are not very effective. Therefore, the banks may map their internal ratings with the Z-scores and this may be taken for assigning the credit ratings for different segments of borrowers which would mitigate their credit risk.

Bandyopadhyay (2006) has compared in this paper, the earlier Z-score models with the new Z-score model developed by him and has recognized that this new model has outperformed the other two existing ones i.e. the Altman’s original Z score model and the Altman Z score developed for the emerging market economies. The author has applied the Multiple Discriminate Analysis (MDA) for predicting one year in advance, the corporate bond default in India on a sample of 104 listed companies culled out from the credit rating agency CRISIL for the period 1998 to 2003. The data set contains the details of the Indian manufacturers whose long term bonds had defaulted during this period. The findings has shown that the new model exhibits its ability to detect bad firms in the two holdout samples with an accuracy of 92% and 88% as well as has a high classification power for predicting the bond default of Indian corporates with an accuracy rate of 91%. Application of logit analysis on the sample set to estimate the probability of default has demonstrated empirically that both financial and non-financial variables are more useful in
describing the default risk more correctly and has predicted the corporate bankruptcy two year prior to financial distress with an accuracy rate to the tune of 97% and 96.3% respectively.

Bandyopadhyay (2007) developed a hybrid logistic model based on inputs obtained from Black-Scholes-Merton (BSM) equity-based option model to describe and predict corporate default risk of Indian listed companies. The paper has used the balance sheet information as well as the stock market data to predict the probability of failure and had ranked the risk as ordinal over a time horizon of one year. The exercise of the risk assessment was carried out on 150 listed Indian companies and also which have been rated by the credit rating agency firms, for the period 1998 to 2005. The findings proved that the ordinal ranking of companies on the basis of their default risk can be generated by applying the developed option model and it can also predict the early warning signals of default more accurately than the existing Z-score models.

Campbell, et. al. (2008) has made two new contributions to the existing literature on predicting financial distress of corporates. The paper introduces to an econometric model for prediction of bankruptcies and failures both in the short term and for long horizons. This paper has included additional variables for forecasting the distress, i.e., “the distance to default”, which has empirical advantages over the pre-defined models. The variables which are prominent in drawing the results of financial distress are size of the firm, institutional ownership, prices per share and the turnover. The paper has studied the prices of the stocks of the sample companies for a 12-month period ahead of distress and has observed that stocks with a high risk of failure are inclined to deliver inconsistently low average yields. The paper calculates returns and risks on portfolios sorted by failure risk over the period 1963 to 2003. The predicted results showed that the distressed ones have low average returns, high standard deviation and values of risk factors. The study further states that on a short horizon the valuation errors are not corrected when distressed stocks declare earnings.

Duda and Schmidt (2010) in their research have found that the static logit model outperforms the hazard model specifications. The study was conducted on 202 US listed manufacturing firms that had defaulted during the period 2000 to 2009. The study was undertaken on “firm-specific” as well as macroeconomic determinants of corporate bankruptcies. The findings suggest that the
forecasting results are better with the use of macroeconomic variables when analyzed through hazard models. The paper emphasizes that profitability; stock return and short-term solvency are the most relevant indicators of bankruptcy. However, for better prediction results they had included five market driven variables which enhanced the probability of default. Other significant variables used in the paper for predicting bankruptcy are cash holdings, leverage, relative market size, excess market return, past stock prices and market-to-book ratio. Hence, the developed model is a combination of traditional accounting based ratios and market driven variables. The static model could accurately predict around 96% of failures whereas the hazard model without macro-dependent was over 77% and if they were included it was to the tune of 84% accuracy level on prediction of bankruptcies of the companies taken during the said period.

Pradhan (2011) had undertaken a case study of State Bank of India and examined the standard ratios used to measure the financial condition of a company. The study has used the tailored back-propagation neural network and thus has endeavored to predict the financial ratios / viability of the firm and assess the credit risk. The authors have attempted to first estimate the financial ratios of the firm from 2001-2008 and have used the estimates for the year 2009 and 2010 for validating the same. The study has finally predicted for the future period of 2011-2015 and emphasized the role of this neural network application based prediction models for banking sector. The analysis further suggests forecasting of the financial position of the borrower in case the loan value is increased or there is extension given for the repayment period.

Noor and Iskandar (2012) have aimed to estimate the probability of corporate survival taking a specified time in range, from 2005 to mid-2011 for 56 financially distressed firms in Malaysia using survival analysis technique. In Malaysia financial distress is associated with the PN17 status of companies, i.e., these companies are considered to have financial problems. In this paper, the usefulness of the corporate governance has been assessed using the Cox proportional hazard form and financial variables have been used for predicting the probability of company endurance to a given time. The results have shown that only two variables namely managerial ownership and company size can provide information regarding corporate survival probability to a specified time. The study found that the delisted companies in Malaysia have lower managerial ownership and larger sizes than the PN17 companies. However, this study could not establish evidence on the
relationships between other factors of corporate governance and financial variables with the survival likelihood of the financially distressed companies.

Ahmadi, et. al. (2012) This study has been undertaken by the authors on a sample set for the period 2005 to 2007 of 49 bankrupt firms and 49 non-bankrupt firms of Iran. This study is also an attempt to predict the bankruptcy of companies using logit model. As per “Article 141 of Commercial Law of Iran”, if “the accumulated losses of any company are to the tune of at least half of the capital of the company then the company is considered as bankrupt”. 19 pre-arranged prediction variables have been culled out from the companies’ annual reports available publicly and used in this study for building a prediction model. Three ratios i.e., retained earnings to total assets, net profit to total assets and debt ratio are seen to have more predictive power for treating a company as bankrupt in Iran.

