IJCBSS
International Journal of Current
Bussiness and Social Sciences

ANALYSIS OF CORPORATE FINANCIAL DISTRESS DETERMINANTS: A SURVEY OF NON-FINANCIAL FIRMS LISTED IN THE NSE

Bernard Baimwera

Lecturer, Kenya Methodist University, Kenya

Antony Murimi Muriuki

Lecturer, The East African University, Kenya

ABSTRACT

The economic consequence of corporate failure and bankruptcy is enormous, especially for the stakeholders of public-held companies. Prior to a corporate failure, a firm's financial status is frequently in distress. Consequently, a method of determining corporate financial distress is clearly a matter of considerable interest to investors, creditors, employees and other stakeholders. The key objective of this study was to examine the determinants of corporate financial distress as postulated by Altman (1968) which are liquidity, leverage, growth and profitability in relation to financial distress for non-financial firms listed in the Nairobi Securities Exchange. The study adopted a descriptive research design with financial data being gathered from financial statements for a three year period 2007 to 2010. It analyzed univariate and multivariate accounting based distress prediction approaches. The Pearson product moment correlation and regression analysis were used to examine the degree and nature of relationship between determinants of corporate financial distress and corporate financial distress itself. Liquidity and leverage were found to have no significant influence in determining corporate financial distress. Growth and profitability, on the other hand, had a significant influence. The Altman Z score model (a multivariate approach) was found to be a significant distress prediction model.

Key Words: Corporate Financial, Non-Financial Firms, NSE

INTRODUCTION

Managers, stockholders, lenders and employees are concerned about their firm's financial health. The job security of managers and employees is not assured should their firms struggle financially. Stockholders' equity position and lenders' claims are also not guaranteed. The government, as a regulator in a competitive market, has concerns about the consequences of financial distress for firms, and it controls capital adequacy through the regulatory capital requirement (Ming, 2000). This shared interest among managers, employees, investors, and the government creates frequent inquiries and recurrent attempts to answer a relentless question about how to predict financial distress, or what reveals the credit risk of firms (Brennan & Schwartz, 1984).Financial distress is the likelihood that a firm will be unable to meet its financial obligations as and when they fall due. A firm in financial distress usually falls in a tight cash situation in which it is difficult to pay the owed amounts on the due date. If prolonged, this situation can force the owing entity into bankruptcy or forced liquidation. It is compounded by the fact that banks and other financial institutions refuse to lend to those in serious distress (Altman, 2000). When a firm is under financial distress, the situation frequently sharply reduces its market value, suppliers of goods and services usually insist on cash on delivery terms, and large customer may cancel their orders in anticipation of not getting deliveries on time (Almeida & Philippon, 2006).

According to Altman (1968), an emphasis on ratio analysis in a firm's financial health, Multiple Discriminant Analysis (MDA) is deemed as an appropriate statistical technique. Although not as popular as regression analysis, MDA has been utilized in a variety of disciplines since its first application in the 1930's. In recent years, this technique has become increasingly popular in the practical business world as well as in academia (Altman, 1968).The MDA technique has the advantage of considering an entire profile of characteristics common to the relevant firms, as well as the interaction of these properties. A univariate study, on the other hand, can only consider the measurements used for group assignments one at a time. Another advantage of MDA is the reduction of the analyst's space dimensionally. The analysis is transformed into its simplest form: one dimension. The discriminant function, of the form $Z = V_1X_1 + V_2X_2 +…+ V_nX_n$ transforms the individual variable values to a single discriminant score, or Z value, which is then used to classify the object where $V_1, V_2, ... V_n$ are discriminant coefficients, and $X_1, X_2, ... X_n$ are independent variables (Altman, 2000).The model proposed by Altman (1968) combines various accounting ratios. He derived the Altman Z-score model, an MDA model, to discriminate between characteristics of a financially distressed firm and a non-financially distressed one combining traditional ratio analysis with statistical techniques. The Altman Z-score model analyses the entire variable profile of the object simultaneously rather than sequentially examining individual characteristics. Combinations of ratios are analyzed together in order to remove possible ambiguities and misclassifications. He suggested that this model can predict ultimate of distress as much as three reporting periods prior to the event.

STATEMENT OF THE PROBLEM

Over the years, the emphasis on corporate financial distress determination has been critical. Its credence has ignited huge debate in the field of corporate finance on which financial distress measurement tools are more appropriate. Since the Altman Z-score model was created in 1968, it has been evolved to suit the peculiar nature of firms under study. The model has evolved from one that predicts financial distress for large firms in the developed countries to one that best suits all firms in the developing world (Szilagy, Hilsche, & Campbell, 2010). While the Altman Z-score model is a multivariate discriminant analysis tool combining various accounting based variables to produce a single distress score, other schools of thought exist that advocate for univariate analysis in place of multivariate analysis. A need therefore arose to assess various determinants financial distress. This study sought to examine individual factors that determine corporate financial distress and the extent to which they affect financial distress of public firms listed in the NSE. The factors, which are drawn from the Altman Z-score model, include companies' profitability, liquidity, growth capacity and leverage. The study also utilised the Altman Z-score model in the measurement of corporate financial and assess the extent of its effectiveness.

GENERAL OBJECTIVE

The general objective of the study was to evaluate the determinants of corporate financial distress for non financial firms listed in the Nairobi Securities Exchange.

SPECIFIC OBJECTIVES

1. To determine the relationship between firms' liquidity and financial distress.

2. To examine the effect of firm's profitability on their financial distress levels.

3. To evaluate the effect of leverage on corporate financial distress.

4. To determine the effect of firms' growth level on financial distress.

LITERATURE REVIEW

Theoretical Orientation

This subsection provides an insight into theories revolving around financial distress; it presents theories that seek to predict financial distress, theories that explain the effects of financial distress, and theories that determine procedures that minimize and spread the cost of financial distress in order to reduce its impact. Distress determinant theories, Wreckers theory of financial distress and normative theory of Bankruptcy are explored in this section.

