PREDICTING CORPORATE FAILURE OF MALAYSIA LISTED FIRM

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ABSTRACT

Corporate failures are known to have high economic cost due to its impact on the investor, creditors, auditors, market analysts, loan officer and also to the management and employees of the affected companies. Due to this reason, over the years there are a lot of the studies on the prediction of corporate failure. Those models are including univariate analysis, risk index model, multivariate discriminant analysis and conditional probability models.

In this study, the logistic regression is selected to predict the corporate failure. There are 86 unhealthy firms and another 86 healthy firms are selected in this study. The variable used in the study will different from the previous study which is only choosing the traditional financial ratio. In this study, it also evaluates the usefulness of the new selected financial ratio to predict the firm failure in Malaysia.
ABSTRAK

Kegagalan korporat boleh menyebabkan kerugian kos ekonomi yang tinggi kerana kesannya terhadap pelabur, pemiiutang, juruaudit, penganalisis pasaran, pegawai pinjaman dan juga kepada pihak pengurusan dan kakitangan syarikat-syarikat yang terlibat. Oleh kerana ini, selama ini terdapat banyak kajian mengenai ramalan kegagalan korporat. Model-modelnya termasuk analisis univariat, model indeks risiko, analisis diskriminan multivariat dan model kebarangkalian bersyarat.

Dalam kajian ini, regresi logistik dipilih untuk meramalkan kegagalan korporat. Terdapat 86 syarikat yang tidak sihat dan 86 syarikat yang sihat telah dipilih dalam kajian ini. Pemboleh ubah yang digunakan dalam kajian akan berbeza daripada kajian sebelumnya yang hanya memilih nisbah keangkaran tradisional. Dalam kajian ini, ia juga menilai kegunaan nisbah keangkaran yang baru dipilih untuk meramalkan kegagalan firma di Malaysia.
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5.1 Conclusion

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INTRODUCTION

1.1 Background
The uncertainties of global financial situation had driven many established businesses into bankruptcy. For example, in year 2008 a year after the outbreak of US banking system liquidity crisis, there are about 10,000 companies filed for bankruptcy in US. The failure of any company has potentially widespread negative effects for those who do business with it as well as many other businesses and individuals including suppliers, customers, employees and their financiers.

Normally the failure of the firm is cause by the few factors such as decline profit or loss, excessive debts, insufficient modal, management frauds and also the global economic situation.

The literature on the corporate failure prediction can be tracks back to 1930's. The study begin with the using of the financial ratio analysis to predict the corporate failure. In mid 1960's, Beaver(1967) had published the univariate analysis while Altman(1968) published the first multivariate study. Altman model is known as z-score which had been commonly adopted to predict corporate failure until today. In 1980's Ohlson(1980) using the logit analysis on the financial ratios to predict the corporate failure. All of the models use the traditional financial ratios to make the analysis to predict the corporate failure.
1.2 Problem Statement

Most of those firm failure prediction studies done in the past focus on the specific country. Those failure prediction models were developed based on the data that they obtain from the country or region they are interested. Those models may not suitable to use in predicting Malaysia list firm as the business environment in Malaysia is different from other countries.

Though the number of public companies in Malaysia is much smaller compared to the United States, we are not shielded from big corporate failures as had happened in the past, though some were rescued through direct government or government agencies intervention, with its resulting adverse financial effects.

Bursa Malaysia had introduced Practice No 17 (PN17) to separate out those firms is financially distressed or does not have a core business or has failed to meet minimum capital or equity (Less than 25% of the paid up capital). Those company fail to comply the regulation under PN 4 will be suspended or delisted from Bursa Malaysia.

1.3 Objective

1.3.1 General Objective

This study is to test a firm failure prediction model that is suitable to use in predicting the firm failure in Malaysia. Hopefully, the study will benefit the various interested parties, since the firm failure will affect a lot of the parties includes shareholder, supplier, investor, banker and also management of the firm.
The model can be used by the investor to analysis the conditions of the firm before they do the investment.

1.3.2 Specific Objective.

1. To investigate the relevant finance factor that influence the failure of the Malaysia listed firm.

2. To assess the performance of the model in predicting financial failure of the firm.

1.4 Limitation of the study

This study is using the financial ratio as the independent variable. The limitations of using the financial ratio are:

1. The financial ratio will not show the true picture of the firm because it only reports the financial condition during that particular time and does not shown the full business cycle.

2. Information in the financial statement may be affected by the different accounting policies that employed by different firm which is allowed by the accounting standard.
1.5 Organization of study

This study starts with the introductory chapter. In this chapter, it includes the background of the study, research problem, objective and significance of the study. In chapter 2, the past studies related to the firm failure prediction models will be discussed. The ratio used for the predictor in the study also will be examined.

Chapter 3 elaborates the research design and the methodology used. It includes data collection, variable selection, sample selection and model test method. Chapter 4 will show the result of the analysis and result of the model test. The relationship between the independent variable and dependent variable will be discussed in this chapter. Chapter 5 is the final chapter of this study that concludes the study.
CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, the past research on the firm failure prediction will be reviewed. This includes the history of the firm failure prediction model, method use for prediction, variable use for the prediction model and the history for the firm failure prediction model in Malaysia.