Hernandez and Wilson (2013) took a sample set of 3020 “non-financial publicly quoted companies” of the United Kingdom for the period covering 1980 to 2011 for signalling financial distress in these companies. This study was also based on the “logit model”. The author has applied financial variables, market-based variables and variables culled out from the macro-economic data for examining the future distress of these companies. Hence, the findings of this study was not only based on the accounting variables but had also tested the efficacy of other variables in the model. As the contributions made by this study and the level of accuracy were quite high, this has been benchmarked against earlier models of neural network and original z-score model.

Kasgari, et. al. (2013) predicted the bankruptcy of manufacturing companies in Tehran Stock Exchange Market using artificial neural network. The comparisons of the results have also been done through logistic regression model. The authors had conducted the study on the group of companies which were declared bankrupt under Article 141 of the Commercial Code of Iran for the period 2001 to 2011. The results derived from this study demonstrate that the neural network predictions are very consistent with reality. They have further stated that this model has proved to be more accurate than that of the logistic regression in predicting the probability of bankruptcy.
Pal, S. (2013) has attempted to study the Indian Steel industry in the post liberalization era and determine the financially healthy and distressed companies. The author has applied discriminant analysis for the study period of two decades ranging from 1991-92 to 2010-11. The sample size of the study was ten Indian Steel companies whose market share was more than 77% in the year 2009-10. The paper has analysed eight financial ratios which have been extracted from different sources like the annual accounts of the companies, economic survey data, the annual survey of Industries, and the CMIE. The results demonstrated that three ratios, viz., return on investment, debtor turnover ratio and the fixed assets turnover ratio to be the most significant in classifying the companies as financially healthy or distressed. Hence, the paper has inferred that profitability and efficiency ratios are the main classifiers in respect of the Indian Steel companies.

Rao, N.V., et. al. (2013) The authors have investigated nine companies in the Indian manufacturing sector, which have been declared as sick under the Sick Industrial Companies Act (SICA). These companies had subsequently filed their cases for bankruptcy during the period 2007-2012. The samples have been culled out from the “Board for Industrial and Financial Reconstruction”, (BIFR) which is the entity that helps the sick companies to revive by applying a restructuring process. To examine the prediction of bankruptcy data from their financial statements five years prior to their being declared as sick was taken for the study. In addition, the stock prices of the companies were also taken into consideration. The paper has used the Altman Z-score model and the “KMV Merton Distance to Default model” for predicting the bankruptcy. The study shows that Altman Z-score model is able to predict bankruptcy filing in respect of Indian manufacturing companies better than the KMV Merton Distance to Default model. Further, Altman’s model is able to predict the bankruptcy two years prior to the event of bankruptcy with an accuracy rate of 77%.

Gupta, V. (2014) has examined the performance of two default prediction models, the Z-score model using discriminant analysis and logistic regressions on a sample of 120 Indian listed companies (60 defaulting and 60 solvent ones). As independent variables the author has used the 24 accounting ratios extracted from the company’s balance sheets and ratings assigned by the credit rating agency CRISIL to these companies have been used as the dependent variable. The author has further tested the model by adding the Industry effects and macro-economic variables.
The author found that the predictive ability of the Z score model is higher when compared to both the Altman original Z score model and the Altman model for emerging markets. This paper has also demonstrated the importance of accounting ratios in predicting default.

Lee (2014) examined the usefulness of traditional financial ratios and market variables as predictors of the probability of business failure to a given time on a sample of companies listed between 2003 and 2009, on Taiwan Stock Exchange using the Cox proportional hazard model. The study has used the survival analysis to examine the main indicators which had led to business bankruptcy in Taiwan. The result presents empirically 12 financial ratios which are significant in predicting the bankruptcy of the corporates. The model has been constructed by using profitability, leverage, efficiency and the valuation ratio variables. The study has proved that the classification has been accurate to the tune of 87.93% in respect of randomly selected 46 financially distressed companies and 128 activity listed companies in the analysis selected as forecasting samples, during the period in Taiwan.

Moghadas and Salami, (2014) paper is based on the hypothesis that there is significant relation between financial ratios and prediction of distressed firm accepted in Tehran stock exchange. Therefore, in this paper, the prediction firms’ financial bankruptcy in Tehran stock exchange has been studied by using the logistic model. The selected sample has two groups of members, 50 each from bankrupt and non-bankrupt firms from the Tehran stock exchange. Nine independent variables have been used in this research. The selection of bankrupt group is as per the firm being liable to trading law under article 141 for the period 2002 to 2010 and the non-bankrupt ones have been selected according to random sampling out of the producing firms accepted by the exchange. The findings has demonstrated that logistic regression model prediction accuracy is 89% accurate for predicting the firm’s financial distress in non-bankrupt firms and for bankruptcy firms it is 91%. Further, use of four variables is generally sufficient to forecast the firm’s financial distress.

Rajasekar, T., Ashraf, S. and Deo, M. (2014) have investigated the financial distress and health of the Indian Navratna companies. Navratna companies are the public sector enterprises (PSEs) who are into the core sectors like mining, oil and natural gas, electric power generation and distribution, telecommunications, Iron and Steel, Water resources etc. The title of “Navratna” were given by
the Government of India to the most successful nine PSEs in the year 1997 and allowed them greater autonomy and environment to compete in the global markets. The authors have chosen the step-wise multiple discriminant analysis and applied them as used in the three bankruptcy prediction models of Springate (1978), Fulmer (1984) and CA-Score (1987). The study has shown that six out of the fourteen Navratna companies were financially sound throughout the period under study i.e., 1995 to 2012 by using all the three models, whereas the remaining eight were found to be distressed during some years in two of the three models. As these companies are funded by the Government, the authors suggest that the financial health of these companies should be monitored at frequent intervals to maintain the credibility and sustain the on-going businesses of these entities.