Predictive Models

Determinant theories provide an assortment of empirically developed distress predictive models by means of matching accounting ratios and distressed firms. A variety of models have been developed in the academic literature using techniques such as multiple discriminant analysis (MDA), logit, probit, recursive partitioning, hazard models, and neural networks. Despite the variety of models available, both the business community and researchers often rely on the models developed by Altman (1968) and Ohlson (1980). (Wang and Campbell, 2010)

One of the classic works in the area of ratio analysis and prediction classification was performed by Beaver in the year 1966. His was a univariate analysis that used t-tests to predict bankruptcy by studying one accounting ratio at a time. The analysis revealed cash flow to debt ratio to be the most effective variable of predicting bankruptcy for as long as five years prior to failure by giving statistically significant signals well before actual business failure. Despite his questioning of the use of multivariate analysis, his univariate analysis of a number of bankruptcy predictors set the stage for the multivariate attempts which followed in a real sense. Subsequent models were developed by Altman in 1968 and Ohlson in 1980. (Altman, 1968). Altman (1968)

extended Beaver's model by developing a discriminant function which combines ratios in a multivariate analysis. Altman found that his five ratios outperformed Beaver's cash flow/total debt ratio. The Altman model combines seven accounting variables (current assets, current liabilities, noncurrent assets, retained earnings, earnings before interest and taxes, long-term liabilities, book value of equity, and net sales) to produce a single Z score that groups analyzed firms into distressed, grey and safe zones. According to Altman (2000), the model's accuracy in predicting bankruptcy one year after reporting is 80% - 90% prior.

Wreckers theory of financial distress

After developing a reduced form default risk indicator, Campbell, Hilscher and Szilagi (2005) present hypothesis that stocks of distressed firms perform in a manner which is vastly inferior to stocks of financially healthy firms. The wreckers' theory of financial distress seeks to explain the benefits that may step out of financial distress to stakeholders. It is not necessary to attribute the negative excess returns of distressed firms to inefficient or irrational markets. Such negative excess returns can be shown to be the equilibrium outcome under efficiency in an environment where a subset of participants is able to draw returns (in kind) from distressed companies. For firms close to bankruptcy, non-cash returns to ownership may be the dominant form of payout. If markets are efficient, those returns must show up in stock valuation. This may be labeled the 'wreckers theory' of financial distress. It explains the entire pattern of results very well. They proceed to show how to test this hypothesis directly against the alternative of inefficient markets using the theory of convenience yields.

It is hard to believe that financial market participants as a group can be that irrational or inefficient. Therefore, Campbell, Hilscher and Szilagi (2005), take one step back and try to tell the story of "profiting from a ship wreckage" from a completely different perspective. They paint an illusion of a firm being hit by a series of negative shocks, making losses and approaching a state of financial distress. With higher leverage, volatility of share prices increases with respect to private information; the ultimate fate of the firm depends on issues unknown to the general public. With information asymmetry becoming more important, uninformed investors – widows and orphans – will leave, as, from their perspective; it is a market for lemons. Very soon, equity will be owned by insiders – market participants who have a specific advantage in obtaining and interpreting information related to the company in question. Two groups come to mind: managers themselves, and competing firms. A third possibility might be private equity or funds, working on a restructuring. (Campbel, Hilscher, & Szilagyi, 2005)

This type of benefit will not necessarily deplete the resources of the company. (Campbel, Hilscher, & Szilagyi, 2005). This leads to a crucial point: Equity is not only a right to receive dividends, it also confers control rights. These control rights have an economic value on their own, as they enable owners to draw a return in kind. If control rights had no economic value, who would care to have them? The value of control rights makes equity comparable to a

commodity. The return of a storable commodity consists of two parts: the capital gain and the "convenience yield", that is, the flow of services which accrues to the owner of a physical inventory but not to the owner of a contract on future delivery.   (Brennan, 1991).The convenience yield of corporate control comprises all non-cash economic benefits of ownership, by no means necessarily illegal ones. Although it does not show up in the books, the convenience yield of corporate control is economically equivalent to a dividend, and it will be valued as such – not only by the ultimate beneficiary, but also by all other market participants who try to form rational price expectations. The shares of distressed firms do generate returns which are consistent with their risk class, but only a subset of market participants can make use of the flows. (Brennan, 1991)

Early Bankruptcy theory

Formal bankruptcy theory began with the recognition that a bankruptcy system is sometimes necessary to solve a collective action problem among the creditors of an insolvent firm. Insolvency may be a function of economic distress, financial distress, or both. Economic distress occurs when the firm cannot earn revenues sufficient to cover its costs, exclusive of financing costs. Such a firm has negative economic value. A firm is only in financial distress if it would have positive earnings were it not required to service its debt. Because a firm's debt is sunk when insolvency occurs, the existence of debt is irrelevant to the question of whether the firm should continue or not. Social welfare is maximized when economically distressed firms are liquidated but financially distressed firms are continued.

