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Financial Risk, Firm Size and Financial Distress: Turbulent Times for Firms Listed at the Nairobi Securities Exchange, Kenya

Elias Walela[1*], Job Omagwa[2] and Stephen Muathe[3]

[1]Faculty of Business, Computer Science and Communication studies, St Paul's University, Kenya
[2]School of Business, Department of Accounting, Kenyatta University, Kenya
[3]School of Business, Department of Business Administration, Kenyatta University, Kenya

*Corresponding author email: b.walela@yahoo.com

ABSTRACT

In Kenya, at least 6 listed firms became insolvent and got into liquidation over a period of 10 years (2009-2018) leading to loss of income, unemployment and other negative outcomes. Hence, the financial stability of the existing listed firms should be examined closely since the firms are expected to be stable at any point in time. Firm Size has been observed to moderate the relationship between various variables and financial distress of firms though there is little empirical evidence in developing economies particularly for firms that are listed at the Nairobi Securities Exchange in Kenya. Hence, an empirical issue that remains is to determine what moderating effect firm size has on the relationship between financial risk and financial distress of the listed firms. The general objective was to investigate the moderating effect of firm size on the relationship between financial risk and financial distress of firms listed at the Nairobi Securities Exchange, Kenya for the period 2009-2018. This study was based on Wreckers theory of financial distress, Trade off theory, Distress theory, Early Bankruptcy theory and the Altman's Z-Score Model for financial distress. The study adopted positivism research philosophy and explanatory and descriptive research designs. The targeted population entailed all 66 firms listed at the Nairobi Securities Exchange, Kenya as at 2018. Time Series Cross-Sectional secondary data was analyzed. The following diagnostic tests were carried out before delving into data analysis: Tests for Multicollinearity, Outliers, Heteroscedasticity, Autocorrelation, Linearity, Goodness of Fit, Stationarity and Model Specification. Data analysis was done using descriptive statistics and inferential statistics using Binary Logistic regression model. The findings indicate that Firm size indeed moderates the relationship between financial risk and financial distress of firms listed at the NSE, Kenya at 5% significance levels. Optimal firm sizes should be set up for listed firms to manage financial distress.

Keywords: Financial Risk, Firm Size, Financial Distress

1 Introduction

Financial distress are circumstances that leads to firms being unable to fulfill their credit obligations to creditors and may result in bankruptcy or restructuring (Enyew, 2019). Distress situations have been observed all over the world across continents hence emphasizing distress as a global problem (Platt, Platt & Chen, 2008). When firms are faced with distress situations, the immediate effect is on the firms' operations (Pindado, Rodrigues & de la Torre, 2006). Factors that contribute to distress situations in firms have been identified and are varied on a wide scale. Firm size is one such factor among others including profitability, liquidity, leverage etc (Isayas, 2021). Various studies across the globe have identified factors that contribute to distress ranging from managerial (Njogu, Gekara, Waititu & Omido, 2017) and (Isayas, 2021)), operational (Beaver, 2010), size of the firm, firm growth (Ater, Kisaka, Iraya & Mwangi, 2017) risk levels exposed to by the firm, government policy, governance (Outecheva, 2007; Salloum & Azoury, 2012; Salloum, Schmitt, & Bouri,

2012; Atosh, 2017). Distress can be studied in its various dimensions, importantly in its financial dimension. This study delved into financial distress which is deemed to affect all firms without respect to the location, type or size of the firms.

Financial distress has gained significant attention in the recent past evidenced by empirical and theoretical literature focusing on the area. Various studies including (Isayas, 2021) and (Enyew, 2019) have been undertaken on financial distress due to its varied nature. This is also noted in (Campbell, Hilscher, & Szilagyi, 2010). This attention calls for in depth analysis of why financial distress is of significance to institutions and the economies of the world in general. Empirical literature across the world that have delved on financial distress include study on early warning signs of financial distress in Romania (Ecaterina, 2013), theories of financial distress (Kalckreuth, 2005), Comparison made between financial distress models before and after recession (Šarlija & Jeger, 2011), Audit quality and financial distress in China (Lu & Road, 2016), Operating and costs of financial distress, a study conducted in Pakistan (Farooq, Nazir & Nawaz, 2012), analysis of distress risk and financial distress for firms (Outecheva, 2007) etc. These studies reiterate financial distress as a global problem for firms and economies. Despite the problem of financial distress all over the world, it is a concept that remains unsolved in the world.

Significant relationships have been proven to exist between financial distress and various firm characteristics including firm size liquidity, firm performance, dividends (Isayas, 2021; Baldwin & Scott, 1983;) etc. This is in effect touching on the growth and liquidity levels hence a firm's liquidity risk. Firm performance is of great influence to a firm's financial distress level because when a stock of a firm does well on the market, the profitability will go up and hence the ability to manage the liquidity risks of the firm and meeting their immediate obligations in addition to access to credit and power to negotiate on contracts. Profitability is linked to performance of firms and empirical studies note that a high degree of profitability result in low degree of indebtedness (Vintilă, Gherghina, & Toader, 2019). Financial risk is also linked to performance of firms and studies that have attempted to discuss factors that affect firms' performance have always included financial risks among others (Muriithi & Waweru, 2017).

Financial risk is one major factor that threatens the survival of many firms all over the world due to its adverse effect on the operations of the firms. Risk is the unpredictability or unexpected change in the returns of a firm (Fali, 2020). Risk threatens the financial viability and firms' long-term survival (Muriithi & Waweru, 2017), in effect the financial distress levels of firms. Financial risk is a considerable example of factors affecting the financial distress levels a firm is exposed to and its management is of great consequence to the economic activity levels of a firm and economy at large (Madhushani & Kawshala, 2018). Analysis of risk relating to financial distress of a firm is important for various reasons, among them informing choice of investment between active and passive stocks in financially distressed firms (Outecheva, 2007). Financial risk is important in that it affects almost all firms in operation regardless of location, size, type and other factors (Karanović, Karanović & Gnjidić, 2018), hence partly informing this study. Understanding of the causes of financial distress and failure of a firm is important to all firms and therefore it is essential for the stakeholders ranging from both potential and current investors in the firm, researchers, the government and lending institutions to get to know the effect financial risk has on financial distress.

