FINANCIAL DISTRESS AMONG SMES IN MALAYSIA: AN EARLY WARNING SIGNAL

BY

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Thesis Submitted to
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
in Partial Fulfillment of the Requirement for the Master of Science (Finance)

Kolej Perniagaan

(College of Business)
Universiti Utara Malaysia

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ABSTRAK

Membuat ramalan tentang kesulitan kewangan di kalangan perusahaan kecil dan sederhana (PKS) boleh memberi impak yang signifikan ke atas ekonomi kerana ia berfungsi sebagai isyarat amaran awal yang efektif. Kajian ini membangunkan model ramalan krisis kewangan dengan menggabungkan pembolehubah kewangan, bukan kewangan dan tadbir urus, dan menganalisis pengaruh ciri-ciri tadbir urus korporat utama, seperti pemilikan dan struktur lembaga, terhadap kemungkinan krisis kewangan. Dua pendekatan yang digunakan ialah analisis diskriminan pelbagai (MDA) dan model logit. Sampel akhir bagi model anggaran adalah daripada 172 syarikat di mana ianya terdiri daripada 50 peratus syarikat yang tidak gagal dan 50 peratus syarikat yang gagal bagi tempoh antara tahun 2000 hingga 2012. Model ramalan menunjukkan prestasi yang agak baik terutamanya bagi model logit dan MDA yang menggabungkan pembolehubah tadbir urus, kewangan dan bukan kewangan, dengan kadar ketepatan keseluruhan sebanyak 93.6 peratus dan 90.7 peratus masing-masing bagi sampel anggaran. Kadar ketepatan dalam sampel *holdout* ialah 91.2 peratus bagi model logit dan MDA. Bukti ini menunjukkan bahawa model bertindak sebagai isyarat amaran awal yang efisien dan boleh digunakan bagi tujuan pemantauan dan penilaian. Pemegang saham yang mengawal, bilangan pengarah dan jantina pengarah urusan merupakan faktor yang signifikan terhadap PKS yang mengalami masalah kewangan.

Kata Kunci: Krisis kewangan, model logit, analisis diskriminan pelbagai, perusahaan kecil dan sederhana

ABSTRACT

Predicting financial distress among SMEs can have a significant impact on the economy as it serves as an effective early warning signal. The study develops distress prediction models combining financial, non-financial and governance, variables and analyse the influence of major corporate governance characteristics, i.e., ownership and board structures, on the likelihood of financial distress. The two extensively documented approaches, MDA and logit methods were used. The final sample for the estimation model consists of 172 companies with 50 percent non-failed cases and 50 percent failed cases for the period between 2000 to 2012. The prediction models perform relatively especially in the logit and MDA model that incorporate governance, financial and non-financial variables, with an overall accuracy rate of 93.6 percent and 90.7 percent respectively in the estimated sample. The accuracy rate in the holdout sample was 91.2 percent for the logit and MDA model. This evidence shows that the models serve as efficient early warning signals and can thus be beneficial for monitoring and evaluation. Controlling shareholder, number of directors and sex of managing director are found to be significant predictors of financially distressed SMEs.

Keywords: Financial distress, Logit model, MDA, SMEs, Malaysia

ACKNOWLEDGEMENT

First and foremost, Alhamdulillah, thanks to Allah S.W.T for ALL the blessings upon me and for providing me the guidance and chance to complete this dissertation to fulfill the requirement of Master of Science Finance at Universiti Utara Malaysia.

I would like to express my sincere gratitude and appreciation to my supervisor Prof. Dr. Nur Adiana Hiau Bt Abdullah for the continuous support of my masters study and dissertation, for her patience, guidance, advices, motivation, enthusiasm, and immense knowledge. Her guidance helped me in all the time of research and writing of this dissertation. I could not have imagined having a better advisor and mentor for my master's study. I would also like to thank Prof. Madya Dr. Rohani Bt Md Rus and Prof. Madyan Dr. Kamarun Nisham Taufil Mohd for their feedbacks. Their commitment and time spent for this dissertation is most appreciated.

I would like to thank my father, Alhaji Kawu Muhammad Ma'aji, and my late mother, Laraba Mikail, for their utmost assistance and prayers, may her soul continue to rest in perfect peace, ameen. My heartfelt thanks goes to my grandmother, Hajiya Hasiya Adamu, may Allah grant her long life, health and prosperity, ameen. And all my family members for their source of inspiration and motivation. To them I dedicated this dissertation.

Finally, to Companies Commission of Malaysia (CCM) for their speedy response in providing the data used in this study and to all my colleagues in the Master of Science (Finance) programme and my lecturers, I wish to thank you all for your support and friendship.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

1.1 Background of Study

The consequences of corporate failure have a far-reaching impact on stakeholders either directly or indirectly. The major stakeholders in a company who are the shareholders stand to lose most of their investment. Creditors may receive partial or no repayment of their initial loans depending on whether their loans were secured or unsecured. The implication of a corporate failure is unfortunately not that simplistic and has serious consequences for many other stakeholders. Some of these consequences include; employees will lose their jobs, the government collects less company and personnel taxes, and social problem might increase. The contributions of Altman (1968); Altman, Edward, Haldeman, & Narayanan (1977); Beaver (1966); Deakin (1977); Blum (1974); and Ohlson (1983) among others have spawned huge literature on the topic of company failure. Since then a number of models have been proposed in order to correctly predict corporate failure but mostly in large public listed firms due to easy access to their financial data. However, very little number of researches on small and medium enterprises (SMEs) has been done as a result of difficulty in accessing their financial data and other information.

In recent years, SMEs are viewed to be the leading contributor to the national economy development in terms of developing entrepreneurship using indigenous skills and technologies, creating employment opportunities, building market competitive through innovativeness and allowing government to realise poverty free society (Jahur and Quadir, 2012). Small business in Malaysia plays a significant role towards economy development in the country therefore understanding why SMEs

businesses fail is vital to the stability and health of the Malaysian economy. Most of the research contributions done in Malaysia regarding corporate failures have been focusing on public listed entities due to easy access of financial data using many bankruptcy prediction models such as univariate analysis, logit regression model, multiple discriminant analysis (MDA), hazard model and probit model (see Abdullah, Halim, Ahmad & MD. Rus, 2008; Halim, Mohd, Rizal & Marzuki 2008; Md-Rus, Nisham, Abdul Latif, & Nadakkavil 2013; Norfian 2013; Sulaiman 2001; Zulkarnian 2006; Zulkarnian, Ali, Md. Nasir, & Mohamad, 2001; and Zulridah 2012). Referring to the aforementioned limitations, the study will explore on the manufacturing sector of Malaysian SMEs in order to predict financial distressed as early as two years using financial, non-financial and corporate governance information and examine the accuracy rate of the model.

1.2 Status and Performance of SMEs across the Globe

The global economic growth has slowdown in 2012, a growth of 2.2 percent down from 2.7 percent in 2011 (EU Annual Report, 2013). Latin America was the only region where economic growth did not lost its momentum as compare to almost all regions. However, many European nations' economy fell into stagnation experiencing a double-dip recession regardless of some initiatives undertaken by the EU authorities in 2012, such as the Outright Monetary Transfers (OMT) among others (EU Annual Report, 2013).

SMEs remain the main economic movers to the recovery process in those regions despite the dull global economic performances. SMEs in EU make up 99.8 percent of non-financial enterprises, rendering about 67 percent of jobs and supplying 58 percent to the region's gross value-added (GVA) (EU Annual Report, 2013).

Additionally SMEs within the Association of Southeast Asian Nations (ASEAN) member states make up 96 percent of all enterprises, with a 50-95 and 30-53 percent contribution to domestic employment and gross domestic product (GDP) respectively (SME Corp Malaysia, 2013).

This outstanding performance and contribution of SMEs have triggered a lot of states and regional initiatives further strengthen the growth of small businesses (EU Annual Report, 2013). In Europe for example, SME development is increased by numerous initiatives premeditated to further innovation, offer improve access to finance and provide business support facilities in the regions (Leung and Rispoli, 2011). Asia-Pacific Economic Cooperation (APEC) also endorsed a four-year Small and Medium Enterprises Working Group (SMEWG) Strategic Plan 2013 – 2016, with the aim of addressing serious issues and concerns related to SME progress and development particularly in (1) financing; (2) building management capability and (3) Market assess, structure and internationalisation (Ortecho and Bengoa, 2014). ASEAN Heads of State in 2012 also vowed to prioritise SME growth within the Economic Community of ASEAN (AEC). All this initiatives that are provided to SMEs throughout the world show the importance of this sector in contributing to the economic growth.