Creditors are less interested in saving firms than in whether assets exist to satisfy their claims. If assets exist, creditors will attempt to seize them, which commonly will yield a piecemeal liquidation. When a firm is experiencing only financial distress, however, the creditors' total insolvency-state payoff would be maximized were the firm continued. Saving a firm, though, will often require creditors to coordinate their collection efforts, and co-ordination costs may be high. As a consequence, reasonable equilibrium exists in which, without regulation, financially as well as economically distressed firms are liquidated piecemeal. A bankruptcy system can avoid this inefficient equilibrium by staying creditor collection efforts so that a state official has time to decide whether the firm is worth saving. (Alder, 2002).Early modern theory favored letting the market make the liquidation/continuation decision. More concretely, a state official should conduct auctions of insolvent firms, free off current claims, distributing the proceeds to creditors. If economic value would be maximized by a piecemeal liquidation, the highest bids will be for individual assets; if continuing the firm as an economic entity would maximize value, then the highest bids would be for the firm as a unit. (Longhover, 2004)

Normative theory of Bankruptcy

Normative theory, also called modern theory of bankruptcy, relates the results of a bankruptcy procedure to earlier stages in the life of the borrowing firm. An ex post efficient bankruptcy system would maximize the payoffs that creditors receive from insolvent firms. For example, a system that rescues only financially distressed firms generates higher payoffs for creditors than a system that attempts to rescue economically distressed firms as well. At the borrowing stage, a competitive credit market reduces the amounts that lenders require solvent firms to repay when the lenders' expected insolvency payoffs increase. This theory posits that (a) interest rates (cost of debt) fall as the efficiency of the applicable bankruptcy system increases (a more efficient system increases creditor payoffs); (b) a society that wants to maximize social welfare would prefer firms to pursue every project for which credit can be raised; (c) debt-financed firms pursue fewer projects than society prefers because firms must surrender bad state returns to creditors, but must share good state returns with them. Society thus should want an efficient bankruptcy system because lower interest rates increase the share of good state returns that firms can keep, thereby reducing the wedge between the socially efficient project set and the project set that debt-financed firms will pursue; and (d) an efficient bankruptcy system also improves the borrower's investment incentives because firms invest in projects to maximize net expected profits, which rise as the interest rate falls. (Alder, 2002)

In addition, a bankruptcy system that reduces the cost of debt capital will reduce the cost of capital generally. The equity-holders own a call option on a leveraged firm because shareholders can buy the firm by repaying the debt. The strike price for exercising this call option thus is determined by the firm's cost of credit. Reducing this cost—that is, reducing the strike price—makes the stock of a leveraged firm more valuable to own. Hence, it becomes easier for firms to raise equity capital as their country's bankruptcy system becomes more efficient. (Douglas, 2002).In the United States, the economic results of normative theory have concrete policy implications, of which four are briefly summarized

Second, parties should be permitted to write contracts, now prohibited, that permit customers and suppliers to cease dealing with an insolvent firm. When solvent parties have exit rights, debtors could still pursue efficient projects but would have difficulty continuing inefficient projects. Consequently, free contracting regarding exit will cause interest rates to fall below the level that the current bankruptcy regime induces. (Alder, 2002) .Third, the debtor-in-possession should decide which creditor expenses are reimbursed. The Code currently authorizes bankruptcy courts to reimburse junior creditor expenses that increase the amount available for distribution to the juniors, but the Code reimburses little senior creditor spending. This compensation scheme encourages rent seeking by the juniors, who sometimes litigate to defeat absolute priority rather than to increase the value of the in-solvent firm. A better scheme would delegate the reimbursement decision to the debtor-in-possession.

Empirical Literature Review

Altman Z score model

Altman (1968) conducted a study attempting an assessment of the quality of ratio analysis as an analytical technique. This was amid arguments by scholars (Bum, 2003) that that traditional ratio analysis is no longer an important analytical technique in the academic environment due to the relatively unsophisticated manner in which it has been presented. The prediction of corporate bankruptcy was used as an illustrative case. Specifically, a set of financial and economic ratios were investigated in a bankruptcy prediction context wherein a multiple discriminant statistical methodology was employed. The data used in the study were limited to manufacturing corporations. In order to assess its potential rigorously, a set of financial ratios was combined in a discriminant analysis approach to the problem of corporate bankruptcy prediction. The theory is that ratios, if analyzed within a multivariate framework, will take on greater statistical significance than the common technique of sequential ratio comparisons (Altman, 1968).

Studies on Discriminant Models

Considering the fundamental role played by small and medium sized enterprises (SMEs) in the economy of many countries and the considerable attention placed on SMEs in the new Basel Capital Accord, Sabato and Altman (2005) developed a distress prediction model specifically for the SME sector and to analyze its effectiveness compared to a generic corporate model. The behavior of financial measures for SMEs is analyzed and the most significant variables in predicting the entities' credit worthiness were selected in order to construct a default prediction model. Using a logit regression technique on panel data of over 2,000 US firms (with sales less than $65 million) over the period 1994-2002, they developed a one-year default prediction model. This model had an out-of-sample prediction power which is almost 30 percent higher than a generic corporate model. An associated objective was to observe our model's ability to lower bank capital requirements considering the new Basel Capital Accord's rules for SMEs (Sabato & Altman, 2005).

Wang and Campbell (2010) re- examine the well- known Ohlson (1980) model on firm failure prediction. The data came from china publicly listed companies and cover a range of 11 years (1998- 2008). The Ohlson (1980) model was re- estimated and then revised to better fit the specific situation of China publicly listed companies. The result showed that OENEG (if total liabilities exceeds total assets, 0 otherwise) and INTWO (1 if net income was negative for the last two years, 0 otherwise) were the two most influential variables in failure prediction and were significant at $p<.01$. This study contributed to the literature by expanding the application of Ohlson (1980) model to China publicly listed companies. It provided applicable measures for predicting firm delisting events in China stock markets.Zouari and Abid (2000) carried out an exploratory research examining and modeling the financial distress prediction using neural network approach.

Studies on financial distress

Financial distress is more likely to happen in bad times. The present value of distress costs therefore depends on risk premia. Almeida & Philippon (2006) estimate this value using risk-adjusted default probabilities derived from corporate bond spreads. For a BBB-rated firm, their benchmark calculations show that the NPV of distress is 4.5% of pre-distress value. In contrast, a valuation that ignores risk premia generates an NPV of 1.4%. They show that marginal distress costs can be as large as the marginal tax benefits of debt. Thus, distress risk premia can help explain why firms appear to use debt conservatively.

