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Size Effect Anomalies and Firms Financial Distress; Evidence from Nairobi Securities Exchange, Kenya

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ABSTRACT: The universal objective of this study is to establish the relationship between size effect anomalies and financial distress of listed firms in Nairobi Securities Exchange (NSE), Kenya. Due to the size effect anomalies, firms experience financial distress. The study adopts descriptive research design and positivist research. It considered all listed firms in NSE which had been licensed by Capital Market Authority (CMA) as at 1st January 2017, totaling to 67 which constitutes the target population. The study considers secondary data which were extracted from the audited financial statements from individual firms from 2007 to 2017. This study will apply panel data model and in data analysis and presentation, the statistical software to be used is EView while the p-value will be applicable in hypothesis testing. The Z-Score, a multivariate approach was applied as the financial prediction model. The results were presented using tables. Size effect anomalies was established to have weak negative correlations with the financial distress. The size effect anomaly was statistically significant at five percent level of significance meaning that the null hypothesis failed to be accepted. The study's recommendations will assist the management, investors, researchers, policy makers and regulators.

KEYWORDS: financial distress, securities exchange, size effect anomalies

1.0 INTRODUCTION

Security exchange is a place whether physical or electronic where securities in listed firms are bought and sold. It may be a private firm, a non-profit firm or a publicly traded firm. It also provides a well governed and regulated place where brokers and firms meet in order to make investments on a neutral ground. According to Karugu, Memba and Muturi (2018), a stock exchange also known as securities exchange or bourse is a formal organization regulated by act of parliament and is a physical location where members gather to trade in securities. Securities are financial assets which are tradeable and are grouped into equity securities also known as stocks, debt securities referred as bonds and derivative securities. Under normal circumstance, securities are traded on an exchange or over the counter.

This study focused on equity securities which are also known as stocks. Stocks are classified as a security that represents ownership interest in a firm. Stock trading thus allows firms to raise capital which in turn is used to settle debt, launch present-day products and diversify if not enlarging its operations. Stock market thus allows the listed firms to step-up long-term capital in addition to offering the investors with alternate investments, (Olweny & Kimani, 2011). Stock market therefore, ought to be efficient as this efficiency is very paramount in the determination of the overall economy growth, (Alile, 1984).

In emerging economies like Kenya, stock market, Nairobi Securities Exchange (NSE) is a significant constituent in the financial sector, (Olweny & Kimani, 2011). All listed firms in the NSE have to be guarded at all costs against financial distress which occur due to size effect anomalies. Financial distress as used in this study, is when a firm is still exhibiting unhealthy financial position and this is according to Altman zones, (Altman, 2000). Financial distress has effects to all the stakeholders and this will not go down well to the Kenyan economic history as the NSE is the beacon of hope in the stock market in the Sub-Sahara Africa. The expectation is that the stakeholders will have financial prudence to caution all firms against the effects of financial distress which will enable firms to be in a healthy financial position which in turn will attracts investors, (Maina & Sakwa, 2012).

Survival of firms listed in the stock market are adversely affected by financial distress as these firms face restructures, being put under receivership, suspension or possibly delisted from the stock markets. Globally all stakeholders are mostly concerned with the financial health of firms listed in the stock markets, (Altman & Hotchkiss, 2010). This has then rendered the stock market as a tool which is very effective for economy development of any country in the world. Therefore, stock market is a suitable device for

mobilizing and allocating savings amid rival uses that are imperative to the development and effectiveness in the economy, (Olweny & Kimani, 2011).

When a firm finds itself in a state of prolonged financial distress, this situation will sharply reduce its market value. This is more often than not referred to as the erosion of the stockholders' wealth. Goods and services suppliers will mostly insist on cash on delivery (COD) terms of supply. In such a circumstance, the big customers may opt to cancel their orders anticipating or citing delays in deliveries, (Almeida & Philippon, 2006).

An anomaly is an observation that is difficult in the traditional framework of financial economics and at times is referred to as a puzzle, (Szyszka, 2007). Anomalies can also be referred to as when the opportunities of trading arise from the strategies by which trading in stock give birth to above-normal returns, (Hubbard, 2008). According to Brav and Heaton (2002), financial anomaly refers to a price pattern conduct that is not in conformity with the traditional forecasts of markets efficiency, logical expectations and asset pricing theory. Based on above definitions, it can be deduced that there is no general definition of this phenomenon, market anomaly. Market anomalies consist of fundamental, technical, seasonal and size effect anomalies. In this study, the focus is on the size effect anomalies. Size effect anomaly means that smaller firms in respect to capitalization outperform larger firms. The theory holds water when the smaller capitalized firms get higher chances of growth than larger capitalized firms, (Keim, 1983). When there is market anomaly, then firms tend to exhibit unhealthy financial position which is financial distress. Thus, market anomaly and financial distress have a relationship. Finding out the link which exists in this interrelation will be regarded as a break-through by all the interested parties, (Baimwera & Muriuki, 2014).

