International Journal of
Emerging Research in Management &Technology
ISSN: 2278-9359
Research Article | 2012

Distress Prediction Model-Model for predicting Bankruptcy in Aviation Industry

Ms. Ummed Kumari[1],
Lecturer Department of Management
Shridhar University,Pilani, Rajasthan. India.
Dr. Omvir Chaudhry[2]
Asst. Professor, Economics and Finance.
BITS-PILANI. Rajasthan. India.

Abstract:

In this paper, a model of bankruptcy prediction conditional on financial statements is presented. The primary data set consists of 5 aviation firms in India. And then the probability of bankruptcy for these firms is calculated using their financial ratios in Altman's Z-score Bankruptcy Prediction Model. The results are checked to assess the validity of Altman's Z-score Bankruptcy Prediction Model.

Keywords: Net present value rule (NPV), business-cycle

1. Introduction

1.1 The event of bankruptcy

The bankruptcy legislation states that a debtor shall begin bankruptcy proceedings if the debtor is insolvent. The debtor is considered insolvent if he is unable to fulfill his economic obligations as they mature. He is not considered insolvent if his property and income are sufficient to cover the obligations. The penal code requires a debtor to petition for bankruptcy when the debtor has reason to believe that the business is run at the expense of the creditors. Factors which can contribute to the understanding of corporate bankruptcy can be found both in the fields of Economics and in the theory of Business Management. However, the many attempts to specify a model of bankruptcy prediction based on causal specifications of underlying economic determinants has not fully succeeded. The difficulties of merging the theoretical and empirical fields may arise from the diversity of the phenomenon. Firms are heterogeneous and the available information is limited. Furthermore, the event of bankruptcy is twofold as the decision of whether or not to continue operations is not directly connected to the particular outcome of bankruptcy. In search of explanatory factors we need not only to identify the factors that influenced on the insufficiency of the firm's performance, but for the firms that do fail we need to explain why the particular outcome of bankruptcy was observed, and not a timely liquidation, a merger, or a restructuring of debt.

1.2 The decision of continuance

If the establishment and abolishment of the firm can be viewed as a reversible investment
decision, or the decision cannot be postponed, at any point in time continuance is optimal
if the present value of operations is in excess of the liquidation value of the firm. This result is referred to as the standard net present value rule (NPV). If none of the above conditions hold, NPV need not hold and the decision of continuance is better analyzed in a dynamic framework. The framework of such investment problems is discussed in Dixit and Pindyck (1994). The option to postpone the investment decision will be valuable, and should therefore be priced in the alternative cost. Compared with the NPV, at any point in time a wedge is added to the critical levels of the decision rules. This result is indeed relevant for the decision of firm continuance: If the entry or exit of markets are sufficiently costly and the variance of outcomes sufficiently high the firm may choose to operate even at a negative contribution margin.

1.3 Restructuring models

In presence of a positive probability of bankruptcy, the value of a company can be viewed as a call option, which will be valuable to the shareholders only if the market value of the company is considered greater than the company debt at the date of maturity. If the option is "out of money" the creditors will have to bear the loss (i.e. a bankruptcy petition is filed). The call

option need not be exercised, and thus there will be an asymmetry in the risk faced by shareholders and creditors. This asymmetry may cause the troubled firm to engage in particular risky projects in effort to recover some value, and so there is a potential for inefficient investment decisions. Models of debt restructuring emphasize the fact that shareholders, bondholders and debt holders will have different priorities on assets liquidated, different ability to control the firm, and different exposure to the risk associated with continuance. By considering different assumptions concerning the underlying setting the restructuring models seeks to analyze what is likely to determine the destiny of a troubled firm.