According to Dichev (1998), several studies suggest that a firm distress risk factor could be behind the size and the book-to-market effects. A natural proxy for firm distress is bankruptcy risk. He hypothesized that if bankruptcy is systematic, one would expect a positive association between bankruptcy risk and subsequent realized returns. However, his study demonstrated that bankruptcy risk is not rewarded by higher returns. Thus a distress factor is unlikely to account for the size and book-to-market effects. Surprisingly, firms with high bankruptcy risk earn lower than average returns since 1980. A risk based explanation cannot fully explain anomalous evidence.

Salehi & Abedini (2009) in their study, the ability of financial ratios for prediction of financial distress of the listed companies in Tehran Stock Exchange (TES) was investigated. For this reason, the multiple regression models were used and a model was presented for prediction of financial distress in listed companies in TES. The assessment of the model was done by utilizing the data of two groups. The first group contained 30 companies which don't have any financial distress, and the second group, similarly, contained 30 companies which have financial distress. The study by Titman and Opler (1994) found that highly leveraged firms lose substantial market share to their more conservatively financed competitors in industry downturns. Specifically, firms in the top leverage decile in industries that experience output contractions see their sales decline by 26 percent more than do firms in the bottom leverage decile. A similar decline takes place in the market value of equity. These findings are consistent with the view that the indirect costs of financial distress are significant and positive.

Paranowo (2010) empirically examined the dynamics of corporate financial distress of public companies (non financial companies) in Indonesia for the period of 2004 - 2008. Using panel data regression, he analyzed internal and external factors affecting corporate financial distress. To distinguish the status of financial condition, the process of integral corporate financial distress was classified into four steps: good, early impairment, deterioration and cash flow problem companies. The results showed that current ratio, efficiency, equity and dummy variable of the status good financial condition have positive and significant influences to Debt Service Coverage as a proxy of financial distress.

RESEARCH METHODOLOGY

Research Design

This research adopted a descriptive research design. This design provided the basis of collecting data in order to determine and describe the financial distress levels for firms listed in the NSE and relating the Z-score values to stock returns and financial risk premium. The study was also quantitative as it involved collection and analysis of quantitative data derived from the financial statements of companies.

Target population

The target population of the study consisted of 38 non-financial public firms listed in the NSE as shown in appendix I. Only non-financial firms were considered as Altman (2000) does not recommend the use of the Altman Z-score model in the analysis of financial firms' financial distress because of financial firms' frequent disclosure of off–balance sheet items. Financial institutions often offer asset management or brokerage services to their clients. Due to this, they may have significant amounts of off-balance sheet assets and liabilities. Off balance sheet items usually belong to the individual clients directly or in trust, while the company may provide management, depository or other services to the client. Financial institutions may report off-balance sheet items in their accounting statements formally, and may also refer to "assets under management," a figure that may include on and off-balance sheet items. Thus it would be erroneous to make conclusions on the assumption that all assets and liabilities reported in the financial companies financial statements belong to the company.

Sampling framework

A census was done where all the firms in the target population will be selected for analysis. This procedure was preferred to sampling as the small size of the population made it possible to study all the firms in the population and at the same time a census solves the accuracy problems associated with sampling.

Data collection

Secondary financial data was obtained from the financial statements (balance sheets and income statements) of selected firms for a three year period 2007 to 2010 in order to fit the Altman (1968) Z score analysis model. The framework for the collection of the data was as in the data frame in appendix II.

Data analysis

Data gathered was analyzed using both inferential and descriptive statistical techniques. Correlation analysis for a three year period was done to relate the dependent variables to the independent variable using the Pearson product-moment correlation coefficient. DSCR was used to measure financial distress premium. The significance of the correlation coefficient was tested using Student t-test. Data analysis was also done with the help of Microsoft Excel computer packages. The Altman Z-score model was used to determine the financial distress levels of companies listed in the NSE and Percentages laid down proportions of firms in the various distress zones: distress zone, gray zone, and safe zone.

The Altman Z-score is a linear combination of accounting ratios, weighted by coefficients, used to measure corporate financial distress. The coefficients were derived by identifying a set of firms which had declared bankruptcy and then collecting a matched sample of firms which had survived (Altman, 1968). Altman applied MDA to a dataset of publicly held manufacturers. The estimation was originally based on data from publicly held manufacturers, but has since been re-estimated based on other datasets for private manufacturing, non-manufacturing and service companies (Altman, 2000).

The original Z score model of 1968 has since been revised to make it suitable for non-manufacturing and firms of all sizes; hence making it applicable for small size firms in developing countries. The standard Altman Z-core MDA model for non-manufacturer firms & emerging market firms is as follows:

$$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

Where: X_1 = Working Capital / Total Assets

                X_2 = Retained Earnings / Total Assets

                X_3 = Earnings Before Interest and Taxes / Total Assets

                X_4 = Book Value of Equity / Total Liabilities

The critical categories used by Altman to predict financial distress, based on Z score model, are as follows:

For Z > 2.6 -"Safe" Zone; the company is in a non bankruptcy zone, it is financially healthy;

Z= 1.1 - 2. 6 -"Grey" Zone; the company should be on alert and exercise caution on fiscal health; and Z < 1.1 -"Distress" Zone; the company is in financial distress, probability of bankruptcy is very high.

In a series of subsequent tests covering three different time periods, the model was found to be approximately 80-90% accurate in predicting bankruptcy one year prior to bankruptcy, with a Type II error (classifying the firm as bankrupt when it does not go bankrupt) of approximately 15-20% (Altman, 2000). Neither the Altman models nor other balance sheet-based models are recommended for use with financial companies. This is because of the opacity of financial companies' balance sheets, and their frequent use of off-balance sheet item (Altman, 2000).