Kliestik, et.al. (2015) in their article have analyzed various studies undertaken for predicting the financial distress of the corporates or bankruptcy. They have studied the various techniques which have been applied in the papers for predicting the corporate defaults and have specifically taken up the analysis of logit and probit models at length. The paper explains the application of logistic regression and has discussed at length the various types of classification variables used in the model for example nominal, ordinal, interval and the ratios. The different logit models like the Classical MNL, Nested logit, mixed logit and Latent Class-MNL have been explained with details of their strengths and challenges. The paper throws usefulness of the probit model too and finally concludes with the differences and similarities of these two prominent models being used by most of the academicians for predicting probability of financial distress.

Mraihi (2015) has attempted to develop for Tunisia a logistic regression model for predicting corporate default. The author’s sample consists of 212 companies (106 companies are healthy ones and 106 companies are the distressed ones) which represents various industries of Tunisia. The coverage is for the period 2005-2010. The paper has studied overall 87 ratios out of which 12 ratios were taken for building the model. The results of this paper establishes that the liquidity and solvency ratios are better indicators for forewarning the financial distress in a firm in comparison to the profitability and the management ratios. The prediction was found very appropriate in terms of correct classification of the stressed and non-stressed companies and in
terms of the predictive power of discrimination over a period of time, i.e., two to three years before the distress.

Desai and Joshi (2015) had undertaken their study with the limited data set of 60 companies taken from CRISIL database which consisted 30 companies which were “D” rated by CRISIL and hence can be termed as defaulted and 30 companies which were rated “AAA” or “AA” indicating that they are the solvent ones. This study had used the financial ratios of these companies as independent variables while the rating assigned is taken as the dependent variable. The findings suggests that the proposed Z score model is higher when compared to original Z-score model of Altman and the other model of Altman which is used for the emerging markets. This analysis establishes its superiority over the default discriminant analysis and also had reaffirmed the significance of financial ratios in predicting defaults.

Senapati and Ghosal (2016) have formulated a model for predicting the financial distress probabilities of non-government non-financial public limited companies of India in the next one year. The study has used the company’s annual reports for the period 2006-07 to 2013-14 and estimated the distressed bank debt, due to sample companies. The authors have chosen for their study, 37 financial variables which have been taken in the earlier studies as potential predictors of distress. They have used the multivariate fixed effect logistic regression based on three financial ratios viz., long term liabilities to total assets, operating profits to total liabilities and current assets to current liabilities for predicting probability of distress in the next one year. The paper also states that the distressed bank debt was found to be increasing since 2011-2012 for the tested companies. The findings suggest that corporates may visualize their distress in advance and also the lenders may factor this in their credit appraisal and assess the commercial viability while lending in future.

Gupta, V. (2017) has used survival analysis to identify the key predictors that can explain the default risk in the Indian listed companies. The findings of this paper have shown in a dataset of 859 companies which is spread across 10 sectors that around eight variables which are combination of financial variables and market variables are significant in predicting the default. This study has basically emphasized the significance of survival model which is different from that of the traditional financial accounting based or market-based models of prediction as this model assesses
the relationship between “time to default” i.e. the survival time and the covariates. The lenders may use this model when they are able to assess the survival time of different companies for credit risk evaluation.

### 3.3 Studies on Strategic Defaults

Aghion (1999) has analysed the credit agreements which are entered into collectively with joint responsibility. The author has argued that there are a few factors that determine the success of peer monitoring in maintaining high repayment rates. The author has demonstrated that a joint responsibility agreement discourages the strategic defaults because the relationships amongst the group members are embedded. Moreover, the borrowers can also impose social sanctions upon strategically defaulting members. However, the author cautions the lenders with regard to the size and structure of the groups and supports the view that formal lending institutions should encourage group lending with joint responsibility to mitigate the risk of strategic defaults.

Gross and Souleles (2002) have analysed the credit card accounts, its delinquency and personal bankruptcy by using a new panel dataset of these accounts in the US. They have also studied the stability of the credit risk models by using estimates of duration models for consumer default and have carried out assessment of different variables and its importance in predicting default. One of the major findings of the paper is that the propensity to default has changed over time and today the stigma associated with delinquency in credit card payment has fallen amongst the US consumers. The borrowers are willing to default due to reduction in default costs incurred by them, including the social and legal costs attached to the defaulter. Though there has been an earnest effort to reduce the risk and improve the overall economic conditions, yet it is observed that such defaults have been on the rise.

Fay, Hurst and White, (2002) have studied the decision of the households in United States when they file their personal bankruptcy. The authors have observed that there has been huge rise in the number of such filings from 0.3% in 1984 to around 1.35% of households per year in 1998 / 1999 and it has been seen as a routine event there. There was huge loss of around USD 39 billion to the lenders in 1998 due to these bankruptcy filings. In this paper, the authors have analysed the data
from the “Panel Study of Income Dynamics” (PSID), which includes information on such personal bankruptcy filings. The findings reveal that there have been strategic model of bankruptcy and the households are more likely to go for such filing when the benefits arising out of filing is more than not filing for bankruptcy. There was little support to the fact that households go ahead for bankruptcy filing when adverse events occur i.e., which had actually reduced their ability to repay (non-strategic filings). The test shows that an increase in USD1000 in benefit to the households from bankruptcy is associated with an increase of 7% probability of bankruptcy and that the relationship is statistically significant. Further, the discharge of debt is the dominant consideration in households’ decisions to file. The paper has also assessed impact of the two different changes proposed by the U.S. in bankruptcy exemptions.