1.4 The informational content of the financial statement

The financial statement is a filtered representation of information. Decisions are made concerning the classification of income and expenses, the timing of income and expenses as well as the valuation of assets and conventions of depreciation. In many cases the firm will have incentives to bias the entries; income tax, profit related pay and debt covenant restrictions are explicitly dependent on the reported figures. The firm may signal profits to attract investors or to win time in a situation of financial distress. The use of financial ratios to make qualitative statements about the going concern of the firm has a long tradition. However, the generality of constructed ratios are controversial. Any textbook of accounting will emphasize the fact that benchmark values are not directly comparable over different industries. Financial ratios must thus be evaluated in conjunction with additional information related to the nature of the firm and the market in which it operates: Differences in trading cycles and degree of capital turnover, market competition, volatility of revenues and costs and the industry's dependency on the business-cycle are factors of importance.
Moreover, measuring financial ratios is not equivalent with observing "real characteristics", but should rather be considered as "surrogate measures" of the relevant aspects. As emphasized by Morris (1989): A unique economic event can result in a variety of ratio patterns, and a single pattern of ratios can be the result of a variety of underlying economic conditions. The business analyst put on the task of giving a subjective evaluation of a firm will therefore use the collection ratios interactively. Different constellations of the financial entries can give rise to hypothesis of the underlying economic conditions. Ideally, the analysis is combined with external sources of information so that an overall profile of the firm can be drawn. Any statistically derived bankruptcy prediction model implicitly assumes that benchmarking financial ratios makes sense. The limited success of bankruptcy prediction models must be viewed in this perspective. Nevertheless, in practice, bankruptcy prediction models are found useful: The holder of a large portfolio of claims may find it costly to supervise individual developments and therefore use the credit risk model as a means to make a first selection of "follow-ups". Furthermore the "objectiveness" of the statistical model may be appreciated. The ability to discriminate by subjective judgments will potentially depend grossly on who is making the analysis and his current orientation towards general economic developments. Even if subjective predictions on average are more effective than those of the statistical model, this source of uncertainty may not be appreciated. If the degree of accuracy of the statistical model can be accurately measured, the model will be particularly useful.

1.5 Bankruptcy prediction models

It is since 1960 some of the impacting papers that have been published, which formulated "distress prediction models" are as follows:

1. Alternative accounting measures as predictors of failure-Beaver,W.[3]
2. Financial Ratios, discrimant analysis, and the prediction of corporate bankruptc– Altman,E.I [2]
3. Financial Ratios and probabilistic prediction of Bankruptcy-Ohlson,J.
4. Forecasting bankruptcy more accurately: A Simple Hazard model-Shumway,T and others.

These papers presented models regarded as predominant ones, along with proprietary models owned by organization as credit rating agencies and consultancy firms. On appreciation of these models, one may conclude that each model has some fundamental strengths as well as its weakness.

The initial seminal papers bankruptcy/distress prediction models being of Beaver 1968[1],Altman [2] being based on statistical models, Dixit and pindyk 1993[4] sought to resolve problems as presented in static models and presented dynamic model, proposing the hazard model. Herein the statistical models largely derive their objectives merely from the statistical optimization of a set of ratios.
Interalia, the initial seminal paper models may be briefly described as ;

a) Beaver identified 30 ratios that were expected to capture relevant aspects. By a univariate discriminant analysis, these ratios were applied on 79 pairs of bankrupt/nonbankrupt firms. The best discriminators were "working capital funds flow/total assets" and "net income/total assets" which correctly identified 90% and 88% of the cases.
b) Altman(1968) conducted a similar study applying multivariate discriminant analysis using the 7 ratios; return on assets, stability of earnings, debt service, cumulative profitability, liquidity, capitalization and size. Applied on 33 pairs of bankrupt/non-bankrupt firms the model correctly identifies 90% of the cases one year prior to failure.
c) Ohlson(1980) is the first to apply the logit analysis on the problem of bankruptcy prediction. By using 105 bankrupt and 2,058 non-bankrupt firms he is also the first to apply a representative sample. He states that predictive power appears to be less than reported in previous studies.

2. Gap in Existing Research

Reaming through the history of Distress Prediction models, one may state that till date there exist no single universal Distress Prediction Model, albeit it may never be co-opted, as Distress Predictions Models in the realm of kind akin to 'alchemy of financial economics'.

Recent years, much attention is given to the choice of methodology. Methods like recursive partitioning, neural networks and genetic programming are commonly applied on the bankruptcy prediction problem. Morris (1998) gives a survey on both new and traditional approaches to bankruptcy prediction.

3. Methodology

A well-known MDA bankruptcy prediction model is Altman's Z-score.

Altman Z-Score Described

Z-Score Analysis: The Z-Score is a measure of a company's health and utilizes several key ratios for its formulation. The model was developed in the late 1960's by Edward Altman, Professor of Finance at New York University School of Business. The model incorporates five weighted financial ratios into the calculations of the Z-Score. Professor Altman continues to update the model's coefficients to reflect changing ways of conducting business. The coefficient values used in this SDS, Inc. Supplier Financial Analysis Notebook were published in 1993 in Professor Altman's book entitled "'Corporate Financial Distress and Bankruptcy", 2nd edition Copyright 1993 by John Wiley & Sons, Inc. ISBN 0-471-55253-4. Professor Altman has defined 5 variables that comprise the Z-score for public and private companies:

1. **X1 Component** of Z-Score is defined as (Xl = Working Capital/Total Assets).
The ratio of Working Capital to Total Assets is the Z-Score component which is considered to be a reasonable predictor of deepening trouble for a company. A company which experiences repeated operating losses generally will suffer a reduction in working capital relative to its total assets.