RESULTS AND FINDINGS

Financial Distress

Financial distress, according to Pandey (2005), is the inherent possibility that a firm may face a tight business conditions and thus have difficulties in paying owed amounts as and when they fall due. This study used the Altman Z score Model to classify firms into various distress zones that predict a firm's financial standing one to three years into the future. The Altman Z-score is a linear combination of accounting ratios, weighted by coefficients, used to predict corporate financial distress.

The standard Z-score model for non-manufacturer firms & emerging market firms takes the form $Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$ with the X variables being liquidity, profitability, growth, and leverage. The model in turn categorizes firms into three zones; "Safe" Zone, where Z is greater than 2.6, firms in this zone are financially healthy; "Grey" Zone, where Z lies between 1.1 and 2.6, firms in this zone should exercise caution; and "Distress" Zone, where Z is less than 1.1, companies in this zone are in high risk of financial distress.

Debt Service Coverage

In corporate finance, Debt Service Coverage (DSC) is the amount of cash flow available to meet annual interest and principal payments on debt, including sinking fund payments. DSC is measured by Debt Coverage Ratio (DSCR) which is calculated by dividing Net Operating Income (EBIT) by total debt service (Borrowings repayment plus Financial Costs). Borrowings repayment data was sourced from companies' cash flow statement while financial costs were obtained from the income statements. A DSCR of less than 1 would mean a negative cash flow. A DSCR of less than 1, say 0.95, would mean that there is only enough net operating income to cover 95% of annual borrowings plus debt payments. A firm with a DSCR less than one would therefore have to sell its investments and assets or raise new finance in order to pay borrowings plus financial costs. Wealth maximizing firms would therefore yearn to maximize DSC

Univariate Analysis

Here, analysis was carried out with the description of a single determinant, its attributes, and its effect on financial distress. The individual determinants were liquidity, profitability, growth and leverage. Simple linear regression and correlation analysis was done using Least Squares regression and Karl Pearson Product Correlation respectively.

The study dwelt on its objective of assessing the extent to which corporate financial distress determinants effectively predict corporate financial distress. The determinants were therefore matched with succeeding year's DSCRs and placed on a nominal scale for analysis. For example, a liquidity ratio of year 2007 was matched with 2008's DSCR with the liquidity ratio being the independent variable and DSCR the dependent variable. The window period was one year.

During analysis of data, some firms generated extremely high DSCRs as they had incurred very low financial costs and paid extremely low borrowing during the year of interest while some firms could not yield a DSCR since they had not incurred any financial costs nor paid any borrowings for the year. Of the 120 units of analysis, 13 (4 units in 2007, 4 units in 2008, three in 2009 and two in 2010) failed to derive a DSCR since they had not paid off any financial borrowings nor incurred financial costs. 2007's DSCRs were excluded from analysis since they had no matching preceding year's determinants ratios as no financial data from year 2005 was collected. At the same time the determinant ratios of year 2010 could not be used as there were no matching DSCRs for the succeeding year. Some individual units of analysis were excluded from analysis because of unavailability of preceding or succeeding years' data. For example financial statements of Kapchorua Limited were unavailable in 2009; there was thus no 2009 DSCR to match with 2008's financials. Nine units of analysis had extremely high DSCRs (DSCR greater than 20 times) and thus they were discarded as outliers with the possibility of biasing study results and thus leading to erroneous conclusions. A. Baumann limited's DSCRs were also excluded owing to their extreme low levels. This led to 54 units being analyzed out of 65 possible units.

Liquidity

Liquidity measures a company's ability to pay off its short-term liabilities and debt obligations from short term assets. It is measured by dividing working capital by total assets of the company. Working capital equals current assets less current liabilities. The higher the value of the ratio a company has, the larger the margin of safety it possesses to cover short term debts.

Table 4.3 Regression of liquidity on Debt Service Coverage

Regression Statistics	
Coefficient	2.96
Intercept	1.35

R	0.22					
R Squared	0.05					
Other Statistics						
	df	*Observed F*	*Critical F*	*Observed t*	*Critical t*	*Standard Error*
R Squared	52	2.55	4.03			
R	52			1.60	2.01	
Coefficient	52			1.60	2.01	1.85

There was a weak positive correlation between liquidity and DSC which was insignificant since at 95% confidence level the critical value t is 2.01 which is higher than observed t = 1.6. The regression model assumes the equation DSCR = 2.96X1 + 1.35 with the liquidity coefficient being tested to be insignificant at 0.05% level of significance because the observed t = 1.60 is lower than the critical t with 52 degrees of freedom. The observed F = 2.55 was lower than the critical F at 95% confidence level, 52 degrees of freedom; the regression model is therefore insignificant and not useful in predicting DSC.

Growth

This refers to the internal growth; the level of growth a firm can achieve without having to resort to additional borrowed funds or additional outside capital infusion. Internal growth rate, in the context of this study, is measured according to the Altman Z score model variable X2 by dividing Retained earnings by Total Assets. A high ratio indicates investment financed out of a high level of retained earnings as compared to external equity and debt. Retained earnings and Total Assets data is obtained from the balance sheet of the firms. Internal growth succeeds the plowing back of earnings and the subsequent reinvestment of these earnings into profitable investments. Upon gathering data, the following results were obtained.