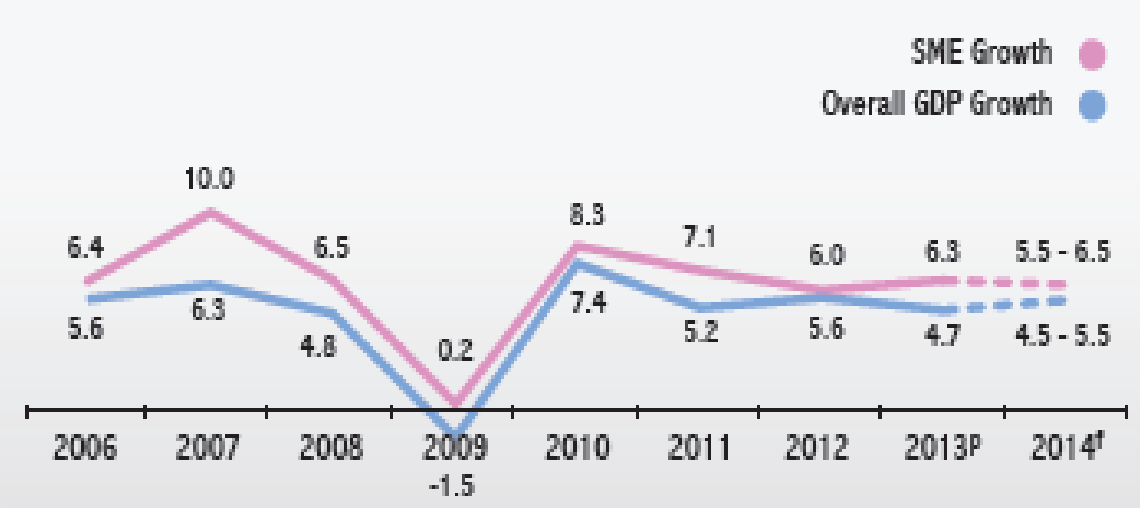
1.3 State of SMEs in Malaysia

By looking at their total numbers, size and nature of operations, SMEs will always be the movers toward economic sustainability and growth of a country's economy and aiming industrial development. In Malaysia, SMEs plays a vital role in supporting endogenous sources of growth and establishing the infrastructure for faster economic expansion and development (Ortecho and Bengoa, 2014). The interdependency of

SMEs and large establishments in collaborating with one another has commanded to the more development of SMEs in Malaysia. Due to the lack of a global standard for defining SMEs, a range of measures is used to define SMEs. Some of these measures include sales turnover, total assets, taking into consideration the number of employees, production capability and total invested capital etc. The categorization of SMEs used in this research follows the definition of the National SME Development Council (NSDC) Malaysia. In general SMEs in Malaysia are defined as follows: Firm in manufacturing sector has sales turnover less than RM50 million or full-time employees less than 200; Firm in services and other sectors has sales turnover less than RM20 million or full-time employees less than 75 (SME Corp Malaysia, 2013).

Statistics from the Department of Statistics Malaysia (DSM) 2013 highlighted that SMEs account for 97.3 percent of total business formations in Malaysia (645,000) and most of the establishments are in manufacturing of textiles, food products, restaurants and accommodation as well as wholesale and retail trade. Since 2004, the contribution of SMEs to the GDP growth has steadily outperformed the growth of the general economy.

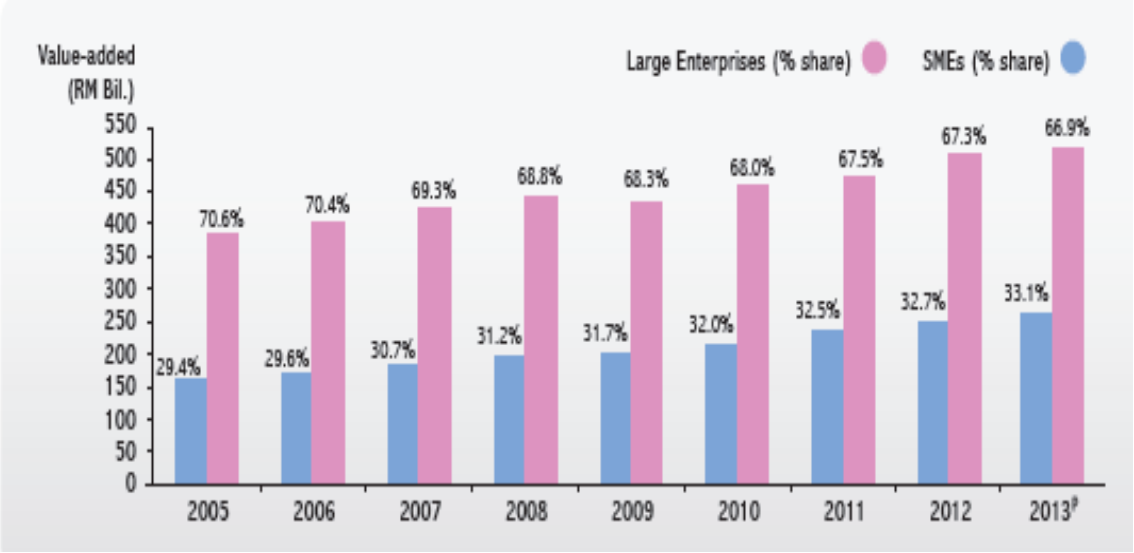
Figure 1.1: SMEs contribution to GDP growth



Source: SME Annual Report, 2013/2014

As presented in figure 1.1, SMEs annual growth rate was 6.3 percent in 2013 while the overall economic growth stood at 4.7percent in 2013 (SME Corp, 2013/2014). As a result of this tremendous achievement in SMEs segment, SMEs share to GDP increased from 29.4 percent in 2005 to 33.7 percent in 2013 (SME Bank, 2013), 59 percent of employment and 19 percent of exports and in 2013. These growths were supported by strong consumption and investment activity in the domestic market (SME Annual Report, 2012/2013).

Figure 1.2: GDP of SMEs and large firms in percentage share to overall GDP



Sources: SME Annual Report, 2013/2014

For the purpose of this research, the focus will be on manufacturing sector of SMEs. In the manufacturing sector, SMEs accounted for 96.6 percent (37,866) of total establishments and around RM191.6 billion of total output of this sector or 34.9 percent was contributed by SMEs (SME Annual Report, 2012/2013). To break down the manufacturing sector of SMEs, food and beverages account for 15.0 percent, metal and non-metallic mineral products 16.7 percent, and textiles and apparels

account for 23.2 percent, whereby all together accounted for 54.9 percent of the total number of business establishments in the sector (SME Annual Report, 2013/2014).

Malaysia is considered to have a complete and structured method to SME development. At the top level, the NSDC brings together the related ministries implementing SME development programmes to decide on the policy direction for SME development for the country. Through its comprehensive and coordinated approach, SME development has progressed over the years, with its share to the GDP increasing from 29 percent to 33.7 percent between 2005 to 2013. One of the key initiatives of the NSDC is the SME Masterplan (2012 - 2020) released in 2012. The government of Malaysia is very much determined to strengthen the position of SME development by setting a stage for a comprehensive approach to provide a supportive and conductive ecosystem through its SME Masterplan to enhance the overall contribution of SMEs to the general economy (NSDC, 2013).

However, despite these achievable successes of SMEs in Malaysia and government support, the failure rate among SMEs in Malaysia have also been increasing year by year at an average rate of 60 percent (Ahmad and Seet, 2009). SMEs in Malaysia still face many domestic and global challenges in order to compete internationally. Among the key constraints faced by SMEs are in terms of access to finance and markets; inability to exploit economies of scale and lack of bargaining power; management ability and skilled workforce; low level of technology and limited access to international markets (Gunto and Haji, 2013).

1.4 Problem Statement

A number of studies have been conducted in the field of corporate failure prediction since the mid sixties (refer Chapter 2 for detail). A variety of models developed from

these studies, each confident in predicting corporate failure with reasonable accuracy. These models, representing financial variables based on audited financial results, using techniques such as multivariate discriminant analysis (MDA), probit analysis, neural networks, logistic regression analysis, genetic algorithms, and decision trees as well as other statistical approach (Lussier, 1995). Each model has its own strengths and weaknesses. Thus, in light of constant changing dynamics or variables affecting company financial results, it is uncertain whether a model based on historical financial variables would only be able to predict corporate failure.

An analysis to determine the corporate failure should include non-financial variables together with financial variables. Although there is no generally accepted listing of non-financial variables for use in forecasting corporate failure, a limited number of studies have been conducted, each identifying a unique set of non-financial variables such as in Lussier (1995) and Keasey and Watson (1987) in the United Kingdom. Since then so many models have been developed using financial and non-financial variables to test and correctly predicts corporate failure among listed and private companies in developed countries but rather scant in an emerging markets such as Malaysia.

Furthermore, there are limited number of researches that consider using corporate governance variables to predict failure among SMEs. Considerable researches have been done incorporating governance variables in the failure prediction models of large or listed firms. The isolation of governance variables in SMEs failure prediction models is because listed companies are traditionally associated with corporate governance as a result of legal separation between ownership and control of the firm. Despite these believe, there is a global concern for instilling corporate governance on SMEs due to the number of high failure of small businesses around

the world (Headd, 2003). Given the context discussed above, this study is implemented to identify factors that could predict corporate failure among Malaysian SMEs in the manufacturing sector by combining the financial, non-financial and corporate governance variables.

1.5 Research Objectives

The general objective of this research is to identify factors that could predict corporate failure among Malaysian SMEs in the manufacturing sector. Specifically, the objectives are as follows:

- To examine financial, non-financial and corporate governance variables in predicting financial distress among SMEs.
- To check on the prediction accuracy rate of the model.

1.6 Research Questions

- What are the financial, non-financial and corporate governance variables that could predict financial distress among SMEs?
- What is the prediction accuracy rate of the model?

1.7 Significance of study

The study will benefit a number of stakeholders using failure prediction model based on the combination of financial, non-financial and corporate governance variables. Having this model may limit the remedial action that could be taken to prevent eventual default because the failure prediction model may enhance the ability to help stakeholders to detect financial distressed companies early and take corrective measure to avoid default or failure. The model could serve as an early warning signal

to management of SMEs as it can predict distress two years prior in order to take proactive measures. Lenders will be able to decide whether to offer new funding or rise their funding to the SME. Furthermore, suppliers can utilise this model in order to understand the going concern of the SME to see whether more credits could be extended or should be stop. NSDC as the highest policy makers of SMEs development can use the model when choosing assistance for the purpose of prevent failure or to endorse further growth.

