Developing A Multi Discriminant Analysis Model As A Tool To Predict Insolvency Of Property Development Firms In Malaysia

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Abstract

Since the last three decades, statistical techniques such as Multiple Discriminant Analysis (MDA) have been used by researchers to predict corporate failures (Altman: 1992) However, to date these techniques have not been tested on property-related financial ratios concerning loans undertaken by property development firms.
Hence, this paper seeks to uncover the possibilities of applying a modified MDA based model to measure the level of probable financial crisis. In this paper, the discussion is focused on the proposed model which is designed to attempt to discriminate between a sample of bankrupt property development firms and a matched sample of healthy property development firms The expected result may be an effective aid to the creditor; in this case the financial institutions, in evaluating each debtors'; in this case property development firms; financial position The aim of this paper is to seek comment on a proposed model from academics and practitioners, particularly those working in this area Therefore, an outline of the proposed model is put forward along with the proposed research design and required data.

Key words. Property development firms, Financial crisis, Insolvency, and Financial ratios

1. INTRODUCTION

A property development firm seeks its interest in property to maximize shareholder value through its activities. The property development firms will aim to fund their activities in order to produce an adequate return from the property after deducting finance costs. The firms are desirable to finance development activities with as much debt as possible or to increase gearing which usually be known as leverage concept.

In Malaysia, in 1996, the Annual Economic Report reported that the real estate and construction sector remains significant at a double digit growth rate for eight consecutive years. Apparently, the performance of this sector is reflected by the increase not only in number but also in value of new and existing real estate transactions, that is, grew by 15.8% and 34.1% in 1995 (and 8.9% and 25.9% in 1994; Bank Negara Report: Monthly Statistical Bulletin September 1996).

The total loan provided in the property sector was RM 53.5 billion, RM 58.4 billion and RM 73.2 billion for the years 1993, 1994 and 1995 respectively. By the end of 1996 the total loan channeled into the property sector increased to RM 95 billion which consumed 41% of the total loan provided by the banking and financial institutions as opposed to 25.3%, 26.9% and 29.2% for the years 1993, 1994, and 1995 (Refer to Table 1 shown below).

Year	Total amount of loan accumulated in the property sector (RM billion)	% of total loan provided by the banking institutions
1993	53.5	25.3
1994	58.4	26.9
1995	73.2	29.2
1996	95.0	41.0

Source: Extracted from Annual Economic Reports and Annual Bank Negara Reports.

Table 1: Total loan accumulated in the property sector between 1993 and 1996

As illustrated in Table 1, the amount of fund that has been channeled into the property sector has expanded enormously that, as reported in September 1996, the increase in loans had outpaced that of deposits. As a result, the banking system experienced a resource gap of RM 3.5 billion in September 1996. The increase in loans was channeled mainly to finance, insurance and business services sector followed by the broad property sector amounting to RM 1.3 billion.

These developments led to the implementation of a new guideline by the Bank Negara Malaysia whereby, effective from 1st April 1997, banking and financial institutions are instructed to limit their total loan provision of not exceeding 20% to the property sector. The action undertaken indicates the awareness of the Government and the Bank Negara Malaysia of the existence of 'undesirable elements of influence' which continued to exert 'contractionary effects' on the financial resources. The 'undesirable elements of influence' has been identified as consisting of greedy speculators and unhealthy property development firms.

Since the total loan provided in the property sector is huge, hence, any default in the repayment may result in a financial crisis impact in the country. Default in payment may result from insolvency of property development firms that undertake the loans. Though the creditors such as the banks and financial institutions have option to take legal actions against those firms, such as foreclosing on collateral, the actions entail much time and expenses. Therefore, the availability of an effective method that enable the creditors to predict the insolvency of property development firms is necessary to help avoid huge loan losses.

2. REVIEW OF RELATED LITERATURE

According to Tappan (1992), generally, the purpose of the investment is to transfer purchasing power through time while increasing real wealth. Hence, investing is a commitment to the future, uncertainty is also implied in property investment. The business of the property development firms can be classified into

two main types: investment and trading. Since trading is a form of short term investment, therefore this study does not differentiate them.

The property development firms recognize profits or losses from two main sources: rentals of the properties and sales of the properties. They may also recognize gains, the increase in value of property. Before undertaking its development, a property development firm will prepare an appraisal to assess the 'residual value' of an intended development site. For this reason, a developer has to know the factors that influence the value of a particular property in the long-term, that is: economic prospects; return on alternative investments, local and national market conditions, quality of the property; location of the property; nature and terms of the lease; and quality of the tenant (or covenant) (Chidgey & Bevan; 1994).

If this value shows a positive outcome, the firm will proceed with the development activities. This involves the risk that the market has changed by the time the development is complete.
The possible illiquidity of property may mean that a property dealing firm cannot sell at the price anticipated when it did its assessment. The firm more likely fails to satisfy its objectives and faces financial distress. Financial distress can be defined as promise to creditors is broken or honored with difficulty (Brealey et al., 1991).