Table 4.4 Regression of Growth on Debt Service Coverage

Regression Statistics	
Coefficient	6.39
Intercept	0.84
R	0.48
R Squared	0.23

Other Statistics						
	df	*Observed F*	*Critical F*	*Observed t*	*Critical t*	*Standard Error*
R Squared	52	15.72	4.03			
R	52			3.96	2.01	
Coefficient	52			3.96	2.01	1.61

(Research data, 2012)

The regression model took the form DSCR = 6.39X2 + 0.84 with DSCR being the dependent variable. The coefficient of determination (R Squared) was 0.23 and the correlation coefficient (R) between liquidity and DSC was 0.48. At 95% confidence level, the regression coefficient, regression model and correlation coefficient were tested to be significant. This is as a result of the critical test statistics, F and t, being lower than the observed statistics. It is therefore concluded that the liquidity regression model only determined 23% of variation in DSC, 77% of variation in DSC remained unexplained by the liquidity regression model. The level of association between liquidity and DSC was a positive moderate association as indicated by the 0.48 correlation coefficient.

Profitability

This assesses the general profitability of a firm. Profitability ratio in this study was determined by dividing operating profit by the total assets of the firm with data being obtained from the income statement and the balance sheet. This measured the rational use of a firm's assets to generate profits from operations with a higher ratio indicating a more rational use. The following results were obtained upon analysis.

Table 4.5 Regression of Profitability on Debt Service Coverage

Regression Statistics	
Coefficient	13.63
Intercept	0.16
R	0.47
R Squared	0.22

Other Statistics						
	df	*Observed F*	*Critical F*	*Observed t*	*Critical t*	*Standard Error*
R Squared	52	14.70	4.03			
R	52			3.83	2.01	
Coefficient	52			3.83	2.01	3.56

(Research data, 2012)

The regression model assumed the form DSCR = 13.63X3 + 0.16 with X3 being the profitability ratio. A profitability ratio of 0.5 would therefore approximately yield a DSCR of 6.975. Profitability has a moderate positive correlation with DSC. At 95% confidence level and 52 degrees of freedom a critical t of 2.01 was derived which is lower than the observed t 3.83 which led to the conclusion that the correlation coefficient was significant. The coefficient of determination (R Squared) was also tested for significance at 0.05 level of significance with v1 =

54 – 52 -1 = 1 and v2 = 52 deriving a critical F test equal to 4.03 therefore making the coefficient of determination significant. The X3 coefficient also tested significant at 95% confidence level with the observed t being greater than the critical t. It was therefore concluded that the profitability regression model only determined 22% of variation in DSC, 78% of variation in DSC remained unexplained by the profitability regression model.

Leverage

It is important to assess the extent to which shareholders or outsiders are financing the business and the cushion of security for the creditors. Leverage, in this study's context, refers to the ratio of debt finance to equity finance. A higher leverage ratio therefore means a higher proportion of debt compared to equity in long-term financing. While higher leverage would boost return on investment in favorable business conditions, higher leverage would, on the other hand, adversely affect return on investment during unfavorable business conditions. Leverage ratio in this study was determined by dividing book value of equity by total liabilities of a firm. With equity being the numerator and liabilities being the denominator, a higher ratio thus indicates low leverage while a lower ratio, high leverage.

Table 1: Regression of Leverage on Debt Service Coverage

Regression Statistics	
Coefficient	0.88
Intercept	0.77
R	0.27
R Squared	0.07

Other Statistics	df	Observed F	Critical F	Observed t	Critical t	Standard Error
R Squared	52	3.94	4.03			
R	52			1.98	2.01	
Coefficient	52			1.98	2.01	0.44

The above statistics were obtained when data was put forth for analysis. There was a weak positive correlation (R) between leverage and DSC which was insignificant since at 95% confidence level the critical value t is 2.01 which is higher than observed t = 1.98. The leverage regression model assumes the equation DSCR = 0.88X3 + 0.77 with the X3 coefficient being tested to be insignificant at 0.05% level of significance because the observed t = 1.98 is lower than the critical t with 52 degrees of freedom. The observed F = 3.94 was lower than the critical F at 95% confidence level 52 degrees of freedom which rendered the coefficient of determination (R Squared) not significant; the regression model, therefore, was insignificant and not useful in predicting DSC.

Multivariate Analysis

This involved a simultaneous analysis of multiple financial distress determinants' ability to predict corporate financial distress by grouping them together thereby yielding a single distress score. This study employed the Altman Z score model, an MDA model, developed to predict corporate bankruptcy. The Altman Z score model takes the form $Z=6.56X_1+3.26X_2+6.72X_3+1.05X_4$ with X_1 being liquidity ratio, X_2 = growth ratio, X_3 = profitability ratio and X_4 = leverage ratio. The model is suitable for general firms in emerging markets where the NSE lies. As with univariate analysis, Z scores were matched with succeeding years' DSCR and bivariate regression and correlation analysis was done. Units of analysis were fifty four. Results were obtained as below:

Table 2: Regression of Altman Z scores with Debt Service Coverage

Regression Statistics	
Coefficient	0.55
Intercept	0.01
R	0.48
R Squared	0.23

Other Statistics						
	df	*Observed F*	*Critical F*	*Observed t*	*Critical t*	*Standard Error*
R Squared	52	15.37	4.03			
R	52			3.92	2.01	
Coefficient	52			3.92	2.01	0.14

(Research data, 2012)

The regression model assumed the form *DSCR = 0.55Z + 0.01*. An upper limit of the safe zone, Z = 2.6, would approximately yield a DSCR equal to 1.44 while the lower limit, Z = 1.1, would approximately yield DSCR = 0.615. Altman Z scores had a moderate positive correlation with DSC. At 95% confidence level and 52 degrees of freedom a critical t of 2.01 was derived which was lower than the observed t 3.92 which led to the conclusion that the correlation coefficient was significant. The coefficient of determination (R Squared) was also tested for significance at 0.05 level of significance with *v1 = 54 – 52 -1 = 1* and *v2 = 52* deriving a critical F test equal to 4.03 therefore making the coefficient of determination significant. The Z coefficient also tested significant at 95% confidence level with the observed t being greater than the critical t. It was concluded that the Altman Z score model only predicts 23% of variation in financial distress as measured DSCR, 77% of variation in DSC remained unexplained by the Altman Z score model.