Firm value is also affected in financial distress situations caused by financial risk. This is because financial risk involves expected payments that are either certain or conditional in terms of the expected cash flows and their timing. Additionally, financial risk is related to the firm value (Moles, 2016) which affects the operations of firms that may affect their financial distress levels. Higher levels of financial risk often result in financial distress (Baimwera & Muriuki, 2014) and the hypothesis is that, if not well managed, financial risk affects financial distress of firms. It is from the understanding that firms have negative exposures to changes in macroeconomic factors that affect their corporate performance and survival in the future (Olga, 2008). This call for greater care by owners of firms and stakeholders in the firms should be concerned about the effects of financial risk on the firms (Moles, 2016).

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Firms in Africa are faced with both problems of financial risk and financial distress. Such risks range from foreign exchange risk especially for firms heavily invested and dependent on oil and energy sectors, credit risks for all firms in the financial sector and other sectors due to their commitments to financial institutions, liquidity risks due to cash flow problems and interest rate risks due to interest rate fluctuations. Investor confidence gets eroded in such cases and firms face cash crunch (Koech, Akuno & Mugo, 2018). Firms are faced with liquidity risk emanating from the lack of immediate cash to engage in immediate trading and honouring of commitments to their creditors and suppliers. The problem of financial distress is as much an old problem as it is new in firms, evidenced by recent failures by large firms. Empirical evidence opine that Africa has had a good share of its firms in various regions facing financial distress due to financial risks (Baimwera & Muriuki, 2014; Mahama & Campus, 2015).

Moles (2016) explains risk as "The chance (or probability) of a deviation from an anticipated outcome". The definition brings out the three dimensions of risk as: probabilities can be attached to risk; risk is concerned with deviations from expected outcome and it is a function of objectives. The lack of determination of the financial outcome and the prospect of financial deprivation are the key factors in defining financial risk. Financial risk implies chance of financial loss arising due to unfavourable changes in the macroeconomic variables such as exchange rates, interest rates etc. that firms are negatively exposed to. Financial risk is an umbrella term that involves various risks associated with financing (Wanjohi, Wanjohi, & Ndambiri, 2017). It is the prospect that financial stakeholders or shareholders will lose money when they make an investment in a firm that is indebted, if the firm's cash flow becomes insufficient to cover its financial obligations. Financial risk involves potential contracted or contractual payments where the cash flows either are known conditionally or for certain. It has been established from studies that the financial soundness of a business depends on the financial risk management in place (Bokpin, Aboagye, & Osei, 2010). The various risks associated with financing that were employed in this study were credit, currency, interest rate and liquidity risks.

Financial risk variables are many but the most common ones are; Credit, Currency, Interest Rate and Liquidity risks. Firms are exposed to these risks on a daily basis and largely in their operations. Various researchers including Muriithi (2016) used financial risk, encompassing risk, related to credit (Credit risk), risk related to liquidity (Liquidity risk) and general risk related to the market conditions (Market risk). (See also; Tafri, Hamid, Meera, & Omar, 2009; Dimitropoulos, Asteriou, & Koumanakos, 2010; Muriithi, 2016).

1.1 Firm Size

Firm size refers to a firm's capacity for production and turnover (Surajit & Saxena, 2009). Studies and policy makers have had a greater interest in how small and medium sized firms have been performing because of their potential to grow to a great extent. Although the challenges faced by firms that are small and medium sized are greater compared with their larger counterparts, the small and medium enterprises have the potential to scale up through finding a niche in the market and taking full advantage of the same. Firm size is influenced by growth and is noted to have a significant moderating effect (Ater *et al.*, 2017). Studies on how the size of the firm affects a firm's performance and beyond have been undertaken (Ferdiano, Restuningdiah, & Achadiyah, 2015). Decisions affecting daily operations and leverage of firms and enterprises are largely dependent on or to a large influenced by the firm size (Muigai & Muriithi, 2017). A positive relationship subsists between firm size and ability to manage FX risk as substantiated by the economies of scale that are specific to the activities (Marin & Montreal, 2013).

Small and medium firms are regarded as the ones more likely to fail as opposed to their larger firms counterparts due to the larger financing costs involved, especially in their initial stages of growth (Campbell, 1996). As much as that is the case, the smaller firms have great potential to grow to big firms with large profits, hence the need to differentiate the risk exposures between them and larger firms. The moderating effect of firm size on the interrelation that exists between firms' financial distress and capital structure is significant (Muigai & Muriithi, 2017). Relationship that subsists between firm size and firm performance is a topic of discussion that continues to arouse interest of many studies because of varied and various reasons. It is

of much importance to note that different firm sizes affect the performance of the firms in different ways and that decisions involving firms differ due to the sizes of the firms (Achyarsyah, 2016). Firm size, in addition to management turnover is among the factors that affect firm turnaround (Chenchehene & Mensah, 2014).

An investigation was important to determine if firm size has a moderating consequence on financial risk exposed to NSE listed firms because of their varied sizes. Achyarsyah (2016) indicates that measuring firm size can be done by use of total assets, sales or market capitalizations. Various measures of firm size have been employed by various researchers, including the use of sales revenue, number of employees and total assets to measure firm size. Muigai and Muriithi, (2017), in the study of the moderating effect firm size has on NSE listed non-financial firms' financial distress adopted total assets as a proxy for firm size. Chenchehene and Mensah (2014) employed sales revenues to determine firm size. This study measured firm size by the size of their total assets since total assets have great potential for determination of production and turnover capacities of firms. Based on past empirical investigations, the total assets was employed to measure firm size in this study.