2. **X2 Component** of Z-Score is defined as (X2 = Retained Earnings/Total Assets). The ratio of Retained Earnings to Total Assets is a Z-Score component which provides information on the extent to which a company has been able to reinvest its earnings in itself. An older company will have had more time to accumulate earnings so this measurement tends to create a positive bias towards older companies.

3**. X3 Component** of Z-Score is defined as (X3 = Earnings Before Taxes + Interest/Total Assets). This ratio adjusts a company's earnings for varying income tax factors and makes adjustments for leveraging due to borrowings. These adjustments allow more effective measurements of the company's utilization of its assets.

4. **X4 Component** of Z-Score is defined as (X4 = Market Value of Equity/Total Liabilities). This ratio gives an indication of how much a company's assets can decline in value before debts may exceed assets. Equity consists of the market value of all outstanding common and preferred stock. For a private company the book value of equity is used for this ratio. This depends on the assumption that a private company records its assets at market value.

5. **X5 Component** of Z-Score is defined as (X5 = Net Sales/Total Assets). This ratio measures the ability of the company's assets to generate sales. This ratio is not included in the Z-Score of a private company.

The Z-Score model for Public industrial companies is: $Z = 1.2\ X1 + 1.4\ X2 + 3.3\ X3 + 0.6\ X4 + 1.0X5$. A healthy public company has a $Z > 2.99$; it is in the grey zone if $1.81 < Z < 2.99$; it is unhealthy if it has a $Z < 1.81$

The Z-Score model for Private industrial companies is: Z = 0.717 X1 + 0.847 X2 + 3.107 X3 + 0.420 X4 + 0.998 X5. A healthy private company has a Z >2.60; It is in the grey zone if 1. 1 < Z < 2.59; it is unhealthy if it has a Z <1.1.

2.1 Data Set

Only secondary data has been used. The financial data of 3 firms are obtained. These are the aviation firms operating in India. The relevant data from their financial statements (as submitted to the lending institutions) is given in the appendix.

4. Appendix

Financial Data (as on 31/03/2011)

(Rs. bn)

Company name	Total sales	Total Assets	Net working capital	Retained earnings	EBIT	Total debt	Equity-debt ratio	Z-Scores
KFA	**64.96**	**94.54**	**-11.93**	**13.43**	**1.41**	**70.57**	**0.34**	**1.27**
Spicejet	**29.61**	**11.28**	**-2.91**	**6.32**	**28.52**	**.86**	**12.11**	**11.35**
Jet Airways	**127.82**	**160.84**	**3.95**	**7.50**	**27.65**	**134.8**	**.193**	**1.47**

4. Results:

Z Score > 2.60 number of firms = 1
2.60 > Z Score > 1.10 number of firms = 2

As on 31/03/2011, further information available is as follows:
Of the three firms having Z-Score less than 2.60, two have been declared bankrupt. The lending institution has recalled term loan from one firm. .
Only one firm financially stable.

5. Conclusions

From the study of Financial Distress and Using Altaman's Z-Score model for prediction of Bankruptcy it is concluded that Altaman's Z-Score model provides valuable information and can be used to predict Bankruptcy for firms yielding reliable results.

6. Scope for Further Research

although this empirical study has yielded fairly valuable results, a larger study encompassing a significantly larger sample would further strengthen the results and pave way for a more accurate model, keeping Altman's model as the base.

References

1. Altman, E.I.(1968):"Financial Ratios, Discriminant Analysis and the Prediction of Corporate bankruptcy",Journal of Finance, September,p.589-609

2. Altman, E.I.,Y. Chen and Weston F.(1995):"Financial Distress and Restructuring Models",Financial Management,Vol.24,No.2,Summer,1995, p57-75

3. Beaver, W.(1966):"Financial Ratios as Predictors of Failure",Journal of Accounting Research,p.77-111

4. Dixit, A.K. and R.S Pindyk(1993): Investment under Uncertainty, Princeton University Press, Princeton 349