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Determinants of financial distress in Kenyan Commercial Banks

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Determinants of Financial Distress in Kenyan Commercial Banks

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Approval

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ABSTRACT

The recent relapse of bank failures in Kenya has been a cause for concern especially after a period of several years of stability in the banking sector. Past studies have identified key determinants of financial distress but few studies have established the effect of spreads on financial distress. This study therefore sought to establish the determinants of financial distress in Kenyan commercial banks. Specifically, the study looked at the influence of leverage, overly aggressive activity, insider lending, ownership structure, bank size and financial soundness (capital adequacy, asset quality, management efficiency, earnings, liquidity and market risk) as bank specific factors. It also looked at economic growth, the central bank rate and interbank activity as macro-economic factors. The study adopted a postpositivistic philosophy and a quantitative research design. The methodology employed was panel data. A multivariate regression model was used to test the hypotheses and link the variables. The study took on a census approach and all forty-three Kenyan commercial banks were taken as the population. Secondary data was extracted from the financial statements of all commercial banks and Central Bank of Kenya website for the period 2012-2018. The study found that leverage, overly aggressive activity, market risk and bank size negatively and significantly affected the level of financial distress. Earnings, liquidity and the spread on insider lending are found to positively and significantly affect financial distress. Private ownership was associated with higher degrees of financial distress. Lastly, macro-economic factors were found to be poor indicators of the level of financial distress explaining less than two percent of the variation in financial distress levels. The study recommends that financial ratio analysis be complemented with additional evaluations, with extra features such as competitive position, capital structure, regulatory compliance among others being encompassed within the final evaluation.

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ABBREVIATIONS/ACRONYMS

CBK	Central Bank of Kenya
IMF	International Monetary Fund
CAMELS	Capital adequacy, Asset quality, Management expertise, Earnings' strength, Liquidity, and Sensitivity to market risk
MDA	Multiple Discriminant Analysis
CEO	Chief Executive Officer
OCC	Office of the Comptroller of the Currency
GDP	Gross Domestic Product
BIS	Bank for International Settlements
PBT	Profit Before Taxes

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DEDICATION

In loving memory of my late dad, John Joseph Ndungu Njenga. To my daughter Jasmine, you are the wind beneath my wings.

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Background of the Study

The different approaches to the definition of the term financial distress goes to show the versatility, complexity, and sometimes even how controversial this economic category can be (Outecheva, 2007). As a rule, the term financial distress is used in a negative connotation in order to describe the financial situation of a company confronted with a temporary lack of liquidity and with the difficulties that ensue in fulfilling financial obligations on schedule and to the full extent (Gordon, 1971; Davydenko, 2005). This study will adopt the definition in its most basic sense, as a decrease in financial efficacy resulting from a cash shortage (Korteweg, 2007). It is a state in which an entity generates inadequate revenues because it is not able to meet its financial requirements. This is caused by illiquid assets, high levels of fixed costs or earnings which are highly sensitive to depressed economic conditions. Disregarding the indications of financial distress can be detrimental for a firm as it may lead to bankruptcy.

Whitaker (1999) identified five central steps in the financial distress process. To start with, the firm is unable to make debt payments on time. It may be a passing cash flow challenge (technical insolvency) or an enduring problem caused by decrease in asset values below debt requirements (insolvency in bankruptcy). Next, a decision is taken as to whether the problem is a temporary one or not. If found to be temporary, the firm can be given time to recover by reaching an agreement with creditors. However, economic losses have already occurred in a case whereby basic long term value of assets has decreased. A decision is then taken as to whether the business would be best liquidated and sold or if it would be of more value if it were continued and sustained in operation. Next is to establish whether the firm should file for protection under the Companies Act

or use informal procedures. Lastly a decision is made as to who should control the firm while under liquidation.

The entire financial system is threatened by problems arising from poor bank management. To achieve the goal of effective management of the country's financial system, methods which help financial institutions promptly identify management related problems are required. Steps can then be taken to protect not just citizens' deposits but also the whole system (Hunjak, 2001). For example, efforts by Japan to liberalise financial institutions in the 1970's was marked by severe financial disruptions and banking problems. What began as a smooth transition spiraled into sharp increase in asset prices, monetary growth, and subsequent fall in asset prices in the early 1990's. Financial institutions were left with a massive non - performing loan estimated at US$ 500 billion leading to the crash of many financial institutions in Japan (Cheserek, 2005).

The United States faced a significant threat to its financial system in the period between 1979 to 1987, when more banks had failed in USA compared to the entire previous post-depression period. In 1988, 171 failed banks were analysed by the OCC in order to identify present features and circumstances at the point when the banks worsened. Additional 51 rehabilitated banks were also analysed. The rehabilitated banks had recovered after undergoing significant challenges. The OCC established that only 10 percent of the challenged and failed banks did not suffer the impact of management led weaknesses. The other 90 percent failed due to management led weaknesses. (OCC,1988).

The ripple effect of contagion to other financial institutions and the economy at large during a financial crisis cannot be under estimated. In March 1980, one of the largest private banks in Argentine- Banco de Intercambio Regional failed. Days later, the Central Bank had to intervene to rescue three other banks, two of which were liquidated. This marked the beginning of a serious crisis of the Argentine financial system which ended up in the liquidation of 71 financial institutions over the next two years. (The

World Bank, 1984). The banking crisis in Chile took place in the period between 1982-1984. Poor macro-economic policies and lack of strong regulation cost the Chilean economy 30 to 40 percent of GDP. As a result, the country's GDP dropped by 14 percent in 1982 and unemployment increased by over 11 percent in in one year. Inflation grew from 10 percent in 1982 to 23 percent in 1983. (Sundararajan & Balino, 1991).

Since the era of the Great Depression, the global financial crisis of 2007–2008 had the worst impact. It led to the collapse or nationalization of some of the world's best-known financial institutions. Many others only survived with significant support from the state. The crisis affected key financial centers across the world more than any other financial crisis post the world war era. (Reinhart & Rogoff, 2009).

Within the region, by 1988 Ghana's formal banking system had about 11 commercial banks and 112 rural banks under the supervision of Bank of Ghana. Their first phase of financial sector restructuring program began in 1988 and ended in 1991 costing an estimated US$300 million or 6% of GDP (Tannar, 1990).

Locally, the collapse of Continental and Union Bank groups and the Rural-Urban Credit Finance in 1984-1986 marked the beginning of bank failures within this period. The banks were not able to repay funds obtained from government bodies so they were liquidated (Martin, 1998). This led to contagion and as a result other commercial banks like Trade bank and Euro bank were liquidated while others like Daima bank were placed under statutory management by the Centrak Bank. Others which experienced liquidity challenges were merged and formed part of the present Consolidated Bank for example Nationwide Finance Company Ltd and the Home Savings and Mortgage Company Limited (Wachira, 2010). The economic impact of these failures is yet to be established.

Between August 2015 and April 2017, three commercial banks had failed in Kenya (CBK 2015-2017). These surprise relapse of bank failures in Kenya, caught many

depositors flat footed. Many individuals and entities could not access their funds in some cases. For three banks to collapse in under one year was a watershed event in modern banking history. It showed how quickly the revelation of credit problems at a well-regarded banking industry could turn into a liquidity problem that threatened the survival of the bank itself, and also the survival of the financial system (Ngunjiri, 2016).

Gilbert, Menon and Schwartz (1990) summarized the three key reasons of financial distress as asset mix, financial structure and corporate governance. In a study by Wulandari, Musdholifah and Kusairi (2017), meant to evaluate the influence of internal and external influences on the Indonesian banking system found that the economic growth was the main external factor whilst internal banking factors included capital, asset quality, management, and earnings. The study by the OCC (1988) evaluating the causes of failure of national banks in the USA, concluded that internal problems contributed to the failure of national banks. These included deficiencies within boards and management, overly aggressive boards and management, insider abuse and fraud whilst external factors included depressed economic conditions. A study by Adeniyi and Kenneth (2014) on prediction of bank failures on some selected banks in Nigeria showed that bank failures were caused by excessive risk taking and poor camel rating. A survey of 21 Kenyan commercial banks by Cheserek (2005) showed that bank failure in the period between 1998 - 2005 was determined by asset quality, capital adequacy and total assets. Asset quality seemed to be the most critical aspect that affected bank failure.

A research gap on determinants of financial distress facing Kenyan commercial banks after the recent relapse of bank failures is evident from the limited number of local studies on the subject. Mamo (2011) tested the applicability of the Altman (1968) model in predicting financial distress in Kenyan commercial banks but did not consider determinants of financial distress. Taliani (2010) came up with a model predicting financial distress in Kenyan commercial banks. His study covered the period 1990 to 2009. The model has not been tested on failures post 2009. Cheserek (2005) studied the determinants of bank failures in Kenya for the period 1998-2005. His study period does

not include the recent bank failures and new macro-economic enviroment. Ochieng (2018) studied the factors contributing to financial distress in Kenyan commercial banks using content analysis. His study did not include any data analysis. Waweru and Kalani (2009) used primary data to study commercial banking crises in Kenya: causes and remedies. No secondary data was employed. Gathaiya (2017) used content analysis to diagnose problems affecting collapsed Kenyan banks between the year 2015-2016. His study did not include any data analysis. This study specifically targets determinants of financial distress in the banking sector by analyzing secondary data from all the commercial banks for the period under study. The study drilled down further on the bank specific factors to establish if the spreads between actual ratios and regulatory ratios have a significant influence on financial distress. Where regulatory ratios did not exist, market average rates applied. This is to enhance new knowledge in a diverse environment.

1.2 Problem Definition

At the start of the decade, the banking sector was going through a very good season with PBT growing at an average of 18% year on year from the year 2010 to 2014 (CBK, 2010-2014). However, from the year 2015 the banking sector commenced a rollercoaster ride. The banking sector experienced a negative 5% year on year growth in PBT (CBK 2015). It then barely recovered to its previous profit levels in the year 2016 with a 10% year on year growth in PBT. It then dipped again in the year 2017 with a negative 10% year on year growth in PBT (CBK 2016-2017). The banking sector then made a comeback in the year 2018 with 14% year on year growth in PBT (CBK 2018). However, this does not compare to its 18% average annual growth levels in PBT experienced at the beginning of the decade.

This raises concerns as to what transpired in the years 2015 and 2017 when the banking sector experienced 5% and 10% profitability dips respectively which it is yet to fully recover from. In August 2015 Dubai Bank became insolvent (KDIC 2015). Less than

three months later, Imperial Bank was also put under receivership (CBK, 2015). In April 2016, Chase Bank was also put under receivership (CBK, 2016). In September 2016, the sector was subjected to an interest rate capping law, which sets the maximum lending rate at no more than four per cent above the Central Bank base rate and the minimum interest rate granted on a deposit held in interest earning accounts with commercial banks to at least seventy per cent of the same rate (CBK, 2018). The full annual impact of that law was to be experienced in 2017. In May 2017, Fidelity bank was acquired by SBM holdings for only one dollar (The Standard, 2017).

As illustrated, because of the fragility and interconnectedness of banking institutions, the failure of a bank is a great concern (Kaufman, 2009). Contagion can quickly spread throughout the economy through spillover effects. This can not only result in the failure of other banks but also the economy at large. This study seeks to assess the effect of both bank specific and macro-economic factors on the level of financial distress in Kenyan commercial banks**.**

1.3 Research Objectives

This research seeks to predict financial distress in Kenyan commercial banks.
Specifically:

1. To assess the level of financial distress in Kenyan commercial banks.
2. To assess effect of bank specific factors on the level of financial distress in Kenyan commercial banks.
3. To assess effect of macro-economic factors on the level of financial distress in Kenyan commercial banks.

1.4 Research Questions

This study seeks to answer the following questions:

1. What is the level of financial distress in Kenyan commercial banks?

2. What is the effect of bank specific factors on the level of financial distress in Kenyan commercial banks?
3. What is the effect of macro-economic factors on the level of financial distress in Kenyan commercial banks?

1.5 Scope of the Study

This study focused on all commercial banks and mortgage finance companies between the years 2012 and 2018. This period covers a full economic cycle which typically falls within two election periods. It is also the period within which three banks have failed in the recent past. The years 2017 and 2018 are also of interest as they are the years when the full annual impact of the interest rate capping law was experienced by banks. The study is capped at 2018 due to availability of data. The study excluded the banks in receivership, banks under statutory management and banks in transition to be acquired in the respective years when these actions took place due to unavailability of data from that point going forward.

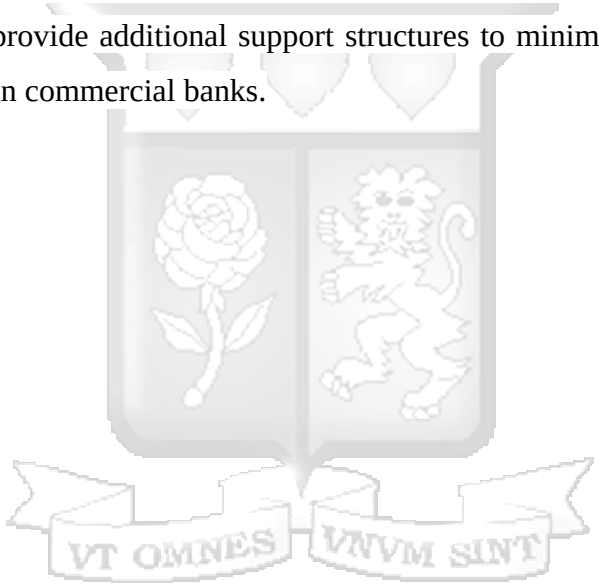
1.6 Significance of the Study

The study results will be beneficial to the following stakeholders:

Regulators: The study will be beneficial to the Central Bank of Kenya and other policy makers who are tasked with monitoring and ensuring stability in the economy. They will take proactive measures to detect and minimize the impact of financial distress to depositors and the economy at large. They will draft policies that will help in improving the mode of operation in the banking sector and keep the commercial banks accountable with regard to managing their levels of financial distress. They will also assist in ensuring veracity of financial information on commercial banks so that accurate and reliable analysis can be carried out on the banking sector.

Senior management of commercial banks: Since they continuously seek the best mode of operation to ensure that commercial banks remain a going concern, the study findings will be beneficial to senior management of commercial banks in ensuring that they steer their organizations in the right direction and take corrective action in a timely manner. They will take proactive measures to quantify and monitor their levels of financial distress and take timely remedial actions where necessary.

