

CHAPTER 5

SUMMARY AND CONCLUSIONS

REVIEW OF THE STUDY

The purpose of this study were to specifically develop an empirical model, to predict the possibility of Corporate failure for industrial Companies listed on KLSE; and validate the model to ascertain its predictive accuracy.

Based on the multivariate technique applied in this study, namely the multiple discriminant analysis , the set of variables (financial ratios) significant for inclusion in the model are classified into five standard categories. They are liquidity, profitability, leverage, investment and activity ratios. From the original set of variables, seven variables are selected as doing the best overall job together in the prediction of Corporate failure. In the order of significant contribution to the model, we have (I) Earnings before interest and tax / Total Assets, (II) Current Assets / Current liabilities, (III) Longterm debt / Shareholders fund, (IV) Net income after tax before extraordinary item / Share holders fund, (V) Net income after tax before extraordinary item / Turnover, (VI) Market value of common and preferred stock / Book value of debt, (VII) Sales / Total Assets,

In order to arrive at a final profile of variables, several procedures were utilized, some of which include (I) evaluation of the intercorrelations between the relevant variables; (II) the determination of the relative contributions of each independent variable and (III) judgement of the analyst.

INTERPRETATION OF MAJOR FINDINGS

This study has achieved its objective of;

- (I) developing an empirical model of significance out of a limited set of financial ratios which;
 - (a) are independent enough to enable proper identification of their individual effects in multivariate analysis.
 - (b) account for a significant proportion of the total variance in a relatively complete set of financial ratios and thus provide most of the information that would be required to classify the companies in the study, to two distinct groups.
 - (c) enable new Industrial Companies with unknown group identity, to be classified into one of the two groups, by calculating their Z-score using the model.
- (II) The application of a multivariate statistical technique to assess the analytical quality of ratio analysis, using the possible prediction of corporate failure as an illustrative case.
- (III) Demonstrating the superiority of the multivariate statistical technique (i.e discriminant analysis) approach, to the unsophisticated traditional ratio analysis, in the prediction of corporate failures.

The predictive accuracy of the model for the first second and third years to failure is 82.19%, 81.77% and 80.13% respectively. This is an encouraging result and it shows that the predictive accuracy of the model drops as the years to failure become more remote. It is worth noting here that failure can be accurately predicted up to three years prior to the date. At the first year before failure, predictions of failed companies not to fail (Type I error) are rarer than predictions of nonfailed companies to fail (Type II error). There is a big difference between the Type I and Type II errors in costs of errors. Type I errors cause investors and creditors to suffer actual economic loss resulting from their inability to collect loans, or the changing off of their equity investments, resulting from the depreciation of their market value. However, no actual

change is recognized from Type II errors, other than opportunity costs resulting from the loss of investment opportunities due to too conservative investment decisions.

The accuracy of the model improved to 77.27% in predicting failure five years in advance. This is not what was expected and one possible explanation could be due to lack of sample of Companies that has actually failed, and, also, that the change from year to year has little or no meaning. Relative importance of some of the variables composing the failing Company model could not be assessed definitively. Nevertheless, Earning before interest and tax / Total assets ratio, found to be the best predictor by Altman's (1986) research and Betts and Belhoul (1982 and 1983) research received consistently high rankings in each of the four tests applied in this study.

Multicollinearity was found, but not in as high a degree as expected. Generally the probability of failure is far smaller than the probability of non-failure. Cooley (1975) has demonstrated by using a simulation model that the cutoff point varies depending on whether or not misclassification costs and/or the probability of misclassification are to be taken into consideration. To select the best cutoff point or points, Altman et al. (1977) and Altman (1980) determined misclassification costs based on the results of rather extensive inquiries conducted by them with respect to commercial bank lendings alone. It is however, practically very difficult to determine misclassification costs of this kind. Thus to arrive at the cutoff point in this study, the average of the centroids for the fail and nonfail firms is taken.

For the generalisability of these results, we will not hesitate to propose that the results can be generalised for other Malaysian publicly listed Industrial Companies of different sizes. This is because the study is based on the strength of the relationships between components of published accounts (i.e Financial ratios), which are relatively constant within the same set of generally accepted accounting practice. Also the sample was drawn from companies of varying sizes. However, with about 21% error rate, these probabilities of group membership should be used only as further evidence of probable failure rather than as conclusive proof in themselves.

Furthermore, it must be realized that the model was derived from a rather small population and while the results are encouraging, subsequent observations necessary to extend the external validity of the model was not possible. Thus we would hesitate to propose that these results are applicable to non-Industrial Companies and non listed Industrial Companies or are transferable to other Countries besides Malaysia. There are some similarities in the ratios that appear significant between this study and Altman (1968), Mason and Harris (1978), there are also some noticeable differences. One such is the Current Asset / Current Liabilities ratio which appear significant in this study and that of Mason and Harris (1978), H.Y.Izan (1984) but does not appear in Altman's (1968).

CONTRIBUTIONS OF THE STUDY

Credit managers, bankers, executives and investors will have potentially useful applications of the results from this study. The discriminant model, if used correctly and periodically, has the ability to predict problems of Malaysian publicly listed Industrial Companies, early enough so as to enable managers to realise the gravity of the situation in time to avoid failure. Consequently, the moment to start taking an interest in a company is when it begins to score negatively, on the wrong side of the cutting score.