1.2   Problem Statement

The NSE plays a critical part in the Kenyan economy and firms listed at the NSE contribute significantly to the Kenyan economy GDP (Katambani, 2014). In addition, Kenya is considered an economic hub in thev region due to its ability to attract domestic and foreign direct investment due to its enhanced capacity through trading in securities (Capital Markets Authority Q4, 2018). Of paramount importance in ensuring a stable financial market, a stable society and ultimately a stable economy is the stability of the firms listed at the NSE, Kenya. The Kenyan government put in place regulations and authorities such as the insolvency bill in 2014 and the Capital Markets Authority. The insolvency bill was enacted in order to cushion firms having cash flow problems from the unexpected, often uncalled for decisions by the receivers that plunged firms into bankruptcy in the past (Insolvency Bill, 2014).

Financial distress has been a challenge of firms listed at NSE and substantial evidence has been documented to that extent. Empirical literature notes that financial distress, credit, currency and liquidity problems still remain a concern of the firms listed in Kenya (Maina & Sakwa, 2017; Nairobi Securities Exchange, 2019). The NSE market experienced different periods trading with different number of firms at any one time due to various reasons including firms placed under administration, suspension and delisting of some firms from the market (Maina & Sakwa, 2017; Guguyu, 2018). Hence, various regulations have been enacted and modified in the past to recent years with the aim of ensuring that the listed firms are and remain prudently managed and profitable at the same time hence adding to shareholders value (Capital Markets Authority, 2002; 2018).

Despite the listed firms in Kenya contributing much to the economy and their significance, their exposure to increasing financial distress is yet to be clearly linked to the moderation effect of firm size on the relationship between financial risk and financial distress. As much as this relationship has been documented in other countries, this remains an issue for investigation especially in Kenya hence this study sought to deal with this contextual gap and by extending to test the moderating effect of firm size on the relationship subsisting between financial risk and financial distress of the listed firms. Evidence in Kenya is that about 9 banks wound up between 2007-2016 and at least 10 firms (including Uchumi Ltd, Kenya Airways, Mumias Sugar company, Marshalls E.A, Sameer Africa etc) listed at the NSE are faced with cases of severe financial distress. Empirical studies recommend that more studies should be undertaken in the area of financial distress in its various dimensions (Kihooto, Omagwa, Wachira & Ronald, 2016) and recent literature touching on the field of finance have highlighted the need for analysis of financial soundness and financial distress of firms in order to curb against its occurrence and adverse effects in advance (Outecheva, 2007; Mahama & Campus, 2015).

Despite the various reforms, regulations and authorities set up in Kenya to ensure a sound and proper working NSE, financial distress is a problem experienced by listed firms in Kenya. At least 16 firms listed at the NSE have been undergoing financial distress in the past years of 2009-2018. There is need for an in- depth analysis of the factors affecting financial distress outside enacted regulations in addition to measuring the level

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of their impacts. There is lack of literature on financial distress and financial risk including incorporation of firm size as a moderator; empirical evidence did not delve into such an analysis. The lack of empirical literature creates conceptual, contextual, empirical and methodological gaps. It is against the backdrop of these needs that this study was conducted.

2   Literature Review

Studies on firm size have yielded mixed results with some indicating that large firms are the ones that avoided distress through turnaround strategies employed while others found out that the smaller firms were the more successful ones as compared to the larger ones. A study conducted to analyze the UK retail industry's corporate turnaround and financial distress found out that corporate turnaround depends on the size of the firm and turnover of management. The study used a bivariate analysis to obtain the descriptive statistics. It was noted that large firms are capable of raising the financial resources needed in the times of distress and the high profile nature of a firm may warrant them being alive (Chenchehene & Mensah, 2014).

Iqbal (2012) did a comparative study concerning liquidity risk between islamic and conventional banks in Pakistan and noted a positive and significant relationship between the size of the bank and liquidity of the banks. A similar study done in Bangladesh by Rahman and Banna in 2016 discovered that bank size was positive and insignificant with liquidity in the case of islamic banks while at the same time, bank size was negatively related with liquidity risk (case of conventional banks) (Iqbal, 2012; Rahman & Banna, 2016). Dezfouli, Hasanzadeh, & Shahchera (2014) studied the relationship between firm size and its performance and observed firm size to be a crucial factor in a firm's performance (Dezfouli *et al.*, 2014). Performance is largely related to liquidity risk of firms in that the better a firm performs, the more profitable it becomes and hence the capability to meet its financial obligations from the finances obtained through profits. The performance enhances profitability of firms which reduces firms' indebtedness that reduces chances of plunging into bankruptcy.

A study by Thim, Choong and Nee (2011) on factors affecting financial distress, case of public listed firms in Malaysia between 2005-2009 to analyze the relationship between financial distress, firm characteristics and risk. found that firm size has a positive and significant relationship with financial distress. Various empirical investigations have used various measures of determining firm size among them being employee size, sales revenue size and total tangible assets for measuring firm size (Chenchehene & Mensah, 2014; Achyarsyah, 2016; Muigai & Muriithi, 2017). This study determined firm size by utilizing the firms' total assets, specifically, the natural logarithms of total assets. This study utilized the total assets since they are more stable than sales and market capitalization, as emphasized by (Achyarsyah, 2016). The hypothesis of the study was therefore formulated as below;

H01: Firm Size has no significant moderating effect on the relationship between Financial Risk and Financial Distress of firms listed at the NSE, Kenya

3   Research Methodology

This study was intended to be objective and free from external individual influence hence the philosophical foundation that guided this study is positivism, which seeks facts about social phenomena that are observable, objective, neutral and can be predicted without undue influence and little regard to subjectivity of individuals (Saunders, Lewis & Thornhill, 2007). The practical considerations in using positivism in this study were based on the type of investigation (explanatory), purpose of this study (which was to test hypotheses), data collection time frame (limited period and time), analysis involved (quantitative analysis methods) and the events of interest which are external, objective, factual and not dependent on the researcher. Explanatory and descriptive designs were employed in this study with an emphasis on establishing and explaining causal relationships (Saunders *et al.*, 2007). The aim was obtaining the cause and effect between variables (Robson, 2002; Sekaran & Bougie, 2011).

