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Corporate Governance and Corporate Failure: A Survival Analysis

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ABSTRACT

Past studies show that weak corporate governance tends to reduce corporate value by employing a variety of prediction methodologies and models including multivariate discriminant analysis, probit and logit analysis and artificial neural networks, whether it will lead to a higher survival probability of a distressed company remains an open question. Within this framework, we aim to estimate the probability of corporate survival to a specified time from 2005 to mid-2011 for 56 financially distressed firms using survival analysis technique. We will use the Cox proportional hazard form to assess the usefulness of corporate governance and financial variables as predictors of the probability of company endurance to a given time. Results show that the delisting of PN17 companies has a significant negative relationship with managerial ownership and positive relationship with size of the company. Results imply that in Malaysia delisted companies are bigger and have lesser managerial ownership than those remain as PN17. In other word, higher managerial ownership helps reduce the risk of failing while larger companies contribute to higher risk of failing. However, this study is unable to obtain evidence on the relationships between other corporate governance and financial variables with the survival likelihood of financially distressed companies.

Keywords: Financial distress, Survival analysis, Cox Proportional Hazards Model, Corporate governance, Malaysia.

INTRODUCTION

Early warning of financial distress is essential to control corporate credit risk. Failure to do so may lead to bankruptcy, liquidation or significant changes in control. Consequently it may result in losses to stockholders, creditors and employees. Traditional distress prediction models employ financial ratios, corporate governance variables and market prices to predict distresses prior to its happening. Corporate governance has long been recognized as one of key factors associated with financial distress (Johnson et al. 2000), e.g. ownership concentration and poor corporate governance (Rajan and Zingales, 1998). Corporate governance has become one of the tools and over 78 percent of corporations and institutional investors are willing to pay a premium for a well-organized company (McKinsey 2002).

In Malaysia, financial distress is often associated with the PN17 status of companies. In pursuant to Paragraph 8.14C(2) of the Bursa Malaysia Listing Requirements, companies that do not meet any or all of the conditions specified under the provision of Practice Note No. 17/2005 of the Listing Requirements are classified as PN17 and these companies considered to have financial problems. These financially distressed companies fall within the definition of PN17 mainly because of failing to meet minimum capital or equity requirement (i.e., not less than 25% of the paid up capital). The success of implementing the PN17 provision largely depends on the ability of board of directors to carry out its responsibilities in recovering the company financial difficulties. Past studies provide supports for significant positive relationships between effectiveness of board of directors and company performance (Coles et al., 2001; Mohd-Mohid et al., 2004). An unsatisfactory performance of company is the result of ineffective board of directors (Ho and Williams, 2003).

The failure or bankruptcy of financially distressed companies often results in significant direct and indirect costs to many stakeholders; including shareholders, managers, employees, lenders and clients. Significant cost reductions through failure prevention may arise if financially distressed companies are identified well before failure and estimates then made of their survival probability for a given time frame. Usually, financially distressed firms do not go bankrupt immediately. Only a small number of them go bankrupt afterward and the rest distressed firms survive. This possibility indicates the need to understand the symptoms of financial distress and the dynamics of corporate failure and use

failure prediction models that will estimate survival probabilities to a given time based on a set of variables symptomatic of corporate financial distress. Prior studies evaluate the effectiveness of board of directors by comparing the boards of directors between poor performance companies and strong performance companies in terms of their characteristics (e.g., Mitton 2002). Results indicate that the company achievement relates to the characteristics of board of directors. However, most previous studies use a cross-sectional design covering a period of one year. The design may not properly measure the board ability to overcome the company financial difficulties. The use of a longer period is more appropriate in evaluating the board ability to secure companies from financial difficulties or to help enhance their performance (Mueller and Barker III 1997). In this study, the effectiveness of board of directors is evaluated using a pooled data approach based on of its ability to save companies financial difficulties from being delisted from the listing on Bursa Malaysia Securities Bhd. (hereinafter referred to as Bursa Malaysia).

The prediction of corporate financial distress employs a variety of prediction methodologies and models including multivariate discriminant analysis, probit and logit analysis and artificial neural networks. While often effective in predicting ultimate corporate failure, these approaches provide little analysis or insight into the dynamics of corporate failure. As static predictors they assume a steady state progression of financial distress, and omit 'time to failure' as an integral factor in corporate distress analysis. Accordingly, the objectives of this article are in two folds. The first objective is to estimate the probability of corporate survival to a specified time for financially distressed firms (e.g. four year survival probability) using survival analysis technique. The second objective is to determine the effectiveness of corporate governance and financial variables as symptoms for identifying and predicting the probability of distress company endurance. Past studies show that weak corporate governance tends to reduce corporate value, whether it will lead to a higher survival probability of a distressed company remains an open question.