Scholars and Academicians: Scholars and academicians will find areas with the potential for further research while also contributing to new knowledge. They will find areas where they can provide additional support structures to minimize the level of financial distress in Kenyan commercial banks.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter analyzes financial distress theories and how they influence commercial banks. It also presents literature by other scholars and formulates study hypothesis with regard to financial distress on commercial banks.

2.2 Theoretical Review

Theoretical framework is the edifice that describes and identifies the key theories that organize a study (Smith, 2004). It is utilized in understanding, laying hypothesis, or in giving meaning to the relationships among the elements that impact, influence, or forecast the outcomes of events specified (Kombo & Tromp, 2009). Theories discussed herein include: Lender of last resort theory, market power theory and portfolio theory.

2.2.1 Lender of Last Resort Theory

The theory of the Lender of Last Resort (LOLR) says that large welfare benefits accrue by lending to illiquid (but solvent) banks, during a financial crisis. Thornton (1802) and Bagehot (1873), were among the first to evaluate the function of the LOLR. Their evaluation if founded on the assumption that financial crises are caused by market failures. Such market failures include threat of bank runs and information asymmetries which prevent the ideal capital allocation. Consequently, banks need to sell assets at fire-sale discounts to secure funding during such crises. This snow balls into depletion of bank capital, reduction in financing for the real economy, finally resulting in a credit crunch and the likelihood of inefficient bank liquidations. As suggested by the LOLR theory, the central bank, by providing funding to banks, can tackle this market failure. By doing so, this will ease the credit crunch and avoid inefficient liquidations (Drechsler, Drechsel, Schnabl & Ibanez, 2013).

Two explanations within the LOLR theory highlight the motivation for take up of LOLR lending. These are the illiquidity theory and the risk-shifting theory. The illiquidity theory says that market failures cause banks to suffer from an inability to roll over financing of assets. For example, in a panic-induced run on a bank's deposits, banks suffering from such illiquidity would be forced to sell off some of their asset holdings if LOLR assistance was inaccessible. The urgency to sell off assets could result to fire sales and the erosion of bank equity, resulting to a credit crunch. By providing such banks with financing for their existing assets through LOLR support, it allows them to avoid fire sales and slowly de-leverage (Drechsler et.al., 2013).

The risk-shifting theory says that, some banks use LOLR haircut subsidies to raise their risk taking, due to risk-shifting motivations. The theory explains that, financially-weaker banks or weakly-capitalized banks experiencing a crisis-induced decline in bank asset values, may be motivated to increase their risk taking using LOLR loans. This is due to the high probability of default. The reason for this is that, as the collateral value decreases, and the borrowing bank defaults, the LOLR would bear some of the loss as well. This is because haircut-subsidized loans are under collateralized. Hence high haircut-subsidy assets represent a risk to the LOLR as they are left to bear some of the down risk whilst the weakly-capitalized bank obtains the upside (Drechsler et.al., 2013). In contrast, as the rate of interest on Central Bank LOLR loans is generally higher than that charged in the interbank repo markets, well-capitalized banks would not view such loans as having a positive net benefit, hence are unlikely to default.

This theory applied during the Great Depression. The motivation for correspondent banks to monitor and manage interbank liquidity risk by holding higher levels of capital or assets in liquid form was weakened when the Fed was founded. This was because institution of the Fed gave a perception of liquidity risk protection against the jolts related to banking panics in the National Banking era. Ultimately, the Fed failed to provide sufficient liquidity to prevent contagion during the Great Depression, and thus

did not fulfill the expectations of banks that the Fed would insure them against liquidity risk shocks (Calomiris, Jaremski and Wheelock (2019),

Onset of distress of other firms can be caused by a default of one firm. This is especially the case whereby firms hold significant liabilities of the defaulting firm. For example, in the recent financial crisis, banks sought to limit their interbank exposures by dumping various classes of assets, which magnified price declines. As the interbank lending market collapsed in September 2008, banks scrambled to hoard reserves as a means of self-insurance against prospective liquidity needs, which aggravated declines in risky asset prices (Heider, Hoerova, and Holthausen 2015).

This theory applies to this study as the Central Bank of Kenya was criticized being LOLR, for failing to provide sufficient liquidity to Chase Bank when it faced a run on its deposits (Abdulla, 2018). Many of the banks holding significant liabilities in Chase Bank sought to limit their interbank exposures by closing all correspondent relationships with banks they considered high risk. Also the erosion of the perception of the Central Bank as the liquidity risk insurer led to a significant reduction in interbank activity (CBK, 2017). The illiquidity theory kicked into play as some of the distressed banks became chronically dependent on the LOLR lending.

2.2.2 Market Power Theory

Market power theory was discovered in the late 1980s because of banks developing interest and studies on performance. It begun with the utilization of the Market Power and Efficiency Structure theories. These two theories were industrial setup models (Athanasoglou, Delis & Brissimis, 2008). These researches gave key reference to the connection between earnings of banks and how the market is structured. Olweny and Shipho (2011) opine that Structure Conduct Performance (SCP) and the Relative Market Power (RMP) hypotheses are two tactics related to the Market Power theory.

As a theory, SCP is described as the connection between firm conduct, how the market is structured and entity performance. Conduct denotes features such as the advertising choices, pricing choices and R&D choices made by entities in a market (Baye, 2010). The manner in which an industry is structured could include market conditions, concentration in terms of number of players and technology; whilst the performance of a firm is the social welfare and earnings. Athanasoglou et al. (2008) proposes that under this situation greater market power earns supernormal profits. Similarly, Olweny and Shipho (2011) supports that higher profits can result from bank market power resulting from concentration in the banking market.

Berger (1995), states that a firm's profitability is subject to inhibitors to entry into an industry. In such case, new entrants shrink the profits as increased penetration costs assist current firms maintain supernormal profits. Hence, market concentration leads to higher profits, as it slows collusion costs amongst existing banks. Olweny and Shipho (2011) observe that markets with less players, that is, concentrated; banks can end up making abnormal profits, despite their efficiency levels, compared to banks operating in markets with more players. This is because banks in markets with few players can charge higher rates on their loans through collusion, while sustaining lower costs of funds on their deposits.

According to Olweny & Shipho (2011) the RMP hypothesis notes that earnings and profitability of banks is determined by market share. RMP proposes the need for only sizeable banks with unique products be able to grow their profits by controlling prices. These banks would be in a position to exercise market power and acquire monopoly profits while institutions with lesser share of the market operate like those under perfect competition and hence cannot earn the same monopoly profits.

Large Kenyan banks have consistently commanded well over 50% of the sector's market share (CBK 2010-2017). Therefore, banks are taking all sorts of measures to enable them grow into a big bank status and be partakers of this huge market share as proposed

by the RMP hypothesis that notes that bank profitability is determined by market share. The RMP hypothesis also proposes that only large banks with differentiated products be able to control prices and grow their profits. In an interest rate cap regime, only banks with differentiated products would be able to control prices and grow their profits. To this end, banks are undertaking a wide range new investments to grow their volumes or venture into products whose pricing can be delinked from the interest rate cap pricing. This competition has seen Kenyan commercial banks open branches extensively, venture into mobile lending platforms and expand into other investments like subsidiaries, associates or joint ventures.

2.2.3 Portfolio Theory

In the works of Atemnkeng and Nzongang (2006), a relevant approach known as balanced portfolio theory is identified. The theory on balanced Portfolio observes that the contents of a bank portfolio, as well as its earnings and shareholder's return are because of policy decisions. Ongore and Kusa (2013), argue that these can be influenced by many aspects like the size of the portfolio, the cumulative yield of the portfolio and the risks exposures on the assets.

Decisions by the bank management determine the preferred composition of the portfolio of commercial banks and the portfolio diversification. Atemnkeng and Nzongang (2006) stresses that the balance sheet composition is chosen by senior bank management. In addition, the firm's ability to earn high profits will be influenced by the cost per unit sustained to make each component of the assets.

Sinkey (1975) showed characteristic of problem banks. Sinkey (1975) suggested various factors, both financial and operational, could be helpful in checking the financial health of a bank and diagnose its main problems. Hayden, Porath & von Westernhagen (2006) established diverging evidence in their research which assessed portfolio diversification and bank profitability. This was carried out by examining individual bank loan portfolios

of 983 German banks across broader economic sectors, different industries, and geographical regions. The findings show that no significant performance benefits accrued because of diversification. It was observed that each type of diversification tended to reduce the banks' returns. It was also established that the impact of diversification depended strongly on the level of risk. The Portfolio theory asserts that banks' financial performance is pegged on internal efficiencies and management decisions (Olweny & Shipho, 2011).

According to the banking supervision reports by CBK, the ratio of gross non-performing loans to gross loans consistently declined from highs of over 30% in the early 2000's to its lowest point of 4.4% in the year 2011 (CBK 2003 – 2011). However, the benefits of this low level of non-performing loans were short lived as the ratio begun a gentle but constant climb to hit double digit in the year 2017 and to super 12% levels as at the year 2018 (CBK 2012 – 2018). This shows that the Kenyan commercial banks have adopted higher risk in their loan portfolios as the rate of return on these loans had been market determined until the year 2016 when the interest rate capping law was introduced.

2.3 Empirical Review

The empirical review covers the measures of financial distress and hypothesis formulation on the bank specific factors and the macro-economic factors.

2.3.1 Measures of Financial Distress

As per Hunjak & Jakovčević (2001), evaluation of financial ratios was the traditional mode for bank performance analysis. Nonetheless, in spite of the number of ratios utilised, a model that would fully satisfy the needs of bank analysis and evaluation is yet to be developed. Hence, financial ratio evaluation is coupled with different quality analysis like equity structure, management efficiency and market position.

Beaver (1966) initiated the use of a univariate discriminate analysis model on several financial ratios on a coupled sample of both failing and non-failing companies to forecast bankruptcy. In a bid to select those ratios that best categorized the companies as failing or non-failing, Beaver (1966) applied a dichotomous classification test. This was to enable him choose the financial ratios that would finally comprise his univariate model. The value for each ratio or measure was analyzed independently and with regard to the respective ideal cut off point of the measure. Firms were then categorized as non-failing or failing. If the ratio fell below the cutoff point, it was categorised as failing and vice versa. Beaver suggested that the cash flow/total debt ratio was the best with an accuracy of 87 percent.

This model assumed a linear relationship between all measures and the failure status. This is one of the limitations of this analysis as it does not always hold in practice. Many ratios show a nonlinear relationship with the failure status as a result. Thus, the univariate modeling technique is often applied in an inappropriate way and conclusions may be questionable (Balcaen and Ooghe, 2004). Another limitation of the univariate model is the inconsistency problem. Whereby, a company can be categorised as failed on the basis of one ratio and then categorised as non-failed on the basis of a separate ratio. This is not realistic as the nature of a company is dynamic and complex and cannot be analyzed using one ratio (Argyrou, 2006). A major advantage of this model is that it is extremely simple and requires no statistical knowledge.

To overcome some of the limitations of the univariate model, Altman (1968) initiated the application of the Multiple Discriminant Analysis (MDA) method to the financial distress prediction space. Altman adopted the use of 33 distressed companies and 33 solvent companies. These companies used a Z-score bankruptcy prediction model. They also established a cut-off point of Z-score (2.675) to categorise distressed and healthy companies. The findings established that the Z-score model could soundly predict financial distress in the first and second years prior to the onset of financial distress. However, the model did not display sound prediction in the third to fifth years before the

onset of financial distress (Altman et.al, 2014). In an international study by Altman et al. (2016), the general Z-Score model yielded a prediction accuracy of 75% which further improved to well above 90% by using estimations specific to a country that incorporated extra variables.

MDA is a technique that allows for the distinction between two or more collection or group of items with regard to several factors. For this particular case, it is to distinguish between failing and non-failing firms with regard to financial distress. Altman's Z-score pooled various measures of risk or profitability. Using key features which best differentiate between the groups, MDA then tries to develop a quadratic or linear combination of these features. This model employs five financial ratios which are weighted so as to maximize the predictive power of the model. A Z score or zeta model which is an overall discriminate score is then produced by the model. A model that demonstrates a company's risk of bankruptcy relative to a standard, is the result. (Altman et.al, 2014).

The Z-score is not without limitations. The Z-Score is not protected from untruthful practices of accounting. It is also not applicable to new companies with minimal or nil earnings as they will score low regardless of their financial health. The Z-Score only hints at the issue of cash flow through the utilisation of net working capital-to-asset ratio. It however does not address the cash flow issue directly. Lastly, when a company records one-time write offs, the Z-Scores can fluctuate quarter on quarter. This can worsen the score when it is not actually the case (Shaefer, 1982).

Most recently, studies have employed artificially intelligent Expert System Models. These models adopt the use of computers in the sense that they are able to show the intelligent behavior of human cognitive activities such as problem solving. They are referred to as artificial intelligence because their intelligence is contained not in human brains but in machines. They include recursive partitioned decision trees where data is divided into sub sets and recursively replacing every one of the subsets with a decision

tree which gives for the initial set, a final decision tree. The most important decision is selecting the variable on which to make the next split. The best splitting rule is the one that minimises the increase in the sum of the impurities. The extent to which a node comprises of training cases from multiple classes, comprising the impurities. This is also known as inductive learning model where the process of generalization is used. In a situation of case-based reasoning which also happens to be a type of artificially intelligent expert model, challenges are solved with the aid of previously solved cases (Aziz and Dar, 2004).

This study employed the Altman's Z-Score as a measure of financial distress. This is because it has been tested for applicability by Mamo (2011) for financial distress in Kenyan commercial banks and results showed 80% validity for failed banks and 90% validity for non-failed banks (Mamo, 2011).

2.3.2 Hypothesis Formulation

The section will cover formulation of the study hypothesis.

2.3.2.1 Bank specific factors that influence financial distress

Bank specific factors that influence financial distress include leverage, overly aggressive activity, insider lending, ownership structure, bank size and financial soundness.

2.3.2.1.1 Leverage

A study by Ebaid (2009) regarding the impact of borrowed capital on financial distress of firms listed in Egypt, showed that debt use had insignificant influence on the financial distress of entities. This finding was inconsistent with similar studies carried out by Ghosh, Nag, and Sirmans (2000) and Hadlock and James (2002). Their results showed financial leverage had a positive influence on financial distress of the firm.