1.8 Organisation of the Study

The study is organised into five chapters. The first chapter is the introductory chapter that covers the background to the study, reviewing the performances of SMEs in a global perspective as well as Malaysia. The chapter will then continue with the problems statement and the purpose of the study, research questions, significance of the study, and structure of thesis. Chapter 2 outlines the underlying theories and empirical evidence on financially distressed SMEs relating to the development of financial distress models based on financial and non-financial distress models. This chapter is sub-divided into three sections: firstly, underlying theories, secondly empirical evidence on financially distressed SMEs based on financial, non-financial and governance variables distressed models; and thirdly, default prediction methods. Chapter 3 discusses the methodology to be applied to determine SMEs failure from financial, non-financial and governance variables. This chapter describes the data collection procedure used, which is used to determine whether a model utilising a number of governance variables, either alone or in conjunction with a model based on financial and non-financial variables is able to predict company financial distress more accurately than a model based entirely on financial and non-financial variables.

Chapter 4 presents the results of the study. Chapter 5 contains the concluding remarks and proposals for future research.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this study is to examine the factors that could predict SMEs failure using the logit and MDA Model. As such the aim of this chapter is to provide a discussion of theoretical literature of predicting company failure, empirical findings from previous studies about SMEs failure and discussion on the different type of models used to predict firm's failure.

2.2 The underlying theories of financial distressed

There are a number of underlying theories on corporate failure, however the study focus on the trade-off theory and agency theory of corporate failure.

2.2.1 The trade-off theory

The benefit and cost of issuing debt is what the trade-off theory focuses on. It suggest that an optimal target financial debt ratio exists, which maximizes the value of the shareholders likewise the company. When the marginal value of the gain related with debt issues offsets the rise in the present value of the cost of issuing more debt, the optimal level is said to be achieved (Myers, 2001). Tax deductibility of corporate interest payment is one of the major gains of debt. The use of debt is favours by the tax deductibility of corporate interest payments. However, the existence of non-debt tax shields and personal tax can make the theory to be complex (DeAngelo and Masulis, 1980; Miller, 1980).

Reduction of cost in manager-shareholder agency conflict is another benefit in the use of debt. Corporate managers have the encouragement to waste free cash flow on

perquisites and bad investment. However Jensen and Meckling (1977) argue that debt financing restrict the surplus cash flow available to management as a result helps to control agency problem. Financial distress is the cost of issuing more debt which sparked by the agency cost i.e. conflicts between shareholders and debtors (Jensen and Meckling, 1976). Therefore firm's use of excessive debt will cause them inability to meets the interest payment and principal payment which will trigger the likelihood of financial distress.

Rational economic behavior is the basic assumption for decision making process of the capital structure theories. Managers are assumed to display rational human behaviour that will leads to economic shareholder wealth maximization. Several firm-specific features are known as important in estimating the optimal level of capital structure, for example asset structure , firm size, growth opportunities, profitability; though, instead of estimating their optimal target with this difficult and time-consuming procedure, industry average might be used as an optimal level by firms. Ferri and Jones, (1979) and Martin and Scott, (1975) argued that the use of industry average is evident that it is the most significant determinant of corporate financial structure.

However decision making process is no longer rational when managements are carrying on with scarce information, limited reasoning abilities and time limitations (March, 1978). Many small business owners lack understanding of the various financing sources available and the skills in accessing them (Hutchinson, 1999). This form of businesses in some cases do not have a full scope of managerial expertise and frequently lack an entirely competent management team (Ang, 1991) and resulted to insufficient knowledge to make well informed decisions. Thus, entrepreneurs might not choose an optimal level due to lack of financial capabilities.

SMEs can use industry averages as financial targets because they have inadequate understanding on the issue of capital structure (Emery, Finnerty, & Stowe 2004). As an alternative of estimating their optimal debt level or ratio by a trade-off between the costs and benefits of borrowing as predicted by the trade-off theory, SMEs might dimly use the industry average as such resulted in high bankruptcy risk and finally into default.

2.2.2 Agency theory

Corporate governance and existence of agency problem has been traditionally associated with larger companies. The problem arises because of the conflict of interest between principals (shareholders) and agents (directors) which is mainly as a result of separation between ownership and control of the firm (Berle and Means, 1933).

It is influencing to believe that corporate governance would not be associated with SMEs since the agency problems are less in small businesses. In some cases, SMEs are having only the owner who is the sole proprietor and manager (Hart, 1995). Mostly, SMEs be likely to have a fewer separation of ownership and management as compare to larger firms. Consequently, conflict of interest between management and owners is less concern for SMEs. Yet, conflict between equity holders and debt holders will like be a problem for SMEs.

Potential gain from debt is the limit of managerial discretion, as developed by Jensen (1986) free cash flow hypothesis. The surplus fund available for management when there is no positive NPV project available to the firm is called free cash flow. Then, as Jensen (1986, p. 323) states, the issue is how to motivate managers to disgorge cash rather than investing it at below the cost of capital or wasting it on organization

inefficiencies. Most of the time managers tends to spend free cash flows by increasing the size of the firm through investing in negative NPV projects due to availability of free cash flow. Taking on more debt will likely be the solution for this problem because issuing more debt will increase interest and principal payments hence reduce available free cash flows thereby reducing agency costs. Managers will be more committed to pay out future cash flows. And in the process were the firm fails to make interest and principal payments, debt holders have a right to take the firm into a bankruptcy procedure.

Jensen and Meckling (1976) identify risk shifting as another possible problem that can cause agency costs. If management acts in the interest of shareholders (these two parties might be the same people in case of SMEs) and there is a possibility of default, managers may try to take actions to transfer value from the debt holders to shareholders. Debt contract supplies that if an investment gets returns above the face value of the debt, equity holders capture most of the gain. However, if the investment fails, the debt holder stands the effect. Therefore, to alleviate asset substitution problems, debt holders are protected through costly monitoring devices that are included in debt contracts.

The relationship between ownership structure and firm performance leads to the prescription that firms should seek ownership structures that enable corporate management to realize the full potential of corporate assets. Suggesting that a low level of large block holders (to provide direct monitoring), insider ownership (to reduce managerial entrenchment), and to some extend a high level of foreign ownership (better ‘‘outside’’ monitoring) should allow for better corporate governance and sustainable long-term performance for SMEs (Randøya and Goelb, 2003). Most of the existing literature recommends that foreign ownership firms can

enjoy firm-specific benefits that do not exist to wholly domestic owned firms. This will thus create a higher performance which will also decrease the likelihood of failure in the SMEs (Emmanuel and Nickolaos, 2010). According to Emmanuel and Nickolaos (2010) recommend that higher performance due to existence of foreign ownership gives the firm the ability to achieve economic of scales and through superior governance and facilitates stronger monitoring of managers. Furthermore previous research recommend that foreign ownership aids to minimize agency costs (Stulz, 1999) especially in small countries and in small firms (Oxelheim, Stonehill,, Randøy, Vikkula, Dullum, & Mode´n, 1998).

However, the cost associated with foreign investors is the additional reporting requirement in terms of content and frequency to the SMEs. For example, regulations for realisation of expenses and revenues vary somewhat between the financial markets in Europe and U.S. While they aid in comparability and comprehension of statements for foreign institutional owners, this would add additional costs on firms, as they have to come up with diverse versions of these statements (Randøya and Goelb, 2003). Foreign owners may likely be unfamiliar with entrepreneurial opportunities that may arise in a firm's domestic market place. As a result would act more conservatively in financing such activities (Randøya and Goelb, 2003).

2.3 Empirical Evidence of Financial Distress

Fitz (1932) was among the first author to contribute to the bankruptcy prediction literature where he analyzed financial profile of companies with the risk of failure. Afterwards more sophisticated investigation on business failure was done to predict financial failure of companies. Failure is lack of resources for firm to pay its financial obligations which as a result will cause bankruptcy as defined by Beaver (1967). The sample of his research consisted of 79 listed failed firms in period 1954-1964 and each of the failed firm was matched with non-failed firm from the same industry and with similar asset size. The result of his research indicated that the best univariate discriminator between failed and non-failed firms was cash flow to debt.

Altman (1968) uses multivariate technique, multiple discriminate analysis–MDA instead of univariate analysis used by Beaver, in order to develop model for prediction of bankruptcy. Altman sample consisted of 33 listed bankruptcy firms and 33 listed non-bankruptcy firms from the manufacturing sector. The sample of non-bankruptcy firms was matched by industry, size and year. He uses 22 financial ratios; however MDA model identified only five ratios (working capital/assets, retained earnings/assets, EBIT/assets, market value of equity/book value of equity and sales/assets) as significant bankruptcy predictors. The classification accuracy of Altman's model was 95 percent, while model error was 5 percent, when testing was done on estimation sample and with data one year prior to bankruptcy. Classification error of the model has increased to 17 percent with data two years prior to bankruptcy, with classification accuracy of 83 percent. However, Deakin (1972) raised some issues in the method of Altman's 1968 bankruptcy prediction model. Deakin argue that among the basic assumptions of MDA is that observations in each group are randomly selected but Altman matched pair sample approach instead of

random selection. Deakin (1972) used randomly selected 11 failed and 23 non-failed firms and developed a failure prediction model. Classification error of the model was reasonably low up to three years before bankruptcy (3-4.5 percent), but for fourth and fifth year before bankruptcy prediction error has sharply risen (21 percent and 17 percent). In 1980, Ohlson introduced another approach method in prediction of bankruptcy research. He used logit model instead of MDA. Ohlson did not use match pair sample, but he used 105 listed bankruptcy firms and randomly chosen 2,058 listed non-bankruptcy firms. Of the nine ratios included into the analysis only size, net income to total assets, working capital to total assets and total liabilities to total assets appeared to be statistically significant. Ohlson's model classification accuracy was 96.3 percent. Ever since then, there are many studies on listed companies conducted in developed (see Bozec nad Laurin 2008; Parker et al. 2002; and Villalonga and Amit 2006) and Malaysia (Abdullah et al., 2008; Alifiah, 2013; Alifiah et al., 2011; Halim et al., 2008; Kim-Soon et al., 2013; Md-Rus et al., 2013; Sulaiman 2001; Ong et al., 2011; Zulkarnain, 2006; Zulkarnain et al., 2001; and Zulridah et al., 2012).