There are several contributions of this study. Unlike past studies, this study adopts the pooled data approach for a period of 5.5 years (2005 to Mid-2011) in strengthening results of the statistical analyses. Hence, the model is dynamic in that it takes into account the entire time period preceding the event (delisted). Most studies on financially distressed companies whether using survival analysis or other related methodologies include both distressed and healthy companies in their studies whereas we only study distressed firms. Previous studies on distress predictions and survival analysis attempted to study the effects of either the corporate governance variables or financial variables whereas our study incorporates both financial and corporate governance variables as determinants of distress prediction.

The ensuing sections of this paper are as follows. Section 2 reviews the literature regarding variables and methodologies used in company distress prediction. Section 3 describes the data source, methodology and variables set. Section 4 analyzes the empirical results and section 5 concludes the study.

LITERATURE ON FINANCIALLY DISTRESSED COMPANIES AND PREDICTIVE METHODOLOGIES

The board of directors plays a key role in the company corporate governance. The board would conscientiously develop the monitoring and controlling mechanisms to ensure the effectiveness of the company decision making process and financial management (Mohd-Mohid et al. 2004). The failure of big companies to continue their business is often associated with weak controlling and monitoring mechanism over the strategic decision making process of the board of directors (Mohd-Mohid et al. 2004). Previous studies identify characteristics of board of directors including leadership structure, financial literacy, multiple directorships, activeness, and equity ownership that relate to the company performance. However, the studies do not examine how these characteristics relate to the improvement of the financial distress by using the longitudinal data approach.

There are two types of leadership structures often referred in literature, either as a joint leadership or a separate leadership structure. Although there are two opposing views on the optimal leadership structure of a company, a number agrees that the management of a company is more effective if positions of CEO and chairman are held by separate individuals (Fama and Jensen 1983). Previous studies show that companies would assign separate individuals to hold the positions of CEO and chairman in order for them to perform their functions effectively. Controls of the top management actions by two separate individuals would be better and more effective because it helps overall monitoring and reduction in agency costs (Pi and Timme 1993). However, Donaldson and Davis (1991) and Brickley et al. (1997) give contradicting arguments against separate leadership. They argue

a joint leadership structure results in a more clear and transparent communication between the management and board of directors.

Financial literacy of board of directors has been identified as one of the most significant factors that increase the credibility of company financial performance from the perspectives of the customers, banks, and government bodies (Nik Hasyudeen 2003). A financially literate board of directors is able to give guidance to the company in obtaining sources of capital effectively to help overcome financial problems (Lee et al. 1999). Another corporate governance variable which has been considered to have an impact on company performance is multiple directorships. Multiple directorships refer to the number of directorship appointments in different companies held by members of the board. Previous studies on the effect of multiple directorships on the company performance produce mixed results. One school of thought believes that board members need to be focused in order to monitor the company more effectively (Core and Larcker 1998). Others believe that the number of director position held by an individual reflects his or her competency and capability to provide an effective role of directors (Mace, 1986). A board member who holds a number of director positions would benefit from his or her broad experience and exposures, hence, is more capable in carrying out the duties effectively (Mohd-Mohid et al. 2004).

Another relevant corporate governance variable is the activeness of board of directors which is reflected in the number of board meetings in a year. Boards of directors that meet actively are expected to be able to design strategic action plans for the company and to suggest improvements for current unsatisfactory operating performance in order to achieve better future achievements (Vafeas 1999). Another characteristic of effective board of directors is equity ownership of board members. Managerial ownership reduces agency costs resulting from a reduction in the gap between owners and the management (Jensen and Meckling 1976). Members of board of directors who own shares in the company establish a controlling mechanism for the company to achieve a better financial and market performance (Coles et al. 2001). When a director is also the owner of the company, he or she has a better access to information and a direct influence on decisions to affect his/her own wealth which ensures an increase in the company overall economic value.