Berger and Bonaccorsi di Patti (2006) in their study on capital structure and firm performance revealed that leverage had a positive influence on financial performance. Studies by Abu-Rub (2012) on capital structure and firm performance concurred with those of Berger and Bonaccorsi di Patti (2006) and showed that leverage had a positive influence on ROE. However, this studies did not zero-in on financial distress.

Muigai (2016) researched the impact of capital structure on financial distress of non-financial companies listed in Nairobi securities exchange. The findings showed that asset tangibility, financial leverage and external equity had a negative significant influence on financial distress of non-financial firms. This contrasted studies by Hadlock and James (2002) and Ghosh, Nag, and Sirmans (2000) above. However, Muigai (2016) concurred with Masdupi, Tasman & Davista (2018) whose study on the effect of leverage, liquidity and profitability on financial distress of listed manufacturing companies in Indonesia, found that leverage has a significant and negative influence on financial distress of manufacturing companies.

The study by Muigai and Muriithi (2017) on the moderating effect of entity size on the relationship between capital structure and financial distress of non-financial companies listed in Kenya, partially agreed with Masdupi, Tasman & Davista (2018) and Muigai (2016). The study showed that debt normally had a significant and negative effect on financial distress of the entities under study. However, this significant and negative effect becomes significant and positive as the entity grows in size.

H1: Leverage significantly influences financial distress of Kenyan commercial banks

2.3.2.1.2 Overly Aggressive Activity

In a study by the OCC (1988) evaluating the aspects causing the failure of national banks, overly aggressive activity exhibited by the governance and or bank management was listed as one of the main factors. They defined very aggressive activity as exercising a liberal credit approach or excessively growth-minded.

A go-getter approach combined with policies and controls that are well laid out can be a disruptive strategy. This is because growth-minded, aggressive outlook and manner of acting is not a bad thing. What was found to be the problem, was excessive growth minded and liberal behavior given the bank specific conditions. 80 percent of the failed banks had a governance and/or senior management with an aggressive approach with respect to the bank conditions. In addition, the governance was aggressive in such manner that had a negative significant influence on the performance of 42 percent of the failed banks. The operating and lending processes of most of the failed banks also depicted issues like inappropriate lending policies, inadequate or inefficient control systems, undue reliance on volatile liabilities, inadequate liquid assets as a second source of liquidity, excessive loan growth in relation to staff capacity and insufficient deposit, capital or debt funding (OCC, 1988).

Another study by Basu (2003) agrees with the OCC (1988) findings. The level of credit risk that banks undertake to a great extent depends upon the competitive structure under which they operate. However, it may also reflect their preference for incurring uncertainty and risk. The level of competition defines the competitive structure. The intensity of the competitive structure mainly depends upon the number of entities operating in the market. These entities compete fiercely with each other to retain or extend their share of the market. It goes to say, the more the entities the more intense the competition among these institutions to attract more depositors and borrowers.

Competition amongst the Kenyan commercial banks has seen banks open branches extensively, venture into mobile lending platforms and expand into other investments like subsidiaries, associates or joint ventures. Some banks have ventured into these investments without the appropriate supporting policies, funding structures and operating resources, leading them into financial distress.

In the study by the OCC (1988), overly aggressive behavior was nearly nonexistent in the healthy banks. Following their recovery, rehabilitated banks depicted fewer

challenges in relation to overly aggressive behavior. Further evidencing that overly aggressive behavior was a key factor influencing to the failure of banks.

H2: Overly aggressive activity significantly influences financial distress of Kenyan commercial banks

2.3.2.1.3 Insider Lending

According to a 1995 Central Bank report, many of the local larger bank failures in the 1990's was a product of extensive insider lending. This then became the largest cause of bad loans for most of these banks. In more than 50 percent of the failed banks, insider loans contributed to a significant share of non-performing loans. Issue of moral degradation were particularly chronic in these failed banks as suggested by the high levels of insider lending abuse (CBK, 1995).

The study by OCC (1988), found a positive correlation between insider abuse and failed banks. Insider abuse as indicated by inappropriate transactions with affiliates, unnecessary dependence on the bank for income or services by a board member or shareholder, unauthorized transactions by management officials, or self-dealing was evident in many of the problem banks during their decline. This led to the failure of 35 percent of the banks.

Another indicator like excessive concentration of ownership, was closely connected with insider lending. In the report by CBK (1995), it stated that in many of the problem banks, majority shareholding belonged to one family or man. Hence in operational decisions, managers faced undue influence by owners. Asserting similar conclusions drawn by the OCC (1988) study. Conditions such as a dominant decision maker, inadequate supervision of key officers amongst others highlighted presence of insider abuse in failed banks (OCC,1988). According to CBK (2013), an institution shall not in Kenya, grant or permit to be outstanding advances or credit facilities or give any financial guarantee or incur any other liabilities to or in favor of, or on behalf of, its

associates and the persons listed as insiders, amounting in the aggregate to more than one hundred per cent of the core capital of the institution.

H3: Insider lending significantly influences financial distress of Kenyan commercial banks

2.3.2.1.4 Ownership structure

Li, Wang and Deng (2008) carried out a research that targeted listed companies in China. The study objectives were to assess the influence of government ownership of companies among other variables on financial distress. This study used data that was in the public domain from annual financial reports of the companies. The sample selected 404 finance distressed and a matching sample of 404 non-distressed firms in the Chinese securities markets. Data utilized in the study covered the period between 1998 and 2005 financial years. The study utilized binary logistic analysis. The results indicated that state ownership is negatively related with financial distress.

This results differ with those of Al-Khouri (2012) whose study on banks in the Gulf Cooperation Council (GCC) zone assessed influence of ownership by government and risk-taking attitudes on financial distress of the banks. The research utilized the fixed effect regression model to quantify the effect of government ownership on financial distress and risk taking. The study established that proportion of government ownership reduced risk taking attitude of banks and hence reduced the risk of financial distress. Banks that had a high proportion of private and institutional ownership were riskier than those with high government ownership. Li, Wang and Deng (2008) also differs with Hu and Zheng (2015) who tested whether ownership structure has any influence on the degree of corporate financial distress in China. The study estimated the degree of corporate financial distress for a sample of 378 firms listed in China. These were firms that had gotten into financial distress in the period between year 2000 and 2008. The

study established that government ownership helped firms decrease their degree of corporate financial distress.

Md-Rus, Mohd, Latif and Alassan (2013) conducted a study in Malaysia that examined the influence of ownership structure on financial distress of entities. It zeroed in on firms that were listed in Malaysian Main Bursa exchange. Distressed firms were considered to be those that had shareholders' equity that was less than 25% of the allotted and paid-up capital of a company. The study period was 2004 to 2009. A firm needed to meet the distress criterion during this period to be identified as a distressed firm. Findings indicated that government ownership was not a significant factor in influencing financial distress of the firms under analysis. This contrasted the findings of Li, Wang and Deng (2008), Hu and Zheng (2015) and Al-Khouri (2012).

H4: Ownership structure significantly influences financial distress of Kenyan commercial banks

2.3.2.1.5 Bank Size

The concept of economies of scale and the traditional neoclassical view of the firm are the key theoretical foundation for debating that entity size is connected to financial distress (Muigai & Muriithi, 2017). Big entities negotiate for better rebates, discounts or interest rates due to the large quantity that they buy, and hence accrue the benefits of economies of scale. In addition, lower unit fixed costs per produced unit, division of labor and specialization give rise to the same economies (Papadogonas, 2006). It is because of these concepts that Papadogonas (2006) hypothesised that large firms tend to be financially robust.

In contrast, a differing conceptual framework exists whereby a negative influence of entity size on corporate financial distress is hypothesised (Muigai & Muriithi, 2017). According to Marsh (1982), sizeable entities may experience sub-optimal performance if

some managers, interested in pursuing selfish goals with total disregard to the profit maximization objective of the firm, take control of large firms.

Dittmar (2004) and Gonenc (2005) found that sizeable entities may experience the negative effects of overleveraging if they get into the habit of issuing more debt. This may contribute to these large firms experiencing financial distress. Maina and Ishmail (2014) and Khan (2012) also supported this position. The findings of their studies showed entity size had a negative influence on entity value. The authors argued that large firms experience dismal financial performance because of inefficient operations. The study by Muigai and Muriithi (2017) showed that debt had a negative and significant influence on financial distress of the entities under study. However, as the entity grows in size, this influence becomes positive and significant. Hence partially agreeing with Khan (2012), Gonenc (2005), Dittmar (2004) and Maina and Ishmail (2014)

H5: Bank size significantly influences financial distress of Kenyan commercial banks

2.3.2.1.6 Financial Soundness

Financial soundness indicators show the current financial health and soundness of the entire sector of financial institutions in a country. The core set of financial soundness indicators include earnings and profitability, sensitivity to market risk, assets quality, capital adequacy and, liquidity (IMF, 2017). Bank for International Settlements states that management efficiency and operational risk has always been a primary aspect of a bank's risk management program (BIS, 2011). As management efficiency and operational risk also form part of CBK's supervisory model (CBK, 2017), it was also included in this study.

Therefore, this study used the following indicators for financial soundness capital adequacy, assets quality, management efficiency and operational risk, earnings and profitability, liquidity, and sensitivity to market risk

2.3.2.1.6.1 Capital Adequacy Ratio

Capital adequacy is the core ability of the bank to undertake shocks when undergoing a crisis. Capital adequacy ratio (CAR) is the ratio that is set by the regulatory authority in the banking sector. The ratio has compulsory conditions imposed by the Central bank (Myers & Brealey, 2003). The Capital Adequacy Ratio ratio can be used to analyse the condition of a bank.

Sangmi and Nazir (2010) in their study findings revealed that capital adequacy ratio had a positive influence on the earnings and profitability of banks. Shahatit (2011) differed with Suka (2012) and Sangmi and Nazir (2010) in the research on the effects of applying capital adequacy standard by commercial banks on their profitability. Study findings revealed that capital adequacy had little influence on profitability of commercial banks in Jordan. Suka (2012) who agreed with Sangmi and Nazir (2010) studied the influence of capital adequacy on the financial performance of commercial banks quoted at the NSE. The study showed that capital adequacy had an influence on the profitability of the banks and further that, capital adequacy contributes positively to the profitability of commercial banks. A study conducted by Al-Tamimi (2013) on commercial banks' capital adequacy in Jordan found that there was a negative non-significant relationship between capital adequacy ratio and capital risk. These research studies did not however zero in on financial distress.

According to the study findings of Rahman et al. (2004), operating efficiency, interest income/interest expense and capital adequacy are reliable financial indicators that can be used to detect problems within banks. In addition, capital adequacy indicated financial reserve levels. According to CBK (2013), every institution shall at all times maintain the minimum core capital to risk weighted assets and total capital to risk weighted assets requirements to 10.5% and 14.5%, respectively.

2.3.2.1.6.2 Credit Risk & Asset Quality

The risk that the lender could lose both the principal and interest on a loan due to default by a borrower is termed as credit risk. In the OCC (1988) study, poor asset quality continued to be the key reason for deterioration for problem banks. The poor asset quality eroded the bank's earnings and finally its capital. Manifestations of credit risk as described by the OCC (1988) research include unwarranted concentrations of credit to one industry, insufficient cash flow analysis, over lending as depicted by high loan amounts relative to debt service ability of the borrower, inappropriate lending policies, decisions made by one dominant individual, inadequate problem loan identification systems, inadequate controls or supervision of key bank officers or departments and lastly nonexistent or poorly followed loan policies.

Mutua (2015), established that credit risk management had a significant influence on bank performance. Credit risk management was defined as the process of risk identification, credit sanctions and risk monitoring. His study agrees with Kargi (2011), whose findings concluded that credit risk management had a significant influence on profitability of Nigeria banks. They further showed the connection between credit risk management and financial distress. When large credit risk exposures exist, performance declines resulting in financial distress. Nyong'o (2014) concurred with Mutua (2015) in that, senior management develop policies and procedures for credit risk management. Also, most banks had a solid credit risk management system. However, the angle of financial distress was not tackled in connection to credit risk management.

Musyoki and Kadubo (2012) found that credit risks variables had a negative influence on banks' financial performance. They however did not show the connection between financial distress and credit risk. A study by Chimkono, Muturi and Njeru (2016), revealed that cost efficiency ratios, average lending interest rate and non-performing loan ratio had a significant influence on the performance of banks in Malawi. It however did not indicate the influence of non-performing loans on financial distress.

2.3.2.1.6.3 Management Efficiency and Operational Risks

Operational risk is defined by the Basel Committee on Banking Supervision as the risk of loss ensuing from failed or inadequate systems or external events, people and internal processes. According to the OCC (1988) study, manifestations of lack of management efficiency and exposures to operational risks include inadequate controls or supervision of key bank officers or departments, poor monitoring of operations to ensure adequate internal controls and compliance with applicable laws and regulations, lack of competent management and decisions made by one dominant individual.

Nyaga, (2017) concluded that quality management principles had a significant relationship with operational risk management. He further noted that implementation of quality management principles was weak across Kenyan banks and thus explaining why banks were being affected negatively by operational failures and provided poor customer service. He however did not show how poor quality management and operational risk management could lead to financial distress.

The study by OCC (1988) concurs with Nyaga (2017) in that, in their study, the OCC found that problematic banks lacked systems, controls and policies to guide their employees (OCC, 1988). Implementation of quality management principles would help banks in achieving effectiveness and efficiency in operations management and prevent bank failures.

2.3.2.1.6.4 Earnings and Profitability

According to Prasad & Ravinder (2012), earnings quality is a key indicator on the bank's capacity to earn consistently. Aspal and Sanjeev (2014) acknowledge that high earnings quality is a reliable measure of future operating status and ought to mirror the organization's current operating performance. Earnings and profitability are perceived as the most well-thought-out measures in an entity's financial statements (Aspal & Sanjeev, 2014).

Both the earnings and profitability are the major source of upsurge in capital base. In addition, it serves in helping present as well as in future endeavours of the entity. Pointers of earnings and profitability include among others; Interest Income to Total Assets Ratio, Return on Earnings (ROE) and Return on Assets (ROA), The most significant pointer adopted in measuring earning is the Return on Assets (ROA) (Reddy, 2012). Dang (2011) observes that public confidence in a bank is constructed by consistent profit. A study by Masdupi, Tasman & Davista (2018) found that profitability has a negative and significant influence on financial distress. A study by Ugoani (2015) concurs with Masdupi, Tasman & Davista (2018). Empirical evidence suggested that nonperforming loans had adverse effects on bank profitability that often lead to bank failures.