The target population was 66 firms quoted at the NSE as at August 2018 (Nairobi Securities Exchange,

2018). The number of firms that operated during the different years under study was different due to various reasons including listing of new firms, delisting or suspension of existing firms etc. The NSE is divided into the following 12 segments (namely sectors) comprising of various firms under each sector: Agricultural (7 firms), Automobiles and accessories (2 firms), Banking (11 firms), Commercial and services (12 firms), Construction and allied (5 firms), Energy and petroleum (5 firms), Insurance (6 firms), Investment (5 firms), Investment services (1 firm), Manufacturing and allied (10 firms), Telecommunication and technology (1 firm) and Real estate investment trust (1 firm) (NSE, 2018).

The study adopted a census of all the listed firms at the NSE as at 2018. Census enabled the collection of the detailed data of every firm under study hence increasing the statistical power and accuracy of the findings, accordingly improving the validity of the findings (Mwangi, Muathe & Kosimbei, 2014). Census method is recommended when the target population is 200 or less, like it was the case in this study which had 66 firms listed at the NSE, Kenya as at 2018. This study employed quantitative secondary data. This study compiled panel data, which enables studying the behaviour over time and across space (Gujarati, 2003; Baltagi, 2005) hence was appropriate and employed in this study. Cross sectional time-series data was collected from the target population. Using cross sectional time-series data (panel data/longitudinal data) enabled tackling complex problems and increases the power of the test by increasing degrees of freedom (Brooks, 2014). Data collected was first cleaned and abridged using excel software. Trend analysis was done in order to establish the general nature, movement and changes in the variables over the period under study. The study utilized both descriptive and inferential statistics. The data was analysed by Descriptive Statistics and Binary Logistic Regression Analysis. Descriptive statistics are employed to summarize and describe data (Muathe, 2010) in addition to helping in understanding the meaning of the analysed data (Kinyua, 2015; Musau, 2018).

Measures of central tendency which included mean, median, mode etc focus on the average or middle values of the data sets (Saunders. Lewis & Thornhill, 2009). Measures of variability used included standard deviation, variance, skewness and kurtosis and their focus was on the dispersion of data. Inferential statistics particularly the binary logistic regression technique was employed to predict the impact of financial risk on financial distress of the NSE quoted firms.

This study adopted Altman Z-Score model 2000, which is a multivariate model employed to measure the firms' financial health in addition to determining the prospect of financial distress of the firms. MDA models are statistical techniques used to classify an observation into one of the several characteristics they possess, especially in qualitative forms e.g. distressed vs not-distressed, bankrupt and non-bankrupt firms etc (Altman, 2000; Achyarsyah, 2016). MDA models are also essential in avoiding type I and type II errors, an essential feature in avoiding misclassification which can be costly to stakeholders (Maina & Sakwa, 2017). The Altman Z-Score model is precise for predicting 95% of the sample accurately with the errors being only 6% and 3% respectively. This reassures the significance of MDA models as practical predictive models.

Multivariate models have the ability to bring out the simultaneous interactions between variables, a characteristic previously lacking in univariate models (Chenchehene & Mensah, 2014) hence was appropriate for the study. The Altman Z-Score (applicable to publicly traded firms) was employed in this study. The Model is captured below:

$$Z_{it} = 1.2X_{1it} + 1.4X_{2it} + 3.3X_{3it} + 0.6X_{4it} + 1.0X_{5it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3.1$$

Where: Z_{it} = Overall Index/Score for firm i and time t

X_{1it} = Working Capital/Total Assets for firm i and time t

X_{2it} = Retained Earnings/Total Assets for firm i and time t

X_{3it} = EBIT/Total Assets for firm i and time t

X_{4it} = Market value of equity/Book value of total liabilities for firm i and time t

X_{5it} = Sales/Total Assets for firm i and time t

i = Individual firm

t = Time (year)

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The variables are explained as follows:

Z – Signals the financial condition of the company which is classified as either

X_1 – Computes the net liquid asset of a firm considering the total assets

X_2 – This ratio computes the financial leverage level of a firm

X_3 – This ratio computes the productivity of a firm's total assets

X_4 – The ratio computes the segment of a firm's assets that is capable of reducing in value prior to liabilities exceeding the assets.

X_5 – This ratio computes the ability of a firm's assets to bring about revenue

The zones specifications for discriminations which are used to decide on the firms are as follows: $Z > 2.99$ – "Non-distressed / Safe" Zone, $Z < 1.8$ – "Distress Zone". After computing the Z-Score, the scores were grouped into the two categories of distressed vs not-distressed and then loaded into the statistical software as the values for the dependent variable (Financial distress) for purposes of running the Binary logistic regression analysis.