Lau (1987) was the first one to introduce a model that has five financial states to approximate the continuum of corporate financial health. He used the multivariate logit analysis to estimate the probability of a firm entering in each of the five ranked states. Johnsen and Melicher (1994) built upon the former of the multinomial logit models for predicting and explaining corporate bankruptcy. They identified three states for their research: State 0 (zero), non-bankrupt; State 1 (one), financially weak; and State 2 (two), bankrupt and used the multinomial logistic models to evaluate the value of information on the prediction of bankruptcy. Theodossiou et al. (1996) analyzed factors that influence the decision to acquire a financially-distress firm in USA using qualitative criteria of distress such as debt default announcement, debt renegotiation efforts and inability to meet debt obligation. Their results suggested that financial leverage, profitability, managerial effectiveness, the firm's growth and size are important factors in financial distress model. Moreover, sales generating ability of the firm, inefficient management, proportions of productive assets to total assets and return on productive assets are positively related to the probability of acquisition of a financial distress firms. Insider control and financial leverage, on the other hand are negative related to the probability of acquisition.

Parker, Peters and Turetsky (2002) investigated the impact of corporate governance attributes on the survival of distressed firms. Their findings showed that distressed firms whose block holder and insider ownership were higher are more likely to survive, and CEO turnover had a negative impact on the likelihood of survival. Tsun-Siou, Yin-Hua, and Rong-Tze (2003) integrated accounting, corporate governance, and macroeconomic variables to build up a binary logistic regression model for the prediction of financially distressed firms. Debt ratio and return on assets were found to be the most explanatory accounting variables while the percentage of directors controlled by the largest shareholder, management participation, and the percentage of shares pledged for loans by large shareholders were shown to have positive contribution to the probability of financial distress. Tsun-Siou and Yin-Hua (2004) adopted three variables to proxy for corporate governance risk, namely, the percentage of directors occupied by the controlling shareholder, the percentage the controlling shareholders shareholding pledged for bank loans (pledge ratio), and the deviation in control away from the cash flow rights on Taiwanese listed firms. Binary logistic regressions were estimated and the results suggested that the three variables mentioned above are positively related to the risk for financial distress in the following year. Generally speaking, firms with weak corporate governance are vulnerable to economic downturns and the probability of falling into financial distress increases. Hensher and Jones (2004) examined the listed companies in the Australian Stock Exchange through the inclusion of multiple states. They illustrated the reliability of a mixed logit model and introduced a three state financial distress model: State 0, non-failed firms; State 1, insolvent firms; and State 2, firms

filed for bankruptcy. Zong-Jun and Xiao-Lan (2006) investigated the relationship between corporate governance characteristics and the risk of financial distress in the context of the Chinese transitional economy. They found that large shareholder ownership, state ownership, and the proportion of independent directors were negatively associated with the probability of distress. However, the degree of balanced ownership, managerial ownership, board size, and CEO duality did not significantly affect the probability of default. Hensher, Jones and Green (2007) claimed that a model that incorporates multiple states of financial distress better reflect the real word by providing various distress stages. They study discovered that the error component logistic model and nested logistic model possess the capability of offering a better explanatory power over a standard logistic specification.

Hui and Jing-Jing (2008) examined the relationships between selected aspects of corporate governance and the indirect costs of financial distress in China and found that ownership balancing at the governance level reduced the indirect costs of financial distress, while each of the following three aspects of corporate governance--the proportion of the company's shares that were held by the state, the percentage of independent directors on the board, and the proportion of total costs that were overhead costs--increased the indirect costs of financial distress. The results suggest that companies benefit from better corporate governance and that such improvements can help the companies to become financially healthy. Gepp and Kumar (2008) used survival analysis to predict business failure and found that this analysis provides more information and can be used to further the understanding of the business failure process. Yang-Cheng and Shu-Lien (2009) performed an empirical investigation on the relationship among the possibility of financial distress, firm performance, corporation governance, default tests, and macroeconomic environment using the companies listed on the Taiwan Stock Exchange (TSEC) and the financial distress events took place between 1997 and 2005. The study found that the capacity of poor company to come out of financial distress was determined by how transparent the governance is. Polsiri & Sookhanaphibarn (2009) developed distress prediction models which incorporating both governance and financial variables and examined the impact of major corporate governance attributes, i.e., ownership and board structures, on the likelihood of distress. They found that the presence of controlling shareholders and the board involvement by controlling shareholders reduce the probability of corporate financial distress.