2.3.2.1.6.5 Liquidity

The capability of an asset to be quickly changed into cash at minimal cost is what is termed as a firm's liquidity. (Brealey et.al., 2000). Andualem (2016) opines that entities with high liquidity levels are less likely to experience financial distress. The liquidity of a firm is an important determinant of financial distress. It is believed that an entity struggling financially, will take various salvation actions, such as improving the assets liquidity through business retrenchment (Change, 2006). According to the research by the OCC (1988), manifestations of liquidity related problems included nonexistent or poorly followed asset and liability management policies, undue reliance on volatile liabilities and inadequate liquid assets.

Outecheva (2007) and Kariuki (2013) assert that financial distress in banks is caused by high leverage, negative cash flow and very low liquidity. The study by Kariuki (2013) found out that most of the banks under study suffered financial distress and that listed banks had an edge over non-listed banks. The study also showed that a rise in financial distress led to a decrease in financial performance and vice versa. Hence financial

distress had a significant negative effect on financial performance of banks. However, the liquidity edge of listed banks was not elaborated.

Gruszczynski (2004), in his study showed size of debt, profitability and liquidity are factors that influence financial distress in Poland. Likewise, a study done by Ouma (2015) on the effect of liquidity risk on the profitability of commercial banks in Kenya, envisaged that liquidity influenced profitability of commercial banks positively. These studies did not however link profitability with financial distress.

A study by Liyuqi (2007) in the United Kingdom, showed that credit risk and liquidity have negative influence on bank's profitability. Crowe (2009) notes that a bank's standing is not stable if it is not maintaining adequate liquidity even if it is having strong earnings, sufficient capital and good asset quality. Said and Tumin (2011) agrees with Liyuqi (2007), and considers liquidity risk as a key fundamental aspect of bank profitability. A study by Imbierowicz and Rauch (2014) shows that credit risk and liquidity risk both influence a banks chances of default. This current study however goes a step further to determine the connection between liquidity and financial distress. Alshatti (2014) carried out a study which showed there was a negative effect of the liquid assets ratio on the profitability of the Jordanian commercial banks. The study differed from the current study in that they operate under different market conditions and the connection between profitability and financial distress is not explained. A study by Masdupi, Tasman & Davista (2018) found that liquidity has a negative and significant influence on financial distress of manufacturing companies.

According to CBK (2013), an institution shall maintain such minimum holding of liquid assets as the Central Bank may from time to time determine. Currently an institution is required to maintain a statutory minimum of twenty per cent of all its deposit liabilities, matured and short term liabilities in liquid assets.

2.3.2.1.6.6 Market Risk

Market risk represents risk of loss in balance and off-balance sheet items due to changes in market prices (Basel Committee on Banking Supervision, 2005). According to Mirkovic, Dasic & Siljkovic (2013), emergence of market risk can be caused by the following key factors: equity prices, interest rates, foreign exchange rate and commodity risk This study limited itself to interest rate risk due to unavailability of data regarding the other market risks. It used gap analysis as the measure of interest rate risk due to ease of use.

Gap analysis, commences with the choice of a suitable time horizon. The quantum of the balance sheet items that will re-price within the period is then determined. The amounts involved give the rate-sensitive liabilities and the rate-sensitive assets. The gap is the difference between the two. The interest-rate exposure is the change in net interest income that occurs in response to a change in interest rates (Dowd, 2002). In their study on market risk management in banks post the global financial crisis of 2007, Mirkovic et. al., (2013) concluded that the importance of market risk cannot be ignored and its management together with the other risks contributes to increased efficacy and thus stability in the banking sector.

H6: Financial Soundness significantly influences financial distress of Kenyan commercial banks

2.3.2.2 Macro-economic factors that influence financial distress

According to Ongore (2013) external factors are those which are outside the control of an entity. In the study by OCC (1988), depressed or poor environments were the product of the deterioration in the commercial real estate, oil and gas or agricultural sectors. A bank's failure having operated in depressed or poor local economies does not mean that the failure was largely due to poor economic conditions.

The OCC (1988) study further showed that an adverse economy was a significant factor in 35 percent of the failures. Even so, a depressed economic environment was the sole significant cause of failure in only 7 percent of the banks surveyed. The remaining failed banks that operated in depressed economies had significant internal problems as well. The evidence from healthy and rehabilitated banks also supported the OCC's hypothesis that economic conditions are rarely the primary factor in determining a bank's condition.

However, Wulandari, Musdholifah and Kusairi (2017), differ with the OCC's findings. In their study aimed at examining the impact of macro-economic and internal factors on banking distress, results showed that economic growth was negatively significant for predicting banking distress. However, inflation as well as interest rate and exchange rate did not significantly affect banking distress.

Yirgu (2017) partially agrees with Wulandari, Musdholifah and Kusairi (2017). In the study on determinants of financial distress using empirical evidence from banks in Ethiopia, the results showed that economic growth and saving interest rate had significantly negative and positive effects on banking financial distress respectively but inflation was not significant. For purposes of this study, the Central Bank Rate was used as the measure of interest rates as it is the benchmark for all lending and deposit rates.

Findings by Kiganda & Evans (2014), Rao & Lakew (2012), Ramadan et al., (2011) and Ongore (2013) on the effect of macro-economic factors on bank profitability all showed that macroeconomic factors had an insignificant influence on bank profitability. They thus agreed with the OCC (1988) but differed with Yirgu (2017) and Wulandari, Musdholifah and Kusairi (2017). These studies did not however focus on financial distress.

In a study focusing on the period of the Great Depression and analysing interbank connections, contagion and bank distress within the period, new data on interbank connections revealed that banks were less likely to close when their correspondents were

stable (Calomiris, Jaremski and Wheelock, 2019). Further, after the establishment of the Federal Reserve, banks took on the expectation that the Fed would reduce network risk, suggested by their management of cash and capital buffers, which became more unresponsive to network risk. This could be viewed in such manner because the Fed's presence was viewed to provide a cushion against liquidity risk leading to banks maintaining less cash and capital buffers. In this way, the Fed likely contributed to the banking system's vulnerability to contagion during the Depression (Calomiris, Jaremski and Wheelock, 2019).

H7: Macro-economic factors significantly influence financial distress of Kenyan commercial banks

2.4 Conceptual Framework

According to Mugenda and Mugenda (2003) and Smith (2004) a conceptual framework is that which recognises the model being researched and the connection between the independent and dependent factors. The conceptual frame work and variable operationalization is presented below in Figure 1 and Table 1 below:

Figure 1: Conceptual Framework

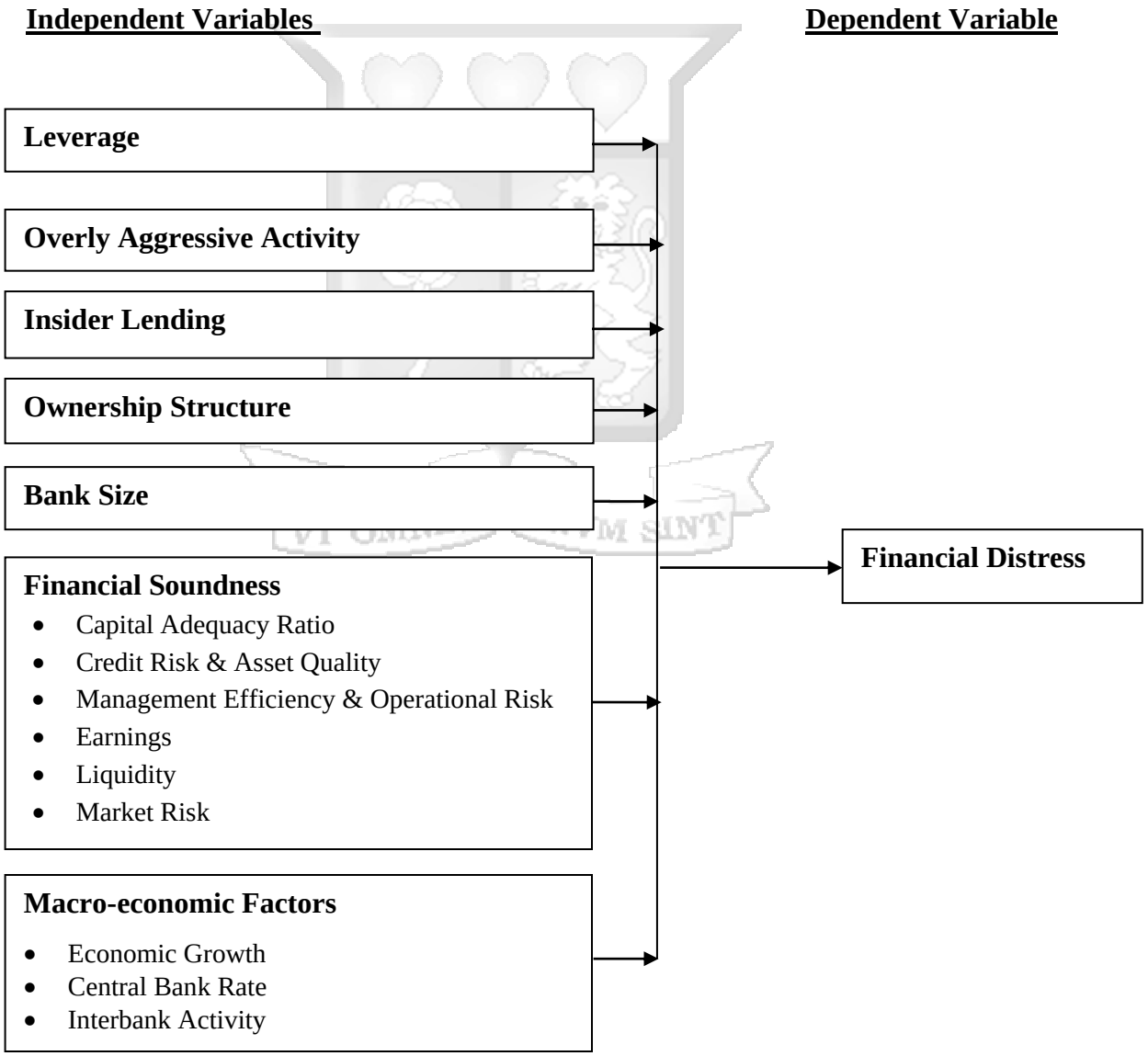


Table 1: Variable Operationalization

	Variables	**Measurement**	**Citations/Source**
1	Financial Distress	Altman Z-Score	Mamo (2011)
2	Leverage	Total Debt/Total Liabilities	Berger and Bonaccorsi di Patti (2006)
3	Overly Aggressive Activity	Loans/Deposits	OCC (1988)
		Total Fixed Assets/Total Assets	Basu (2003)
4	Insider Lending	Total Insider Loans & Advances/Core Capital	CBK (2013)
5	Capital Adequacy	Total Capital/ Total Risk Weighted Assets	CBK (2013)
		Core Capital/ Total Risk Weighted Assets	CBK (2013)
6	Credit Risk & Asset Quality	(Gross NPL's) /Gross Loans	Ugoani (2015)
7	Management Efficiency & Operational Risks	Operating Expenses/Revenues	Sufian and Kamarudin (2012).
8	Earnings	ROA	Reddy (2012)
9	Liquidity	Net Liquid Assets/ Total deposits & Short Term Liabilities	CBK (2013)
10	Market Risk	Relative Gap/Total Assets	Dowd (2002)
11	Bank Size	Logarithm of Assets	Muigai & Muriithi, (2017)
12	Ownership	Public or Private	Al-Khouri (2012)
13	Economic Growth	GDP Growth	OCC (1988)
14	Central Bank Rate	CBR	Yirgu (2017)
15	Interbank Activity	Annual Interbank Volumes/Aggregate Interbank Volumes	Calomiris, Jaremski and Wheelock (2019)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the research methodology which includes the research philosophy, research design, population, data collection methods, data analysis and research quality.

3.2 Research Philosophy

The study has opted for postpositivistic worldview because its assumptions represent the traditional form of research which hold true especially for quantitative research (Creswell, 2014). Postpositivists hold a deterministic and reductionistic philosophy. The deterministic philosophy is one whereby, causes determine outcomes. It is reductionistic because the intention is to minimise the nortions to a discrete set (Creswell, 2014). Under the postpositivistic philosophical approach, this study set up the hypotheses on the basis of the existing relevant theories. Then these hypotheses were tested and confirmed or disproved by use of quantitative and statistical methods.

3.3 The Research Design

In order to obtain answers to study objectives, the research design is the structure and plan of investigation considered (Cooper & Schindler, 2007). This study employed a quantitative research design. Under the quantitative design, this study tested the objective theories by examining the relationship among variables. These variables were measured, and numbered data analysed using statistical procedures.

3.4 Population

Population is an entire group of elements or persons, that have no less than one aspect in common (Kombo & Tromp, 2009). The population of this study is all the commercial banks in Kenya from the year 2012 to 2018 excluding banks in receivership, banks

under statutory management and banks in transition awaiting to be acquired, in the respective years when these actions took place. This exclusion is due to unavailability of data from that point going forward. For purposes of this study, the whole population of Kenyan commercial banks with the said exclusions, were subject to the study. Hence it employed the census approach.

3.5 Data Collection Methods

As per Gall, Gall & Borg (2007), data collection refers to the process of gathering unprocessed and raw data, which following the scientific process of data analysis, can be processed into meaningful information. For purposes of this study secondary data was collected.

3.5.1 Secondary Data

Secondary data is data that already exists and can be obtained from sources like organizational records, government sources, corporate fillings, print, and trade, business associations among other sources (Saunders et al., (2012).

In this study, the secondary data plays a key role. The secondary data is collected for the research period starting from the years 2012 to 2018. Secondary data was collected on: capital adequacy, asset quality, management performance & operational efficiency, earnings & profitability, liquidity, market risk, total assets, total liabilities, debt, ownership, bank size, total fixed assets, net loans, total deposits, total insider loans, core capital, working capital, earnings before interest and taxes, retained earnings, book value of equity, GDP, Central Bank Rate and Interbank Volumes.

The secondary data has been extracted from the financial statements of commercial banks and the Central Bank of Kenya website for the period of study. The period of study is from the year 2012 to 2018. This period covers a full economic cycle which typically falls within two election periods. It is also the period within which three banks

have failed in the recent past. The years 2017 and 2018 are also of interest as they are the years when the full annual impact of the interest rate capping law was experienced by banks. The study is capped at the 2018 due to availability of data.

