

THE PREDICTION OF CORPORATE FAILURE*

A. D. CASTAGNA, B.Com., M.B.A., Ph.D., A.A.S.A. (Senior), A.S.I.A. (Prov.)
Department of Finance, The University of New South Wales

Z. P. MATOLCSY, B.A. (Hons.), A.S.I.A.
Lecturer in Department of Financial & Quantitative Studies,
Kuring-Gai College of Advanced Education

* This paper is an abstract of a working paper. The authors wish to acknowledge the support of The Sydney Stock Exchange's Research Department. However, the responsibility for the views expressed in this paper remain with the authors and do not necessarily reflect the official view of The Sydney Stock Exchange.

The ability to predict corporate failure is important from a social viewpoint as it minimises misallocation of resources and the time during which losses are incurred. Accordingly, a model which predicts potential corporate failures as early as possible, would serve to reduce such losses by providing ample warning to interested parties, for preventive measures.

In the past few years a number of studies have been conducted in the United States, with the aim of developing financial models for the prediction of corporate failure. The most notable studies were those of Beaver [3] and Altman [1]. Beaver adopted a paired classification technique to predict a company's failure status on the basis of individual financial ratios. He found that the cash flow to total debt ratio, and the net income to total asset ratio, outperformed the short-term solvency ratios as the most successful predictors of failure. Altman developed a discriminant model, based on five financial ratios which were able to predict 95% of company failures in the year prior to failure. However, Altman found that the predictive ability of his model declined rapidly as the number of years prior to failure increased. More recently studies by Altman [2] and Meyer and Pifer [5] have examined the prediction of failure within industry groups.

The purpose of this paper is to report the results of an inquiry into the prediction of Australian corporate failures. The primary motivation for this inquiry stems from the interest displayed by some members of the financial community on methods of predicting corporate failures. Certainly, the number of recent business failures makes an inquiry of this nature topical. Concern with this problem has even caused some zealous individuals to use models developed¹ in the United States to predict, "who's next to go down on the local scene." Caution is urged against the adoption of this practice as the models developed overseas may only be useful where similar situations apply to those from which the model is generated.

In the following sections, the approach of the

study is briefly explained. Section III summarises the findings and conclusions of the study.

II

The term "failure" can be defined in several ways, depending upon the various applications of the term. For example, a distinction is usually made between failure in an economic sense and failure in a financial sense.² In this paper, failure is defined in the strict legal sense of receivership, or liquidation.

The study examines the 20 quoted industrial companies that failed to survive in the period, 1963 to 1975 inclusive, and which are identified as having at least five years of published accounts, prior to failure. The date of failure was taken to be the date of appointment of the receiver, or liquidator. For every failed company in the sample, there is a surviving company from the same period, randomly selected from the Statex Industrial companies. The failed companies, and the control group consisting of the surviving companies operated in 8 different industries. The industrial composition of the total sample appears in Table 1.

From the standardised financial statements³ of the failed and surviving companies, 13 ratios were computed for each company year. These ratios are listed in Table 2. The ratios compiled encompass financial measures which were found to be significant in previous studies, and some popular measures found in the literature. The measures encompass three overall groupings of financial indicators: (1) profitability and efficiency measures; (2) liquidity measures; and (3) solvency and leverage measures. One would expect on a priori grounds that profitability, liquidity, and solvency measures of the failed companies would show significantly worse results than the surviving companies, and that these differences would increase as the failure date approaches.

The study utilizes a quadratic discriminant analysis technique in order to examine the predictive ability of the selected financial ratios to discriminate between failed and surviving companies. Essentially, the methodology proposed for this study is identical to the one used by the writers in a previous study [4], and will not be repeated in

this paper. Due to the limitations of the sample size, it was not possible to satisfactorily examine the characteristics of failed and surviving companies within each year, and each industry separately. Consequently, the results of the study are based upon data which was 'pooled' across industries and over time.