1.1 Statement of the Problem

Financial distress takes a big chunk of challenges which firms listed in NSE are exposed to in their day-to-day operations. Firms experience different forms of financial distress based on their liquidity, leverage, profitability, market value and efficiency, (Altman, 2000). Arnold (2016), acknowledges that the effects of financial distress are so harsh to the firm's operations and its environment. The environment in this instance consists of employees, management, credit institutions, stockholders, investors and a whole economy.

Financially distressed firms' market value substantially declines and so their stock prices equally reduce (Warner,
1977). Big firms quoted in the stock market not always do exhibit a healthy financial position. Specifically in Kenya, about 53% of the firms listed in NSE are financially distressed, (Maina & Sakwa, 2012). Still in the local front, 21 listed firms had undertaken financial restructure, put under receivership, suspended or delisted from NSE due to financial distress since independence, (CMA, 2012).

1.2 Objective of the Research

The main objective of the study is to establish the relationship between size effect anomalies and financial distress; evidence from Nairobi Securities Exchange, Kenya.

1.3 Research Hypothesis Testing

H_0: Size effect anomalies have no statistical significant relationship with the financial distress; evidence from Nairobi Securities Exchange, Kenya.

2.0 THEORETICAL REVIEW

Theories came into being in justifying, foretelling and understanding a phenomenon. In most cases theories also came into existence with aim of provoking and expanding the contemporary knowledge inside the boundaries of important current premises. Thus, theoretical framework is a formation which reinforces a research theory. Aguilar *et al*. (2009), state that a theoretical framework acts as a guide to research, dictates which variables are for evaluation and which statistical relationships to be taken into consideration in the background of an inquiry under study. In conclusion, theoretical framework aids the researcher to notice the variables of the research which in turn gives a more universal structure for the analysis of data that assists in choosing the relevant research design.

2.0.1 Fama-French Three-Factor Model

It is an extension of the Capital Asset Pricing Model (CAPM) and was developed by Fama and French to capture the relation between average return and size, which comprises of market capitalization and price times shares outstanding and the relation between average return and price ratios like book-to-market. The Fama-French threefactor model describes stock returns through three factors; market risk, the outperformance of small capitalized firms relative to large capitalized firms and the outperformance of high-to-market value firms versus low bookto-market value firms, (Fama & French, 1993). The original model is as below;

$$Expected\ Rate\ of\ Return = Risk - free\ Rate + Market\ Risk\ Premium + SMB + HML \quad (2.1)$$

The reasoning behind this model was that high value and small capitalized firms tend to in most circumstances outperform the overall market. Fama and French argued that because small firms can suffer long earnings depressions that overtake big firms, size is associated with a common risk factor that might explain the negative relation between size and average return, (Fama & French, 1993). The importance of the Fama-French threefactor model is adjusted for outperformance tendencies. The additional two extra risk factors make the model to be more flexible relative to CAPM.

The Fama-French Three-Factor Model Formula;

$$r = r_f + \beta_1 (r_m - r_f) + \beta_2 (SMB) + \beta_3 (HML) + \varepsilon \quad (2.2)$$

Where: r = *Expected rate of return* r_f = *Risk-free rate* β = *Factor's coefficient* $r_m - r_f$ = *Market risk premium*

SMB (Small Minus Big) = *Historic excess returns of small-cap firms over large-cap firms*

HML (High Minus Low) = *Historic excess returns of value stocks (high book-to-price ratio)* ε = *Risk.*

2.0.2 Traditional Ratio Analysis (TRA)

Financial distress detection is specifically receptive to financial ratios analysis; profitability, liquidity and solvency which are commonly referred to as TRA. Agencies were founded to provide qualitative information in evaluating the credit worthiness of a specific customer. This was done before the evolution of quantitative measures of a firm's performance. Beaver (1967), provides a typical assignment in the field of ratio analysis bankruptcy segmentation.