3.6 Data Analysis

Data analysis is seen as a practice which involves raw data being arranged and organized so as to allow for the extraction of useful information from it (Gall *et al.*, 2007). Data Analysis was used as per table 2 below.

Table 2: Data Analysis

	Variables	**Measurement**	**Test**
1	Financial Distress	Altman Z-Score	Zones of Discrimination
2	Leverage	Total Debt/Total Liabilities	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)
3	Overly Aggressive Activity	Loans/Deposits	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)
		Total Fixed Assets/Total Assets	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)
4	Insider Lending	Total Insider Loans & Advances/Core Capital	Correlation & Regression analysis. Variance Analysis (Actual Vs Regulatory Cut-Off)
5	Capital Adequacy	Total Capital/ Total Risk Weighted Assets	Correlation & Regression analysis. Variance Analysis (Actual Vs Regulatory Cut-Off)
		Core Capital/ Total Risk Weighted Assets	Correlation & Regression analysis. Variance Analysis (Actual Vs Regulatory Cut-Off)
6	Credit Risk & Asset Quality	(Gross NPL's) /Gross Loans	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)

7	Management Efficiency & Operational Risks	Operating Expenses/Revenues	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)
8	Earnings	ROA	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)
9	Liquidity	Net Liquid Assets/ Total deposits & Short Term Liabilities	Correlation & Regression analysis. Variance Analysis (Actual Vs Regulatory Cut-Off)
10	Market Risk	Relative Gap/Total Assets	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)
11	Bank Size	Logarithm of Assets	Correlation & Regression analysis. Variance Analysis (Actual Vs Industry Average)
12	Ownership	Public or Private	Correlation & Regression analysis.
13	Economic Growth	GDP Growth	Correlation & Regression analysis.
14	Central Bank Rate	CBR	Correlation & Regression analysis.
15	Interbank Activity	Annual Interbank Volumes/Aggregate Interbank Volumes	Correlation & Regression analysis.

3.6.1 Multiple Discriminant Analysis

MDA is a technique that allows for the distinction between two or more collection or group of items with regard to several factors. For this particular case, it is to distinguish between failing and non-failing firms with regard to financial distress. Altman's Z-score pooled various measures of risk or profitability. Using key features which best differentiate between the groups, MDA then tries to develop a quadratic or linear combination of these features. This model employs five financial ratios which are weighted so as to maximize the predictive power of the model. A Z score or zeta model which is an overall discriminate score is then produced by the model. The result is a model that demonstrates a company's risk of bankruptcy relative to a standard (Altman et.al, 2014).

The original Z score whose applicability was restricted to public manufacturing firms was as below (Altman et al., 2014):

$$Z = 1.2T1 + 1.4T2 + 3.3T3 + 0.6T4 + 0.999T5$$

Where:

T1 = Working Capital / Total Assets
T2 = Retained Earnings / Total Assets
T3 = Earnings Before Interest and Taxes / Total Assets
T4 = Market Value of Equity / Total Liabilities
T5 = Sales/ Total Assets

Later, the market value of equity was changed to the book value of equity and the model applicability was expanded to include private and non-manufacturing firms (Altman et al., 2014).

The amended coefficients were:

$$Z=0.717T1 + 0.847T2 + 3.107T3 +0.420T4 + 0.998T5$$

To include emerging markets, the model was amended in 1995 and applicability expanded to include manufacturing and non-manufacturing companies as well as public and private firms (Altman et al., 2014):

The revised coefficients were:

$$Z=6.56T1+3.26T2+6.72T3+1.05T4$$

For purposes of this study, the model used to investigate objective one was as below. The model was arrived at due to its applicability to non-manufacturing companies as well as public and private firms.

Z=6.56T1+3.26T2+6.72T3+1.05T4

The ratios are as follows.

T1 = Working Capital / Total Assets

T2 = Retained Earnings / Total Assets

T3 = Earnings Before Interest and Taxes / Total Assets

T4 = Book Value of Equity / Total Liabilities

The zones of discrimination as guided by the model are as follows:

Safe Zone > 2.60

Grey Zone > 1.10 to 2.60

Financial Distressed Zone < 1.10

3.6.2 Linear Regression Model

Linear regression model was used and diagnostic tests carried out. The panel data regression model that was used is:

$Zit = \beta_{it} + \beta x_{it}' + \mu_{it,}\ i = 1...\ N$ (Banks) $t = 1,...,T$ (time)

Where:

β_1 = Leverage

β_2 = Overly Aggressive Activity

β_3 = Insider Lending

β_4 = Capital Adequacy

β_5 = Credit Risk & Asset Quality

β_6= Management Efficiency & Operational Risks

β_7= Earnings

β_8= Liquidity

β_9= Market Risk

β_{10}= Ownership

β_{11}= Bank Size

β_{12}= Economic Growth

β_{13} = Central Bank Rate

β_{14} = Interbank Activity

Linear regression model was also used on the spreads and diagnostic tests carried out. The panel data regression model that was used is:

$Zit = c_{it} + Cx_{it}' + \mu_{it}$, $i = 1... N$ (Banks) $t = 1,...,T$ (time)

Where:

C_1= Leverage Spread Against Industry Average

C_2= Overly Aggressive Activity Spread Against Industry Average

C_3= Insider Lending Spread Against Industry Average

C_4 = Capital Adequacy Spread Against Regulatory Cut-Off

C_5= Credit Risk & Asset Quality Spread Against Regulatory Cut-Off

C_6= Management Efficiency & Operational Risks

C_7= Earnings Against Industry Average

C_8= Liquidity Spread Against Regulatory Cut-Off

C_9= Market Risk Spread Against Industry Average

C_{10}= Bank Size Spread Against Industry Average

3.6.3 Panel Data Analysis

The objective of this panel analysis is to investigate in relation to Objective 2 and 3 of the study:

1) The effect of bank specific factors on the level of financial distress in Kenyan commercial banks.

2) The effect of macro-economic factors on the level of financial distress in Kenyan commercial banks.

This section will detail the model specifications. The description of the panel approach and the diagnostic tests are provided in appendix 1.

3.6.3.1 Model 1: Fundamental Factor Model

This Model specification uses the bank specific factors to explain financial distress in an attempt to answer Objective two. This model specification uses the following company attributes to explain financial distress:

$$Fin\ Distress_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 MR_{it} + \beta_3 NLD_{it} + \beta_4 FA_{it} + \beta_5 IL_{it} + \beta_6 CA1_{it} + \beta_7 CA2_{it} + \beta_8 CRAQ_{it} + \beta_9 ME_{it} + \beta_{10} ROA_{it} + \beta_{11} LIQ_{it} + \beta_{12} OWN_{it} + \beta_{13} SIZE_{it} + \varepsilon_{it}$$

Where:

LEV_{it} is the measure of Leverage (Total Debt/Total Liabilities)

MR_{it} is the measure of Market Risk (Relative Gap/Total Assets)

NLD_{it} is the first measure of Overly aggressive activity (Net Loans/Deposits)

FA_{it} is the second measure of Overly aggressive activity (Total Fixed Assets/Total Assets)

IL_{it} is the measure of Insider Lending (Total Insider Loans & Advances/Core Capital)

$CA1_{it}$ is the first Capital Adequacy Ratio (Total Capital/ Total Risk Weighted Assets)

$CA2_{it}$ is the second Capital Adequacy Ratio (Core Capital/ Total Risk Weighted Assets)

$CRAQ_{it}$ is the measure of Credit Risk & Asset Quality (Gross NPL's as a ratio of Gross Loans)

ME_{it} is the measure of Management Efficiency & Operational Risk (Operating Expenses/Revenues)

ROA_{it} is the measure of Earnings (Return on Assets)

LIQ_{it} is a measure of Liquidity (Net Liquid Assets/ Total deposits and Short-Term Liabilities)

OWN_{it} is a dummy variable for Ownership Structure which takes a value of 1 if the company is privately owned, and 0 if publicly-owned

$SIZE_{it}$ is measured by the Logarithm of Total Assets

3.6.3.2 Model 2: Fundamental Factor Model with Spreads

This Model specification follows from Model 1 above and uses the spreads of the company attributes to explain financial distress in an attempt to further answer objective two. The spreads have been calculated by taking the difference between the actual ratio less the regulatory cut-off (where applicable) or the market average where no regulatory cut-off exists. The regulatory cut off points exist for both measures of capital adequacy (CA1 and CA2), Liquidity and Insider Lending.

$$Fin\ Distress_{it} = \beta_0 + \beta_1 SPLEV_{it} + \beta_2 SPMR_{it} + \beta_3 SPNLD_{it} + \beta_4 SPFA_{it} + \beta_5 SPIL_{it} + \beta_6 SPCA1_{it} + \beta_7 SPCA2_{it} + \beta_8 SPCRAQ_{it} + \beta_9 SPME_{it} + \beta_{10} SPROA_{it} + \beta_{11} SPLIQ_{it} + \beta_{12} OWN_{it} + \beta_{13} SPSIZE_{it} + \varepsilon_{it}$$

3.6.3.3 Model 3: Macroeconomic Factor Model

This model specification uses the following macroeconomic attributes to explain financial distress:

$$Fin\ Distress_{it} = \beta_0 + \beta_1 GDPG_{it} + \beta_2 CBR_{it} + \beta_3 INT_{it} + \varepsilon_{it}$$

Where:

$GDPG_{it}$ is the measure of Economic Growth (GDP Growth)

CBR_{it} is the Central Bank Rate

INT_{it} is a measure of Interbank Activity (Annual Interbank Volumes/Aggregate Volumes)

3.7 Research Quality

3.7.1 Instrument Reliability

Reliability within quantitative research refers to the stability, consistency, and repeatability of results. If consistent outcomes have been obtained in identical situations but different circumstances, the result of a researcher is considered reliable (Twycross & Shields, 2004). This study tested for internal consistencies to check if approximately the same results are achieved when the same test is carried out.

3.7.2 Instrument Validity

Absolute validity is difficult to establish in research (Bryman & Cramer, 1997). Secondary data was used as obtained without any manipulation of the figures.

The usual procedure in evaluating the content validity of a measure is to employ the advice of a professional or expert in a particular field (Mugenda and Mugenda, 1999). Expert opinion was requested from the study supervisor. The supervisor gave suggestions of corrections to be made to the study and in that manner assisted in improving the content validity of the data that was collected.

3.7.3 Ethical Considerations

Ethical considerations refer to a system of values which can significantly change previously held stands about actions and choices (Fouka & Mantzorou, 2011). This study bore respect for anonymity and confidentiality by not disclosing the names of banks in the study results.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1. Introduction

This chapter presents the research findings obtained from the study. The summary of number of banks in the research study is shown in Table 3 below:

Table 3: Summary of the number of Banks involved in the Study

Year	Total No. of Banks	Receivership	Acquisitions (Existing Bank)	Acquisitions (New Bank)	New Banks	Not Published
2012	43	0	0	0	0	0
2013	43	0	0	0	0	0
2014	43	0	0	0	0	0
2015	41	-2	0	0	0	0
2016	39	-1	0	0	0	-1
2017	40	0	-2	1	2	0
2018	39	0	0	0	0	-1

The chapter further provides descriptive statistics for each research objectives. The diagnostic tests justifying the choice of model for both objectives two and three are further detailed in Appendix 2, 3 and 4 respectively.

4.2. Level of Financial Distress in Kenyan Commercial Banks

4.2.1 Descriptive Statistics for Level of Financial Distress in Kenyan Banks

A summary of the descriptive statistics on the level of financial distress for the Banks is shown in Table 4 below:

Table 4: Summary Statistics for the Level of Financial Distress

Financial Distress	n	mean	std dev	median	min	max	range	skew	kurtosis
	288	2.47	1.09	2.48	-2.44	5.35	7.79	-0.38	1.84

The average level of financial distress as measured by the Z-Score for the Banking sector across all years of study is 2.47. A simple analysis of normality on the basis of the skewness and kurtosis show some deviation from the typical normal distribution where a skewness of 0 and a kurtosis of 3 is expected.

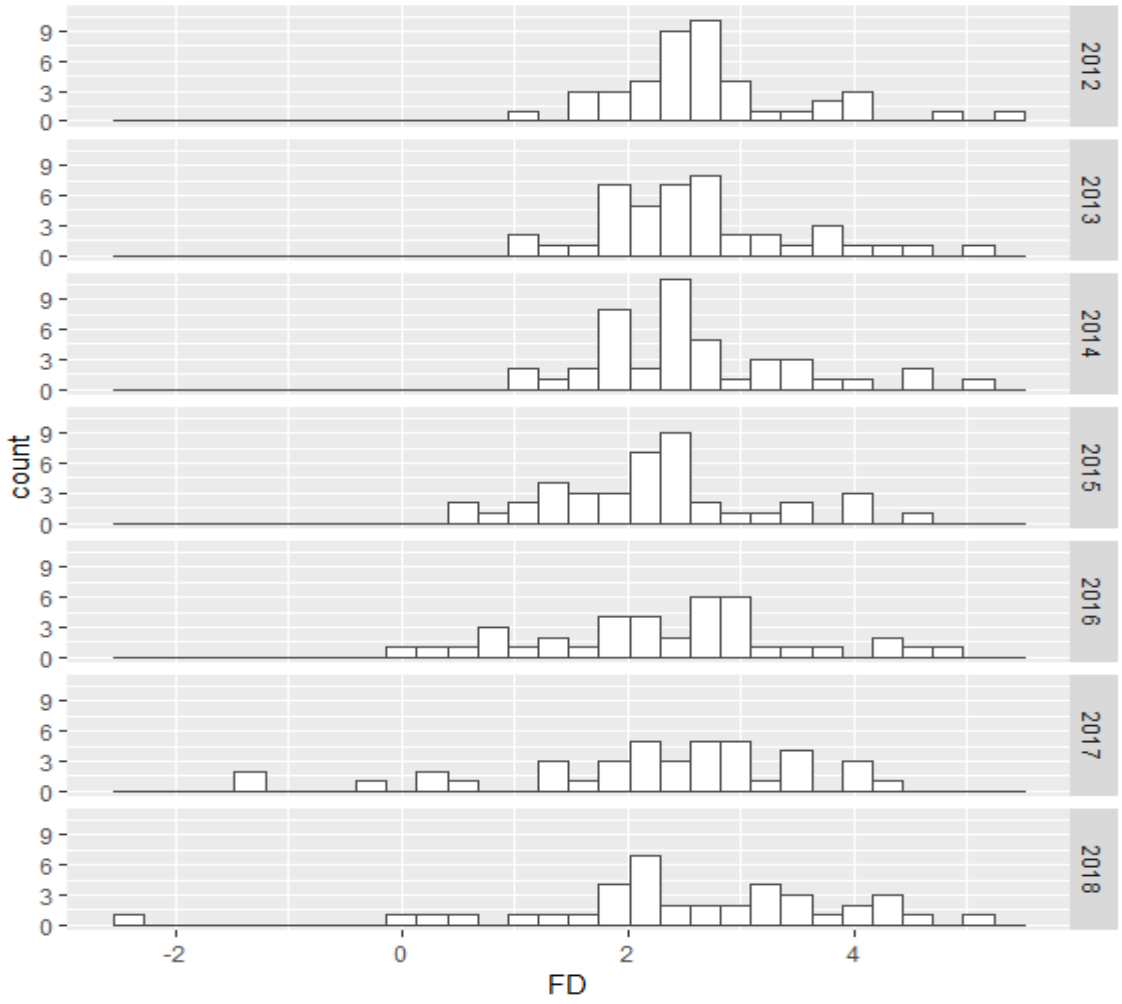
The summary statistics grouped by year are also summarized further in Table 5 below. A related visualization of the distribution of the levels of financial distress across the years is shown in Figure 1 below.