3.1 Test for Moderation effect of Firm size

This study employed the procedure described by Keppel and Zedeck in 1989 as an analysis procedure for testing the moderating effect of firm size on the relationship between financial risk and financial distress of firms listed at the NSE, Kenya. Keppel and Zedeck, (1989) suggested that the perceived moderator has to be established as an explanatory variable and afterwards as an interaction term (moderator). Based on the assumption of a Cobb Douglas multiplicative relationship (Cobb & Douglas, 1928) between the independent variables and the dependent variables when firm size is utilized as an independent variable, the perceived relationship was specified as:

Logit (p) =f (Credit risk, Currency risk, Interest rate risk, Liquidity risk, Firm Size)

The linearized model was specified as follows;

$$Logit\ (p) = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \varepsilon_{1it} \dots\dots\dots\dots\dots\dots\dots\dots\dots3.2$$

Relying on the assumption of a Cobb Douglas multiplicative interaction between the predictor and the explanatory variables when firm size is utilized as a moderator, the perceived relationship was specified as;

$$Logit\ (p) = \beta_0 + \sum_{j=1}^{4} \beta_j X_{jt} + \sum_{j=5}^{8} \beta_j X_{jt} Size4_{jt} + \varepsilon_{jt} \dots\dots\dots\dots\dots\dots\dots\dots\dots3.3$$

Where; β_0 = Constant term

β_j = Coefficients of the explanatory variables and interactive terms

$X_{i,t}$ = Vector of financial risk variables

$X_{i,t} Size4it$ = Vector of interactive variables (product of explanatory and moderating variable)

$\varepsilon_{i,t}$ = Error term

The decision-making criteria is shown in the table 1 below;

Table 1: *Moderation Decision Making Criteria*

Scenario	Description	Conclusion
1.	*B5* in model 2.2 significant *B5-B8* in model 2.3 insignificant	Firm size is an explanatory variable
2.	*B5* in model 3.5 insignificant *B5 - B8* in model 2.3 significant	Firm size is a moderator

4   Findings and Discussion

This chapter presents the findings according to the specific objective of the study. The findings are presented in tables, figures and narrations.

4.1   Descriptive Statistics

Presented in this section are the results of the descriptive statistics and the associations and trends between the variables study. The trend for each of the covariates was obtained by plotting the resultant time series against time in stablishing the trend of the industry. The summary of the descriptive statistics from the study for all the variables of the NSE listed firms for the years 2009 to 2018 are presented in the table 2 below.

Table 2: *Descriptive Statistics*

		Financial Distress	Credit Risk	Currency Risk	Interest Rate Risk	Liquidity Risk	Firm Size
N	Valid	631	631	631	631	631	631
	Missing	0	0	0	0	0	0
Range		1	5.9067	2.0622	0.4854	18.9604	14.1897
Minimum		0	-2.9477	-1.0293	-0.1746	-1.1995	11.8348
Maximum		1	2.9590	1.0328	0.3108	17.7609	26.0245
Mean Statistic		0.58	0.8056	-0.3154	-0.0016	1.2719	16.9074
Mean Std. Error		0.020	0.0283	0.0145	0.0049	0.0966	0.0889
Std Deviation		0.494	0.7102	0.3650	0.1238	2.4270	2.2321
Variance		0.244	0.504	0.133	0.015	5.890	4.982
Skewness Statistic		-0.332	-1.561	1.142	1.216	3.731	0.187
Skewness Std. Error		0.097	0.097	0.097	0.097	0.097	0.097
Kurtosis		-1.896	5.907	2.966	1.512	16.395	0.240
Kurtosis Std. Error		0.194	0.194	0.194	0.194	0.194	0.194

The study used data from all the 66 firms (NSE, 2018) listed at the NSE to obtain the needed results. However, the NSE had different number of firms operating over the ten- year period under study because of various factors including delisting and suspension of firms, among other factors. The results of the descriptive statistics of the study data are presented in table above and included range, minimums, maximums, mean, mean standard error, standard deviation, variance, skewness, skewness standard error, kurtosis and kurtosis standard errors of the study variables. As much as over 70% of the data were obtained from the secondary sources of data collection, some cases of missing data were experienced.

Encountered cases of missing data were resolved using the Multiple Imputation (MI) technique of filling in missing data. Multiple imputation is a widely adopted statistical method in practice for dealing with missing data. The method removes the potential loss in statistical power and chances of getting biased results (Rezvan, Lee, & Simpson, 2015). The data used was after deletion of 29 missing cases (since they accounted for less than 5% of entire data), hence the descriptive statistics are for 631 valid / complete cases. This processing enabled the ascertainment of the nature of the data that was used in the study.

4.2   Trend Analysis

4.2.1   Trend in Financial Distress Levels

Trend analysis of financial distress of the listed firms helps in better understanding of the variables under study over time. The trend in Financial Distress levels was also established for the years under study. The results from the analysis are presented in the figure 1 below.
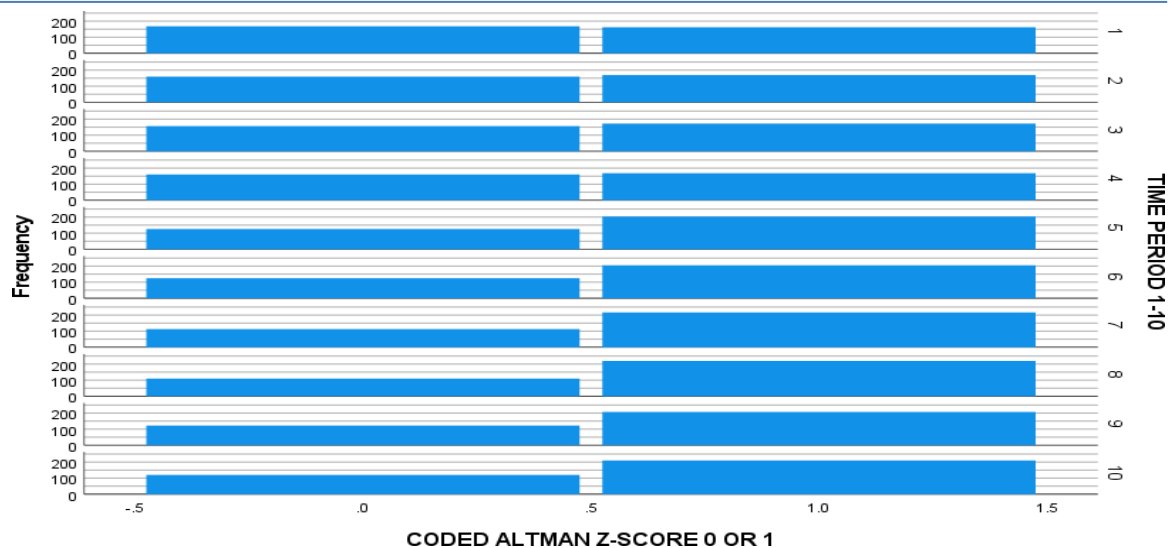
Figure 1: *Trend in Financial Distress*