Edminister (1972) was among the early research on SMEs business failure that also used MDA statistical technique to discriminate among loss and non-loss SME borrowers. His analysis resulted with MDA model with seven financial ratio variables. Classification accuracy of the model was 93 percent, while model error was 7 percent. The research reveals that classifying ratios by quartile is a particularly valuable tool, as demonstrated by the use of quartiles in every variable of the study. This is because extreme values are negated and are therefore prevented from unduly affecting the function parameters (Edminister, 1972).

The model of Altman and Sabato (2007) utilised the used of short-term to equity book value, EBITDA to total assets, EBITDA to interest expenses, cash to total assets and retained earnings to total assets. Data was derived from COMPUSTAT which consist of 120 failed and 1890 non-failed companies and the period cover was between 1994 to 2002. Their empirical result showed that the prediction accuracy could be enhanced by 30 percent if a prediction model specific to SMEs was used on the holdout sample. The logit model used in their analysis performed slightly better in discriminating between failed and non-failed companies than the MDA. As such the result contradicted with the previous studies of Bellovary (2007) which showed that MDA had more predictive accuracy than that of logit model in his review of failure prediction studies. Focusing on SMEs, Altman and Sabato (2007) developed one of the most relevant models specifically made for this size of firm. Their study compares the traditional Z-score model with two new models which consider other financial variables and use traditional logistic regression. On a panel of data of over 2,000 US SMEs in the period 1994-2002, these authors found that the new models outperform the traditional Z-score model, with an accuracy rate of 89.81 percent for model 1 and 77.68 percent for model 2 compare with 68.57 percent of Z-score model.

Luppi, Marzo, & Scorcu, (2007) provide further evidence of failure prediction of SMEs for the Italian market and the estimated probability of default (PD) produced accuracy rate of 85 percent. Their analysis showed that debt was positively related to failure. Firms with greater cash flows were less likely to fail while EBITDA and ROI serve as an important factor in estimating failure among SMEs in Italy similar to larger firms too. However, ROE was found to be insignificant in explaining SMEs failure. Luppi et al. (2007) suggest that this is due to the small portion of equity to

finance SMEs as funds largely come from debt financing provided by banks. Pederzoli and Torricelli (2010) provide further evidence of SMEs in Italy by using logit model using sixteen financial ratios to predict failure. Equity to asset ratio, EBIT to asset, long-term liabilities to asset and sales to asset were found to be negatively significant based on Schwartz Information Criterion (SIC) selection procedure. However the accuracy ratio was 66.84 percent and the performance of the model is poor compare to Luppi et al. (2007). Sirirattanaphonkun and Pattarathammas (2012) uses bank data in order to predict failure as banks required SMEs to submit their financial data as part of a loan agreement. Data were also derived from private and public authority of Thailand such as BOL database. Their study used many financial ratios to predict failure. Variables such as liquidity ratio, profitability ratio and leverage ratios appeared to be statistically significant. The result shows that the Logit model gives higher predictive accuracy at 85.5 percent for out-of-sample test. Furthermore, the pooled estimation of bankruptcy firms from both MDA and Logit models could help achieve even higher predictive accuracy level.

The model of Lussier (1995) utilised qualitative data to predict financial distress among SMEs which was consider among the first model that utilised such data. The model consists of fifteen major variables identified in twenty studies. "The model is non-financial and it uses resource-based theory (RBT) as it helps to better understand the role of resources in new ventures by focusing on the identification and acquisition of resources, that are crucial for the firms' long-term success" (Lichtenstein and Brush, 2001). The model he developed was tested and replicated by other researchers outside the US market such as by Houben, Bakker & Vergauwen (2005), Lussier and Halabi (2010), Lussier and Pfeifer (2001), Teng,

Bhatia, & Anwar, (2011) in Croatia, Netherlands, Chile and Singapore market, respectively. In the research of Lussier (1995), Lussier and Pfeifer (2001) and Teng et al., (2011), they all found that staffing was a significant predictor among the non-financial factor while Lussier (1995) and Lussier and Pfeifer (2001) found that education was also a significant factor among the non-financial factors. Furthermore, managerial expertise is also found to be significant in explaining distress among SMEs (Houben et al., 2005 and Teng et al., 2011). However Keasey and Watson (1987) stress the important and support financial variables in explaining distress among SMEs. They argued that non-financial data could only marginally predict the success and failure of SMEs as such financial data would still need to be considered.

Lugovskaja (2009) uses MDA model in his paper to predict bankruptcy among Russian SMEs. The research sample consisted of 260 bankrupt and 260 randomly chosen healthy SMEs. The author developed two models; model one considering financial variables while model two include both financial and non-financial variables. The first MDA model resulted with finding that the following six variables were significant for bankruptcy prediction: current liabilities/total assets, cash/current liabilities, ROA and cash/ total assets, current assets/current liabilities, and (cash plus short term debtors)/current liabilities. The second MDA model besides financial ratios included non-financial variables (size and age), which both appear to be significant. The classification accuracy for the model with just financial ratios was 76.2 percent, while for holdout sample it was 68.1 percent. Model with financial ratios and non-financial variables had higher classification accuracy (77.9 percent for estimation sample and 79 percent for holdout sample).

Further evidence of SMEs failure prediction was carried out by Behr and Guttler (2007) from the German Market. The sample of their study consists of 40,154 firm-

year observations covering between 1992-2002 by using logit model analysis to develop failure prediction model. The authors used financial and non-financial data to predict failure of SMEs. Among the variables used, external equity financing, equity ratio, growth of equity ratio, return on sales, depreciation ratio, return on sales growth, temporary liquidity problems, size of firms, location of firm head office, business sector and legal form of business were significant predictors of failure. The equity ratio of SMEs in Germany was found by Behr and Guttler (2007) to be relatively low as most of the firms relied on individual financing, friends, family and business associates. The accuracy rate of their model was 85 percent.

The new Basel Capital Accord has assisted the financial sector to recognise SMEs as a client, therefore developing an appropriate risk models is increasingly important. Blanco, Irimia and Oliver (2007) developed a credit risk models precisely for small firms in which non-financial information are included too as predictors of the company credit worthiness. The study used a dataset from Credit Management Research Center of the University of Leeds (UK). It contains 38,570 cases (50 percent non-default cases and 50 percent default cases) of unlisted small firms from UK during the period 1999-2008. The empirical findings showed that qualitative data relating to variables as legal action by creditors to recover unpaid debts, company filing histories and firm specific characteristics make a significant contribution to increasing the default predictive power of risk models built specifically for SMEs.

Altman et al. (2010) explore the effect of the introduction of non-financial information as predictor variables into the models developed by Altman and Sabato (2007). They employed a large sample from the UK which includes 5,749,188 sets of accounts for businesses that survive in the period 2000-2007 and 66,833 companies that fail during those periods. They retain data from 2006/7 as a test sample. The data

analyzed for failed companies are the last set of accounts filed in the year preceding insolvency. Their findings showed that qualitative data relating to such variables as company filing histories, legal action by creditors to recover unpaid debts, comprehensive audit report/opinion data and firm specific characteristics make a significant contribution to increasing the default prediction power of risk models built specifically for SMEs, consistent to the study Blanco et al. (2007).

Abdullah et al. (2014) in their contribution studied 132 privately-owned SMEs in the manufacturing sector in Malaysia during the period 2000-2010. Their empirical result shows that higher gearing and lower profitability entailed higher probability of failure and when firm age is added to the model as non-financial variable, they found it to be significant and increase the model's classification accuracy. Receiver Operating Characteristics (ROC) curve demonstrates that both models possess better predictive ability than a random model, but model two which includes financial and non-financial variables show superior performance. The accuracy rate that the model could correctly predict failures ranges from 75 to 89 percent and the model could be used as a refined tool to avoid possible adverse situations among the SMEs.

All previously mentioned research was done using financial and non-financial variables such as using financial ratios such as liquidity, profitability, leverage and firm size, age of firm, sector, and late filling dates for non-financial variables. From all the previously mentioned researches, there is limited number of researches that considers using corporate governance variables in their models to predict failure of SMEs. Considerable researches have been done incorporating governance variables in the failure prediction models of large or listed firms (see Bozec nad Laurin 2008; Kam, Citron & Muradoglu 2008; Md-Rus et al. 2013; Parker et al. 2002; and Zeitun and Tian 2007).

The isolation of governance variables in SMEs failure prediction models is because traditionally corporate governance has been linked to larger companies primarily due to the separation between ownership and control of the firm. Corporate governance is generally conceived that it would not relate to SMEs because agency problems are less expected to exist (Abor and Biekpe, 2007). For example, SMEs are made up of only the owner who is the sole proprietor and manager (Hart, 1995). Essentially, SMEs lean towards a less distinct separation of ownership and management as compare to that of larger firms. Sometimes it is argued that since SMEs have fewer employees who are often related to the owner and thus no separation of ownership and control, therefore there will be slight need for corporate governance in their operations. In addition, the issue of accountability by SMEs to the public is absent as they do not rely on public funds (Abor and Biekpe, 2007).