In order to have better understanding of the study, the different methods used for the past study and the variable use in each study will be reviewed. Both the methodologies and the variables used for each study are equally important. The different variables combination used in the same model study will give the different result. By going through the previous study, it will help us to understand the limitation of each model, their significance of each model and also the relationship between the independent variable and dependent variable (firm failure).

According to Jodi (2007), the literature on corporate failure prediction can be dated back to 1930’s. Over the years, there are many corporate failure models had been developed by using different method and different variant. The method had been used included univariate analysis, Risk Index, Multiple Discriminant Analysis (MDA) and Conditional Probability Model. There are around 42 types of the variables being chosen for the analysis. Those variable in used in five or more studies over those year. (Jode el, 2007). All of the variables
used for the analysis can be categorised into four categories, liquidity ratio, profitability ratio, turnover ratio and solvency ratio.

2.2 Univariate Analysis

Univariate analysis is one of the simplest forms of the statistical analysis. This kind of the analysis only carried out single type variable in term of applicable unit analysis. The main quantitative method for univariate analysis is the median, mean or average. It also describes the dispersion of data: the range, maximum and minimums, variance with average and standard deviations, as well as frequency distributions.

The most well known univariate analysis model for the corporate failure prediction is done by Beaver 1966. He chose a number of financial ratios of a paired sample of failing and non-failing companies in order to predict company failure. Beaver classified a company as a failure if any of the three events occurred: bankruptcy, bond default, or an overdrawn account.

The univariate model assumes a business failed when any one of these financial ratios indicates financial difficulty; this is a simplification version as start-ups may have low cash flow and large debt balances but cannot be classified as failures.
The advantage of the univariate analysis is the simplicity. It does not require any statistical knowledge. It only needs to do the comparison of each ratio between two different group firms which is unhealthy firm and healthy firm. However, univariate analysis model is based on assumption that relationship between the independent variable and dependent variable is linear. Some of the study show that many ratios are non linear function with the corporate failure.

The study from Altman(1968) and Zavgren(1983) show that the univariate model will has inconsistency problem. This is because firm classification can only occur for one ratio at a time and giving inconsistent classification result for different type of ratio on the same corporate. There are a few studies show that using single variable to determine the firm failure is very risky.

On the other study done by Cybinski(1998) mentioned that for univaraite model, it is difficult to assess importance of ratios in isolation because most of the variables are highly correlated. In actual, financial status of the corporate is complicated. It is multidimensional concept and cannot be analyzed by one ratio.

The other disadvantage of the univariate analysis is the optimal cut off point of the variable chosen. The variables are chosen by “trial and error” and it will cause the bias during selection. The accuracy of the model will be lowered down when used in predictive context.
2.3 Risk Index Model

In order to have better view of the corporate financial health, Tamari (1966) introduced a risk index model. It uses points system. The corporate will be rated from 0 to 100 according to the selected financial ratios of the firm. Point is allocated accordingly to the weights of the financial ratio. By using the model, the problem of inconsistency from the univariate analysis can be solved.

2.4 Multiple Discriminant Analysis

Multiple Discriminant Analysis (MDA) is a statistical method to handle multiple groups of the variable. It consists of linear combination of variable that will discriminate best between the defined group.

For MDA model, several variables of the model will be combined into one multivariate discriminant score. MDA model also known as continuous scoring system because the discriminant score can be form $-\infty$ to $+\infty$. The linear discriminant function is as follow:

$$D_i = D_0 + D_1X_{i1} + D_2X_{i2} + \ldots + D_nX_{in}$$

Where

$D_i$ = discriminant score for firm (form $-\infty$ to $+\infty$)

$X_{ij}$ = value of the attribute (with j = 1, 2, 3......)

$Dj$ = linear discriminant coefficient (with j = 1, 2, 3......)
Altman (1968) felt that the result for univariate analysis model by Beaver (1966) is confusing and easily misinterpreted. It is because univariate model is isolated and based on a single variable. Besides that, there are too many financial ratios available for analysis and some level of difficulties to do the selection. Every result has a unique implication.

Altman classified the 22 popular financial ratios into 5 standard ratio categories which is named liquidity, profitability, leverage, solvency, and activity ratio. Those five factors were chosen through:

a) Observation of previous statistical significance variable
b) Evaluation of inter-correlation of the variable
c) Accuracy of the various profile

Altman used multivariate discriminant analysis to develop five factors to predict bankruptcy of manufacturing firms. This analysis model is known as Z score. The Z score can be expressed as:

\[ Z = 1.2T_1 + 1.4T_2 + 3.3T_3 + 0.6T_4 + 0.999T_5 \]

Where

\[ T_1 = \frac{\text{Current Asset - Current Liabilities}}{\text{Total Asset}} \]

\[ T_2 = \frac{\text{Retained Earnings}}{\text{Total Asset}} \]

\[ T_3 = \frac{\text{Earnings Before Interest and Taxes}}{\text{Total Asset}} \]
\[ T_4 = \text{Market Value of Equity/Total Asset} \]

\[ T_5 = \text{Sales/Total Asset} \]

In most of the firm failure prediction studies, low discriminate score indicates the poor financial health. For the Z-Score developed by Altman, those companies rated Z-score below 1.81 are classified as bankrupt group while Z-score greater than 2.7 fall into non bankrupt group. The score between 1.81 to 2.7 is categorized as grey zone; it is difficult to determine its status.