The observed trend in the distress levels, coded 0 = distressed and 1 = Not-Distressed, showed that most firms were not distressed during the periods 2009 upto 2015. However, the number of distressed firms was on an upward trend from 2015 to almost equal the number of non-distressed firms by the year 2018 (Period 1=Year 2018 …. period 10=Year 2009). Various factors can be attributed to this, including the policies that were introduced during the period. For example, the capping of interest rates at 11.5% law for banks and financial institutions may have affected the operations of firms in terms of their lending and borrowing potential. Other factors include inflation rate that rose to 8% above the upper limit for CBK (at 7.5%), weakening currency, 13% depreciation in USD/Ksh exchange rate, continued liquidity tightness in the money market etc (NSE, 2018).

The total number of cases used in analysis of distressed verses not-distressed firms is presented in the bar graph in figure 2 below.
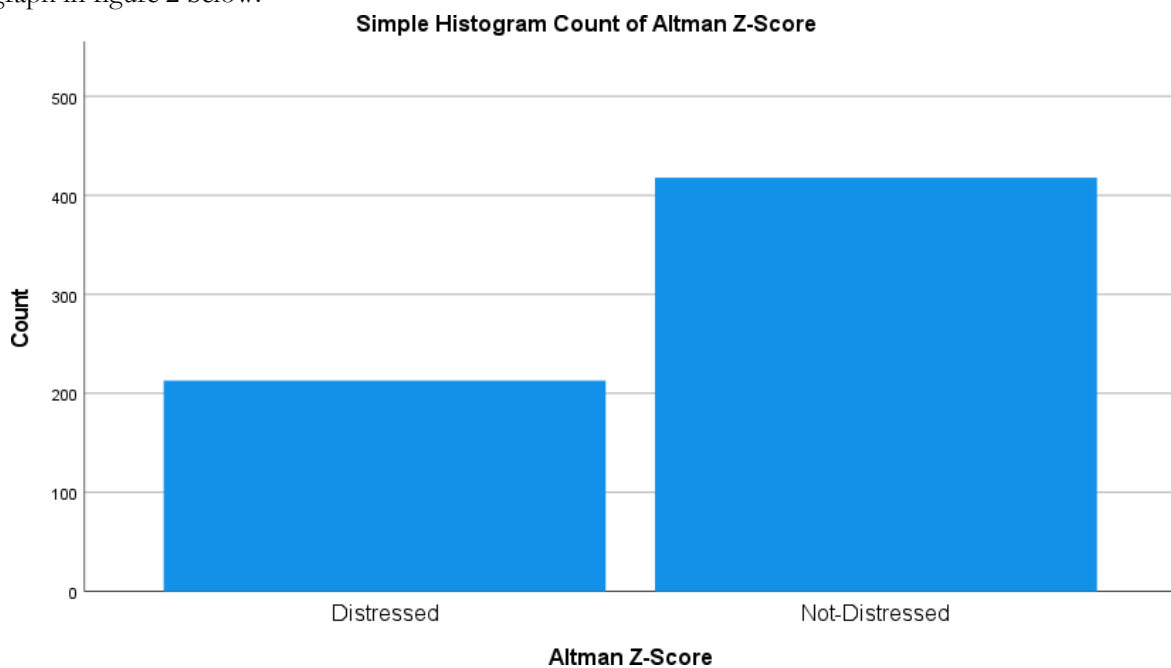

Figure 2: *Cases of analysed Firms (Distressed vs Not-Distressed) at NSE*

The results from the figure above indicate that the total number of cases for Not- distressed firms were higher than total cases of distressed firms for the years under study. 418 cases of Not-distressed firms and 213 cases of distressed were analyzed over the 10- year period. The total valid cases analyzed were 631 (418+213)

out of the total possible cases of 660 (66 firms * 10 years = 660). As previously explained in the preceding section, cases of missing firms were varied but mainly due to non-listing, suspension from trading and delisting of some firms under the period of study. The trends in the independent variables' (credit, currency, interest rate and liquidity risks) risk levels of the firms over the period under study were also analyzed. The tables and figures below present the results from the analyses and discussions given as to the likelihood of the explanations as to why the observations were as such.