Beaver (1967), showed that a lot of measures could make biased opinion on matched samples of collapsed and successful firms up to five years before collapse. Generally; solvency, liquidity and profitability ratios are considered as the most significant barometers. Ranking of their significance is not certain. This is so because most researches attained different ratios as the best measure of existing challenges. Subsequently Deakin (1972), used same variables as Beaver and concluded that indeed there is a definite ratio in forecasting bankruptcy.

The theory is considered to be relevant to this study as it is applicable in measuring of the financial health which is the financial distress level of a specific firm. Profitability, liquidity and solvency may be taken to be good measures of the financial health of a firm, (Beaver, 1967). These ratios though might not be the best measures or superior indicators in defining the financial health of a firm. These ratios are put into much use when determining a firm's profits and its earnings to the shareholders.

2.0.3 Z-Score Model

Limitations which were witnessed in the TRA saw the birth of Z-Score model. This model gave an answer to Beaver's concern. It came into being in 1968 through the works of Edward Altman was considered as a quantitative balance sheet technique of coming up with a firm's financial health. Altman puts into use a technique of Multiple Discriminant Analysis (MDA). This technique was essentially created to sort out the vagueness dilemma that came up with Beaver's univariate investigations and to determine a wholesome firm's financial profiling, (Wang, Wang & Wang, 2017).

Due to the invention of Altman, z-score can now can be computed for both financial and non-financial firms. The risk was considered to be greater when the score was low as such a firm was considered to be actually falling into financial distress. The original work was premised on the data sourced from 66 publicly held manufacturing firms. It was surprising to note that a half of firms had filed for insolvency between 1946 and 1965. Altman examined 22 conceivably helpful financial ratios out of which he picked five that when combined provided the best overall forecasting corporate bankruptcy, (Altman, 1968).

The variables which Altman used were classified into categories of five standard ratio as: liquidity, leverage, profitability, market value and efficiency ratios, (Altman, 1968). Below is the model which was applicable for the manufacturing firms;

$$Z - Score = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 0.999X_5 \quad (2.3)$$

Where $X_1 = Working\ Capital/Total\ Assets$ *(Liquidity)*

$X_2 = Retained\ Earnings/Total\ Assets$ *(Leverage)*

$X_3 = EBIT/Total\ Assets$ *(Profitability)*

$X_4 = Market\ Value\ of\ Equity/Total\ Liabilities$ *(Market Value)*

$X_5 = Sales/Total\ Assets$ *(Efficiency)*

Altman, Hartzell and Peck (1995), the model does not have the sales/total assets (efficiency) ratio in nonmanufacturing firms, as this was to minimize the risk in the potential industry. The model's specifications are as follows;

$$Z - Score = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4 \quad (2.4)$$

In the Z-Score, when the value is above 2.99, then the firms are viewed as being in the "safe" zone. Likewise, when the value is between 1.81 and 2.99, is a "gray" zone as there is a likelihood of the firm getting into financial predicament approximately in the next two years of operation. When the value of the Z-Score is beneath 1.81, then at such a point a firm is mediated to be in a point of "distress" zone in which there is a high likelihood of financial distress within the time period, (Altman, 2000).

In early years, Altman Z-Score was noted to be 72% of reliability in foretelling bankruptcy two years before it occurs, (Altman, 1968). In successive tests, 31 years later that is in 1999, it was noted to be 80% to 90% reliable in prediction of bankruptcy before its occurrence. A firm with the Z-Score less than one ended up to underperform the bigger market by more than four percent, (Altman, 2000). It is important as an investor, when the results of the Z-score is close to or below three, it is advisable to engage an expert in doing some quite extensive due diligence before investments considerations are made.

2.0.4 ZETA Model

With the handicaps experienced in the Z-Score, there was need to develop a superior model which saw the coming into existence of ZETA model. The ZETA was developed in 1976 by Altman, Haldeman and Narayanan due to the shortcomings of the original Z-Score. The purpose of coming up with ZETA as a model was to establish, evaluate and demonstrate a new bankruptcy categorization model. It considered clearly recent evolutions in consideration to business failures during the period 1969 to 1975, (Altman, Haldeman & Narayanan, 1977).

According to Altman *et al*. (1977), the principal findings gave a conclusion that the ZETA theory for bankruptcy categorization seemed to be very precise. This was measured up to five years before collapse with successful categorization of above 90% of one year before and 70% certainty up to five years. The ZETA model did better than the other bankruptcy categorization approaches in the forms of anticipated cost basis using prior likelihoods and clear cost of error approximations, (Altman *et al*., 1977). These scholars in their research, were amazed to note that regardless of the statistical data attributes show that a quadratic format is suitable, the linear framework of the similar model surpassed the quadratic format in testing the model correctness.