According to Amran and Ahmad, (2010), around 72 percent of companies in Malaysia are family-owned businesses a reflection of the circumstances in many emerging economies. Furthermore, about 60 percent of Malaysian companies have ownership concentration and do not have good corporate governance practices (Amran and Ahmad, 2010). Top-down management is mostly the characteristics of family-controlled companies. As a result shareholders in SMEs may not be able to uphold their rights although there are provisions to do so under the common law, section 181 of the Companies Act 1965 and section 181A of the Companies (Amendment) Act 2007 (Rachagan and Satkunasingam, 2009).

As a result of these arguments, there is a global concern for the application of corporate governance to SMEs due to the number of high failure of small businesses around the world (Headd, 2003). It is frequently indicated that similar guiding principle that apply to large companies should also be relevant to SMEs. The

continuing propensity toward improving board roles within publicly listed firms will extend to SMEs by institutional forces (Corbetta and Salvato, 2004). The existing empirical literature on corporate governance of SMEs emphases on a number of factors comprising of board skill level, board size, CEO duality, board composition and control, percentage of shares closely held and family ownership (Abor and Biekpe, 2007). However, in this study family ownership was excluded as this information not available, SMEs in Malaysia are not required to disclose such information.

CHAPTER 3
METHODOLOGY

3.1 Introduction

The early identification of financial distress provides stakeholders with the opportunity to take pro-active corrective action that may assist in preventing the financial failure of a company. This chapter describes the data, population and sample use, theoretical framework and methods apply in the study as well as variables measurement.

3.2 Data Collection and Sample Selection

The two main objective of this study is to examine financial, non-financial and corporate governance variables in predicting failure among SMEs and to check the prediction accuracy rate of the model. As such the Companies Commission of Malaysia (CCM) database (an autonomous body that function as a one-stop centre for corporate information, regulation and development of conducive business environment) was used in this study to identify the sample which consists of both distressed and non-distressed SMEs for a twelve-year observation period from 2000 to 2012. Companies were matched based on the same industry group and close in asset size, i.e. failed companies were matched against healthy companies that have almost similar total asset. Financial statements are used to extract the financial variables and the companies profile was used to obtain the non-financial and corporate governance variables.

As mentioned earlier, the study focused on companies in the manufacturing sector as the sector contributes significantly to the economic development of Malaysia.

Statistics from the Department of Statistics Malaysia (DSM) 2013 highlighted that SMEs account for 97.3 percent of total business formations in Malaysia (645,000) and most of the establishments are in manufacturing of textiles, food products, restaurants and accommodation as well as wholesale and retail trade. Approximately 34.9 percent of the total output of manufacturing sector or RM191.6 billion was contributed by SMEs (SME Annual Report, 2012/2013).

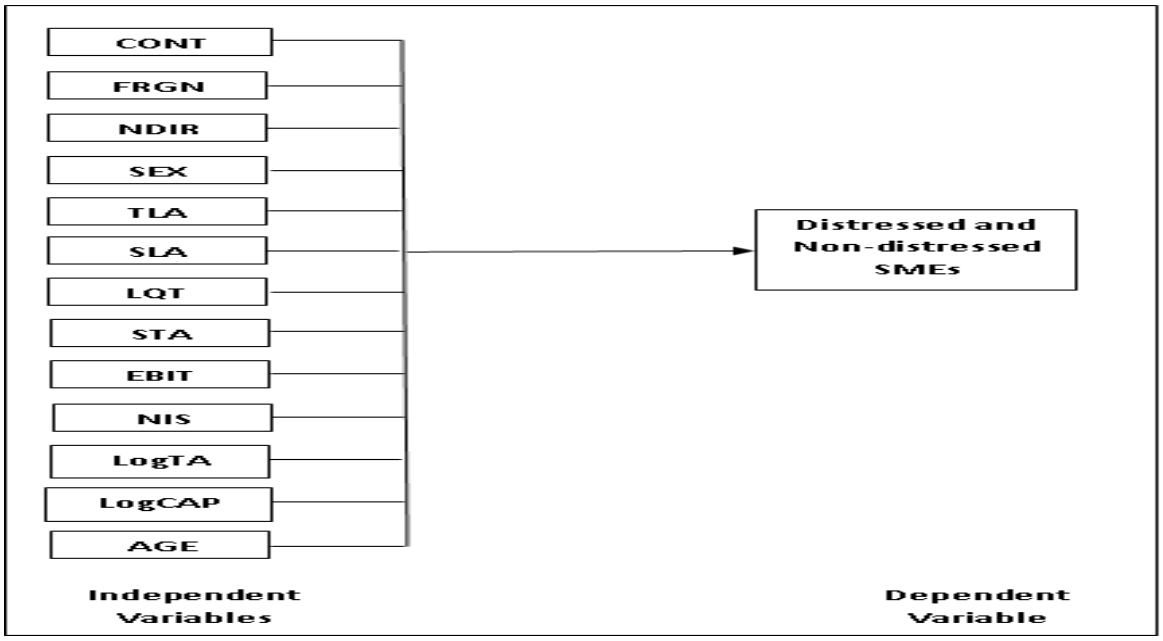
The final sample for the estimation model consists of 172 companies (50 percent non-failed cases and 50 percent failed cases). Twenty percent of the estimated sample were retained as a test sample (hold-out sample). The companies were selected based on the SME's definition adopted by the National SME Development Council as discussed earlier and that company is classified under winding off by court order or creditors request in Part X Section 218 of 1 (e) and (2) of Malaysian Companies Act 1965. Data for two years prior to failures were used in the estimation analysis because most of the failed companies did not submit their financial reports when the winding-up period approached, which led to a very small sample for the year prior to failure.

3.3 Research Framework

There are thirteen independent variables that consist of four corporate governance variables, eight financial variables and one non-financial variable. The dependent variable is the financial distress status of the SME. If the SME is existing and healthy, it coded as 0, otherwise 1 if the company is in financial distress. The thirteen independent variables in this study includes: total liabilities to total assets (TLA), short term liabilities to total assets (SLA), as a measure for "leverage"; current assets to current liabilities (LQT), as a measure for "liquidity"; sales to total asset (STA),

earnings before interest and tax to total asset (EBIT), net income to share capital (NIS), as a measure for "profitability"; AGE as a measure of firm years in business; logarithm of total assets (LogTA) and logarithm of share capital (LogCAP), as a proxy for "size"; controlling shareholder (CONT) and foreign shareholders (FRGN) as measures of ownership structure; number of directors in the board (NDIR) and SEX as measures of board structure.

Figure 3.1: Conceptual research framework



Foreign owner (FRGN), sex of MD (SEX), controlling shareholder (CONT), number of directors (NDIR), age of company (AGE), logarithm of total assets (LogTA), logarithm of share capital (LogCAP), total liabilities to total assets (TLA), short term liabilities to total assets (SLA), liquidity (LQT), sales to total assets (STA), earnings before interest and tax to total assets (EBIT), net income to share capital (NIS).

3.4 Hypotheses Development

The study of the relationship between the financial distress and financial, non-financial and governance factors derives the following hypotheses as follows:

H1: There is a positive relationship between debt ratio and financial distress.

H2: There is a negative relationship between earnings before interst and tax and financial distress.

H3: There is a negative relationship between age and financial distress.

H4: There is a positive relationship between size and financial distress.

H5: There is a negative relationship between number of directors and financial distress.

H6: There is a positive relationship between controlling shareholder and financial distress.

H7: There is a relationship between gender of managing director and financial distress.

H8: There is a relationship between foreign ownership and financial distress.

3.5 Methods

During the last 40 years, many authors have tried to examine possible methods to correctly predict corporate or business failure. The studies of Beaver (1966) and Altman (1968) inspired the development of many statistical methods such as the univariate and multivariate models to predict company failure by using a set of financial ratios. To solve the ambiguity problem linked to the Beaver's univariate analysis, Altman (1968) used a multiple discriminant analysis (MDA) technique to assess a more complete financial profile of firms. He examined 22 financial ratios and 5 categories of financial ratios such as liquidity, profitability, leverage, solvency and activity ratios were selected as they provide a combination of best overall prediction of corporate bankruptcy. Since then, MDA was seen as the prevalent

statistical model applied to predict failure among businesses and was used by many authors (see Altman et al., 1977; Altman et al., 1995; Blum, 1974; Deakin, 1972; Edmister, 1972; Eisenbeis, 1977; Gombola et al., 1987; Lussier, 1995; Micha, 1984; and Taffler and Tisshaw, 1977).

However, authors in subsequent studies pointed out two basic assumptions of MDA are often violated when applied to the failure prediction problems. In MDA model, the standardized coefficients cannot be interpreted like the slopes of a regression equation and hence do not indicate the relative importance of the different variables. Ohlson (1980) was the first to apply the conditional logit model to the failure prediction's study considering MDA's constraints. One of the constraints highlighted by Ohlson is certain statistical requirements imposed on the distributional properties of the predictors. For example, the variance-covariance matrices of the predictors should be the same for both groups. Another constraint is the output of the application of the MDA model which has limited intuitive interpretation. A further constraint identified by Ohlson is related to the matching procedures that have been used in MDA. He argued that the matching base on some criteria like size and industry tend to be somewhat arbitrary, as such there is no benefit or lost by different matching procedures including no matching at all (Ohlson, 1980). After the work of Ohlson (1980), many authors have used logit regression model such as Abdullah et al. (2014); Becchetti and Sierra (2002); Charitou and Trigeorgis (2002); Gentry et al. (1985); Keasey and Watson (1987); Mossman et al. (1998); Ooghe et al. (1995); and Platt and Platt (1990). Therefore the study will use both logit and MDA model to predict failure among SMEs.