Financial distress faced by a developer may cause a default on the repayment of the loan. Ongoing financial distresses are the earliest stage of poor conditions that may bring the development firms into failure. Failure rarely comes suddenly, it develops steadily passing several stages which development can be clearly discerned (Kharbanda, 1985). Developer's failure which brings both direct and indirect impacts to his creditor, such as 'financial crisis', hence the creditor's interest is the reason for developer's firm failure (Walters, 1991).

Review on related literature revealed that financial crisis has numerous definitions and often conflicting approaches (Wolfson, 1986; Veblen, 1904; Mitchell, 1941; Bordo, 1992). The definitions vary with the specific manifestations of crisis being studied. However, for the purpose of this study, financial crisis is defined as follows:

"A situation in which a significant group of financial institutions have liabilities exceeding the market value of their assets, leading to runs and other portfolio shifts, collapse of some financial firms, and government intervention" (Sundararajan and Balino, 1992).

The term crisis refers to a situation in which a sudden and great reduction of the value of creditor's assets, caused by huge loan defaults, may result in apparent liquidity problems in his financial system. If the creditor's customers realize the problem, they will become panic. Banking panics occur almost simultaneously with financial crises and stock market crashes (Canova, 1994). This situation may worsen when the customers rush to withdraw their deposits and so lead the creditor's firm into a serious insolvency. The term insolvency is used for a company/ firm which fails to pay its debts as they fall due, while the term bankruptcy applies to individuals and not firms (Rees, 1990).

Once a credit has been advanced, the creditor or his account officer has to monitor the borrower's performance to ensure that the credit is and remains properly risk rated and takes action to protect the interest of the creditor if unfavourable trends occur.

Early detection of a problem accompanied by appropriate action usually mitigates the impact to the creditor's institution. However, early detection of problem credits has not proved easy, moreover, an accurate and timely analysis and information is extremely required (Basu, 1995).
Hence, as long as financial institutions grant huge loans to developers, the institutions should prepare to be able to surmount the possible difficulties like the financial crisis. The seriousness of the default problems is a threat that may lead the bank to insolvency if they could not be detected and remedied on time; as exemplified by the liquidation of The Bank of New England in 1991 (Sinkey, 1992).

Hence, the act to limit the possibility of the occurrence of financial crisis can be viewed as an attempt to predict insolvency of the development firms. Insolvency is defined as the occurrence of: (1) negative cash flow from operations, (2) deteriorating financial structures, (3) negative net worth, and (4) inability of the firm to meet its financial obligations and the decreasing market price of the share.

3. DISCRIMINANT ANALYSIS AS BANKRUPTCY PREDICTION MODEL
Discriminant analysis is viewed as the appropriate statistical technique in handling either two groups or multiple groups (multi discriminant analysis) of variables. It involves deriving the linear combination of the two (or more) independent variables that will discriminate best between the a priori defined groups (Hair et al.; 1990).

Among the researchers who had utilized this technique was Altman whose model known as Z-score model that was commenced in 1968 showed significant useful results in predicting bankruptcy of manufacturing firms. From the results of applying the model, Altman realized certain weaknesses in his prediction model, which seemed to be inherent in other similar models as well (Bettinger; 1981). First, the model resulted from the first study had been limited to manufacturing firms, therefore it might not be applicable to other kinds of firms. Second, most of the data used had been taken from Moody's or a similar source with the result being that most of the firms surveyed were large, publicly held firms for which a great deal of statistical information was available. Whereas, the fourth variable of the model, that is the market value of equity/ book value of total debt, has no constant ratio value in practice. This is because market value may easily change, therefore, tend to invalidate universal application of the model.

Nevertheless, these are only minor weaknesses and could probably be overcome. Moreover, Altman continued to develop further his study in predicting bankruptcy and tested it in many other countries such as France (1974), Brazil (1979), Australia (1981), Italy (1994) and others. The firms he had observed are manufacturing firms, textile industry, broker dealers, Savings and Loans Industry and banking industry. In 1977, assisted by Haldeman and Narayanan, he developed a new model based on Zeta analysis, which utilized seven ratios. Some of these ratios were different from the five ratios of the first model. The change in the number and type of ratio on the first model and Zeta analysis model indicate that variable selection plays an important role in obtaining an accurate result.

The model also became an object of criticism by several other researchers, such as Gupta (1983), Kharbanda and Stallworthy (1987) and others. Gupta (1983) considered Altman's multivariate analysis model as less reliable than other model like univariate analysis model that was utilized in 1967 by Beaver who formerly used the same sample data that Altman did. According to Gupta (1983) Beaver's study gave a more consistent results than Altman's in predicting bankruptcy for three to five years prior to bankruptcy.

Likewise, Kharbanda and Stallworthy (1987) criticized Altman's Z-score model. They considered his approach as too complex to be applied in practice. No doubt, however, the univariate model is simpler than

Altman's model, since it only utilized single ratio instead of multi ratios that Altman based on. Furthermore, the bankruptcy problem is complicated and is too complex to be analyzed using a single ratio. In his most recent work with Marco and Varetto (1994), Altman sought to compare corporate distress diagnosis using linear discriminant analysis and neural network and he stated that his model had not been less reliable than neural network model

To date, Altman's model is continuously developed and adjusted to suit current environment as well as the needs of the industry in which the research is conducted.