There are compelling reasons for constructing the ZETA model. Firstly, it is very effective in predicting the firms' failures up to five years before the firm collapsing. In the second instance, it makes the use of a larger size firm as the firms' average size and the financial profile have so far changed. This brings in the requirement that the new model be as up to date as desirable and this is in regard to the nature of data which is temporary. Thirdly, past failed models either put too much emphasis on the broad categorization of manufactures or particular industries. Fourthly, it became useful due to alterations in financial reporting standards and acceptable accounting practices, (Altman *et al*., 1977).

ZETA model's relevance in this study is that it gives the stakeholders of listed firms' ability to predict with more accuracy the firms' failures. It's percentage in prediction is very high while it can also predict up to five years before firms collapse. According to Altman *et al*. (1977), ZETA theory, is used to measure the financial health of firms and this basically means the financial distress of firms which is this study's dependent variable. As much as ZETA model is superior to the Z-score, this study used the later as a measure of the financial distress because it considered a longer period of time and more firms.

2.0.5 Wreckers Theory

The Wreckers theory was first advanced by Campbell, Hilscher, and Szilagy in 2005. They hypothesized that the stocks of distressed firms' performance are subordinate to the stocks of financially healthy firms, (Campbell *et al*., 2008). Wreckers theory attempts to give an explanation of the gains which may be generated from the financial distress to all the stakeholders. Campbell *et al*. (2008), likened this theory to the account of profiting from the wreckage of a ship. They came out with a picture of a firm being smashed by a succession of negative upsets, making losses and heading towards a position financial distress.

This theory explores to demonstrate the benefits that may emanate from financial distress to stakeholders, (Kalckreuth, 2005). It is applicable to an efficient-market interpretation of a stock market. It links the work on private benefits to the literature on the empirics of asset pricing and that the financial structure and the probability of default may be essential for determining the size of private benefits of control. There is further claim that with a cumulative probability of default, then there is a possibility of superior enticement to get out firms' resources from the private and non-dividend advantages, (Kalckreuth, 2005).

Consideration has been taken not to always associate negative excessive returns to distressed firms in an efficient or irrational market. With the volatility of share prices increase which have higher leverage in consideration to private information, then the fate of a firm relies on issues not known to the general public which brings in aspect of information asymmetry. If market is efficient, then the returns must be shown in the stock valuation, (Campbell *et al*., 2008). This is labelled as the Wreckers theory of financial health of firms.

2.1 Conceptual Framework

A conceptual framework is conglomeration of ideas and principles which are applicable to the disciplines of explorations and come up with presentations. The main aim of a conceptual framework is to classify and narrate ideas which are applicable to the study and find out the associations which exist amid them. Miles and Huberman (2009), points out that conceptual framework brings about main aspects, establishes variables and presupposes association amidst them.

Figure 1: Conceptual Framework

Source: Researcher (2018)

3.0 RESEARCH METHODOLOGY

Research methodology is a systematic design on how a researcher will carry out a research with an objective of ensuring validity and reliability of the results in addressing the research's aims and objectives. According to Zikmund, Babin, Carr and Griffin (2013), research methodology is a chunk that explains the practical processes in a way considered to be relevant to the association.

3.1 Research Design

Is an extensive scheme of obtaining answers to the inquiries being studied and administering the complications experienced in the course of the research, (Polit & Beck, 2017). Research design empowers a researcher to share scarce resources by making sure that an appropriate methodology is applied (Cooper & Schindler, 2014). According to Shaughnessy, Zechmeister and Zechmeister (2002), there are various research designs that can be used in a research. Among the various research designs available, this study adopts the descriptive research design. Bajpai and Singh (2011), objectives of a descriptive research are identifying current circumstances, wants, researching immediate status of an event, exploring facts about a problem and coming up with explanations to the relationships of traits and characteristics. The main aim of descriptive research is to systematically describe a population, situation or phenomenon as it seeks to answer what, where, when and how questions as opposed to answering the why question. The design also uses the secondary data which are quantitative in nature besides the data collection sheets to mine data from the listed firms' annual financial reports in which census was used as the entire population was considered and also the use the panel data analysis as the statistical data analysis for data analysis.