3.5.1 Logit Model

A logit model is estimated using the maximum likelihood method. The logit prediction model used in this study is as follows:

$$Z_i = \beta' x_i + u_i \qquad (1)$$

Where:

Z_i = distressed if Zi> 0; non-distressed otherwise.
x_i = explanatory variables.
u_i = error term
Z_i ranges from –α to +α

The probability and likelihood function for the distress can be defined as follows:

$$P_i = E(Y = 1/ x_i) = \frac{1}{1+e^{-(\beta' xi + ui)}} \qquad (2)$$

Logistic distribution function is represented in equation (2). If P_i represents the probability of distress as given in equation (2), therefore (1-P_i) would be the probability of non-distressed.

$$1 - Pi = \frac{1}{1+ e^{Zi}} \qquad (3)$$

The company is classified as distress if the calculated probability from the logit model is more than 0.5, otherwise as non-distressed.

3.5.2 MDA Model

The MDA model function can be written as follows:

$$D = a + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n \qquad (2)$$

Where:

D = discriminant score;
a = estimated constant;
$\beta_1, \beta_2 \ldots \beta_n$ = estimated coefficients;
$X_1, X_2 \ldots X_n$ = explanatory variables.

Thus, each company receives a single composite discriminant score which is then compared to a cut-off value that determines to which group the company belongs to. MDA consists of three steps: (1) estimating the coefficients of variables; (2) calculating the discriminant score of each case; and (3) classifying the cases. In both models a forward stepwise procedure is applied which allowed the predictor variables to be included only based on the contribution they made. A stepwise procedure is usually applied when there is lack of theoretical basis in the selection of the predictor variables (Low, Fauzias, and Zainal Ariffin, 2001).

Models are estimated using data pooled from 2000 to 2012, a period considering a full economic cycle. Twenty percent of the cases were retained in order to undertake holdout sample test for models performance. There are three models developed, these are:

Model 1: Financial and non-financial variables only

Model 2: Governance variables only

Model 3: Financial, non-financial and governance variables

Model 1 utilising only financial and non-financial variables as used by Abdullah et al. (2014) is to act as a benchmark by which to compare the results obtained by model 2 and 3. Model 2 would only include the governance variables whereas model 3 incorporating both financial, non-financial and governance variables is design to test whether the three set of information in conjunctions are able to produce superior result to those obtained from either model 1 or model 2.

3.5.3 Variables Measurement

Unlike most previous studies of which financial distressed prediction models on SMEs are based on financial and non-financial variables, in this study, the prediction model uses three types of variables: governance variables (in relation to ownership and board structure), financial and non-financial variables.

Table 3.1: Definition of variables

Variable	***Type***	***Definition***
CONT	Governance (ownership)	Dummy variable which takes the value of 1 if the firm has one shareholder holding 25 percent or more of the voting right, otherwise 0
FRGN	Governance (ownership)	Dummy variable which takes the value of 1 if the firm is having foreign owners, 0 otherwise.
NDIR	Governance (board structure)	Measure of number of directors in the board structure of the firm
SEX	Governance (board structure)	Dummy variable which takes the value of 1 if the firm's Managing director is male and 0 otherwise.
TLA	Financial	Ratio of total liabilities to total assets.
SLA	Financial	Ratio of short term liabilities to total assets.
LQT	Financial	Ratio of current assets to current liabilities.
STA	Financial	Ratio of sales to total asset.
EBIT	Financial	Ratio of earnings before interest and tax to total asset.
NIS	Financial	Ratio of net income to share capital.
LogTA	Financial	Logarithm of total assets.
LogCAP	Financial	Logarithm of share capital.
AGE	Non- Financial	Years of firm business operations.

The first group contains variables that represent major governance characteristics of ownership and board structures of firms in an economy where concentrated ownership is common. The second group of explanatory variables consists of financial variables that are well documented to have a significant impact on the

likelihood of corporate distress in previous researches. The non-financial variable of age of the firm which is also well documented to have a significant impact on the likelihood of corporate distress in previous researches.

The governance variables can be classified to two ownership structure variables and two board structure variables. The ownership variables include CONT, which is a dummy variable indicating if a firm has a controlling shareholder and FRGN, which is a dummy indicating if a firm has at least a foreign shareholder. The board structure variables include NDIR a variable that counts the number of directors in the board of the firm. SEX which is a dummy variable indicating if firm Managing director (MD) is either male or female.

On the other hand, the financial variables (ratios) include TLA, SLA, as measure for "leverage"; LQT as measure for "liquidity"; STA, EBIT, NIS, as measure for "profitability"; AGE as measure of firm years in business; LogTA and LogCAP, as a proxy for "size". The ratios were selected based on their popularity and their usage in the literature and the predictive success stated in previous researches. According to Scott (1981), he noted that many of the variables that appeared in most empirical work did not rest on any strong underlying theory; as such the use of these ratios in the study could be accepted.

CHAPTER 4
EMPIRICAL RESULTS AND DISCUSSION

4.1 Introduction

In this chapter the results of the data analysis are presented. The data were collected and then processed in response to the problems posed in chapter one of this study. The main objectives of the study are to predict failure among SMEs using financial, non-financial and governance variables and to determine the accuracy rate of the model.

4.2. Descriptive Statistics

Table 4.1 presented the results of mean differences on the variables used to estimate the logit and MDA model. Overall out of the thirteen independent variables, foreign owners, liquidity and logarithm of total asset are not significantly different between distressed and non-distressed SMEs. The result indicated that 92 percent of distressed SMEs are holding 25 percent or more of the voting right whereas only 30 percent of the non-distressed SMEs are holding 25 percent or more of the voting right. On average there are only 29 percent and 23 percent of distressed and non-distressed SMEs are having foreign ownership. It appears that 94 percent of the distressed SMEs are having a male managing director (MD) while there is only 52 percent of the non-distressed SMEs are having a male MD. For non-distressed SMEs, the average board size is four directors while for distressed SMEs, the average board size is only two directors.

Keasey and Watson (1987) highlighted some benefits for SMEs to have a large number of directors in the board among which he argued it will increased efficiency of the board as directors will have better chances for communicating, listening to

each other, and keeping the discussions on track. He also argued that the individual board members will add value to the business and supply any necessary skills in the areas of strategy and/or management and operations' oversight.

Table 4.1 Descriptive Statistics

Panel Pool (2 years prior)					
Variables	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**	**Sig**
	Distressed SMEs (172)		**Non-distressed SMEs (172)**		
FRGN	0.290	0.457	0.230	0.425	0.389
CONT	0.920	0.275	0.30	0.439	0.000***
NDIR	2.26	0.490	3.56	1.523	0.000***
SEX	0.940	0.235	0.520	0.504	0.000***
TLA	1.639665	1.6988932	1.069736	1.7074397	0.000***
SLA	0.932847	0.1297635	0.867709	0.1846139	0.008***
LQT	1.5833955	5.4147794	2.103312	4.1362782	0.481
STA	1.238576	1.3326733	0.946171	0.7062023	0.074*
EBIT	-0.269019	0.5949879	0.023244	0.1410697	0.000***
NIS	-0.795062	1.9086819	0.089221	2.1888388	0.005***
LogTA	15.495015	1.4151391	15.566687	1.4984732	0.747
LogCAP	14.266799	1.4777394	13.715486	1.5857497	0.000***
AGE	14.87	7.162	20.26	5.537	0.000**

*, **, *** significant at 10 percent, 5 percent and 1 percent levels respectively. Foreign owner (FRGN), sex of MD (SEX), controlling shareholder (CONT), number of directors (NDIR), age of company (AGE), logarithm of total assets (LogTA), logarithm of share capital (LogCAP), total liabilities to total assets (TLA), short term liabilities to total assets (SLA), liquidity (LQT), sales to total assets (STA), earnings before interest and tax to total assets (EBIT), net income to share capital (NIS).

Furthermore, in consistence with the previous researches, distressed SMEs are having a high level of debt liabilities and lower liquidity which resulted in negative basic earnings power and net income to share capital. However, both groups are considered to be relying heavily on short term liabilities to finance their day-to-day business operations. Smaller companies often rely heavily on trade finance from suppliers when bank finance is not available to them (Altman et al. 2010). The average age of distressed SMEs is 15 years whereas non-distressed SMEs have been in operations for about 20 years. There is little differences in terms of asset for

distressed and non-distressed SMEs as the companies are match together base on assets.

4.3 Pearson correlation

A Pearson correlation test was employed to investigate the relationship between the independent variables and the results are summarised below in table 4.2. The findings shows that the correlations among the variables are relatively low ranging from 0.007 to 0.427 and majority of the relationships are insignificant. However, FRGN against TLA, SEX against CONT, SEX against EBIT, CONT against NDIR, CONT against AGE, NDIR against AGE, LogTA against LogCAP, TLA against STA, TLA against EBIT and SLA against STA are found to be significant. Multicollinearity is not a threat to this study as indicated by the low pair-wise correlation among the variables. To further verify that multicollinearity is not a problem to this study, a variance inflating factor (VIF) is reported in table 4.3. The R^2 are relatively low for all the variables. The VIF ranges from 1.170 to 1.640 which is less than 10 indicating there is no issue of multicollinearity to this study.