Pranowa et al. (2010) examined the dynamics of corporate financial distress of public companies (non-financial companies) in Indonesian (IDX) for the period of 2004-2008. Using panel data regression, they analyzed internal and external factors affecting corporate financial distress. The results showed that current ratio, efficiency, equity and dummy variable of the status good financial condition had positive and significant influences to Debt Service Coverage (DSC) as a proxy of financial distress. On the other hand, leverage had a negative and significant relation with DSC. Other variables such as profit, retain earning, good corporate governance and macroeconomic factor have no significant impact on the status of corporate financial distress. Chancharat et al. (2010) also examined the determinants of various states of financial distress companies in Australia and concluded that there were significant differences in the variables that determined the stages of financial distress that a company was facing. Senguota and Faccio (2011) provided a comprehensive examination of corporate responses to financial distress during an economy-wide crisis, specifically through the restructuring of assets (through asset sales, mergers, or liquidations) and/or liabilities. They examined the hazard of corporate responses to financial distress. Using firm-level data from five countries hardest hit by the East Asian financial crisis of 1997-98, this study contrasted the effects that financial and corporate governance variables had on restructuring choices. The study found that, during a crisis, financial constraints and corporate governance each had a large effect on restructuring choices.

Several studies on distressed companies have been conducted in Malaysia. Zulkarnain et al. (2001) used a stepwise multivariate discriminant analysis (MDA) and found that total liabilities to total assets, sales to current assets, cash to current liabilities, and market value to debts were important determinants of corporate failures in Malaysia. Low et al. (2001) analyzed financial distress using the logit analysis and found that sales to current assets, current assets to current liabilities, change in net income, cash and marketable securities to total assets were significant determinants of financial distress. However, the coefficients of the first three variables were not as expected when a significant positive coefficient prevailed. Therefore they claimed that measures of liquidity and profitability may be misleading, and concluded that only the cash flow ratio served as an indicator to detect potential failure of a company. Mohamed. Li & Sanda (2001) compared the MDA and the logit model and found that when using MDA, debt ratio, and total assets turnover were found to be significant but when logit analysis was used, an additional variable, interest coverage, was also found to be significant. Thus, they emphasized the importance of leverage ratio as a predictor of failure. Shamsul Nahar (2006) examined the influence of board independence, CEO duality and ownership structure on the firm financial distressed status and found that board independence and CEO duality were not associated with

financial distressed status. Management and non-executive directors' interests were associated negatively with financial distress.

Zulkarnain & Hasbullah (2009) formulated a model to predict corporate financial distress and applied it to trace the potential failure in Malaysian financially distressed firms due to the Asian Crisis in 1997. The study found that 5 out of 64 financial ratios were significant to discriminate distress and non-distress, they were total liabilities to total assets, assets turnover, inventory to total assets, sales inventory, and cash to total assets. The study by Nur Adiana, Rohani and Abd Halim (2009) found that debt to total assets was significant in predicting distressed companies using the multivariate discriminant analysis (MDA), logit and hazard models. They found that the higher the debt, the higher was the probability of defaulting among the financially distressed companies. MDA also identified net income growth as another predictor whereas the logit and hazard model found that return on asset (ROA) to be an important predictor. Nevertheless, the sign of the ROA coefficient were different between the two models. Furthermore, company size was also identified as a contributing factor to financially distressed companies for the hazard model. Chin-Fook, Gun-Fie, and Wai-Ching (2010) analyzed 16 financial ratios using MDA and found seven ratios to be significant.

A quick glance at those reviews indicates that the statistical techniques employed in the financial distress literature include univariate statistics, linear and quadratic discriminant analysis, logistic regression, probit, and recursive partitioning, and survival analysis. To sum, there exist a large number of corporate financial distress prediction models based on various types of methodologies. Beaver (1966) pioneered the development of univariate analysis as a model for corporate failure prediction. Beaver (1966) found that the model can predict failed firms for at least five years prior to failure. However, since univariate analysis uses individual financial ratios as a single predictor of failure, the model may give inconsistent and confusing classifications results for different ratios on the same firm (Altman, 1968). To overcome the problem, Altman (1968) applied MDA which can handle multiple financial ratios in predicting company failure. The main criticism of MDA is its potential violation of the assumption about the multivariate normal distribution of independent variables (Mcleay and Omar, 2000). Ohlson (1980) then used probit and logit analysis an approach that avoided this criticism.