4.2.2 Trend in Firm Size

There was need to analyse any condition that would alter the relationship/association between the independent (Financial risk) and dependent (Financial distress) study variables. Firm size, perceived to moderate this relationship was therefore analyzed in terms of the trend. The trend in the changes in the firm sizes of the listed firms was analyzed and the results are hereby presented in the figure 3 below.
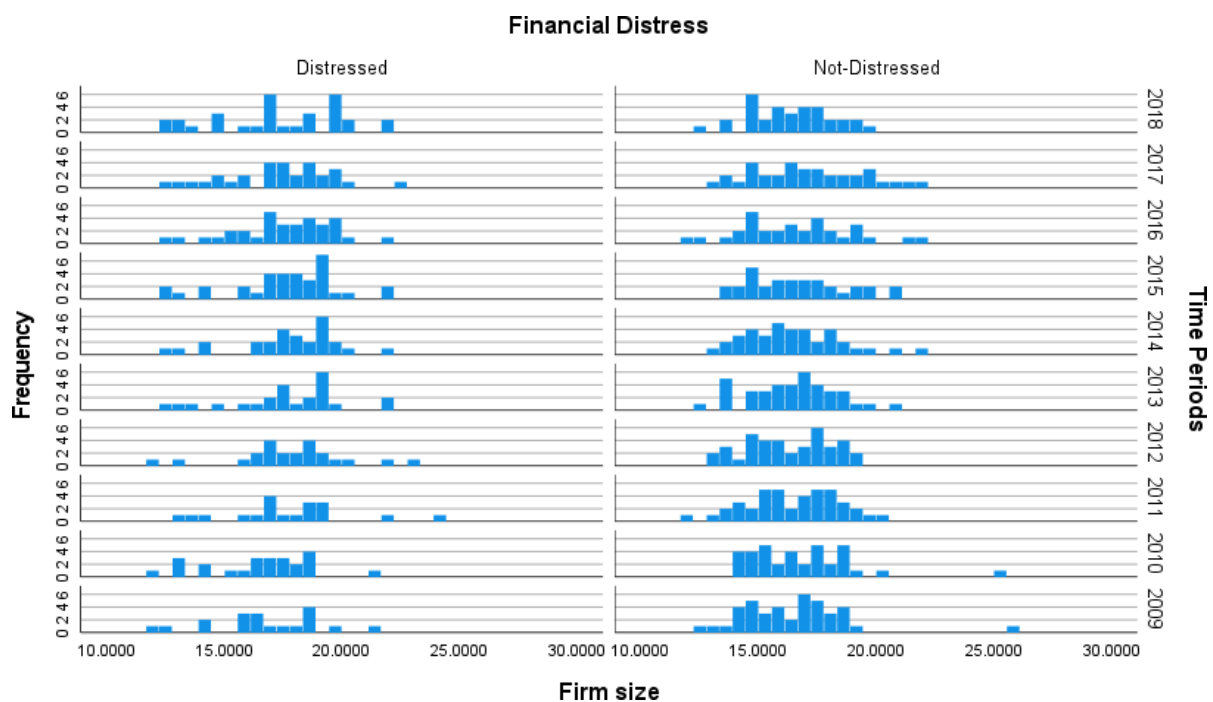

Figure 3: *Histogram of trend in firm size*

Firm size was employed in the study to measure its moderating effect on the relationship between financial risk and financial distress of the firms listed at the NSE, Kenya for the period 2009 to 2018. The trend showed that non-distressed firms had a greater value of total assets as measured using the logarithm of the total assets of the firms as compared to the distressed firms. However, there was an increase in the value of assets for distressed firms compared with non-distressed firms for the years 2014 to 2018, with the graphs signaling almost equal sizes in terms of total assets of the firms in both categories for the latter years under study, 2013-2018.

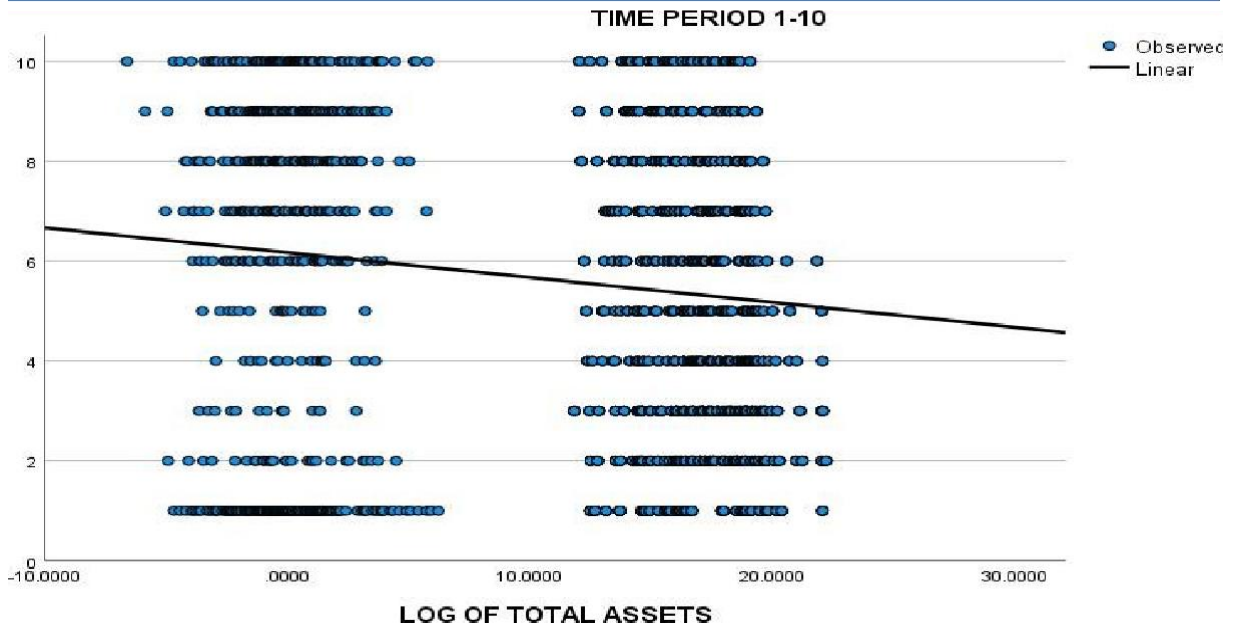Graphically, the trend in total assets was also presented in the figure 4 below.

Figure 4: *Graph of Trend in Firm Size*

The trend showed that non-distressed firms had a greater dispersion in total assets as measured using the logarithm of the total assets of the firms as compared to the distressed firms in the prior years under study (2009-2013). However, there was an increase in the dispersion of assets for distressed firms compared with non-distressed firms for the years 2014 to 2018. The years 2014-2017 showed that assets for non-distressed firms increased in value and dispersion and were comparatively greater than those of distressed firms. The trend shows that in 2018, the assets of distressed firms showed greater and centralized dispersion than for the non-distressed firms. Generally, the non-distressed firms showed greater asset base for the whole period under study.