Table 4.3: Variance inflating factor

Variables	**R^2**	**VIF = $1/(1-R^2_j$**
FRGN	0.145550	1.170
SEX	0.316608	1.463
CONT	0.310184	1.449
NDIR	0.259417	1.350
Age	0.216671	1.277
LogTA	0.390370	1.640
logCAP	0.270086	1.370
TLA	0.348245	1.534
STD	0.200863	1.251
LQT	0.155651	1.184
STA	0.243614	1.322
EBIT	0.359935	1.562
NIS	0.198037	1.247

Tables 4.2: Pearson correlation

	FRGN	SEX	CONT	NDIR	AGE	logTA	logCAP	TLA	SLA	LQT	STA	EBIT	NIS
FRGN	1												
SEX	-.089	1											
CONT	-.065	.427***	1										
NDIR	.093	-.215***	-.333***	1									
AGE	-.100	-.230***	-.331***	.256***	1								
lgTA	-.062	.150	.106	.174**	.063	1							
logCAP	.074	.235***	.209***	-.016	-.027	.383***	1						
TLA	.203***	-.038	.065	-.185**	.051	-.396***	-.024	1					
SLA	-.102	.142	.093	-.299***	-.094	-.169**	.135	.149	1				
LQT	.073	.033	.022	.050	-.034	-.041	.063	-.215***	.100	1			
STA	-.179**	.149	.120	-.097	-.075	.090	.085	-.094	.171**	-.152**	1		
EBIT	-.051	-.219***	-.234***	.161**	.007	.161**	-.126	-.268***	-.117	.086	-.335***	1	
NIS	-.040	-.194**	-.111	.151**	-.053	.010	-.165**	-.127	-.036	.112	-.031	.366***	1

*, **, *** significant at 10 percent, 5 percent and 1 percent levels respectively. Foreign owner (FRGN), sex of MD (SEX), controlling shareholder (CONT), number of directors (NDIR), age of company (AGE), logarithm of total assets (LogTA), logarithm of share capital (LogCAP), total liabilities to total assets (TLA), short term liabilities to total assets (SLA), liquidity (LQT), sales to total assets (STA), earnings before interest and tax to total assets (EBIT), net income to share capital (NIS).

4.4 Multiple Discriminant Analysis

Using a sample of matched distressed and non-distressed SMEs as dependent variables together with financial, non-financial and governance factors as independent variables, a stepwise discriminant analysis is use to ascertain the discriminating power of the variables. Stepwise MDA allows the variables selected for analysis to be ranked according to their influence on the final result. The variable with the highest influence that passes the test of eligibility is then included in the examination. At each stage, the variables already selected are also tested against an exclusion criterion and they may be excluded from the analysis if they fail to satisfy the condition. The process continue until there are no variables that can be entered or removed from the analysis (Pattarathammas, 2012).

Based on the stepwise procedure, it appears that model 3 outperformed models 1 and 2 based on Wilks' lambda and classification accuracy. Wilks' lambda indicates the significance of the discriminant function. The smaller the Wilks' lambda for an independent variable, the more likelihood that the variable add to the discriminant function. Wilks' lambda is used in a second context of discriminant analysis, to test the significance of the discriminant function as a whole (Huberty, 1994). Table 4.4 shows that model 3 have 34.6 percent unexplained variation in the group variables while model 1 and model 2 have 63.8 and 40.7 percent respectively. Therefore the discriminate function in model 3 revealed a significant association between groups and all predictors, accounting for 65.4 percent of between group variability as compared to model 1 and model 2 accounting for just 36.2 and 59.3 percent respectively.

Table 4.4: Stepwise MDA analysis for estimated models

Variables	Category	Model 1		Model 2		Model 3	
		Standardized canonical discriminant function coefficient	Wilks' Lambda	Standardized canonical discriminant function coefficient	Wilks' Lambda	Standardized canonical discriminant function coefficient	Wilks' Lambda
FRGN	Governance			0.295	0.407 (0.389)	0.206	0.346 (0.000)***
CONT	Governance			0.739	0.547 (0.000)***	0.638	0.547 (0.000)***
NDIR	Governance			-0.539	0.461 (0.000)***	-0.524	0.461 (0.000)***
SEX	Governance			0.377	0.428 (0.000)***	0.260	0.385 (0.000)***
TLA	Financial	-0.261	0.638 (0.000)***				
STD	Financial						
LQT	Financial						
STA	Financial						
EBIT	Financial	0.484	0.653 (0.000)***			-0.233	0.355 (0.000)***
NIS	Financial						
LogTA	Financial						
LogCAP	Financial	-0.613	0.731 (0.000)***			0.402	0.405 (0.003)***
AGE	Non-financial	0.740	0.848 (0.000)***			-0.255	0.369 (0.000)***
Constant		-8.884		-0.678		-3.122	
Wilks' Lambda		0.638 (0.000)		0.407 (0.000)		0.346 (0.000)	

*, **, *** significant at 10 percent, 5 percent and 1 percent levels respectively. **Model 1**: financial and non-financial variables, **model 2:** governance variables, **model 3:** combined model 1 and 2

A closer analysis of the standardized canonical discriminant function coefficient in model 3 which combined financial, non-financial and governance variables and has the lowest Wilks' lambda revealed three significant predictors that have the highest discriminating power, namely CONT (0.638), NDIR (-0.524) and LogCAP (0.402) with FRGN (0.206), SEX (0.260), EBIT (-0.255) and AGE (0.233) as having less discriminating power but statistically significant. Altman, (1968) also found that EBIT is among the five financial ratios that successfully discriminate between the distressed and non-distressed SMEs. Chancharat, (2011) and Khunthong, (1997) found a similar result with that of Altman (1968). Lugovskaja (2009) in his second MDA model that combined financial and non-financial variables found that, size and age of firm appeared to have high predictive power to discriminate between distressed and non-distressed SMEs in Russia which is consistent with this study. However, model 3 stepwise procedure exclude total debt ratio among the variables that have significant influence to the group, but model 1 reported total debt ratio to have a high discriminating power to predict failure among SMEs. This is consistent with the previous work of Buggakupta, (2004), Kiatkhajornvoung (2008) and Sirirattanaphonkun and Pattarathammas (2012) where they found that total debt ratio is having a high predictive power to discriminate between distressed and non-distressed SMEs. The result of this study shows that if an analysis is done based on financial and non-financial variables, total debt ratio becomes significant. However, when governance variables were included this variable becomes insignificant in discriminating the group.

Table 4.5: Classification accuracy rate under MDA model

	Estimated (172 SMEs)			Holdout (34 SMEs)		
	Distressed	**Non-distressed**	**Overall**	**Distressed**	**Non-distressed**	**Overall**
Model 1	73.3%	83.7%	**78.5%**	64.7%	76.5%	**70.6%**
Model 2	91.9%	83.7%	**87.8%**	94.1%	82.4%	**88.2%**
Model 3	95.3%	86.0%	**90.7%**	100%	82.4%	**91.2%**

To validate the models accuracy, the cross validated classification showed that overall model 3 is having the highest predictive accuracy both in the estimated and holdout samples. Overall 90.7 and 91.2 percent were correctly classified in the estimated and holdout sample respectively. Model 3 outperformed model 1 that is used as a benchmark to compare the results from the other models. The results clearly suggest that the model which incorporates financial, non-financial and governance variables will have a better predictive accuracy. This is in contrast to Lugovskaja (2009) who suggests that a model with financial and non-financial variables had higher classification accuracy both in the estimated and holdout samples.

However, as highlighted earlier in chapter 3, a number of shortcomings of MDA have been pointed out by Ohlson (1980) when applied to failure prediction problems. In MDA, the standardized coefficients cannot be interpreted like the slopes of a regression equation. Ohlson also notes that the requirement that the predictor variables be normally distributed clearly is not fulfilled by the use of governance data (mostly dummy variables). One of the assumptions underlying the efficient use of discriminant analysis is that the variables are multivariate normal in their distribution and clearly this condition is not fulfilled by the non-financial and governance data.

4.5 Logit Analysis

In view of the shortcomings of the MDA model, a stepwise logistic regression was run and presented in table 4.6. Model 3 combined both financial, non-financial and governance variables and appear to performed better compare to model 1 (as benchmark) and model 2 based on Hosmer and Lemeshow (HL) test and classification accuracy of the model. There are seven variables found to be significant which are CONT, NDIR, SEX, TLA, EBIT, LogCAP and AGE with a respective likelihood ratio (LR) of 28.36, 23.26, 12.07, 3.66, 14.23, 8.6 and 14.96 indicating a rejection of the null hypothesis. The LR tests the null hypothesis that the coefficients of independent variables are zero in the model. It is considered more accurate in estimating the statistical significance of an independent variable to the explanation of dependent variable (Menard 1995 cited Abdullah, 2014). When it comes to model 2, all governance variables are found to be significant in predicting failure of SMEs.