3.2 Population of the Study

It refers to a whole unit of individuals, events or objects possessing routine visible attributes, (Mugenda & Mugenda, 2013). Population is considered as the conglomeration of persons, occurrences or events of interest that a researcher is investigating, (Sekaran & Bougie, 2011). In this research, census will be adopted because all firms in the target population will be considered for analysis. This choice was based on the fact that the elements in the target population was definite and thus made it practicable to research each and every listed firm. According to census methods involve an exhaustive enumeration of the units constituting the target population, (Kothari & Garg, 2014). Census is more advantageous as it solves the problem of accuracy which is associated with sampling, (Saunders, Lewis & Thornhill, 2012). Thus, the population target of this study will be all firms listed in NSE.

3.3 Scope of the Study

The period under consideration was between 1st January, 2007 and 31st December, 2017. This period was significant to this study due to the fact that it witnessed one of the global financial crises, 2007-2008. It is generally expected that during the periods under financial crisis, the stock prices see steep decline in value, (Marcus, YvesMichel & Ching-Hwa, 2015). This period was also of importance to the study as it witnessed Kenya experience one of its lowest moments as the country was plunged into electoral violence occasioned by the 2007 disputed presidential election results. The country's political instability severely affected the general state of the economy of the country.

3.4 Sources of Data

This study depends so much on the quantitative and secondary data collection methods. In secondary data collection, a researcher simply relies on the works of another to get on moving with their intended study. Kothari and Garg (2014), secondary data must be suitable, adequate and reliable. This study has also adopted panel data for the 11year period, 1st January, 2007 to 31st December, 2017. This choice was informed by the fact that panel data contains observations about different cross sections across time and this is so with the listed firms in NSE over the period under study.

The interpretation of the regression coefficients was modeled by the utilization of the E-views software output. Annual data encompassing the entire period of study were considered as this was to ensure that there were enough degrees of freedom estimations in the models. The secondary data was obtained from annual financial publication reports of all firms in the NSE. Also,

admissible literature in magazines, websites and other relevant secondary sources formed part of the secondary data. All these sources of the secondary data were believed to be suitable adequate and reliable, (Kothari & Garg, 2014).

4.0 RESULTS

The outcomes of this study were delivered by the usage of descriptive statistics, correlation analysis, unit root tests and panel regression equation. The regression coefficients interpretations were modeled by the adoption of the E-views software output.

4.1 Descriptive Statistics

Descriptive research design comes in handy besides the inferential statistics where correlation and panel multiple regression analysis are of great assistance. It summarizes and profiles the relationships of fundamental, technical, seasonal and size effect anomalies and the financial distress of the firms in NSE. The inferential statistics is used to check hypothesized effects and establish the outcomes in the population. It makes deductions, predictions and conclusions about a population on a sample of data appropriated from the population under study. The term inferential originates from the term "infer" which simply means to deduce or conclude from evidence and reasoning rather than from explicit statements. According to Kothari and Garg (2014) and Cooper and Schindler (2014), inferential statistics is all about testing the null hypothesis to determine the validity of making conclusions and estimations of the population parameters.

Table 1: Descriptive Statistics

	LN_Z	LN_SEA
Mean	0.919192	15.89881
Median	0.917689	16.10833
Maximum	1.942604	20.01562
Minimum	-0.580257	8.223815
Std. Dev.	0.574154	2.180459
Skewness	-0.030158	-0.870898
Kurtosis	2.264766	4.420947
Jarque-Bera	2.947791	27.37010
Probability	0.229032	0.000001
Sum	119.4950	2066.845
Sum Sq. Dev.	42.52527	613.3179
Observations	130	130

Notations:

LN_ - Natural log of

LN_Z - Natural log of z-score

LN_SEA - Natural log of Size effect anomalies

4.1.1 Financial Distress

Financial distress is measured through equations 2.3 and 2.4 which result into Z-score, (Altman, 1968). Out of the 67 firms in NSE, financial distress which is equated to be the dependent variable, possessed a skewness value of -0.0302 which was taken to mean that it was negatively skewed. This thereby meant that the curve had abnormally distribution as the value was not zero. The kurtosis value was 2.2648 signified that the curve was platikurtic as this value was less than three and thus not normal. A value of 2.9478 as far as Jacque-Bera is concerned meant that this curve was abnormally distributed as the value was not close to zero.

Mean, standard deviation and probability are measures which are considered to be having absolute figures and thus better in determination of normality than skewness, kurtosis and Jaque-Bera. The Z-score had a mean of 0.9192 and a standard deviation value of 0.5742 meaning that there is no huge deviation from the mean during the period of study. The probability value of 0.2290 gave a clear indication that there is a normal distribution in the data as the value was picked to more than 0.1. In the table above, only the dependent variable, financial distress is normally distributed as per the probability value.