MDA model had been extensively used by the researches for the bankruptcy prediction study till 1980s because of the high predictive accuracy (95%) in one year prior to failure.

However, there are a few assumptions need to be made when apply the MDA technique;

a) The variables used for MDA model should be multivariate normally distributed.

b) Group dispersion (variance-covariance) matrices should be equal across all groups.

c) The prior probability of the failure need to be specified.

There are a few studies done by the researcher such as Deakin 1976, Taffler 1977, barnes, 1987 had pointed out the first assumption is violated. Barnes 1982 and Ooghe &verbaeres 1985 mentioned that most of the financial ratio variables use in the study is non-normal
distributions. This may cause bias for the test of significance and the estimation of the error rates.

If the group dispersion matrices are not equal, a quadratic classification rule needs to be used. However, most of the studies avoid using quadratic MDA model because this model is very complicated.

MDA model is extensively used in failure prediction; the model has a few serious disadvantages. MDA for the failure prediction requires linear classification rule, which means that discriminant score above or below a certain cut off point automatically signals a good or poor financial health. However, not all the function ratio shows the linear function with the financial health.

Discriminant scores are only ordinal measures. According to Zavgren, 1985, MDA use for failure prediction is inaccurate assessment of the probabilities associated with particular discriminant score. In MDA model, the standardized coefficient cannot be interpreted and do not indicate relative importance of the different variable. Blum (1974) has pointed out the relative importance of variables by comparing the ranking of variable by relative size of standardised coefficient.
2.5 Conditional Probability Model

Logit analysis has been used to investigate the relationship between binary or ordinal response probability and explanatory variables. The method fits linear logistic regression model for binary or ordinal response data by the method of maximum likelihood.

Binomial or binary logistic model only will have 2 possible results which are 1 or 0. This will limit the dependent variable. It takes the following form:

\[ P = \frac{P(y=1)}{X} = F(X'B) \]

Where

- \( P \) = probability 1 or 0
- \( X' \) = vector of independent variables (where \( X' = X_1, X_2, X_3, \ldots, X_n \))
- \( B' \) = Coefficient corresponding to values \( X \) (where \( B' = B_1, B_2, B_3, \ldots, B_n \))

Ohlson (1980) was the first who use the logit analysis in predicting the firm failure. In Ohlson Opinion, MDA model is not suitable to use as a firm failure predictor due to the following reasons:

a) MDA model for firm failure violated the variable distribution assumption and this will limit its predictive abilities.

b) Output of the MDA is a score and it needed to have clear cut off point to do the prediction.

c) Most of the previous studies using MDA model has chosen the pairing method to do the sampling and it may cause the bias.
Ohlson (1980) using the conditional logit analysis in order to avoid the problem facing by the MDA model. Ohlson study was including a total of 2163 firms with the financial data from 1970 to 1976. From the 2163 firms, 105 were bankrupt firms and 2058 were non-bankrupt firm. Ohlson extracted those firms’ data from the 10-K financial statement in order to have more accurate timing of bankruptcy occur for the firm. Ohlson believed issue of timing is important for his prediction study. This point had been pointed out on the later study done by Dichev (1998). Dichev stated that some of the firms are only delisted long after bankruptcy event occur. In Dichev’s opinion, issue of bankruptcy timing must be handled more carefully. If not, the prediction power of the model will not manifest.

Based on the Ohlson’s study, size of the firm is significant to his study. Logit model was able to predict bankruptcy to 96% and 95% respectably within 1 year and 2 years. However, Begley’s study shown that, the changes of the operating environment affects the model.

The Logit analysis model does not require the distribution for the independent variable to be normally distributed as needed by the MDA model. In logit analysis, it only requires the dependent variable to be dichotomous.
Logit analysis possess a few advantages such as:

a) Logit analysis model had only two outputs which are 0 and 1 which will immediately give the outcome of the prediction of the firm (Failure probability).

b) The study (Ohlson 1980) also shows that coefficient of the Logit analysis model can be interoprated separately as importance of the each independent variable.

c) Logit analysis also allows qualitative variable with categories rather than continuous data

d) Logit function will have the non-linear graph. This will not deteriorate the firm’s financial score because logit function will show the extremely healthy or weak firm in its analysis

There is also studies show the disadvantages of using the logit analysis. The following are the some disadvantages of logit analysis pointed by the study:

a) Logit model is sensitive to the problem of the multi-collinearly. The study of the firm failure prediction is mainly using the financial data which are highly correlated because most of them share the same numerator or denominator.

b) Logit analysis is also sensitive to outliers and missing value.

c) Logit analysis is sensitive with extreme non-normal data set.