Multiple Regression

In this section, an actual regression model was developed with four independent variables. The independent variables are liquidity (X1), growth (X2), profitability (X3), and leverage (X4). The regression model took the form: DSCR=.05X1+8.72X2+4.39X3+1.88X4-0.15 as in the table below.

Table 3: Multiple Regression with Debt Service Coverage

Regression Statistics		
Coefficient	X1	0.05
	X2	8.72
	X3	4.39
	X4	1.88
Intercept		-0.15
R Squared		0.33

Other Statistics		df	Observed F	Critical F	Observed t	Critical t	Standard Error
R Squared		49	6.15	2.56			
Coefficient	X1	49			0.11	2.01	0.44
	X2	49			2.29	2.01	3.81
	X3	49			2.44	2.01	1.80
	X4	49			1.09	2.01	1.72

At 95 percent confidence level and 49 degrees on freedom, liquidity and leverage coefficients were found to be insignificant since their observed t statistic was lower than the critical t test. Profitability and growth coefficients fell in the critical region and thus concluded significant. The regression model had a 33% coefficient of determination which was found to be significant with the observed F being greater than critical F-test at 0.05 level of significance and V1 equal to 4 (54-49-1=4) and V2 equal to 49. The regression model therefore explained 33% of variation in DSCR.

Multiple Regression with DSCR Intercept equal to Zero

Since the Altman Z score model is a multiple regression model with DSCR intercept/constant equal to zero, the researcher also saw it fit to develop an actual multiple regression model with constant equal to zero. The following regression model was obtained from the data gathered.

Table 4: Multiple Regression of with intercept equal to Zero

Regression Statistics		
Coefficient	X1	-0.01
	X2	8.22
	X3	4.43
	X4	1.86
R Squared		0.59

Other Statistics							
		df	*Observed F*	*Critical F*	*Observed t*	*Critical t*	*Standard Error*
R Squared		50	17.65	2.79			
Coefficient	X1	50			-0.03	2.01	0.38
	X2	50			2.51	2.01	3.28
	X3	50			2.49	2.01	1.78
	X4	50			1.09	2.01	1.70

The regression equation took the form DSCR = -0.01X1 + 8.22X2 +4.43X3 + 1.86X4. At 95 percent confidence level and 50 degrees on freedom, liquidity and leverage coefficients were found to be insignificant since their observed t statistic was lower than the critical t test. Profitability and growth coefficients fell in the critical region and thus concluded to be significant. The regression model had a 59% coefficient of determination which was found to be significant with the observed F being greater than critical F-test at 95% confidence level. This presented a more improved model of predicting debt service coverage by explaining 59% of variation in DSCR in comparison to other regression models derived in this study.

DISCUSSION OF FINDINGS

This study finds growth, as measured by dividing retained earnings by total assets, to be the most significant determinant of corporate financial distress. Profitability, measured by dividing earnings before interest and taxes, is found to be the second most influential determinant of corporate financial distress. Liquidity and leverage are found to have no significant effect on corporate financial distress. The Altman Z score model is found to be having a significant influence on corporate financial distress though with a moderate correlation with DSCR as a proxy to corporate financial distress. These findings are in congruence with Sitati and Ondipo's (2006) study which found out that the Altman Z score model had 80% accuracy in predicting corporate bankruptcy and 90% accuracy in predicting safety and thus being a useful tool in the Kenyan market. The findings also agree with Zouari and Abid's (2000) which led to the conclusion that it is not necessary to have complex architecture in neural models to predict firm's financial distress and that the more the predictability horizon is shorter and the input information structure is most recent, the more the predictive capability of the prediction model as far as the

Altman Z score model is concerned. The findings, however, do not concur with the findings of Keating & Hillegeist (2003) study which left them concluding that Black-Scholes-Merton option-pricing model would be a better bankruptcy predictor than less sophisticated Altman Z score and Ohlson O score model in predicting corporate bankruptcy.

As far as leverage analysis is concerned, the findings of this study differ with those of Halim (2008) who concludes that the ratio of debt to total assets was the most significant predictor of corporate distress among the ten determinants of corporate performance examined. The findings of Titman and Opler (1994) support the opinion that highly leveraged firms lose substantial market share to their more conservatively financed competitors in industry downturns. This study, in contrast, finds leverage to be of no significant ability to predict financial distress. The findings also differ with Paranowo's (2010) findings. Paranowo (2010) found out that leverage and liquidity had positive and significant influence to Debt Service Coverage as a proxy of financial distress. On the other side, Paranowo's study revealed that profitability and retained earnings had no significant impact on the status of corporate financial distress. This led him to the conclusion that that a high profitability should not be a guarantee that the companies can survive to fulfill its liabilities.

The results agree, in part, with the recommendations of Kiragu (1993) that firms need to generate sufficient earnings in order to meet fixed finance charges. They however differ on the fact that his findings that the critical ratio in determining corporate financial distress was liquidity and that firms had to maintain sufficient liquidity in order to avoid insolvency problems. The findings also agree with those of Keige (1991) that return on net worth can be used successfully in predicting for a period up to 2 years before it occurs. The discrepancies in the findings can be explained by the fact that the types of ratios that will best discriminate between failing companies and successful ones tend to differ from place to place and from time to time (Keige, 1991).

CONCLUSIONS

The following conclusions are drawn according to the research questions and results of the study:

Liquidity and leverage were found to be having no significant influence on corporate financial distress. They both had a weak positive correlation with DSC which was insignificant as determined by a two tailed t-test with 95% level of confidence. As variables in multiple regression models, their coefficients also had no significant contribution. Liquidity and leverage, as measured in the study, therefore have no significant effect on DSC as a proxy to corporate financial distress.