4.1.2 Size Effect Anomalies

The curve was negatively skewed as it had a skewness value of -0.8719 which meant that the curve was abnormal distribution as the value was not zero. Kurtosis of 4.4209 meant that the curve is leptokurtic. This is so as the value was more than three and thus the curve is not normally distributed. A Jarque-Bera value of 27.3701, meant the curve was not normally distributed as the value was not close to zero.

There was a mean value of 15.8988 and a standard deviation value of 2.1805 meaning that there were no huge deviations from the mean. A probability of 0.0000 signified that the data was not normally distributed as the value was less than 0.1. The results yielded by the normality tests of the data in the size effect anomalies, proved that the data was not normally distributed. In other words, this can be looked at as all the tests of normality proved beyond any reasonable doubt to be abnormal.

All the measures of normality tests in the market anomalies and financial distress, indicated that the data for measures of fundamental and technical anomalies are not normally distributed. Likewise for seasonal and size effects anomalies had similar results. These findings are in agreement with the findings that data can never be normal because of asymmetries, discreteness and boundedness of the observable data, (Westfall, 2014). Data may also not be normal simply because of outliers which can be on either extreme end, (Adams *et al*., 2018).

4.2 Correlation Analysis

Table 2: Correlation Analysis

	LN_Z	LN_SEA
LN_Z	1.000000	
LN_SEA	-0.166462	1.000000

In table 2, the size effect anomalies had a correlation coefficient of -0.1665. This signified a weak negative correlation with the z-score as the value was below 0.2. Therefore, this means that when size effect anomalies decreased by -0.1665 per year then the financial distress is decreased by one percent in the subsequent year. Thus, a decrease of 0.1665 of a unit of size effect anomalies, consequently reduces a unit of financial distress in the successive year. This finding indeed established that there exists a negative relationship between size effect anomalies and financial distress of listed firms in NSE which is also similar to the findings of Duy and Phuoc (2016), where the study's finding also gave a negative relationship.

4.3 Unit Root Tests at Intercept and Level I (0)

In the framework of panel unit root test, it is witnessed that various tests have been advanced. These tests are; Levin-Lin-Chu (LLC) test; Im, Pesaran and Shin (IPS) test and fisher type tests such as Augmented Dickey-Fuller (ADF) and Plackett and Pearson (PP), (Levin, Lin & Chu, 2002; Im, Pesaran & Shin, 2003; Dickey & Fuller, 1979). The main limitation of these tests is that they are based on the assumption of cross-sectional independence across variables. In this part, the research seriously takes into consideration the analyses of the dependent variable, financial distress and the independent variables which include fundamental, technical, seasonal and size effect anomalies individually with their measures in determining whether the variables have the unit root or not.

4.3.1 Financial Distress

Table 3. Panel Root Test for Financial Distress

Panel unit root test: Summary Series: LN_Z

Method	Statistic	Prob.	Cross sections	Obs
Null: Unit root (assumes common unit root process)				
LLC	-23.2433	0.0000	48	446
Null: Unit root (assumes individual unit root process)				
IPS	-5.75092	0.0000	48	446
ADF	170.348	0.0000	48	446
PP	188.212	0.0000	48	454

In table 3, the dependent variable, financial distress was found to be stationary at intercept and level I (0). This was so as the results of LLC test statistic, IPS test, Augmented Dickey-Fuller and Plackett and Pearson (PP) indicated that all the tests had probability values of 0.0000 which were statistically significant at five percent level of significance. Since the p-values of the considered tests were less than five percent, therefore, we fail to accept the null hypothesis that dependent variable, financial distress has a unit root and thus stationary. This was the reason why it is meant that the financial distress was stationary at the

intercept and level I (0). This result is similar to the findings of the study by Nunzio and Diego (2016) who found the presence of stationarity in the data being researched.