Table 5: Summary Statistics for Level of Financial Distress by Year

	n	mean	sd	median	min	max	range	skew	kurtosis
2012	43	2.73	0.87	2.6	1.15	5.35	4.2	0.92	0.93
2013	43	2.63	0.88	2.51	1.12	4.98	3.86	0.69	0.14
2014	43	2.57	0.9	2.44	1.07	5.14	4.07	0.85	0.35
2015	41	2.26	0.94	2.24	0.56	4.69	4.13	0.49	0.03
2016	39	2.34	1.14	2.44	-0.03	4.8	4.83	0.05	-0.41
2017	40	2.22	1.35	2.48	-1.34	4.34	5.68	-0.92	0.5
2018	39	2.54	1.44	2.39	-2.44	5.17	7.61	-0.95	1.85

An interesting pattern arises here. The minimum level of financial distress worsens gradually from 2012 to 2018, with a minimum score of 1.15 noted in 2012, down to a score of -2.44 noted in 2018. The distribution of the responses provides more information in figure 2 below:

Figure 2: Distribution of Financial Distress Levels by Year

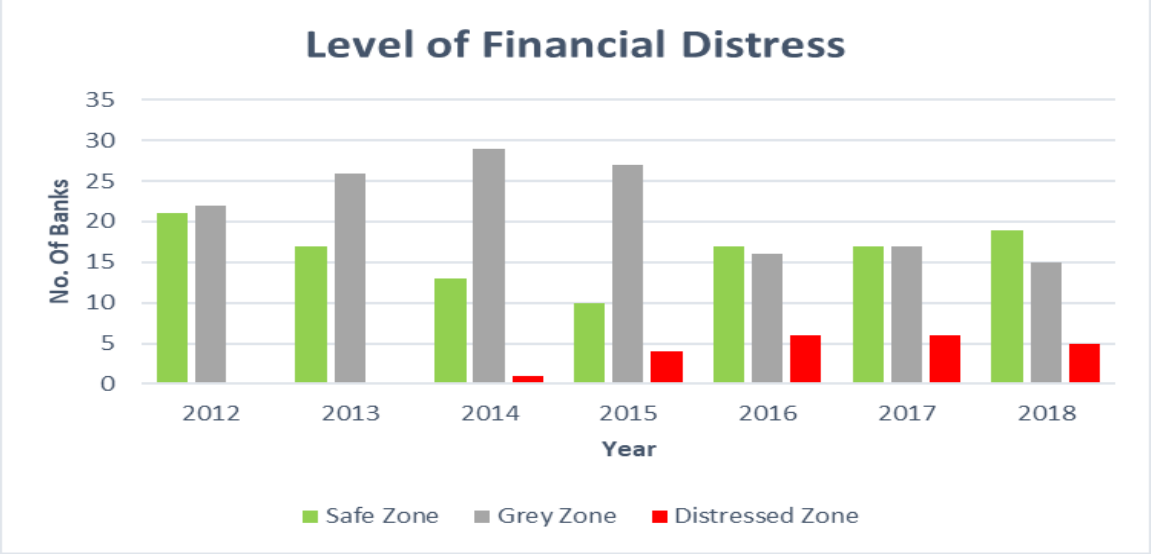


It is noted that across the years, the spread of histogram has become slightly wider, especially in recent times (2015 to 2018), with the lower tail extending from year to year. This is backed up by the worsening minimum level of financial distress, as well as the increasing standard deviation from 2012 to 2018. This is an indication of the declining performance of the overall banking sector. Similarly, the skewness of the distribution gradually shifts from positive to negative when we hit 2017 (-0.92 in 2017, -0.95 in 2018). The high kurtosis noted for the overall data set (1.84) seems to be

significantly affected by the year 2018, which registers a kurtosis of 1.85, with the other years having significantly lower levels of kurtosis.

Figure 3 below further illustrates the number of banks within the various discrimination zones across the study period.

Figure 3: Illustration of Financial Distress Zones by Year



4.3. The Effect of Bank-Specific Factors on the Level of Financial Distress

4.3.1 Descriptive Statistics for Bank Specific Variables

A summary of the descriptive statistics on the Bank Specific Factors is shown in Table 6 below:

Table 6: Descriptive Statistics for the Bank Specific Variables

Indicator	Measure	Mean (%)	std dev (%)	Median (%)	Min (%)	Max (%)	Range (%)	skewness	kurtosis
Leverage	Total Debt/Total Liabilities	3.9	6.0	0.7	0.0	30.0	30.0	2.1	7.5
Overly Aggressive Activity	Net Loans/Deposits	80.3	38.5	78.0	11.3	597.9	586.6	8.6	115.3

Overly Aggressive Activity	Total Fixed Assets/Total Assets	2.8	3.2	2.1	0.2	31.8	31.6	5.2	40.7
Insider Lending	Total Insider Loans & Advances/Core Capital	28.2	50.2	19.2	-6.5	756.5	763.0	11.1	156.2
Capital Adequacy	Total Capital/ Total Risk Weighted Assets	23.3	11.6	20.2	-22.0	94.5	116.5	2.1	12.2
Capital Adequacy	Core Capital/ Total Risk Weighted Assets	21.4	11.9	17.7	-23.5	94.5	118.0	2.1	11.9
Credit Risk & Asset Quality	(Gross NPL's) /Gross Loans	12.0	12.0	8.0	0.0	72.0	72.0	2.2	9.1
Management Efficiency	Operating Expenses/Revenues	103.5	374.0	67.0	19.9	6321.7	6301.7	16.1	267.2
Earnings	ROA	1.3	3.3	1.8%	-24.5	15.7	40.1	-3.4	26.6
Liquidity	Net Liquid Assets/ Total deposits & Short-Term Libs	43.0	18.2	39.2	-9.5	123.6	133.1	1.0	5.1
Market Risk	Relative Gap/Total Assets	10.2	8.3	10.6	-22.7	42.8	65.5	-0.1	4.3
Size	Logarithm of Assets	7.6	0.6	7.5	6.4	8.8	2.4	0.2	2.0

An assessment of the median values indicates that banks are moderately aggressive on the basis of how much they lend relative to the size of their deposits (median of 78%). The median scores for Capital adequacy (20.2% and 17.7%) are well above the regulatory cut-offs of 14.50% for Total Capital/ Total Risk Weighted Assets and 10.5% for Core Capital/ Total Risk Weighted Assets. The median score for management efficiency is quite high, indicating that banks spend more than half of their revenues on operating expenses. The median liquidity is also significantly above the regulatory requirement of 20%. The discussion here does not focus on the mean points due to the effect of the outlier data points which significantly skew the statistics.

4.3.2 Results for Bank Specific Variables

The results from a robust (corrected for autocorrelation) Fixed Effects model estimation (model specification 1) are shown in Table 7 below:

Table 7: Fixed-effects (within) regression with Bank Specific Variables

R-sq:						
within	90.4%		Number of observations		288	
between	86.5%		Number of Groups		45	
overall	86.1%					
F (12,44)	146.7		Prob>F		0.0000	
corr(u_i, Xb)	-0.2173					
Indicator	***Measure/Ratio)***	***Robust Coef.***	***Std. Error***	***t***	***P>|t|***	
Leverage	Total Debt/Total Liabilities	-1.99	0.44	-4.51	0.0000	***
Overly Aggressive Activity	Net Loans/Deposits	0.01	0.02	0.33	0.7460	
Overly Aggressive Activity	Total Fixed Assets/Total Assets	-8.10	1.13	-7.16	0.0000	***
Insider Lending	Total Insider Loans & Advances/Core Capital	-0.03	0.02	-1.96	0.0570	*
Capital Adequacy	Total Capital/ Total Risk Weighted Assets	0.68	0.88	0.77	0.4450	
Capital Adequacy	Core Capital/ Total Risk Weighted Assets	-0.54	1.06	-0.51	0.6110	
Credit Risk & Asset Quality	Gross NPL's /Gross Loans	-0.36	0.39	-0.92	0.3650	
Management Efficiency	Operating Expenses/Revenues	0.00	0.00	0.92	0.3610	
Earnings	ROA	10.58	1.29	8.22	0.0000	***
Liquidity	Net Liquid Assets/ Total deposits & Short-Term Libs	4.93	0.26	18.89	0.0000	***
Market Risk	Relative Gap/Total Assets	-0.91	0.37	-2.48	0.0170	**
Size	Log Assets	-0.10	0.19	-0.51	0.6100	
Ownership	Dummy Variable	0.00	(omitted)			
	_cons	1.34	1.40	0.96	0.3430	
Significance Key: (*** 0.01), (** 0.05), (* 0.10)						

The model explains approximately 86% of the variation in financial distress levels for the banks across the years. The results above show that Leverage (measured by Total Debt/Total Liabilities), Overly Aggressive Activity (measured by Total Fixed Assets as a ratio of Total Assets) and Market Risk (Relative Gap/Total Assets) negatively and significantly affect the level of financial distress. This means that with a unit increase in

these ratios, there is a decline in the Z-Score of the bank, indicating an increase in financial distress. Their significance is assessed at the 95% confidence interval. The effect of Overly Aggressive Activity is much larger than that of Leverage and Market Risk.

On the other hand, Earnings (measured by ROA) and Liquidity (measured by Net Liquid Assets/ Total deposits & Short-Term Liabilities) are found to positively and significantly affect the Z-Score given to a bank at a 95% confidence interval. This means that when the earnings and liquidity measures of the bank increase, the z-score increases as well, indicating greater banking stability. The positive effect of Earnings is much larger than that of Liquidity. The variable ownership is omitted from the fixed effects model as it is a dummy variable, which is already taken care of in the fixed effects.

4.3.3 The Effect of Spread Variables on the Level of Financial Distress

The spreads have been calculated by taking the difference between the actual ratio less the **minimum** regulatory cut-off (where applicable), or the market average where the regulatory cut-off does not exist. The regulatory cut off points exist for both measures of capital adequacy (CA1 and CA2) and Liquidity.

Specifically, when looking at the variable on Insider Lending (Total Insider Loans & Advances/Core Capital), the spread is calculated differently. This is done by deducting the actual ratio from the **maximum** regulatory cut-off; a positive spread indicates that the bank has not reached the regulatory limit, whereas a negative implies the bank has surpassed the regulatory limit of 100%.

4.3.3.1 Descriptive Statistics for Spread Variables

A summary of the descriptive statistics on the spread variables is shown in table 8 below:

Table 8: Descriptive Statistics for Spread Variables

Indicator	mean	std dev	median	min	max	range	skewness	kurtosis
Leverage	0.0%	5.9%	-3.0%	-4.9%	26.3%	31.2%	2.1	7.6
Overly Aggressive Activity	0.0%	37.5%	-2.7%	-67.9%	498.2%	566.1%	8.3	109.5
Overly Aggressive Activity	0.0%	3.2%	-0.7%	-3.5%	28.1%	31.6%	5.0	38.5
Insider Lending	71.8%	50.2%	80.8%	-656.5%	106.5%	763.0%	-11.1	156.2
Capital Adequacy	8.8%	11.6%	5.7%	-36.5%	80.0%	116.5%	2.1	12.2
Capital Adequacy	10.9%	11.9%	7.2%	-34.0%	84.0%	118.0%	2.1	11.9
Credit Risk & Asset Quality	0.0%	11.3%	-3.0%	-18.8%	59.9%	78.6%	2.1	9.2
Management Efficiency	0.0%	368.5%	-14.6%	-241.0%	6060.7%	6301.7%	15.5	256.0
Earnings	0.0%	3.2%	0.4%	-24.5%	13.3%	37.8%	-3.3	24.7
Liquidity	23.0%	18.2%	19.2%	-29.5%	103.6%	133.1%	1.0	5.1
Market Risk	20.3%	8.4%	20.6%	-13.7%	53.6%	67.3%	-0.1	4.4
Size	0.0	0.6	-0.1	-1.2	1.2	2.4	0.2	2.0

An assessment of the median values indicates that the median spread for management efficiency is negative, meaning majority of the banks are below the industry average for management efficiency. The median spread for leverage is also slightly negative, meaning majority of the banks are below the industry average for leverage. With an 80.8% median spread, this indicates that the median level of insider lending in the banking sector is approximately 20.2% across the years used in the study. The discussion here does not focus on the mean points due to the effect of the outlier data points which significantly skew the statistics.