4.3 Hypothesis Testing

The study employed the procedure described by Keppel and Zeddeck in 1989 as an analysis procedure to test whether firm size would moderate the relationship between financial risk and financial distress of firms listed at the NSE, Kenya. Keppel and Zedeck, (1989) suggested that the perceived moderator has to be established as an explanatory variable and afterwards as an interaction term (moderator) which was employed in this study. Assuming a Cobb Douglas multiplicative relationship between the independent and dependent variables when firm size is introduced as an explanatory variable, the perceived relationship was specified as:

Logit (p)i,t = f(Credit risk, Currency risk, Interest rate risk, Liquidity risk, Firm Size)

The linearized model was specified as follows; (Model 1)

$$Logit\ (p)_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 Size_{5it} + \varepsilon_{1it} \ldots\ldots\ldots\ldots\ldots 4.1$$

Following the assumption of a Cobb Douglas multiplicative relationship between the variables when firm size is introduced as a moderator, the perceived relationship was specified as; (Model 2)

$$Logit\ (p)_{it} = \beta_0 + \sum_{j=1}^{4} \beta_j X_{jit} + \sum_{j=5}^{8} \beta_j X_{jit} Size4_{jit} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 4.2$$

Where; β0 = Constant term

βj = Coefficients of the explanatory variables and interactive terms

Xi,t = Vector of financial risk variables

Xi,t SIZE4i,t = Vector of interactive variables (product of explanatory and moderating variable)

εi,t = Error term

The results from model 4.1 and 4.2 are presented in the tables below.

Table 3: *Results from Model 1 for moderating variable*

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.forEXP(B) Lower	Upper
Step 1a Credit Risk	.211	.127	2.770	1	.096	1.234	.963	1.582
Currency Risk	-.306	.308	.989	1	.020	.736	.403	1.346
Interest Rate Risk	2.828	.815	12.051	1	<.001	16.916	3.426	83.517
Liquidity Risk	.291	.198	2.156	1	.042	1.337	.907	1.972
Firm Size	.446	.083	28.747	1	.141	1.562	1.327	1.838
Constant	.126	.169	.555	1	.456	1.134		

    a.   Variable(s) entered on step 1: Credit Risk, Currency Risk, Interest Rate Risk, Liquidity Risk, Total Assets.

The above result in table is the result from model 4.1 for firm size. The result indicates a statistically non-significant result for firm size (p = 0.141 > 0.05 Level of significance). Analysis of Model 2 was also conducted and produced the result as in the below table.

Table 4: *Results from Model 2 for moderating variable*

	β	S.E.	Wald	t = β∕S. E	p-value
Step 1a Credit Risk	.211	.127	2.770	1.6614	.073
Currency Risk	-.306	.308	.989	-0.9935	.019
Interest Rate Risk	2.828	.815	12.051	3.4699	<.001
Liquidity Risk	.291	.198	2.156	1.4697	.030
DFL by TA	-.200	.098	2.747	-2.0408	.043
OPR by TA	1.925	.719	.901	2.6773	<.001
YIV by TA	.198	.762	11.131	0.2598	.000
LCR by TA	.146	.163	1.801	0.8957	.001
Constant	.109	.126	.456	0.8651	.238

    a.   Predictors: (Constant), Credit Risk, Currency Risk, Interest Rate Risk, Liquidity Risk

    b.   Predictors: (Constant), Credit Risk, Currency Risk, Interest Rate Risk, Liquidity Risk, DFL by TA, OPR by TA, YIV by TA, LCR by TA

    c.   Dependent Variable: Financial Distress

Key: DFL – Degree of Financial Leverage   OPR – Open Position Ratio

    YIV – Yield Implied Volatility   LCR – Liquidity Coverage Ratio

    TA – Total Assets

From the table above, the coefficients B5, B6, B7 and B8 as described in model 3.6 were statistically significant (p = 0.043, p = 0.001, p = 0.000 and p = 0.001 respectively) since they were all under 0.05 as required. The study therefore concluded that firm size significantly moderates and positively affects the relationship between financial risk and financial distress of the firms listed at the NSE, Kenya. In effect, firm size affects the magnitude of the effect of financial risk on financial distress of the listed firms.

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5   Conclusion

Financial distress has been a challenge for firms listed at NSE and substantial evidence has been documented to that extent. Listed firms in Kenya that put in place measures to manage financial risks, especially by properly managing their currency, interest rate and liquidity risks will avoid instances of financial distress. Test of hypothesis results points out that firm size significantly moderates the relationship between financial risk and financial distress of firms listed at the NSE, Kenya. The study thus concludes that firms with a large assets base are better off in vending off instances of financial distress as compared to firms which are smaller in size. Firms should therefore aim to optimize their assets base sizes so that to reduce instances of financial distress. This paper recommends that the governance of the NSE and research bodies should invest more in the area of research in order to enable better understanding of the problem of financial distress of the listed firms. The National Assembly, the Senate and the National Treasury of Kenya should set up policies and legislation to protect investors of listed firms from instances of financial distress. Required financial risk levels can also be set up for firms by regulators and through policy in order to have a yardstick for measurement mechanisms for efficiency. Furthermore, the government and regulators of listed firms in Kenya should put in place punitive measures for firms which ignore measures to curb against financial risk and distress. Directors and finance/risk managers of the listed firms in Kenya should be keen to manage their financial risk exposures; especially interest rate risks through diversification of bond maturities or hedging using interest rate derivatives and credit risk management through proper cashflow management. Proper measures against financial distress should be put in place by firms in their specific ways of operations.

6   Declarations

6.1   Competing Interests

The authors hereby indicate that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non- financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

6.2   Publisher's Note

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