Hoque (2003) paper has argued that one of the major reasons for defaulting in loan repayment is the morally indefensible behaviour of the borrowers and lenders in emerging market economies. The paper has studied cases pertaining to Bangladesh Shilpa Bank which is the largest industrial credit provider in Bangladesh and which was able to recover only 10% of the total outstanding loans as of June 2002. The findings suggests that there are information asymmetry between the borrowers and the lenders as the borrowers are more informed about the project they are entering into and the risks and capabilities they have, to undertake them. The lenders inefficiency and the imperfect credit market gives rise to unworthy credit borrowers. The paper has also established that if the overstated value of the collateral increases, it becomes an incentive to the borrower to strategically default as the benefits arising out of the loan default is more than repaying them. As is evident in most of the developing countries the institutional legal framework do not support the lenders and nor they are cost effective as it is an expensive and time consuming ordeal.

Zeitun and Tian (2007) had examined default risk on 59 publicly listed companies in Jordan for the period 1989 to 2002 and related the performance of these companies to its ownership structure. The study had brought out some important findings viz., the return on assets of a company is significantly affected as it is public owned and Government’s shares are negatively related to the Return on Equity. It has also been observed that the defaulted firms had high credit concentration risk when compared to the non-defaulting companies. Overall, the finding of the paper suggests
that reducing the stake of Government can increase the performance of these companies but however some can go bankrupt in the short term.

Elul, et. al. (2010) has assessed the relative importance of negative equity and the illiquidity as the two main drivers which could trigger mortgage default, as measured by high credit-card utilization. The authors have combined the loan level mortgage data with the balance sheet details available in the credit information companies of the defaulting borrower. They have found that these two factors interact with each other and that they are significantly associated with such defaults. The study has empirically proved that for a borrower who is illiquid, it could be costly for him to wait for the house prices to recover hence prefers to default due to negative equity. The paper has also demonstrated that the level of unemployment shocks and second mortgage significantly increase the mortgage default risks.

Ghent and Kudlyak (2010) in this paper the authors have explored to understand the law as prevalent on mortgage loans across the states of United States and the effect of such legislations on the nature of the default. The paper has presented a model which can be used by lenders to expedite the default process or deter it. It also examines to what extent does recourse deters default and the changes it brings in on the pattern in which the borrower defaults. It has also been observed that the lender do not prefer to seek deficiency judgement as it is costly and time-consuming. However, the mere threat of such a judgement deters default in practice. A deficiency judgment can be defined as “an unsecured money judgement against a borrower whose mortgage foreclosure sale did not produce sufficient funds to pay the underlying loan in full.” Empirically the findings of the study shows that in a sample of loans originated between 1997 to 2008 the probability of default is 32% higher in non-recourse States than in the recourse States in the US. The study also demonstrates that the lenders recourse increases the probability of default occurring in a more lender-friendly manner, such as a deed is initiated in lieu of foreclosure, and thus recovery seems better.

GFSR, IMF (2011) The Global Financial Stability Report of the International Monetary Fund released in April 2011 states that “the borrowers have become more strategic in their default
decisions by becoming more willing to exercise their default option on underwater (negative equity) mortgages”. This is a situation when a borrower though he might be able to service the debt commitment towards a mortgage loan yet chooses to default because the value of the underlying property is less than the mortgage amount. The report further elaborates that there is an inverse relationship between the prices of home equity and the delinquency in repayments. As the home equity value decreases the propensity of the borrower to become a strategic defaulter on residential mortgages tends to increase and hence this negative equity poses a huge risk in the mortgage market. On the policy perspective the report also states that by increasing the supply of houses, the increase in the tendency of the borrowers to strategically default puts further downward pressure on the prices of the houses. The delinquency probability with more than 20 percent negative home equity is nearly 50% higher than with negative equity between 0 and 20%. Higher the negative equity, higher is the propensity to strategically default.

Andrianova, et. al (2011) have provided evidence to theoretical predictions using a panel of 110 banks from 29 African countries that African financial deepening is beset by a high rate of loan defaults. This in turn has encouraged the credit institutions to hold liquid assets instead of lending or make investments in foreign assets. This paper has put forward a theoretical model that captures the prominent features of African credit markets. This shows that there are high loan defaults and low lending from the institutions as the enforcement agencies are weak, investment opportunities are relatively limited and there is asymmetry in information availability. The study has shown that growth is inversely related to the rate of loan defaults, as does the rule of law and control of corruption. On ownership the paper has opined that though it apparently looks like government banks have better information capital and can thus reduce the loan defaults, but in countries in which the corruption is below the world norm, the government stake actually makes the matters worse.

Seiler, et. al. (2012) have examined as to why certain underwater primary resident homeowners decide to strategically default. They have observed various reasons for such kind of strategic defaults. The foremost is the owner’s expectation on the future level of the price variation on the properties and also the way the lending institution has approached him for the recovery. The moral values of the borrower like shame and guilt also contributes to his decision to default strategically. Apart from this, the other individual traits like gender, income and age also act as the key drivers
which lead the individual to strategically default. The study has further elaborated that the strategic defaulters are able to assess the amount of shame or guilt they would have to undergo but the ramifications on the financial score is not visualised appropriately. Hence the borrowers do not repent on their decisions too. Some clearly even admit that they have strategically defaulted out of choice and not because of any economic hardship. They have also seen in their study that more than 60% of these defaulters have made major purchases (mostly vehicle) just one year before they defaulted.

Giroud, et. al. (2012) had taken 115 ski hotels as their sample of study from the primary data source as available with the Austrian Hotel and Tourism Bank (AHTB). All these hotels had undergone debt restructuring during the period 1998 to 2005. AHTB also provided data of around 2095 ski hotels that did not undergo any kind of debt restructuring from its lenders. The study has used exogenous variables to assess the financial capacity of firms and in this way to group the defaulters into financially constrained (non-strategic) defaulters and financially unconstrained (strategic) defaulters. This article has empirically supported the argument that debt overhang affects the performance of the leveraged firms. The key instrument used in the paper is the “Unexpected Snow” that captures the conditions of the hotel before and after the debt restructuring. The lenders are thus able to distinguish between the firms that are in distress due to “negative demand shocks” i.e., who are genuine defaulters due to liquidity crunch and those that are in distress due to “debt overhang” i.e., the strategic defaulters.