4.3.3.2 Results for Spread Variables

The results from a robust (corrected for autocorrelation) Fixed Effects model estimation (model specification 2) are shown in the table 9 below:

Table 9: Fixed Effects (within) Regression with Spread Variables

R-sq:						
within	87.9%		Number of observations		288	
between	71.4%		Number of Groups		45	
overall	75.6%					
F (12,44)	141			Prob>F	0.0000	
corr(u_i, Xb)	-0.2756					
Indicator	***Spread of Measure/Ratio***	***Robust Coef.***	***Std. Error***	***t***	***P>|t|***	
Leverage	Spread -- Total Debt/Total Liabilities	-1.65	0.42	-3.95	0.0000	***
Overly Aggressive Activity	Spread -- Net Loans/Deposits	0.01	0.04	0.14	0.8920	
Overly Aggressive Activity	Spread -- Total Fixed Assets/Total Assets	-7.27	1.13	-6.43	0.0000	***
Insider Lending	Spread -- Total Insider Loans & Advances/Core Capital	0.06	0.02	3.75	0.0010	***
Capital Adequacy	Spread -- Total Capital/ Total Risk Weighted Assets	1.33	1.00	1.32	0.1930	
Capital Adequacy	Spread -- Core Capital/ Total Risk Weighted Assets	-1.78	1.19	-1.50	0.1410	
Credit Risk & Asset Quality	Spread -- (Gross NPL's) /Gross Loans	-0.68	0.39	-1.72	0.0920	*
Management Efficiency	Spread -- Operating Expenses/Revenues	0.01	0.01	1.13	0.2640	
Earnings	Spread -- ROA	10.80	1.90	5.68	0.0000	***
Liquidity	Spread -- Net Liquid Assets/ Total deposits & Short-Term Libs	5.11	0.27	18.88	0.0000	***
Market Risk	Spread -- Relative Gap/Total Assets	-0.46	0.39	-1.18	0.2430	
Size	Spread -- Log Assets	-0.61	0.16	-3.76	0.0000	***
Ownership	Dummy Variable	0.00	(omitted)			
	_cons	1.40	0.10	14.62	0.0000	
Significance Key: (*** 0.01), (** 0.05), (* 0.10)						

The model explains approximately 76% of the variation in financial distress levels for the banks across the years, a slight decline from Model 1. The results above show that the **spread** of Leverage, Overly Aggressive Activity (measured by Total Fixed Assets as a ratio of Total Assets) and Size (measured by log of total assets) negatively and significantly affect the level of financial distress. Their significance is assessed at the 95% confidence interval. This means that with a unit increase in the spread (an increase in the margin between the bank's ratio and the regulatory cut off of the industry average), there is a decline in the Z-Score of the bank, indicating an increase in financial distress. For example, when the bank has significantly higher leverage levels as compared to the industry leverage, its financial stability declines. Similarly, a large bank (whose size is larger than industry average) or an overly aggressive bank that holds a vast amount of fixed assets (greater than industry average) have lower levels of financial stability. The effect of overly aggressive activity is much larger than that of Size and Leverage.

For insider lending, the spread is calculated differently by taking the regulatory cut off (100%) less the bank's level of insider lending. This means that a higher spread is preferable since the banks insider lending is further below the regulatory ceiling. The coefficient on this is positive and significant at the 95% confidence interval. This means that a higher spread (lower insider lending) leads to higher levels of financial stability for the bank.

On the other hand, the **spread** for Earnings (ROA less industry average) and the **spread** for Liquidity (measured by Liquidity ratio less the regulatory cut-off of 20%) are found to positively and significantly affect the Z-Score given to a bank at a 95% confidence interval. This means that when the bank's earnings and liquidity measures are higher than the industry average or the regulatory cut-off mark, the z-score increases, indicating greater banking stability. The effect of earnings is significantly higher than that of liquidity (coefficient of 10.80 on Earnings, compared to 5.11 on Liquidity)

The variable ownership is omitted from the fixed effects model as it is a dummy variable, which is already taken care of in the fixed effects.

4.4 The Effect of Macro-economic Variables on the Level of Financial Distress

4.4.1 Descriptive Statistics for Macro-economic Variables

A summary of the descriptive statistics on the macroeconomic variables is shown in the table 10 below:

Table 10: Descriptive Statistics for Macroeconomic Variables

Indicator	mean	std dev	median	min	max	range	skewness	kurtosis
Economic Growth	5.4%	0.5%	5.7%	4.6%	5.9%	1.3%	-0.7	2.0
Central Bank Rate	10.4%	2.3%	10.0%	8.5%	15.8%	7.3%	1.7	4.4
Interbank Activity	14.3%	4.7%	16.3%	3.6%	19.1%	15.5%	-1.5	4.0

An assessment of the mean values indicates that economic growth and interbank activity record a negative skew across the years studied. Interbank activity is more negatively skewed as compared to Economic Growth. The lowest level of interbank activity was seen in 2012 (3.6%). The highest was recorded in 2015 (19.1%).

4.4.2 Results for Macro-economic Variables

The results from a robust (corrected for autocorrelation) Random Effects model estimation (model specification 3) are shown in table 11 below:

Table 11: Random Effects Model Estimation with Macroeconomic Variables

R-sq:			
within	6.87%	Number of observations	288
between	0.09%	Number of Groups	45
overall	1.94%		
Wald chi2(3)	16.49	Prob > chi2	0.0009

Corr (u_i, Xb)	0 (assumed)					
Indicator	***Measure/Ratio***	***Robust Coef.***	***Std. Error***	***t***	***P>|t|***	
Economic Growth	GDP Growth	-9.66	9.59	-1.01	0.3140	
Central Bank Rate	CBR	-10.45	3.43	-3.05	0.0020	***
Interbank Activity	Annual Interbank Volumes/Aggregate Volumes	-6.36	1.69	-3.77	0.0000	***
	cons	4.96	0.91	5.46	0.0000	
Significance Key: (*** 0.01), (** 0.05), (* 0.10)						

The R-squared of this model is very poor compared to Model 1 and 2 above. This could be explained by the fact that the main significant variables have been factored out by the bank specific variables and the bank specific spreads which combined have explained over 86% of the variation in financial distress levels for the banks. The results however indicate that the Central Bank Rate and the level of Interbank Activity both negatively and significantly affect the level of financial distress. Their significance is assessed at the 95% confidence interval.

That notwithstanding, Economic Growth is found to be insignificant in affecting the level of financial distress. For the two significant variables, this means that with a unit increase in the Central Bank Rate and the ratio of Annual Interbank Volumes/Aggregate Volumes, there is a decline in the Z-Score of the bank, indicating an increase in financial distress. When the Central bank charges a higher rate of interest on loans to banks, the stability of banks is negatively affected. Similarly, increased interbank lending in the sector is detrimental to bank's stability.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter addresses the summary of findings, conclusions drawn and recommendations made. This is presented according to the objectives of the study. The conclusions are aligned to the three objectives and seven hypotheses pursued by the study.

5.2 Summary of the Findings

5.2.1 Level of Financial Distress in Kenyan Commercial Banks.

In the year 2012 and 2013 there were no commercial banks under financial distress. This however grew to 1 bank in the year 2014, 4 banks in the year 2015,6 banks in the year 2016 and 2017 and lastly reducing to 5 banks in the year 2018. One bank did not publish their financial statement for the year 2016 and another had not published their 2018 financial statement as at the time of carrying out this study. This is contrary to the CBK prudential guidelines (CBK, 2013). The non-publication in itself raises a red flag. The banks identified to be under financial distress in the years 2015 and 2016 did not include Imperial Bank and Chase Bank which were both put under receivership in the respective years.

Banks in the grey zone were 22 in the year 2012, which grew to 26 in the year 2013, 29 in the year 2014, 27 in the year 2015, 16 in the year 2016, 17 in the year 2017 and lastly 15 in the year 2018.

Bank in the safe zone were 21 in the year 2012, which reduced to 17 in the year 2013, further reduced to 13 in the year 2014, and reduced even further to 10 in the year 2015, only to pick up in the year 2016 and 2017 to 17 and lastly 19 in the year 2018.

The increase of banks facing financial distress in the year 2015 and 2016 with minimal changes thereafter signifies that the bank failures of 2015 and 2016 had a significant and

long-term ripple effect on the banking sector. Further analysis established that banks that displayed financial distress for over two years consistently funded a significant portion of their assets through LOLR lending. This is in line with the LOLR illiquidity theory which states market failure causes banks to suffer from an inability to roll over financing of assets (Drechsler, Drechsel, Schnabl & Ibanez, 2013). Onset of distress of other firms can be caused by the default of one firm. This is especially the case whereby firms hold significant liabilities of the defaulting firm. Banks further seek to limit their interbank exposures by dumping various classes of assets, which magnify price declines (Heider, Hoerova, and Holthausen 2015). The situation is made worse when the LOLR fails to provide sufficient liquidity to prevent contagion and thus not fulfill the expectations of banks that the LOLR would insure them against liquidity risk shocks (Calomiris, Jaremski and Wheelock (2019).

When the bank failures occurred in the year 2015 and 2016, many of the banks holding significant liabilities in these banks sought to limit their interbank exposures by closing all correspondent relationships with banks they considered high risk. In a worse turn of events when Chase Bank faced a run on its deposits (Abdulla, 2018) many banks had the perception that CBK as the LOLR would provide sufficient liquidity to prevent contagion. When this did not happen, the interbank market shrunk by 30% (CBK, 2016) mainly affecting the banks considered risky. The interbank market is yet to recover to 2015 volumes leaving the banks which cannot secure interbank funding to significantly rely on the LOLR for the funding of their assets allowing them avoid fire sales and to slowly de-leverage. Unfortunately, some of these banks continue to erode their asset value and hence earnings. This then leads to capital erosion. Alternative and timely solutions like acquisitions or liquidation need to be established. This is evident by the worsening Z-score of some banks across the study period.

5.2.2 Effect of Bank Specific Factors on the Level of Financial Distress in Kenyan Commercial Banks

Bank specific factors as measured by leverage, overly aggressive activity, insider lending, ownership structure, bank size and financial soundness (as indicated by capital adequacy, asset quality, management efficiency, earnings, liquidity and market risk) explain approximately 86% of the variation in financial distress levels for the banks across the years.

The results above show that Leverage (measured by Total Debt/Total Liabilities), Overly Aggressive Activity (measured by Total Fixed Assets as a ratio of Total Assets) and Market Risk (Relative Gap/Total Assets) negatively and significantly affect the level of financial distress. This means that with a unit increase in these ratios, there is a decline in the Z-Score of the bank, indicating an increase in financial distress.

On the other hand, Earnings (measured by ROA) and Liquidity (measured by Net Liquid Assets/ Total deposits & Short-Term Liabilities) are found to positively and significantly affect financial distress. This means that when the earnings and liquidity measures of the bank increase, the z-score increases as well, indicating greater banking stability.

The results of this study on the significant and negative influence of leverage on financial distress concur with those of Muigai (2016), Masdupi, Tasman & Davista (2018) and Muigai and Muriithi (2017). The study results however differ with Ebaid (2009) whose studies indicated that debt use had insignificant impact on financial distress. They further contrast those of Hadlock and James (2002) and Ghosh, Nag, and Sirmans (2000) whose study findings showed that there was a positive correlation between leverage and financial distress of the firm.

The results of this study on the significant and negative influence of overly aggressive activity on financial distress agree with those of Basu (2003) and the OCC (1988). This is also in line with the market power theory. The level of risk that banks take largely depends upon the competitive structure under which they operate. With large Kenyan

banks consistently commanding well over 50% of the sector's market share, the commercial banks fiercely compete with each other to extend or at worst retain their market share. This competition has seen Kenyan commercial banks open branches extensively, venture into mobile lending platforms and expand into other investments like subsidiaries, associates or joint ventures. Many of these investments may not be very efficient.

The results on the significant and negative influence of market risk on financial distress agree with those of Mirkovic, Dasic & Siljkovic (2013). This is in line with the portfolio theory. Kenyan commercial banks have adopted higher risk in their portfolios subjecting them to interest rate risks.

The study findings on the significant and positive influence of earnings on financial distress agree with those of Aspal & Sanjeev (2014) that high earnings quality ought to serve as a reliable indicator of future going concern status and operating performance of an organisation. It should also mirror the organization's current operating performance. However, the findings differ with those of Ugoani (2015) and Masdupi, Tasman & Davista (2018) who found that profitability has a negative and significant influence on financial distress.

The findings of this study on the significant and positive influence of liquidity on financial distress agree with those of Outecheva (2007), Kariuki (2013), Gruszczynski (2004) and Cheluget (2014). The findings however differ with Masdupi, Tasman & Davista (2018) who found that liquidity has a negative and significant influence on financial distress of manufacturing companies. These differences may have been observed because it appears that the onslaught of the financial distress was the recent bank failures which in itself created a liquidity event causing further financial distress of some banks.

For the study period, over 60% of the banks under financial distress in any one year are private banks while the rest are public banks. This concurs with the study by Al-Khouri

(2012) and Hu and Zheng (2015) that government ownership helped firms decrease their degree of corporate financial distress. The study however differs with Md-Rus, Mohd, Latif and Alassan (2013) whose findings indicated that government ownership was not a significant factor in influencing financial distress.

5.2.2.1 Effect of Spread Variables on the Level of Financial Distress in Kenyan Commercial Banks

Spreads on bank specific variables explains approximately 76% of the variation in financial distress levels for the banks across the years.

The spreads have been calculated by taking the difference between the actual ratio less the **minimum** regulatory cut-off (where applicable), or the market average where the regulatory cut-off does not exist. The regulatory cut off points exist for both capital adequacy and Liquidity. The variable on insider lending spread is calculated by deducting the actual ratio from the **maximum** regulatory cut-off; a positive spread indicates that the bank has not reached the regulatory limit, whereas a negative implies the bank has surpassed the regulatory limit of 100%.

The results above show that the spread of Leverage, Overly Aggressive Activity (measured by Total Fixed Assets as a ratio of Total Assets) and Size (measured by log of total assets) negatively and significantly affect the level of financial distress. This means that with a unit increase in the spread (an increase in the margin between the bank's ratio and the regulatory cut off or the industry average), there is a decline in the Z-Score of the bank, indicating an increase in financial distress. For example, when the bank has significantly higher leverage levels as compared to the industry leverage, its financial stability declines. Similarly, a large bank (whose size is larger than industry average) or an overly aggressive bank that holds a vast amount of fixed assets (greater than industry average) have lower levels of financial stability.

For insider lending, the spread is calculated differently by taking the regulatory cut off (100%) less the bank's level of insider lending. This means that a higher spread is preferable since the banks insider lending is further below the regulatory ceiling. The coefficient on this is positive and significant at the 95% confidence interval. This means that a higher spread (lower insider lending) leads to higher levels of financial stability for the bank.