4.3.2 Size Effect Anomalies

Table 4. Panel Unit Root Test for Size Effect Anomalies

Panel unit root test: Summary Series: LN_SEA

Method	Statistic	Prob.	Cross sections	Obs
Null: Unit root (assumes common unit root process)				
LLC	-6.52166	0.0000	49	484
Null: Unit root (assumes individual unit root process)				
IPS	-1.46813	0.0710	49	484
ADF	111.549	0.1651	49	484
PP	157.597	0.0001	49	490

In table 4 above, SEA was found to be stationary at intercept and level I (0) because the LLC test statistic had probability value of 0.0000 which is significant at five percent level of significance. IPS test had probability value of 0.0710 which is statically insignificant at five percent level of significance. Augmented Dickey-Fuller (ADF) had probability value of 0.1651 which is statistically insignificant at five percent level of significance. Plackett and Pearson (PP) had probability values of 0.0001 which is significant at five percent level of significance. Therefore, using LLC and PP, we fail to accept the null hypothesis that size effect anomaly has a unit root and that SEA was found to be stationary at intercept and level I (0). This result concurs with the findings of Nunzio and Diego (2016) of the existence of stationarity.

However, using IPS and ADF values which were more than 0.05, then the results indicated that we accept the null hypothesis that SEA has a unit root and that size effect anomaly was found not to be stationary at intercept and level I (0), thus bringing in the type I error. This finding is in agreement with that of Reed (2014) who brought out into light that unit root tests can experience inflated Type I error rates when data are cointegrated. This finding also was in agreement with the results of Nelson and Plosser (1982), who found out a strong evidence in favour of unit root non-stationarity using Dickey-Fuller (1979) testing procedure.

4.4 Panel Regression Equation

The data was lagged by one period since market anomalies experienced in one period tend to have their implications felt in the subsequent periods. Hausman test is applied in panel regression equation and this test is applicable to all the variables which are being considered, (Hausman, 1978). In Hausman test, Chi-square test statistic was considered in determination of the level of significance. This led to making a decision as to whether to adopt the fixed effects model or random effects model.

$$\gamma_{it} = \beta_0 + \sum_{i=1}^{k} \beta_i X_{kit} + \epsilon_{it} \quad (4)$$

Where X is the independent variables; X_1 is size effect anomaly, γ_{it} is the dependent variable denoting financial distress of firm i at time t, X_{it} is the independent variable of firm i at time t, β_0 is the constant term, β_i is the coefficient of the independent variables, size effect anomalies.

4.4.1 Hausman Test

Table 5. Correlated Random Effects - Hausman Test

Correlated Random Effects - Hausman Test
Equation: EQ02FIRSTDIFFERENCE
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	18.436861	6	0.0052

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var (Diff.)	Prob.

DSEA	-0.049141	0.347519	0.014647	0.0010

Notations;
D - First Difference of
DSEA - First Difference of Size Effect Anomalies

Size effect anomalies which are measured in terms of market capitalization, Chongyu, Li & Yang, 2018). It had a value of -0.0491 as the coefficient and 0.7476 as the significant probability which is indeed insignificant at five percent level of significance. This means that when size effect anomalies are decreased by 0.0491 percent per year then the dependent variable, financial distress is decreased by one percent in the subsequent year. They had a weak negative and a statistical insignificant relationship which concurs with the study findings of Banz, (Banz, 1981).

Therefore, we accept the null hypothesis that SEA has no statistical significant relationship with the financial distress of listed firms in NSE, Kenya. This study has indeed established that there exists a relationship between size effect and financial distress of listed firms in NSE, Kenya. This signifies that size effect anomaly has a direct link with the firm's financial health in NSE. Locally this finding agrees with the findings of Muchina, (Muchina, 2015). Also, this finding concurs with the findings of Banz, Hawawini and Keim; Gompers and Metrick; Avramov *et al*. and Campbell *et al*., (Banz, 1981; Hawawini & Keim, 2000; Gompers & Metrick, 2001; Avramov *et al*., 2013 & Campbell *et al*., 2011).

4.4.2 Fixed Effect Model

Table 6 Fixed Effects Model

Dependent Variable: FD
Method: Panel Least Squares
Cross-sections included: 22
Total panel (unbalanced) observati ons: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DSEA	-0.049141	0.147486	-0.333192	0.7476
C	-0.010649	0.018645	-0.571121	0.5836

Effects Specification

Cross section fixed (dummy variables)

R-squared	0.964596	Mean dependent var	-0.005585
Adjusted R-squared	0.845108	S.D. dependent var	0.203078
S.E. of regression	0.079924	Akaike info criterion	-2.164000
Sum squared resid	0.051103	Schwarz criterion	-0.932374
Log likelihood	66.95200	Hannan-Quinn criter.	-1.734130
F-statistic	8.072745	Durbin-Watson stat	3.492419
Prob (F-statistic)	0.002294		

R-squared had a value of 0.964596 which is 96%. This meant that 96% explains the market anomalies, independent variables affecting the financial distress, dependent variable. The Adjusted R-squared had a value of 0.845108 which is 85%. It meant that 85% of the market anomalies, independent variables affected the financial distress, dependent variable. When the difference between R-squared and Adjusted R-squared is less than 20%, then the data is deemed to be stable. If the difference between the two is more than 20%, then the data is considered to be unstable. In this study, the difference between the two is 11%. This meant that the data is stable as the two values are not far away from each other, (Gupta, 2002).