Trautmann and Vlahu (2013) had conducted an experimental analysis on the borrower fundamentals on loan repayment and its impact on the lender bank. The findings submit that the probability of the solvent borrowers to wilfully default is more likely when the banks expected strength is low. Also the borrowers though have the capability to repay are less likely to do so when they see other borrowers’ expected repayment capacity is low. Hence the papers shows that the fundamentals of the borrowers to repay their own debt changes with expectations of the lenders’ strength and the expectations they have on the repayment intention of others and subsequently explain the behaviour of the borrower to strategically default. From the regulatory angle, the research suggests that it is necessary to identify these conditions under which the contagion occurs and take steps to avoid the same.
Guiso, et. al., (2013) have considered the effect of the behavioural factors on the strategic default decision. They have used the US consumer finance survey data to determine that strategic default is driven by a combination of multiple factors like economic, emotional and sociological. They have observed that the propensity to default on mortgages even when the borrower has the capacity to repay is seen when the value of the mortgage exceeds the value of the house. The increase in such strategic default is noticed both in absolute terms and relative to the size of the home equity shortfall. The willingness to wilfully default is evidenced both by pecuniary and non-pecuniary factors. The fairness or morality etc. finds little importance when the borrowers are exposed to other people who strategically default. Hence, the propensity for them to default strategically also increases due to negative demonstration effect.

Asimakopoulos et. al., (2016) is one of the very few studies undertaken that utilizes data from corporate loans for analyzing or predicting strategic defaults. They have inferred that some borrowers divert the loan funds and find it more attractive not to pay off their loans or renegotiate the loan on better terms for economic gain. These strategic defaulters are able to channelize the saved amount for other expenditures. Further, they have investigated the potential determinants of Greek corporates behavior by relating the probability of strategic default to a number of firm characteristics such as size, age, liquidity, profitability and collateral value. The paper has established that high amounts of debt outstanding in any account coupled with a period of economic uncertainty in a country are positively correlated to the amount of strategic default. Further, such defaults have a negative relationship with the value of the underlying collateral offered against the loan.

3.4 Studies on Wilful Defaults

Study of the existing literature indicated that the concept of “wilful defaulter” is unique and prevalent only in India. Further, it was also observed that the descriptive or empirical analysis of the data on “wilful defaults” had received very limited attention in the literatures. It was therefore, necessary to review the definitions; related terms and the regulatory and statutory prescriptions, if any, prevalent on similar defaults internationally. Hence, to carry out this assessment, there was a felt need to conduct a short survey on the existing practices in other countries. This survey was initiated with concerned senior and middle level officials of few banks in India which are having
international presence and also with senior executives of two credit information companies in India, as they also have location overseas. The results of the survey confirmed that there are no regulations or guidelines prescribed by any regulators on wilful defaulters in any of their overseas locations that correspond to those which are in place in India. A default on a loan was generally considered an event of bankruptcy in most of the countries. Therefore, it is interesting to note that India is the only country which discerns between “wilful” defaulters and other defaulters, both on law governing them and on credit reporting. The officials stated that other countries do not grant statutory recognition to the concept of “wilful” defaults and therefore creditors look to other remedies under law to address the issue of defaults. The legislative framework and speedy judicial redressal available in other countries are deterrent enough for any borrower to become a “defaulter” on its loans. Therefore, unlike India where there is a mechanism for identification of a “wilful defaulter” by the credit institutions and reporting of the same to the credit information companies, survey revealed that predominantly the steps undertaken by the credit institutions in other countries are as under:

(a) Credit institutions assess the possibility of establishing fraud against the defaulting company and / or its senior management / board of directors and where sufficient grounds exist, they approach the local authorities for investigation into the matter and prosecution thereafter. On the basis of the investigation report, these credit institutions may also consider filing a civil suit against the individuals involved in the fraud and gain recourse against their personal assets.

(b) The credit institutions initiate liquidation proceedings against the defaulting companies pursuant to which the liquidator can commence investigation into the conduct of senior management and if applicable, proceedings may also be initiated against the managerial personnel in their personal capacity.

(c) Filing a suit against the defaulter for lifting of the corporate veil in order to establish liability.
(d) The law related to bankruptcy is already in place in most of the developed countries. Hence, the lenders would initiate the legal proceedings accordingly. This also facilitates in capturing the details of the firm’s financial distress position and mechanism to be adopted for the resolution. Thus the bankruptcy code enables to mitigate the overall systemic risk and keeps the financial stability under check.

Further, the survey also established that the credit report in other countries will only show the delinquency and will not distinguish between “wilful” and “genuine” defaults, as is the case in India. However, it is very important to note that the options listed above entail high standards of proof.

With this in background, an attempt is made to review the existing literature on “wilful” defaults, as applicable in the Indian context. The review of the same is detailed below chronologically.

**3.4.1 Studies on Wilful Defaults in India**

Sanjeev (2007) has identified the endogenous and exogenous factors which contribute to the increasing levels in the bad loans, in the books of the banks operating in India. The author had collected the data through structured questionnaire wherein 37 representatives were randomly selected from various public, private and foreign banks. The study has observed that amongst the various exogenous factors, the wilful default of the borrowers emerges as one of the most critical factor which influences the increase of bad loans in the Indian commercial banking system, the other being the economic down turn. Further, 48.65% of the respondents had also indicated that they do not have any platform to share the information in respect of such defaults. However, as seen in Chapter II with the enactment of Credit Information Companies (Regulation) Act, 2005 India has now four Credit Information Companies and a system of centralised reporting and dissemination of credit information has been put in place in respect of defaulters.