If failure is unavoidable, the firm's creditors and stockholders may be better off if a merger with a stronger enterprise is negotiated before bankruptcy.

Investors, having access to this model could use it for screening out undesirable investments. Since the model is basically predictive the analyst can utilize the predictions to recommend appropriate investment policy.

The importance of the function of evaluation of business-loan in our society cannot be over emphasised, especially to commercial banks and other lending Institutions. Admittedly , the analysis of the financial statements of the loan applicants is just one section of the entire evaluation process, but it is a very important link. The loan officer might be able to avoid potentially disastrous decisions by getting access to

a fast and efficient device for detecting unfavourable credit risks. The multiple discriminant analysis cannot be used as the only means of credit evaluation since other important variables as the purpose of the loan, its maturity, the security involved, the deposit status of the appilicant, and the particular characteristic of the bank are not explicitly considered in the model. However, the cost of investigation of loan applicants can be lowered by using the discriminant Z score index. Less time and effort would be spent on Companies whose Z score is very high. While those with lower Z score will signal a thorough investigation. The model will be particularly appealing in the case of short- term loans or relatively small loans. This may be situations where the expected income from the loan is not high enough to justify the relatively normal costly credit evaluation process.

RECOMMENDATION FOR FUTURE RESEARCH

This study has focused primarily on Malaysian Industrial Companies. An area of future research therefore would be to examine the applicability across a broad cross-section of firms and industries such as finance, property etc. In other words, to develop a more robust model.

Another area for future research would be to extend the analysis to unincorporate entities for which comprehensive financial data, including market price quotations are not readily obtainable and where the incidence of business failure is normally greater than with larger public listed corporations.

APPENDICES

APPENDIX 2-A

SUMMARY OF PAST STUDIES

STUDY CONDUCTED BY	YEAR	SAMPLE SIZE	NO. OF RATIOS USED	CLASSIFICATION ACCURACY FOR YEARS BEFORE FAILURE, IN %		
				Year 1	Year 2	Year 3
Beaver	1967	158	14	----	----	----
Altman	1968	66	22	95	72	48
Deakin	1972	64	14	97	95.5	95.5
Blum	1974	230	12	93	80	70
Altman, Baidya, and Ribeiro- Dias	1979	46	22	88	84.2	77.8
Takahashi, Kurokawa, and Watse	1979	72	106	-----	----	----
Sandro	1984	50	47	84	76	78
Bernard	1984	867	19	80.2	79.9	75.7
Izan	1984	103	10	94.1	75.0	63.5

APPENDIX 3-A

LIST OF FINANCIAL RATIOS

RATIO	FORMULA
LIQUIDITY RATIOS	
	Current assets
*Current ratio	$\frac{\text{Current assets}}{\text{Current liabilities}}$
	Current asset - inventories
Quick (acid-test) ratio	$\frac{\text{Current asset - inventories}}{\text{Current liabilities}}$
	Net working capital
*Net working capital to total assets	$\frac{\text{Net working capital}}{\text{Total assets}}$
PROFITABILITY RATIOS	
	Net income after taxes
Return on investment	$\frac{\text{Net income after taxes}}{\text{Total assets}}$
	Net income after taxes, before extraordinary items
*Return on stockholders equity	$\frac{\text{Net income after taxes, before extraordinary items}}{\text{Share holder funds}}$
	NIAT-preferred dividends
Earnings per share	$\frac{\text{NIAT-preferred dividends}}{\text{No. common shares outstanding}}$
	Sales - CGS
Gross profit margin	$\frac{\text{Sales - CGS}}{\text{Sales}}$

	Net income before taxes and interest
Operating profit margin	<hr/> Sales
	Net income after taxes, before extraordinanry items
*Net profit margin	<hr/> Turnover
	Retained earnings
*Retained earnings To total assets	<hr/> Total assets

ACTIVITY RATIOS

	Sales
*Total asset turnover	<hr/> Total assets
	Sales
Fixed asset turnover	<hr/> Fixed assets
	Sales
Net working capital turnover	<hr/> Current assets - Current liabilities
	Sales
Inventory turnover	<hr/> Average inventory of finished goods
	Average accounts receivable
Collection period for receivables	<hr/> Annual credit sales/365

LEVERAGE RATIOS

Debt to assets	$\frac{\text{Total debt}}{\text{Total assets}}$
Debt to equity	$\frac{\text{Total debt}}{\text{Total stock holder equity}}$
*Long-term debt to equity	$\frac{\text{Long-term debt}}{\text{Share holder funds}}$
Times-interest earned	$\frac{\text{NI before taxes and interest}}{\text{Interest expenses}}$
Fixed-charge coverage	$\frac{\text{NI before taxes and interest} + \text{lease obligations}}{\text{Interest expenses} + \text{lease expenses}}$

INVESTMENT RATIOS

*Price-earnings ratio	$\frac{\text{Market price per share}}{\text{EPS}}$
Dividend payout	$\frac{\text{Annual dividends per share}}{\text{EPS}}$

*Earnings before interest and tax To total assets	<div>Earnings before interest and tax</div> <hr/> <div>total assets</div>
*Market value of common and preferred stock To book value of debt	<div>Market value of common and preferred stock</div> <hr/> <div>book value of debt</div>
Common stock dividend yield	<div>Annual dividends per share</div> <hr/> <div>Market price per share</div>

* Ratios selected for this study