Conventional statistical methods (e.g. logistic regression, decision tree, and etc.) are very successful in predicting failure of distressed company. However, these methods could hardly predict when company will fail, and how long the company will stay with. Since all of these classical methods assume a steady state for failure process, the models may be classified as 'single period' or 'static models' (Shumway 2001). The models assume that the time from classification as distressed to actual corporate failure occurs within a single period. However, this assumption is usually violated because financial distress does not occur immediately after classification, but is preceded by the deterioration in a firm's financial health over a number of years (LeClere 2000). He points out that qualitative response models such as logistic regression or probit models employ data from the time period directly preceding the occurrence of the event of bankruptcy. Hence, the model is static in that it ignores the entire time period preceding the event. Furthermore, the information provided by the estimated model is limiting as the data used to estimate the probability of financial bankruptcy may only be available immediately prior to the event. Shumway (2001) also points out the discordance between single-period bankruptcy prediction models and multiple-period bankruptcy data. He argues that the single-period classification models that have been commonly used for predicting bankruptcy yield biased and inconsistent estimates because they ignore the fact that the characteristics of firms change through time.

DATA AND MODEL SPECIFICATION

A pooled data approach of a period from 2005 to mid-2011 is used to evaluate the effectiveness of board of directors in safeguarding companies from financial difficulties. The year 2005 is selected following the implementation of Practice Note 17 (PN17) in 2005 which is the final year of reporting the company performance and its financial position before being classified as PN17. All companies that are identified as PN17 during the period under study (i.e. 2005 to 2011) are included in the sample. In this study, characteristics of board of directors and other financial variables are identified at the time the companies become PN17. The level of recovery of success of PN17 companies is classified into three categories. The first category consists of PN17 companies that are being re-listed at any time during the period which are considered to be successful in overcoming their financial difficulties. Second category consists of companies that remain as PN17 until end of 2009. Third category comprises PN17 companies that are being de-listed from Bursa Malaysia during the period which are considered to be unsuccessful in solving their financial problems. There are 68 financially distressed

companies in a period from 2005 to Mid-2011, however, this article only considers the second (9 remained) and the third (47 delisted) categories of companies which comprises of 56 companies.

Since dependent variable in survival analysis is time to events, the time when company entering into financially distressed is constructed in this study. Date of external administration during 2005-mid-2011 is recorded. For each company in the sample, a variable TIME is used to indicate the time that company failure (being delisted) occurred, or for censored cases, the last time at which companies were observed. A second variable of STATUS is used to distinguish the censored cases (remains as PN17) from the observed cases (delisted). It is common to have STATUS = 1 for observed cases and STATUS = 0 for censored cases. In this study, the survival data are singly right censored so that all the censored cases have a value of 5 years for the variable TIME.

The explanatory variables incorporate both the corporate governance variables and financial ratios variables. Previous studies have found evidence on the effects of several corporate governance variables such as leadership structure (CEO), financial literacy (EXPERT), multiple directorships (MULTIDIR), board activeness (ACTIVE), equity ownership (MANOWN) as discussed in the section 2. Table 1 shows the details and definitions of the covariates used in the study. Variable leadership structure refers to either joint leadership or separate leadership. Joint leadership exists when the posts of chief executive officer and chairman are held by the same individual. Separate leadership, on the other hand, exists when both positions are held by two separate individuals. In this study, joint leadership is coded 1 and separate leadership is coded 0. This measurement approach is also used by Judge et al. (2003). Variable financial literacy of board of directors is determined based on the members' knowledge of accounting and finance as well as the working experience in both areas. Prior studies in Malaysia use the Malaysian Institute of Accountants (MIA) membership as the proxy of financial literacy (e.g. Ruzaidah and Takiah 2004; Nor Haizah et al. 2006; Mohd-Mohid *et al.* 2004). It is argued that MIA membership does not provide an accurate basis of financial literacy because it does not take into consideration the formal higher education and experience in the related areas (Collier 1993).

In this study, the financial literacy considers two components, knowledge and experience, in accounting and finance. Scores for accounting and financial knowledge of board members are calculated in the following manner: a score 3 is assigned for directors who are members of MIA, score 2 for directors with experience in financial sector, and score 1 for directors who are not members of MIA but with education in accounting and finance. The score for experience is based on the years of experience in the area of accounting and finance as follows: score 4 for experience of >30 years, score 3 for >20 years and ≤30 years, score 2 for >10 years and ≤20 years and score 1 for ≤10 years. Thus, the financial literacy of board of directors is determined based on the ratio between the financial literacy score of board members and the possible maximum score to be attained by all board members. The financial literacy ratio for each company is calculated based on the following formula:

$$\frac{\text{(Score of accounting \& finance knowledge + Score of experience)}}{\text{Maximum score}}$$