III

The Results

In general, the results demonstrate that in all five years before failure, the financial ratios of failed companies were significantly different from surviving companies. In addition, the differences in the mean values of these ratios were in the predicted direction in all five years. Failed companies tended to have lower profitability, liquidity, and solvency, and higher levels of indebtedness in comparison to surviving companies. However, the ability of the financial ratios to *predict* failure is less conclusive.

We found, for example, that the percentage of correctly predicted failed companies in the first to fifth year was: 80; 85; 85; 78; and 74 percent, respectively. The predictive power was low in the first year in comparison to the prediction rate found in the overseas studies. However, the predictive power of the selected financial ratios tended to be higher in the second to fifth year than was evidenced in the overseas studies. The main empirical findings can be summarized as follows:—

(1) The ratios which displayed the highest discriminatory power were EBIT/Total Assets (ratio $\emptyset 2$) and Total Debt/Total Assets (ratio $1\emptyset$). In fact, these two ratios accounted for approximately 70 per cent of the total discriminatory power in explaining the differences between the failed and surviving companies.

(2) A subset of 5 ratios namely, ratios: $\emptyset 2$, $\emptyset 5$, $1\emptyset$, 12 and 13 performed as well as the entire 13 ratio set.

(3) The failed companies were on average about one half the size (in terms of market capitalisation) of the surviving companies. In addition, the incidence of failure was higher in the building and construction industry than in any of the other industrial groups.

In conclusion, the operational relevance of this study is to indicate the need to examine the return to total assets (EBIT/Total Assets) and debt structures (Total Debt/Total Assets) in evaluating the potential failure status of companies. In addition, the current Ratio Retained Earnings/Total Assets, and the Market Capitalization/Total Debt are also relevant, but less significant, in evaluating potential failures.

¹ Altman's [1] model has been the favourite.

² Although there is no consensus on the definition of failure in an economic sense, it is usually identified as the situation where a company's revenues do not cover costs. Financial failure generally recognises two aspects, (a) technical insolvency, defined as the situation when a company cannot meet its current obligations as they fall due, even though its total assets may exceed its total liabilities, (b) bankruptcy, defined as the situation when the total liabilities of a company exceed the realizable value of its total assets.

³ In order to minimise data errors, it was important to standardise the method of collection and assembly of data. Since the surviving companies were a sample of Statex Industrial companies, the failed companies financial data were collected and assembled in a similar manner to Statex, prior to the computation of their ratios. This procedure was also followed for the surviving companies on the Statex file for which information prior to 1963 was not available.

BIBLIOGRAPHY

- [1] E.I. Altman, "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy," *The Journal of Finance*, 23, (September 1968), 589-609.
- [2] E.I. Altman, "Predicting Railroad Bankruptcies in America," *The Bell Journal of Economics and Management Science*, 4, (Spring 1973), 184-211.
- [3] W.H. Beaver, "Financial Ratios as Predictors of Failure," *Empirical Research in Accounting: Selected Studies*, 1966, Supplement to Vol. 4, *Journal of Accounting Research*, 71-127.
- [4] A.D. Castagna and Z.P. Matolcsy, "Financial Ratios as Predictors of Acquisitions," *The Journal of the Securities Institute of Australia* 4, (November/December 1976).
- [5] P.A. Meyer and H.W. Pifer, "Prediction of Bank Failures," *The Journal of Finance*, 25, (September 1970), 853-868.

Table 1: Summary of Industry Groups

Industry Code	Failed Companies	Surviving Companies
2	3	—
5	3	5
6	2	2
7	2	—
8	1	3
9	1	4
10	6	2
11	2	4

Table 2: Description of Financial Ratios

Ø1:	Ord. Earnings After Tax/Ord. Shareholders Funds
Ø2:	EBIT/Total Assets
Ø3:	Operating Income/Operating Assets
Ø4:	Liquid Ratio
Ø5:	Current Ratio
Ø6:	Long Term Debt to Equity
Ø7:	Short Term Debt to Equity
Ø8:	Net Tangible Asset Per Share/Share Price
Ø9:	Total Debt/Gross Cash Flow
1Ø:	Total Debt/Total Assets
11:	Working Capital/Total Assets
12:	Retained Earnings/Total Assets
13:	Market Capitalization/Total Debt