Profitability and Growth were found to have a significant influence on corporate financial distress though they each had moderate positive correlations with DSC. Under univariate

analysis, the variables were seen to have a significant influence by having significant coefficients of determination. The ratios also had a significant contribution in multiple regression analysis. Profitability was found to explain 22% of variation in DSC as a proxy to corporate financial distress while growth explained 23%.The Altman Z score model was found to have a significant influence on DSC as a proxy to corporate financial distress. It however had weak ability to predict financial distress one year prior as evidenced by the study. The Altman Z scores have a significant moderate correlation coefficient with DSCR of 0.48. Altman Z score model's regression equation versus financial distress was also found to be significant since the Z scores' coefficient on the equation and coefficient of determination were significant. With a 23% coefficient of determination, it can be concluded that the Altman Z score model could only explain 23% of variation on financial distress while 77% of variation in financial distress could not be explained by the model.

RECOMMENDATIONS

Drawing from the findings of the study, financial managers in wealth maximizing firms should not place an absolute reliance on the Altman Z score model alone in determining their financial distress position. This is because the model was found to effectively explain only 22% of occurrence in financial distress. Instead, they should focus on maximizing earnings and retaining as much earnings as possible for further reinvestments in order to land themselves in a safe credit position.

REFERENCES

Alder, E. B. (2002). The Law of Last Resort, . *55 Vand. L. Rev.* , 1661-1674.

Almeida, H., & Philippon, T. (2006). *The Risk-Adjusted Cost of Financial Distress.* New York: New   York University.

Altman, E. I. (1968). Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. *The Journal of Finance* , 589-609.

Altman, E. I. (2000). Predicting Financial Distress of Companies: Revisitng the Z-score and Zeta Models. *Journal of Finance* , 40-54.

Altman, E., (1977). Zeta Analysis: A new Model to identify Bankruptcy Risk of Corporations. *Journal of Banking and Finance* , 22-33.

Baimwera, B. (2006). *The Relationship between Book-to-market ration of equity and distress for stocks quoted at the NSE.* Nairobi: University of Nairobi.

Brennan, M. J. (1991). The price of convenience and the valuation of commodity contingent claims. In D.   Lund, & B. Oskendal, *Stochastic models and option values* (pp. 34-71). North Holland: Elsevier.

Brennan, M. J., & Schwartz, E. S. (1984). Optimal financial policy and firm valuation. *Journal of Finance 39* .

Bum, J. K. (2003). Bankruptcy Prediction: Book value or Market Value? *Journal of Finance*, 22-30.

Campbel, Y., Hilscher, J., & Szilagyi, J. (2005). *A 'Wreckers Theory' of Financial Distress: Discussing "In Search of Distress Risk".* Berlin: Seventh Bundesbank Spring Conference.

Dichev, D. I. (1998). Is the Risk of Bankruptcy a Systematic Risk? *The Journal of Finance*, 10-28.

Douglas, G. (2002). The End of Bankruptcy. *Law and Economic review* , 784-785.

Halim, A., Ahmad, H., & Rus, M. R. (2008). Predicting Corporate Failure of Malaysia's Listed Companies: Comparing Multiple Discriminant Analysis, Logistic Regression and the Hazard Model. *International Research Journal of Finance and Economics* , 1-17.

Haugen, R., & Senbet, L. (1978). The insignificance of bankruptcy costs to the theory. *Journal of Finance* , 383-393.

Keating, K. E., & Hillegeist, A. S. (2003). *Assessing the Probability of Bankruptcy.* California: VaRisk, Inc.

Keige, P. (1991). *Business Failure prediciton using Discriminate Analysis.* Nairobi: University of Nairobi.

Kiragu, M. (1993). *The Prediction of Corporate Failure using Price Adjusted Accounting data.* Nairobi: University of Nairobi.

Longhover, D. (2004). Protection for Whom? Creditor Conflict and Bankruptcy. *Law and Economic review* , 258-261.

Ming, J. (2000). Policy Implicatiions of the Federal Reserve Study of Credit Risk Models at Mjor US Banking Institutions. *Journal of Banking and Finance* , 15-33.

Pandey, I. M. (2005). *Financial Management.* New Delhi: Vikas Publishing House.

Paranowo, K. e. (2010). Determinant of Corporate Financial Distress in an Emerging Market Economy: Empirical Evidence from the Indonesian Stock Exchange 2004-2008. *International Research Journal of Finance and Economics* , 80-88.

Sabato, G., & Altman, E. I. (2005). Modelling Credit Risk for SMEs: Evidece from the US Market. *Journal of Banking and Finance* , 11-33.

Salehi, M., & Abedini, B. (2009). Financial Distress Prediction in Emerging Market: Empirical Evidences from Iran. *Business Intelligence Journal* , 1-12.

Sitati, A., & Odipo, M. K. (2009). *Evaluation of applicability of Altman's revised model in prediction of Financial Distress: A case of companies quoted in the Nairobi Stock Exchange.* Nairobi: University of Nairobi.

Szilagy, J., Hilsche, J., & Campbell, Y. J. (2010). *Predicting Financial Distress and the Performance.* Cambridge: Harvard University.

Titman, S., & Opler, C. T. (1994). Financial Distress and Corporate Performance. *The Journal of Finance* , 1015-1040.

Wang, Y., & Campbell, M. (2010). Financial Ratios and the Prediction of Bankruptcy:The Ohlson Model   Applied to Chinese Publicly Traded Companies. *The Journal of   Organizational Leadership and   Business* , 1-15.

Zouari, A., & Abid, F. (2000). Financial distress prediction using neural networks: The Tunisian firms   experience. *International Conference on Modeling and Simulation* (pp. 399-406). Spain: University of Sfax.