Variable multiple directorships of board members is measured by the average number of directorship positions of board members in other companies. It is determined by dividing the total number outside directorship positions of all board members by the number of board members. This method of measuring multiple directorships is used by Song and Windram (2000), and Ruzaidah and Takiah (2004). Meanwhile, variable board activeness represents the total number of board meeting for the year measures the activeness of board of directors. This approach is used in previous studies to determine the activeness of board of directors (Ruzaidah and Takiah 2004; Mohd-Mohid et al. 2004). Variable equity ownership of board of directors is determined by the number of company share owned directly and indirectly by the board members. The share equity held by board members through subsidiary or nominee companies are not included. In this study, equity ownership is the percentage of the total shares owned by board members divided by total shares issued by the company. This method is consistent with that used by Joh (2003) and Mohd-Mohid et al. (2004).

This article includes four control variables, three representing financial ratio and one representing audit quality. Financial ratios have long been widely used in explaining the possibility of corporate financial distress such as Beaver (1966), Altman (1968), Bongini, Ferri and Hahm (2000), Routledge and Gadenne (2000), Catanach & Perry (2001), and Rommer (2005). Three financial variables are considered namely company performance which is represented by logarithm of return on assets (ROA), total assets (SIZE) (Coles et al. 2001; Mohd-Mohid et al. 2004) and ratio of debt to total assets (LEVERAGE) (Mueller & Becker III 1997). Quality of audit is measured based on size of audit firms (DeAngelo 1981; Becker et al. 1998). The dummy variable, the BIG4, which represents high

quality audit services is coded 1 and the non-BIG4 which represents low quality audit services is coded 0.

Survival analysis is a class of statistical method for studying the occurrence and timing of events. In survival analysis, an 'event' is defined as a qualitative change that can be situated in time (Allison, 1995). Since companies may state from 'distress' to 'delisted' or onto 'distress to 'remained' the event of interest in this study is defined as a company entering into a financial distressed state. But these changes usually occur over a time horizon of several periods rather than instantaneously. In these cases, a methodology which allows for dynamic path analysis is required if we are to analyze the progression of corporate failure. The expectation is that the corporate 'disease' of financial distress begins with identifiable initial conditions of the 'symptom' variables. The symptomatic conditions then change progressively over time as the financial distress worsens.

Survival analysis contains two key functions called the survivor function and hazard function. The survival function, *S(t)*, gives the probability that the time until the firm experiences the event, *T*, is greater than a given time *t*. Given that *T* is a random variable which defines the event time for some particular observation, then the survival function is defined as:

$$S(t) = \Pr(T > t) \tag{1}$$

The hazard function defines the instantaneous risk that an event will occur at time *t* given that the firm survives to time *t*. The hazard function is also known as the 'hazard rate' because it is a dimensional quantity that has the form of number of events per interval of time. The hazard function is defined as:

$$h(t) = \lim_{\Delta t \to 0} \frac{\Pr(t \leq T < t + \Delta t \mid T \geq t)}{\Delta t} \tag{2}$$

Therefore, the hazard function is more intuitive to use in survival analysis because it attempts to quantify the instantaneous risk that company fail will take place at time t given the company already survived to time t. There are three different techniques in survival analysis; non-parametric, semi-parametric and parametric techniques. Non-parametric models are useful for preliminary analysis of survival data and for estimating and comparing survivor function. The two main methods are the Kaplan-Meier method and the life-table method. Parametric models are referred to as accelerated failure time (AFT) models. The key issue is to specify a probability distribution for the time of event. Common distributions include the exponential, Weibull, log-normal, log-logistic and gamma distribution. Semi-parametric models, unlike the parametric, do not require to specifying the probability distribution of hazard function over time. That's why it's called semi-parametric. The most widely used semi-parametric regression model for survival data is the Cox proportional hazards model proposed by Cox (1972).

In Cox (1972) study, there are two significant innovations include the proportional hazards model of Cox (1972, 1975) and maximum partial likelihood to survival data that might be right censored. The Cox model is a semi-parametric model in which the hazard function of the survival time is given by:

$$\lambda(t; x) = \lambda_0(t)\, e^{\beta' x(t)}$$

where $\lambda_0(t)$ is an unspecified baseline hazard rate which measures the effect of time on the hazard rate for an individual whose covariates all have values of zero, x(t) is a vector of covariates that influence the hazard, and β is a vector of unknown regression parameters. The main reason for the popularity of Cox proportional hazards model is it is semi-parametric approach which does not require the particular probability distribution to represent survival times.