Total debt ratio is positively related to failure as found in model 3 in logit analysis. The findings appears to be consistent with that of Abdullah, Halim, MD. Rus, & Zainuldin (2014) where they found debt ratio is significant to predict financially distressed SMEs at all prior periods of the study. Altman (1968), Beaver (1970), Blanco, Irimia and Oliver (2007), Shane (1996), all reported that debt ratio had a significant predictive ability. Shane (1996) further illustrated that younger companies tend to take more debt as the owners have limited resources which could lead the company to having huge amount of debt outstanding as a result push the company to financially distressed situation if owners unable to settle their obligations. Altman, Sabato and Wilson (2010) also suggest that the high level of debt in SMEs both in terms of trade debt supplied to customer and trade credit

obtained from suppliers is because small companies may try to boost sales by offering credit to beat their competitors, without the financial resources to sustain the strategy. As a result this may lead to financial distressed of SMEs as they may be unable to settle their debt to the supplier due to late payments from large customers taking extended credit. The finding is also in line with the trade-off theory. The higher the company's debt level, the more likely the company faces default due to high interest obligations. Besides, the less profitable the SME, the high propensity to failure vice versa as EBIT is negative and significant to failure among SMEs both in logit and MDA model 3. Distressed SMEs are less profitable as compare to the non-distressed SMEs and the findings is in consistent with previous work of Abdullah et al. (2014).

Under logit and MDA estimation, model 3 shows that AGE of company is negatively related to failure and is significant in predicting failure among SMEs. The longer the company survives then the less likelihood that it is to fail. Finding is in line with previous studies like that of Abdullah et al. (2014), Altman et al. (2010), Blanco et al. (2007) and Shane (1996) among others all in support of the argument. The longer the company exist, the more chance of it to survive. The results from the models suggest that controlling shareholders has a positive significant impact on predicting failure among SMEs in Malaysia. This indicates that the greater the holding of controlling shareholder, the higher is the likelihood of failure among SMEs. NDIR variable is negatively related to failure and is significant in predicting distressed SMEs. Thus, it can be stated that the larger board can decrease the probability of SMEs failure due to increase oversight and expertise. The finding is also consistent with that of Keasey and Watson (1987) who tested the Argenti's SMEs found that the number of directors on the SME's board is negatively related to failure.

Table 4.6: Stepwise logistic regression analysis for estimated models

Variables	Category	Model 1		Model 2		Model 3	
		Coefficient	Change in -2 Log Likelihood	Coefficient	Change in -2 Log Likelihood	Coefficient	Change in -2 Log Likelihood
FRGN	Governance			1.904	7.590 (0.006)***		
CONT	Governance			3.541	49.220 (0.000)***	4.053	28.363 (0.000)***
NDIR	Governance			-1.655	37.595 (0.000)***	-1.662	23.263 (0.000)***
SEX	Governance			2.750	18.405 (0.000)***	3.334	12.066 (0.01)***
TLA	Financial					0.138	3.656 (0.056)*
STD	Financial						
LQT	Financial						
STA	Financial						
EBIT	Financial	-9.937	44.694 (0.000)***			-9.747	14.233 (0.000)***
NIS	Financial						
LogTA	Financial						
LogCAP	Financial	0.508	14.833 (0.000)***			0.734	8.600 (0.000)***
AGE	Non-financial	-.230	40.821 (0.000)***			-0.279	14.964 (0.000)***
Constant		-8.884		-.473		-2.202	
Hosmer and Lemeshow test		14.270 (0.075)		6.167 (0.405)		9.450 (0.306)	

*, **, *** significant at 10 percent, 5 percent and 1 percent levels respectively. **Model 1**: financial and non-financial variables, **model 2:** governance variables, **model 3:** combined model 1 and 2

Sex of MD is positively related and significant to corporate failure both in MDA and logit. The results show that men MD are more likely predicted to cause failure among SMEs than the female counterpart. Foreign ownership is considered to be relatively low for both distressed and non-distressed SMEs as the descriptive statistics shows and insignificance in model 3 indicate that this variable could not predict failure among SMEs. However, if the model only focused on governance variables, FRGN is found to be significant to predict failure.

The Hosmer and Lemeshow test for logistic regression is widely used to answer the question on how well does the model fit the data. A higher p-value shows that the model fit the data. Overall all models from the logit analysis fit the data because the observed and expected event rates in sub-groups are similar which indicates that the models are consistent with the data. The p-value of 0.075, 0.405 and 0.306 for model 1, model 2 and model 3 respectively implies the models passes the test.

Table 4.7: Classification accuracy under Logistic regression model

	Estimated (172 SMEs)			**Holdout (34 SMEs)**		
	Distressed	**Non-distressed**	**Overall**	**Distressed**	**Non-distressed**	**Overall**
Model 1	80.2%	88.4%	**84.3%**	88.2%	82.4%	**85.3%**
Model 2	87.2%	89.5%	**88.4%**	94.1%	82.4%	**88.2%**
Model 3	93.0%	94.2%	**93.6%**	94.1%	88.2%	**91.2%**

Table 4.7 provides a summary of the accuracy rate of the models for the estimated and holdout sample. Model 1 can correctly predict 80.2 percent and 88.4 percent of the distressed and non-distressed SMEs respectively in the estimated sample with the overall accuracy of 84.3 percent and the holdout sample is having an overall accuracy of 85.3 percent. The result of the estimated sample is close to the accuracy rate reported by Abdullah et al. (2014), Altman and Sabato (2007), Behr and Guttler

(2007) and Luppi et al. (2007) with 81.2 percent, 87.2 percent, 85 percent and 85 percent respectively. Abdullah et al. (2014) also report an overall holdout sample accuracy rate of 87.5 percent for 2 year prior model which is closed to model 1. Model 2 indicates that governance variables are also strong predictors of failure among SMEs. Running only the governance variables, the model can correctly predict 87.2 percent and 89.5 percent of the distressed and non-distressed SMEs respectively in the estimated sample with the overall accuracy of 88.4 percent. The holdout sample is having an overall accuracy of 88.2 percent.

Furthermore, when all categories of variables (financial, non-financial and governance) are included in model 3, it significantly improves the classification performance of the model both for estimated sample and the holdout sample. Model 3 has an overall predictive accuracy rate of 93.6 percent and 91.2 percent for the respective estimated and holdout samples. Keasey and Watson (1987) also suggested that by adding non-financial or governance variables, the model outperform the model with only financial variables.

CHAPTER 5
CONCLUSION

5.1 Introduction

In this chapter, a summary of the findings is forwarded. It is then followed by implications of the study. A discussion on the limitations and recommendation for future research conclude the chapter.

5.2 Summary of findings

The study builds on the previous work of Abdullah et al. (2014) that utilised financial and non-financial variables in predicting failure among SMEs in Malaysian manufacturing sector. In this study, governance variables are included to see whether or not by having financial, non-financial and governance variables, it is possible to achieve higher prediction accuracy rate of SMEs failure.

The study improves upon the existing models from the literature of SME distressed prediction in various ways among others are; the study presented new empirical findings on predicting financially distressed SMEs in the manufacturing sector for the period between 2000 to 2012. It also explores the value added of governance variables to the prediction model and where the prediction accuracy improve significantly to 93.6 percent and 90.7 percent using the logit and MDA model respectively against 81.2 percent of the logit model in Abdullah et al. (2014) which utilised only financial and non-financial information. Generally the governance variables examined in this study were chosen to capture some important SME's characteristics.

The findings clearly confirm for what has been found in other studies for large corporations, that using governance variables as predictors of company failure significantly improves the prediction model's accuracy rate (Lackshan and Wijekoon, 2012; Md-Rus et al. 2013; Polsiri and Kingkan, 2009). The results in MDA and logit analysis showed that most of the distressed SMEs are having a large number of controlling shareholders. Non-distressed SMEs are having more directors in their board which may help to increase oversight, monitoring and expertise in the company's operations however distressed SMEs are having less number of directors which increase the likelihood of failure among SMEs both in MDA and logit analysis. Male managing director is also positively related to failure. However, foreign ownership appears to be unrelated with the failure status. Young SMEs seems to be more likely to fail as compare to longer existence SMEs due to experience and growth development. In addition, debt ratio is positively related to failure among SMEs. The findings affirm that small business in Malaysia finance most of their business operation using bank loan as they have limited access to capital market. The result also shows that EBIT is negatively related to failure and distressed SMEs are less profitable compare to non-distressed SMEs as a result of huge amount of liabilities that trim their profit.

5.3 Implications of the study

Considering the limitation of almost a large part of SMEs information, the result of this study will help SMEs in detecting financial distress as early as two years before they fail. The findings will serve as an early warning signal for management to take proactive measures to overcome the threats. Financial institutions such as banks will benefit from this study as it will help them in setting their internal systems and procedures to manage credit risk for SMEs. The model will also be beneficial to

regulatory bodies like National SME Development Council who are the highest policy-making body to formulate strategies for SME development. The findings from the study will assist them in monitoring and evaluating SMEs and even stress the importance of governance practices among SMEs in Malaysia.

5.4 Limitations of the study

As the first study that utilises governance variables in predicting failure among SMEs in Malaysia, a number of limitations have been encountered. SMEs are not required to publish their accounts. Therefore the data collected is rather limited to those appeared in the CCM database which in this case did not cover a number of governance variables tend to be significant in previous studies. In addition, a lot of companies have to be dropped from the estimated sample due to missing data which limit the sample to 172 SMEs. Furthermore, in MDA, the standardized coefficients cannot be interpreted like the slopes of a regression equation. Ohlson (1980) also notes that the requirement that the predictor variables be normally distributed clearly is not fulfilled by the use of governance data (mostly dummy variables). One of the assumptions underlying the efficient use of discriminant analysis is that the variables are multivariate normal in their distribution and clearly this condition is not fulfilled by the non-financial and governance data.

5.5 Recommendations for future research

Looking at the limited number of research incorporating governance variables among SMEs in predicting financial distressed, more investigation can be carried out of SMEs in other sectors of the Malaysian economy to check whether the model of this study could be applied in other sectors. Furthermore, a comparative study can be

carried out among SMEs in different countries to identify country specific variables that contribute to financial distressed of SMEs.

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