The probability F-statistic value was also considered in the determination of the model stability. The probability F-statistic was 0.0023 which is significant at five percent level of significance. Since the value F-statistic was less than 0.05, it therefore meant that there was great stability in the model. With such a low figure, then it can be conclusively said that the model is very stable,

(Gujarati & Porter, 2010). Lastly in the model stability, was the consideration of Durbin Watson value which was at 3.4924, meaning that the data in this study had no autocorrelation at all as the value was not four, (Gujarati & Porter, 2010).

The study also confirmed that there was no challenge of multicollinearity as the coefficient of correlation did not go beyond the stipulated values of 0.75, 0.8 or 0.9 (Mashotra, 2007; Cooper & Schindler, 2014; Hair *et al.,* 2006). The results showed that the coefficient of correlation values were far below the stipulated values and thus the challenge of multicollinearity was less severe between or among the variables as it had been dealt with in the study. Also, the results indicated that there was no challenge of heterodasticity as there was no constant variance between or among the error terms, (Gujarati & Porter, 2010).It is interesting also to note that the results by Maina and Sakwa (2012) indicated that 53% of all the firms in NSE were in financial distress. In this study, 41% of the firms listed in NSE were in financial distress while only 33% of the firms were in the safe zone in 2017. During the world financial crisis of 2007 and 2008, this study indicated that in 2007, 35% of the firms were in the distress zone while 33% of the firms were in the safe zone and in 2008 41% of the firms were in the distress zone and 33% in safe zones. Immediately after the world financial crisis of 2007 and 2008 that is in 2009, 37% of the firms were in the distress zone while 31% were in the safe zone. From the above results, it can be inferred that the NSE did not really face the wrath of the 2007 – 2008 world financial crisis.

5.0 FINDINGS

This study established that there was a negative relationship between size effect anomalies and financial distress of listed firms in NSE, Kenya but statistically significant during the period under study. This therefore means that the null hypothesis was failed to be accepted that size effect anomalies have no statistical significant relationship with the financial distress of firms in NSE, Kenya. The result demonstrated that CMA, NSE and investors will take up the firms' capitalization as the measure of firms' size as this affects the financial position of firms. This is so because any slight change in the size of the firm definitely affects the financial position of the firms listed in NSE. As such the regulators and investors have to closely monitor the size of the firms as any slight change may have negative repercussions.

6.0 CONCLUSIONS

The study established that there was a positive relationship between size effect anomalies and financial distress of listed firms in NSE. This relationship was also found to be insignificant. It alluded that there was indeed a link between size effect anomalies and financial distress. This confirms the applicability of the Efficient Market Hypothesis which allows the investors have in their possession all the relevant information required in their decision making as to whether it is worth in investing in a specific stock or not. Also, the theory of Fama-French three-factor is applicable.

7.0 RECOMMENDATIONS

The results have indicated that a slight alteration in the firm size also affects the financial health of a firm. It thus recommends that the management should have proper and accurate records of the firm size. This should be closely monitored so as to see that there is no significant change in the size of the as this may have a negative impact on the financial health of the firm. The study further recommends that market capitalization should be used as a tool for monitoring the firm's size.

Investors are required to make use market experts whose sole mandate is to carry out the market due diligence in determination of which stocks is worth investing in before making any investment decision. It has been pointed out in the study that firms that are about to experience financial distress can be precisely be predicted in two years before this happens, then potential investors should be careful not invest in such stocks.

FURTHER RESEARCH

Researchers and scholars should look into other measures of firm size other than market capitalization such as total assets, total sales and profitability in determining firm size in listed firms in NSE, Kenya. Also a research should be followed through for an extended period of time so as to be considered adequate. As such, more lengthy and rigorous academic inquiry is invited to make more informative conclusions on establishment of the relationship between size effect anomalies and financial distress of listed firms in NSE, Kenya. This will go a long way in aiding in the provision of an in-depth, thorough and exhaustive understanding of the relationship between size effect anomalies and financial distress of listed firms in NSE, Kenya.

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