ANALYSIS OF RESULTS

Table 2 presents descriptive statistics of all variables of this study. For the purpose of comparisons, the descriptive statistics are segregated by 2 categories of PN17 (remain as PN17) and delisted. Table 2 depicts the Cox proportional hazards model estimation. It presents the coefficient estimation, the standard error of this estimate, Wald chi-square tests with the relative *p*-value for testing the null hypothesis that the coefficient of each covariate is equal to zero and hazard ratio. A Hazard ratio for the effect of specified covariate is obtained by exponentiating the estimated regression coefficient of that covariate. A hazard ratio equal to 1 indicates that the covariate has no effect on survival. If the hazard ratio greater (less) than 1, indicating the more rapid (slower) hazard timing. When interpreting a fitted

proportional hazards model, examining the scale of covariates is recommended, continuous or categorical. If the covariate is continuous, the hazard ratio is the ratio of hazard rates for an increase of one unit of the variable.

Results of the analysis indicate that only two covariates appear to be significant either at the 5% or 10%, respectively. These covariates are SIZE and MANOWN with the coefficient 0.3648 and -0.0182, respectively. The coefficient sign of MANOWN is negative (-0.0182), indicating that an increase in covariate decreases the hazard of being delisted. In other word, an increase in firm's ability to generate and adjust equity ownership of board directors can decrease the hazards of being delisted. The hazard ratio for MANOWN is 0.982, meaning that an increase of one percentage point in MANOWN will shrink the hazard rate by 1.8%. Thus, a company with high percentage of equity ownership of board directors will shrink the risk of failing by 1.8%. The positive coefficient for SIZE (0.3648) indicates that an increase in covariate increases the hazard of entering into financially distressed (delisted). This positive sign of SIZE indicates that the larger the size of a company the higher the likelihood that it becomes financially distressed (delisted). The hazard ratio estimate for SIZE is 1.440, meaning that an increase of one unit in SIZE will increase the hazard rate by 98.56%. That is, the company that is 10 times bigger in terms of assets will increase the risk of failing (being delisted) by 98.56%. In other word, positive sign for SIZE implying bigger companies are more likely to be delisted than smaller ones. Even though this finding is in contrast to what is expected since most of previous studies suggest larger companies are better managed and better protected from failure (Ohlson 1980) but this result is consistent with Elkhal (2002) and Chancharat et al. (2008). In the Malaysia context this finding regarding positive impact of SIZE is consistent with Nuradiana Hiau et al. (2009). A possible explanation of this positive impact of SIZE phenomenon given by Chancharat et al. (2008) is that the companies could have had unsustainable growth rate in their total assets. A large company might have inflexible management and have problems monitoring managers and employees; consequently, the company may have inefficient communication and then face financial difficulties (Rommer 2004).

Other governance variables such as CEO, EXPERT, MULTIDIR, ACTIVE as well as financial variables are insignificant even though some studies have found the impacts of ownership and board structure in reducing the probability of corporate financial distress (Polsiri & Sookhanaphibarn 2009). Regarding the impact of CEO duality in Malaysian context, Shamsul Nahar (2006) found this variable was not associated with financial distressed status. Nuradiana Hiauh et al. (2009) also found significant positive impact of LEVERAGE (debt to total assets).

There are two factors namely sizes of company and equity ownerships that seem to discriminate the survival rates between delisted companies and remained as PN17 companies. To sum, these empirical findings suggest that the delisted companies have bigger size and less equity ownership of board members (MANOWN) than remains as PN17 companies. For the sample in this study, SIZE and MANOWN have been found statistically significant in the Cox proportional hazard model. Meanwhile, other variables either represent governance or financial have never been found statistically significant in the model.

The survivor probability of the average company through specific time periods at covariates means is shown in Figure 1. It found that for an average company, the ten month survival probability is 99.94 percent, twenty months survival probability is 62.3, 30 months survival probability is 40.1 percent and more than 40 months survival probability is 30.5 percent.

CONCLUSION AND FUTURE RESEARCH

This study examines financially distressed companies in Malaysia during 2005 to Mid-2011 using survival analysis and the Cox proportional hazards model (CPH). The results show that only two variables namely managerial ownership and company size can provide information regarding corporate survival probability to a specified time. The study found delisted companies have lower managerial ownership and larger sizes than remains as PN17 companies. However, the study is unable to obtain on the relationship between other corporate and financial variable with the survival likelihood of financially distressed companies. As mentioned earlier, all studies in corporate distress and survival analysis were conducted using healthy and financial distress companies, we hope future research that combined these two types will give better picture of a firm's survival power over financial distress. Since the level of recovery of success of PN17 companies is classifies into three categories, multiple states of financially distressed companies analyses seem to be more appropriate for future research.