4. THE PROPOSED STUDY

This study intends to develop a model to predict insolvency level of property development firms by utilizing discriminant analysis technique as Altman's predictive bankruptcy approach. It attempts to adopt and modify accordingly Altman's model so that it is suitable for application to predict possible financial crisis in a property development firm.

5. THE PROPOSED APPROACH

In the study undertaken, in order to predict insolvency of property development firms, a sample of property development firms showing early signs of insolvency is required. However, in Malaysia, financial data of insolvent firms are not easily available. Therefore, a number of property development firms, that involved in loan problem and under close observation of the Bank Negara Malaysia, will be used as insolvent firms.

In addition, firms that do not show the signs of insolvency or in the context of this study is categorized as healthy firms, are also selected. The selection is based upon an approximately paired sample size, whereby for each sample of insolvent firm, a healthy firm of the same size and year of 'insolvency' is then selected.

In the context of this study, property development firm is a company that derives return from both rentals and growth in value based on either the existing state of construction or a provision for the costs to complete construction (Chidgey and Bevan, 1994).

6. THE PROPOSED MDA MODEL

In this study, financial ratios are derived from the financial statements of the sample firms. These ratios cover the key financial performance areas of profitability, activity, liquidity, leverage, efficiency and the uniqueness of real estate implied in cash position. All of the aggregated ratios are processed using principal components analysis. This analysis is utilized to reduce the number of ratios that are interrelated, remove ratio redundancy, and identify the salient dimensions represented by the ratios. The expected result is a set of factors (ratios) that are orthogonal (uncorrelated) to each other.

Multiple discriminant analysis (MDA) will then be performed on the remaining ratio set using a direct approach, whereby all of the ratios are used for computation at the same time. MDA is used as it considers linear combinations of the ratios to generate a combination that best classifies the sample used. The generated combination then forms the prediction model.

For the purpose of this study, the following model which is expected to be able to predict insolvency of property development firms will be used:

$$Z = W_1 X_1 + W_2 X_2 + \ldots\ldots\ldots\ldots + W_n X_n$$

Where :
Z = the discriminant score
$W_1, W_2, \ldots\ldots\ldots, W_n$ = the discriminant weights
$X_1, X_2, \ldots\ldots\ldots, X_n$ = the remaining ratio set that represent the actual condition of the firm

The model has to be validated in terms of its predictive ability. The slight reduction in predictive ability is deemed satisfactory for this study, since it is important to take note that inherent qualitative elements affecting the financial statements of the property development firm will, to a certain extent, affect the accuracy level of the model.

7. BENEFITS AND LIMITATIONS

a] Benefits

The prediction of insolvency of future property development firm is expected to provide a means to benefit the following groups. One, analysts, investors and potential investors - who are trying to form a view on a financial strength and stability of individual companies, often on a comparative basis. Two, lenders - who will normally have separately assessed the value of the property comprising the security for their lending, and who will be using this prediction to form a view on the continued financial viability of the borrower and the continuing adequacy of the security. Three, the taxation authorities - who used to focus on the profit and loss account and the company's accounting policies and may shift to this applicable prediction model.

b] Limitations

The result of this study is limited by a number of constraints. One, it only views property development firms that had fulfilled the requirements of obtaining credit. It does not take into consideration the background of the firms before the credit were granted. Two, the objectivity of the data and information extracted from the financial statements are outside the control of the researcher. Finally, in this study a relative small sample sized is used. This is due to the problem of obtaining and gaining access to financial data which in most cases are confidential. Hence, this explain why the samples used in this study is not limited to one type of property only.

8. CONCLUSION

It is hoped that the model outlined here fulfills the criteria set out for it. In particular, it aims to capture the details of the financial performance as reflected in the financial statements, while linking this to broader determining factors that affect the financial performance of the property development firms, without overformalizing the highly variable circumstances, affecting performance of property development firms. Its use in predicting level of insolvency of such firms is particularly important and useful. The elaboration of MDA as a prediction instrument reflects the complexity of real estate development financing processes in late capitalist economics but it is hoped that the model contains the element needed for an account of the development process which in turn affects the performance of the property development firms under different conditions.

The research required to investigate the financial performance of property development firms, in this way is, however, quite demanding. It involves careful and time-consuming documentary and difficult-to-interpret financial data. It is nevertheless, an essential for the researcher to understand and capable of interpreting financial statements of property development activities.

In particular, such research should enable the development of much richer hypotheses about indicators of financial performance of property development firms. On the other hand, in the practice and policy context many professionals and financial analysts are aware of the general signals that illustrate the financial performance of property development firms. However, their difficulty is to make sense of the variety they encounter and most importantly to assess the performance objectively.

It is expected that the model proposed should help them to identify some of the model significant financial ratios shaping the financial performance of the property development firms in which they are involved. This might help them develop their own strategies to avoid financial crisis as early as possible, more effectively. More generally, the introduction of this model as an effective prediction instrument may lead to better decision making, better policy design as well as, undoubtedly, a useful and effective weapon to prevent financial crisis in the economy.

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