Rajakrishnan, (2009) has studied the Primary Agricultural Credit Societies (PACS), in the Nagapattinam District of Tamil Nadu, which has seven talukas. The PACS having the highest overdue from each of the taluka was chosen for the study and from each of these PACS 10% of wilful defaulters’ data and 10% of the non-wilful defaulters’ data had been culled out for analysis.
The findings of the field study undertaken during the research shows that the percentage of wilful defaulters in the total number defaulters of the PACS is almost equal. In total 268 wilful defaulters and 276 non-wilful defaulters were taken as a sample for this study. It has been observed that these wilful defaulters are a major threat to the development of PACS and this has significantly affected the growth of small and marginal farmers and the borrowers who are regular in repayment of this district. The study has found certain specific characteristics of wilful defaulters of this area, which inter alia has stated that the wilful defaulters are largely the big farmers and landlords, more literate, having better status in the society, well connected politically, largely dependent on institutional credit facilities and seen to be availing of more loan waivers. On the other hand the non-wilful defaulters were generally having small size land holdings, belonging to low economic strata with subsidiary occupation and less connected to the outside agents and mass media. The author has applied “Discriminate function analysis” to identify the variables which discriminate the two groups of borrowers. This paper has analysed the magnitude, effects of wilful defaults on PACS and its other members and has come out with certain socio-economic characteristics which describes the wilful defaulter more precisely in the area of study.

Bardhan and Mukherjee (2013) have examined theoretically the cases of wilful default in a developing country’s banking system and have highlighted the sequence through which such defaults occur. The authors have observed that right from the inception of the debt contract between the lender and borrower there is information asymmetry as borrowers are better informed about the potential risks and return from the investment project. The authors have demonstrated that wilful defaulters underreport the cash flows generated from the project and thus default in their repayments but the lender is oblivious as the system does not have effective monitoring and supervision mechanism. Further, to undertake the same the lender has to take up an audit which involves cost to him. Hence asymmetric information leads to adverse selection of the borrower and problem of moral hazard. Therefore, if a high risk project succeeds, it is an incentive to the borrower, but if it fails, the lender bears the brunt. Poor enforcement mechanism and lagged legal system motivates such wilful defaulters to hoodwink the system with impunity. The paper has also studied the implications on bank’s loan decision making and profitability due to problem of wilful defaults. It states as the loan capacity of the lender increases it tends to lend more to such borrowers which in turn increases the incidence of wilful defaults. Finally they have concluded
that the regulations are a tradeoff between higher profits to the lender and higher occurrences of wilful defaults.

Linder and Jung (2014) in their IMF working paper have analyzed the status of the Indian corporates since the Global Financial crisis. In this paper, the corporates’ balance sheet figures have clearly shown that there has been huge increase in the leverage ratios for the past 15 years which is linked to the piled up interest payment debt burden of these companies. The Indian corporates have now become so vulnerable to the systemic shocks that there is immediate felt need for the banks’ credit appraisals to improve, have stringent impairment standards of the assets from the lender’s side as well as improve the macroeconomic front of the country. The paper further states that the public sector banks in particular have to mitigate these risks and strengthen their balance sheets immediately. IMF paper has suggested that improvements in business climate, structural reforms and reduced uncertainty along with bank’s asset quality including enhancing the legal and institutional insolvency framework would help India in improving its overall economy and financial health.

Goel and Pathak (2014) had conducted their study on the factors affecting the repayment performance of borrowers who had availed loans from the District Central Cooperative Banks in Punjab. The authors have opined that one of the significant factors which have made the functioning of the cooperative banks in India ineffective is the repayment behaviour of wilful defaulters. There is a change in the behaviour and spirit of the human beings in favour of “not to repay” the loans when it is availed from these institutions. It is stated that the non-performing assets represent 50 percent of loans extended in case of Cooperative Banks. The findings of the paper prove that in 27.04% of the cases, the irregularity in repayment was made by seeing others who did not repay i.e. the negative demonstration effect. Hence, a wilful defaulter pollutes the entire system and has become a moral hazard having huge ramifications to the Cooperative banking system as a whole.

Mishra (2014) is a study aimed at examining the current position of rural credit system in Dasrathpur Block of Jajpur District in Odisha. The author has investigated the performance of the credit institutions, amount of loans sanctioned and the trend in repayment of the overdue in respect
of that district. The major problems analysed in respect of repayment of the rural credit, includes *inter alia* diversion of credit money, weak legal enforcement of the debt contracts and lack of supervision on the part of the credit institutions. The district has also evidenced corruption and mismanagement in the lending institutions. The consequence of all these factors when combined has led to having more number of wilful defaulters. Further these defaulters are largely seen in the higher income group.

Ernst & Young (2015) had brought out a research paper in which they have stated that the corporate borrowers have repeatedly blamed the economic slowdown as the primary factor behind defaulting on bank loans. However, the periodic independent audits on borrowers have revealed that wilful default or fraud is responsible for the defaults. The result of the survey states that 87% of the respondents have stated that diversion of funds to unrelated business through fraudulent means is one of the root causes for the NPA crisis in India. Further, 44% of the respondents had also stated that impact on the amount of provisioning at the branch level is the key reason which prevents them by reporting a NPA borrower as a “wilful defaulter”. The survey results also shows that most of the wilful defaulters approach the court, in which case it becomes the responsibility of the lender to justify their action of declaring him as a wilful defaulter with supporting evidence. Hence, they are extremely cautious before they declare, as they will not only lose the case if unable to prove, but also let the defaulter scot free.