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TABLE 1: The variables used in the study

Variable	Code	Definition
Leadership Structure	CEO	Joint leadership is coded 1 and separate leadership is coded 0.
Financial Literacy	EXPERT	(Score of accounting & finance knowledge + Score of experience)/ maximum score
Multiple Directorships	MULTIDIR	Average number of directorship positions of board members in other companies.
leverage	LEVERAGE	debt to total asset ratio
Company Size	SIZE	Natural logarithm of the total asset
Equity Ownership	MANOWN	Number of company share owned directly and indirectly by the board members.
Activeness	ACTIVE	The total number of board meeting for the year
Performance	ROA	Return on Assets
Audit Quality	BIG4	High quality audit services is coded 1; low quality coded 0
Time to event	TIME	In months
Occurrence of event	STATUS	Remained = 0; Delisted = 1

TABLE 2: Descriptive statistics

	DELISTED (n = 47)			REMAIN AS PN17 (n = 9)		
Variable	Mean	Min	Max	Mean	Min	Max
CEO	0.38	0.00	1.00	0.22	0.00	1.00
EXPERT	0.32	0.00	0.68	0.37	0.19	0.76
MULTIDIR	0.93	0.00	3.80	0.82	0.00	3.00
ACTIVE	5.32	2.00	16.00	6.22	4.00	16.00
MANOWN	17.00	0.00	59.00	26.00	0.00	54.00
BIG4	0.45	0.00	1.00	0.33	0.00	1.00
LEVERAGE	2.91	-21.59	47.15	5.44	-1.16	15.07
SIZE	18.81	13.99	21.96	18.46	17.30	19.70
ROA	-0.60	-5.47	0.24	-0.42	-3.02	0.05

TABLE 3: Survival analysis estimation

Variable	Estimate	Stan. Error	Chi-square	Pr > Chisq	Hazard ratio
CEO	0.5620	0.3596	2.4418	0.1181	1.754
EXPERT	-0.7167	0.8619	0.6915	0.4057	0.488
MULTIDIR	-0.1016	0.1904	0.2848	0.5936	0.903
LEVERAGE	-0.0113	0.0143	0.6243	0.4295	0.989
SIZE	0.3648	0.1613	5.1161	0.0237	1.440
MANOWN	-0.0182	0.0099	3.3272	0.0681	0.989
ACTIVE	0.0312	0.0630	0.2455	0.6202	1.032
BIG4	0.1362	0.3234	0.1773	0.6737	1.146
ROA	-0.1043	0.1633	0.4082	0.5229	0.901

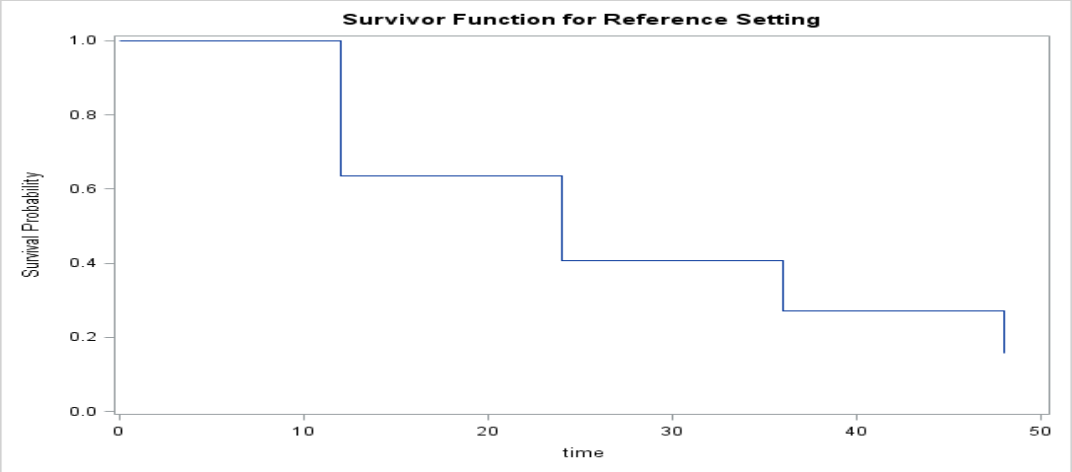

FIGURE 1: Graph of survival function at covariate means