Dalal (2015) in his article had explained some of the methods which are used by the borrowers to divert or misuse the loan funds. Some of the highlighted ways which the defaulter adopts are by using the funds in undisclosed bank accounts, creation of secret reserves, inflated expenditure, suppression of cash, diversion of sales etc. However, while analysing the reasons for increase in wilful defaults, the author has pointed out that many lenders investigate the diversion of funds up to a point and then give up due to difficulties faced in proving and costs involved in the investigations. The author has concluded that while it is necessary for the lender to do the cost-benefit analysis for taking the investigations further but routine adoption of such measures emboldens the borrowers in abusing the public funds.
Sagar (2016) in his theoretical paper has outlined some of the modus operandi specific to the sector, adopted by the wilful defaulters in India. For example, in the manufacturing sector the project cost is generally over valued by the borrower and also there is overbilling by the suppliers and others. Hence, the promoter’s stake is nil or bare minimum which incentivises him to wilfully default. In import-export sector, a defaulter allegedly floats or opens a shell company abroad and undertakes transactions with them which finally default in its payments. Hence, the unobservable part of the borrower ab initio is falsified and fraudulent. The author has also quantified that in the recent financial year 2015-16 though the Public Sector Banks have declared a whooping Operating profit of Rs.1.40 lac crores but due to economic downturn and RBI’s guidelines on provisioning for stressed assets, they have registered a huge net loss of Rs.18000 crores and increase in wilful defaulters is one of primary reasons for the stated loss.

3.5 Conclusion

3.5.1. Summarising studies on prediction model

As is evident from the above review of literature there have been numerous studies with regard to predicting financial distress or bankruptcy of companies undertaken by researchers of various countries, both in developed and emerging market economies. Each study has attempted to predict such failure as suitable to their country, though it is established that the predictions are mostly based on financial variables and some have initiated to bring in the market and macro- economic variables in their prediction model. These reviews also indicate that predominantly researchers have employed the logit model, multivariate discriminant analysis and few have undertaken to develop survival model to discriminate the distressed with the non-distressed companies and bring in higher percentage of accuracy in their prediction. Like the International studies, Indian researchers have also attempted to predict corporate financial distress as applicable in Indian context. The following two Tables, No.10 and No.11 summarise and compare the various studies conducted in abroad and in India.
Table 11: Summary of international studies on corporate distress prediction

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Researcher/ Year of Publication</th>
<th>Method used &amp; Study period</th>
<th>Sample size (Distressed/Non-distressed)</th>
<th>Any other Feature</th>
<th>Findings of the Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Altman E. (1968)</td>
<td>MDA 1946-1968</td>
<td>33 &amp; 33 of US</td>
<td>7 ratios</td>
<td>Accuracy more than 90%.</td>
</tr>
<tr>
<td>3.</td>
<td>Altman E. (1977)</td>
<td>ZETA (non-linear and linear discriminate models) 1969 - 1977</td>
<td>Improved on 1968</td>
<td>7 ratios</td>
<td>93% one year prior and 70% five year prior to default</td>
</tr>
<tr>
<td>6.</td>
<td>Altman et. al. (1994)</td>
<td>Logit compared with NN &amp; DA. 1962-1992</td>
<td>213 &amp; 213 of US</td>
<td>5 ratios</td>
<td>Basic 7 financial ratios Average 90% prior to one year of default</td>
</tr>
<tr>
<td>7.</td>
<td>Sheppard (1994)</td>
<td>Model to suit an industry</td>
<td>Industry-wise</td>
<td>5 variables</td>
<td>Hazard models better than static ones.</td>
</tr>
<tr>
<td>9.</td>
<td>Low, et. al. (2001)</td>
<td>Logit 1998</td>
<td>26 &amp; 42 of Malaysia</td>
<td>11 variables</td>
<td>Accuracy around 90%</td>
</tr>
<tr>
<td></td>
<td>Authors</td>
<td>Method</td>
<td>Time Period</td>
<td>Firms/Variables</td>
<td>Prediction Details</td>
</tr>
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<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>11</td>
<td>Campbell et. al. (2008)</td>
<td>Econometric model 1963-2003</td>
<td>All active firms during the year</td>
<td>4 variables taken</td>
<td>Prediction includes “distance to default”</td>
</tr>
<tr>
<td>13</td>
<td>Noor &amp; Iskandar (2012)</td>
<td>Survival model 2005-2011</td>
<td>56 delisted firms in Malaysia</td>
<td>2 variables taken</td>
<td>Delisted companies have lower ownership but are larger in size.</td>
</tr>
<tr>
<td>14</td>
<td>Ahmadi, et. al. (2012)</td>
<td>Logit 2005-2007</td>
<td>49 &amp; 49 of Iran</td>
<td>19 variables taken</td>
<td>3 ratios have discriminant power</td>
</tr>
<tr>
<td>16</td>
<td>Kasgari, et. al. (2013)</td>
<td>Logit &amp; NN 2001-2011</td>
<td>Manufacturing companies of Iran</td>
<td>Important Financials of companies</td>
<td>NN results are consistent with reality</td>
</tr>
<tr>
<td>17</td>
<td>Lee (2014)</td>
<td>Survival 2003-2009</td>
<td>46 &amp; 128 of Taiwan</td>
<td>12 financial ratios and market variables taken</td>
<td>Accuracy around 88%</td>
</tr>
<tr>
<td>18</td>
<td>Moghadas &amp; Salami (2014)</td>
<td>Logit 2002-2010</td>
<td>50 &amp; 50 of Tehran</td>
<td>9 variables taken</td>
<td>Accuracy around 90%</td>
</tr>
<tr>
<td>19</td>
<td>Kliestik, et. al. (2015)</td>
<td>Logit &amp; probit</td>
<td>Analysed earlier studies on these two models</td>
<td>Classification on variables used taken</td>
<td>Strengths &amp; challenges of both models</td>
</tr>
<tr>
<td>S. No.</td>
<td>Researcher/ Year of Publication</td>
<td>Method used &amp; Study period</td>
<td>Sample size (Distressed/ Non-distressed)</td>
<td>Any other Feature</td>
<td>Findings of the Research</td>
</tr>
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</tbody>
</table>

Table 12: Summary of Indian studies on corporate distress prediction

Note: MDA - Multiple Discriminant Analysis; NN - Neural Network; CRIS - Composite Rule Induction System
Source: Developed for this thesis
<table>
<thead>
<tr>
<th></th>
<th>Authors</th>
<th>Methods</th>
<th>Sample</th>
<th>Financials</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>Pal., S. (2013)</td>
<td>MDA 1991-2011</td>
<td>10 Indian Steel companies</td>
<td>8 financial ratios taken</td>
<td>3 ratios are significant</td>
</tr>
<tr>
<td>6.</td>
<td>Rao, N.V.et. al. (2013)</td>
<td>Z-Score &amp; KMV Merton model 2007-2012</td>
<td>9 sick companies of Indian Manufacturing Sector</td>
<td>Financials and stock prices</td>
<td>Accuracy 77% two years prior to default</td>
</tr>
<tr>
<td>7.</td>
<td>Gupta, V. (2014)</td>
<td>MDA &amp; logistic</td>
<td>60 &amp; 60 Indian listed companies</td>
<td>24 accounting ratios, industry group and macro-economic variables taken</td>
<td>Logit model provides greater flexibility</td>
</tr>
<tr>
<td>8.</td>
<td>Rajasekar, et. al (2014)</td>
<td>MDA 1995-2012</td>
<td>Indian Navratna Companies</td>
<td>Financials of 14 companies</td>
<td>6 out of the 14 companies were financially sound</td>
</tr>
<tr>
<td>10.</td>
<td>Senapati &amp; Ghosal (2016)</td>
<td>Multivariate Logistic regression 2006-2014</td>
<td>1051 Non-government non-financial public limited companies</td>
<td>37 financial variables taken</td>
<td>Three financial ratios are the main discriminator s for next one year.</td>
</tr>
</tbody>
</table>

Note: MDA - Multiple Discriminant Analysis; NN - Neural Network; BSM - Black-Scholes-Merton
Source: Developed for this thesis
3.5.2. Summarising studies on Strategic Defaults

A thoughtful analysis of the above literature reviewed on “strategic defaults” exhibits that the prolonged economic downturns experienced by the countries and the continued real estate crisis faced by them have contributed to a significant number of mortgage defaults in the developed countries, mainly in the US. All the researchers have categorised the defaulters into two baskets. One, whose defaults can be termed as “involuntary” and are genuinely unable to pay their debts due to job loss or prolonged illness etc. The second categories of borrowers who have the capacity to pay, but are unwilling to keep up their commitments are the “strategic defaulters”. (Gross & Souleles (2002), Fay, et. al. (2002), Elul, et. al. (2010), GSFR (2011), Seiler, et. al. (2012), Guiso, et. al. (2013). The burgeoning reason cited in most of the papers for these defaults is the “under water” situation i.e., when the home value has declined far below the outstanding balance of the home loan. The second reason to consider strategic default by the borrowers’ is predominantly the sociological and behavioural motivation, which are termed as “moral hazards” and mainly increased due to the negative demonstration effect. (Aghion, (1999). The fairness or morality finds little importance today and the stigma of delinquency, the fear, shame or guilt of non-payment has fallen and thus there is low level of regret especially when the borrowers experience persistently the same scenario around them. In underdeveloped countries, in addition to the morally indefensible behaviour, strategic defaults occur mainly due to weak institutional legal framework, lagged judicial decisions, increased stake of Government ownership, corruption, lender’s poor monitoring and supervision mechanism etc. (Hoque, (2003), Zeitun & Tian (2007), Ghent & Khdlyak (2010), Andrianova, et. al. (2011), Trautmann & Vlahu (2013). Though the above mentioned literatures are based on the situations prevalent in the western countries, however, some of the moral hazards and sociological aspects characterised above also holds good for “wilful defaulters” in India. Further, the literature on “wilful defaults” the fundamental characteristic of which is similar to “strategic defaults” i.e., not meeting the repayment obligation in spite of having ability to pay have also been concluded to understand the distinctions of the subject in proper perspective.

3.5.3. Summarising studies on Wilful Defaults
As is evident from the foregoing paragraphs, there have been very few studies undertaken on wilful defaults. It is observed that most of them are theoretical in nature and few are conducted on a specific sample through survey mode Sanjeev (2007) and Ernst and Young (2015). The general characteristics of wilful defaulters and the modus of operandi adopted by them have been discussed by few like Bardhan and Mukherjee (2013), Dalal (2015) and Sagar (2016). Rajakrishnan (2009), Goel and Pathak (2014) and Mishra (2014) have taken up their analysis pertaining to a specific bank or a particular geography only.

Hence with thorough review of the existing literature it is well recognized that there are no theoretical or empirical study carried out on analysis of wilful defaulters’ data as available in India. However, as stated in earlier chapters effective prediction of these defaulters would help all the stakeholders and improve the financial landscape of the country. The credit institutions are facing huge losses due to stressed assets which have brought a huge dip to their profitability and also affecting their capital base. Hence, this research would benefit the credit institutions to avert or mitigate the credit risk in their portfolios. The findings of this research may also add value to the regulators and other stakeholders and act as inputs while drawing policies on the subject.

In this regard, an effort has been made to empirically demonstrate that the annual financials of wilfully defaulted companies can act as early warning indicators to future distress. This study has also attempted to explore whether the suit-filed wilful defaulters’ data can sufficiently indicate the entity’s financial distress in the foreseeable future. Thus, the models developed in the Indian context and their outcomes investigated in this study would sufficiently enhance the arena of information in respect of wilful defaults.

Examination of the literature and the summary presented in this chapter with regard to prediction models, strategic defaults and wilful defaults has revealed the research gap on the subject. With clear understanding of the research issue in hand, we now turn our discussions in the next chapter on the research methodology which has been adopted to achieve the desired objectives.