On the other hand, the spread for Earnings (ROA less industry average) and the spread for Liquidity (measured by Liquidity ratio less the regulatory cut-off of 20%) are found to positively and significantly affect the Z-Score given to a bank at a 95% confidence interval. Meaning that when the bank's earnings and liquidity measures are higher than the industry average or the regulatory cut-off mark, the z-score increases, indicating greater banking stability.

These finding provide new knowledge in that, in addition to ratio analysis to establish financial distress, further analysis on the spreads of these ratios can not only validate but also provide significant additional information. In this study, the spreads of earnings and liquidity validate the earlier results that the two variables positively and significantly affect the level of financial distress. In a similar manner, the spreads of leverage and overly aggressive activity also validate the earlier results that that the two variables negatively and significantly affect the level of financial distress. In addition, the spreads on insider lending and size provide new information.

This new information is in line with observations by Hunjak & Jakovčević (2001) that financial ratio evaluation need be complemented with other varying evaluations like competitive position, regulatory compliance, capital structure amongst other because a model that would adequately meet the needs of bank analysis and assessments is yet to be developed.

The findings that insider lending significantly and positively influences the level of financial distress concurs with that of the OCC (1988). The study findings that size

significantly and negatively influences the level of financial distress concurs with Marsh (1982), Gonenc (2005), Dittmar (2004), Khan (2012) and Maina and Ishmail (2014) but however differ with those of (Papadogonas (2006).

5.2.3 Effect of Macro-economic Variables on the Level of Financial Distress in Kenyan Commercial Banks

The R-squared of the macro-economic model is very poor. Macro-economic variables explain approximately 1.94% of the variation in financial distress levels for the banks across the years. The explanation for this could be that the main significant variables have been factored out by the bank specific variables and the bank spreads which combined have explained over 86% of the variation in financial distress levels for the banks. Thus even the most ideal macro-economic model could only have explained no more than 14% of the variation in financial distress levels for the banks.

The study findings that macro-economic factors had an insignificant effect on the levels of financial distress concur with those by the OCC (1988) that found that poor macro-economic factors were the sole significant cause of failure in only 7% of the banks surveyed. Therefore, this study concurs with the OCC (1988) in their conclusion that economic conditions are mostly a secondary and not primary factor in determining a bank's condition.

The study findings further concur with Kiganda & Evans (2014) whose results showed that macroeconomic factors have insignificant effect on bank profitability and hence earnings in Kenya. The study is also consistent with the findings of Rao & Lakew (2012) whose results indicated that external factors had a statistically insignificant effect on the profitability and thus earnings of commercial banks operating in Ethiopia. It is also consistent with the study of Ramadan et al., (2011) whose results associated with the macro-economic determinants showed a positive insignificant impact on return on assets and observations by Ongore (2013) that macroeconomic variables insignificantly

affect bank profitability and hence earnings. The discussions here focus on earnings as the study findings have already established that earnings positively and significantly influence the level of financial distress in Kenyan commercial banks.

5.3 Conclusion

The increase of banks facing financial distress in the year 2015 and 2016 with minimal changes thereafter signifies that the bank failures of 2015 and 2016 had a significant and long-term ripple effect on the banking sector. Further analysis established that banks that displayed financial distress for over two years consistently funded a significant portion of their assets through LOLR lending. In addition, the outlier data points which have significantly skewed the results have been caused by the worsening position of one bank. This signifies that continuous reliance on LOLR lending does not necessarily improve the position of a bank. Constant monitoring and analysis needs to be carried out to establish at what point alternative solutions like acquisitions or liquidations need to be sort to avoid further loss of the value of bank assets and further capital erosion.

The efforts of the Central Bank of Kenya to sell off some of the distressed banks has yielded positive effects with the level of financial distress of these banks improving to the grey zone. But the bigger question is how to avert the snow balling of financial distress as that experienced by banks after the three bank failures.

When a bank experiences a panic-induced run on its deposits for whatever reason as was experienced in 2016, the Central Bank of Kenya needs to carry out a comprehensive cost-benefit analysis before making a decision as to whether or not to provide liquidity to the distressed bank in order to avert contagion. The scope of this analysis should go beyond the distressed bank and also include possible scenario testing of the impact on the banking sector and the economy as a whole.

Policies on LOLR should be well laid out and communicated to banks detailing the terms and conditions under which banks can access LOLR lending either in the case of a

panic-induced run on deposits or failure to secure lending from the interbank market. Commercial banks on the other hand should continuously measure and monitor their levels of financial distress. The measures and frequency of monitoring should be incorporated in the banks' Asset Liability Management policies. Financial distress levels in the bank and sector should be a standing agenda in the banks' Asset Liability Committee and the Board risk committees. This will ensure that banks take a more proactive than reactive approach and that issues are identified and addressed in a timely manner. Banking supervision department should include the audit of this process in their supervisory plan. Further, CBK together with the banks' internal and external auditors need to provide comfort as to the veracity and reliability of published bank financial statements. This will allow for effective measuring and analysis of financial distress of any commercial bank or the wider sector. The qualification of financial statements of one of the commercial banks raised doubts as to the true level of financial distress of that bank. This veracity and reliability should extend beyond the annual statements and should also include the quarterly financial statements. This will allow for reliable intra-year analysis and avoid year end surprises.

The results of this study on the significant and negative influence of leverage on financial distress signifies that proper analysis needs to be carried out by a bank before on-boarding debt to ensure that it does not plunge the bank into unnecessary financial distress. Scholars and academicians can assist in coming up with leverage models that can be customised for every bank and provide guidance on the optimal capital structure of the bank. This can be used to predict the optimal size of debt that the bank can on-board. The results of this study on the significant and negative influence of overly aggressive activity (as measure by the proportion of total fixed assets to total assets) on financial distress signifies that the Central Bank of Kenya needs to demand more rigour from the banks before approving a new outfit in the form of a new branch, lending platform or other significant investment. This rigour should include provision of proper

business plans, financial projections and scenario testing to ensure that banks do not open inefficient outfits that later erode capital.

Financial ratio analysis complemented with different evaluations like competitive position, regulatory compliance, capital structure amongst others improves on the efficacy of the model. This is because a model that would fully satisfy the needs of bank analysis and evaluation is yet to be developed. The use of a combination of models to explain the level of financial distress has provided new knowledge in that, additional analysis on the spreads of bank specific variables has not only validated their results but also provided significant additional information with regard to new variables that have significantly influenced the level of financial distress.

The results of the study demonstrating that economic conditions are not the primary factor in determining a bank's condition is further evidenced by the fact that the distribution of banks across the three zones barely changed in the year 2017 despite the interest rate capping law having a full annual impact. The situation even further improves in 2018 when more banks move to the safe zone whilst the distressed zone remains barely unchanged. These results confirm past studies that bank specific weaknesses play a significant role in the decline of a majority of the failed and financially distressed banks compared to the macro-economic environment.

5.4 Recommendations

From the research findings, the study recommends to policy makers especially the Central Bank of Kenya, to lay out and communicate policies on LOLR lending, including clear terms and conditions under which banks can access LOLR lending either in the case of a panic-induced run on deposits or failure to secure lending from the interbank market. Time frames within which a bank can continuously rely on LOLR lending to finance its assets should be clearly stipulated as extended reliance by banks on the LOLR lending can lead to further deterioration of bank assets and capital erosion leading to unnecessary exposure of depositors funds.

CBK together with the banks' internal and external auditors need to provide comfort as to the veracity and reliability of published bank financial statements. This will allow for effective measuring and analysis of financial distress of any commercial bank or the wider sector. This veracity and reliability should extend beyond the annual statements and should also include the quarterly financial statements. The will allow for reliable intra-year analysis and avoid year end surprises.

Central Bank of Kenya needs to demand more rigour from the banks before approving a new outfit in the form of a new branch, lending platform or other significant investment. This rigour should include provision of proper business plans, financial projections and scenario testing to ensure that banks to do open inefficient outfits that later erode capital.

Commercial banks on the other hand should continuously measure and monitor their levels of financial distress. The measures and frequency of monitoring should be incorporated in the banks' Asset Liability Management policies. Financial distress levels in the bank and sector should be a standing agenda in the banks' Asset Liability Committee and the Board risk committee meetings. This will ensure that banks take a more proactive than reactive approach to issues regarding financial distress and that challenges are identified and addressed in a timely manner. Bank supervision should keep banks accountable by including audit of systems and processes used by banks to identify and monitor levels of financial distress, as part of their supervision plan. In addition, proper analysis needs to be carried out by bank management before on-boarding debt to ensure that it does not plunge the bank into unnecessary financial distress.

Scholars and academicians can assist in coming up with leverage models that can be customised for every bank and provide guidance on the optimal capital structure of the bank. This can be used to predict the optimal size of debt that the bank can on-board. Financial ratio analysis should be complemented with different evaluations like competitive position, regulatory compliance, capital structure amongst others to improve

on the efficacy of the model. This is because a model that would fully satisfy the needs of bank analysis and evaluation is yet to be developed. Lastly, a similar study can be carried out in other sectors of the Finance industry including Micro-Finance Institutions and Saccos.

5.5 Limitations

This study employed secondary data from the financial statements of Kenyan commercial banks. This numbers may be subject to manipulation by management and conservatism. For banks that changed names within the study period either through an acquisition or other, the original name of the bank was retained throughout the study for consistency and reliability.

The measure on market risk was limited to interest rate risk and excluded foreign exchange risk, equity prices, and residual risk due to unavailability of data. Gap analysis as used to measure market risk has its limitations in that it only applies to interest-rate risk on on-balance sheet items, and rather than look at the impact on asset or liability values, it looks at the effect of interest rates on income. Its results are horizon period sensitive, so results are affected by the horizon period chosen. Some of the limitations of the Z-Score were evident in the study as it is not applicable to new companies with little or no earnings as they will score low regardless of their financial health. This was the case for one new bank.

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Appendix I: Description of Panel Data Approach and Diagnostic Tests

1.0 Description of the Panel Data Approach

One important decision when using a panel data approach regards which type of panel model to use: pooling, fixed effects and random effects.

Essentially, there have been two approaches to creating panel data, combining cross section with time series data. First, the Least square dummy variables estimation has been suggested to account for constant effects associated with both the time and cross-sectional units. The use of dummy variables is an attempt to specify a model with an error term that indeed has zero mean, as required from assumptions of classical linear regression. The second approach is to recognize possible serial correlations in the error terms and account for these to increase the asymptotic efficiency of the estimates of the causal parameters.

The pooled OLS estimators used with panel data are unbiased under fulfilled assumptions of model linearity, independence, strict exogeneity and unrelated effects in small samples. Additionally, assuming and normally distributed idiosyncratic and individual specific errors, it is normally distributed in small samples.

1.1 Fixed Effects Model

According to Baltagi (2005), the fixed effects (FE) least squares, also known as least squares dummy variables (LSDV), suffers from a large loss of degrees of freedom. Having too many dummies in the model may aggravate the problem of multicollinearity among the regressors and it is common to see most variables being eliminate because of this. In addition, this FE estimator cannot estimate the effect of any time-invariant variable like sex, race, religion, schooling or union participation. In addition to LSDV Estimation, the fixed effects model can also be estimated using the *within estimation* which does not use dummy variables. The within estimation uses deviations from group

(or time period) means. The two strategies produce the identical parameter estimates of regressors (non-dummy independent variables).

The LSDV model takes the basic form below:

$$y_{it} = \alpha + \beta x_{it} + \mu_i + v_{it}$$

Where μ_{it} denotes the *unobservable* individual-specific effect and v_{it} denotes the

remainder disturbance. This fixed effects (FE) least squares, also known as least squares dummy variables (LSDV), suffers from a large loss of degrees of freedom. We are estimating $(N-1)$ extra parameters, and too many dummies may aggravate the problem of multicollinearity among the regressors. If *N* is large,

LSDV will include too many individual dummies and therefore it becomes optimal to wipe out these fixed effects. This is done using

The within estimation takes the form below:

$$(y_{it} - \bar{y}_i) = (x_{it} - \bar{x}_i)'\beta + (\varepsilon_{it} - \bar{\varepsilon}_i)$$

Where $\bar{y}_i$ is the mean of dependent variable (DV) of individual (group), $\bar{x}_i$ represent the

means of independent variables (IVs) of group *i*, $\bar{\varepsilon}_i$ is the mean of errors of group i. As

noted from the above time-invariant variables are wiped out by the *within* transformation, the deviations from means transformation. Alternative transformations used to wipe out the individual effects have been suggested, including the between transformation which averages values of all cross sections over time and runs the estimation using these averages. This gives:

$$(\bar{y}_i) = a + (\bar{x}_i)\beta + \bar{\varepsilon}_i$$

Early applications of this error components in economics include (Kuh, 1959) on investment and Mundlak (1961).

The Fixed eff ects estimator of β is unbiased under assumptions of model linearity, independence, strict exogeneity and no perfect collinearity in small samples. Assuming no serial correlation and normally distributed idiosyncratic errors, it is normally distributed in small samples. If the model is the true model, then Least squares dummy variable estimation provides the best linear unbiased estimator (BLUE) as long as v_{it} is the standard classical disturbance with mean 0 and variance–covariance matrix σ^2. In this case, the μ_i are assumed to be fixed parameters to be estimated and the remainder disturbances v_{it} stochastic with independent and identically distributed IID (0, σ^2)

1.2 Random Effects Model

There are too many parameters in the fixed effects model and this causes loss of degrees of freedom can be avoided if the μ_i can be assumed random. In this case $\mu_i \sim$ IID (0, σ^2) *and* $v_{it} \sim$ IID (0, σ^2) and the μ_i are independent of the v_{it} In addition, it is also taken that there is no endogeneity inherent in the model (i.e. the x_{it} are independent of μ_i and v_{it}). According to Baltagi (2005), the random effects model is an appropriate specification if we are drawing *N*

individuals randomly from a large population. In this case, *N* is usually large and using a fixed effects model would lead to an enormous loss of degrees of freedom.

Nerlove & Balestra (1996) emphasize that the population "consists *not* of an infinity of individuals, in general, but of an infinity of *decisions*" that each individual might make. This view is consistent with a random effects specification. In addition, they suggest that under the random effects model, GLS based on the true variance components is BLUE, and all the feasible GLS estimators considered are asymptotically efficient as either *N* or $T \rightarrow \infty$. The Random Effects GLS estimator is consistent and asymptotically normally distributed under fulfilled assumptions of model linearity, independence, strict exogeneity, no autocorrelation, unrelated effects and constant variance of the individual specific effect. The estimator also has good small sample properties.

We use the F-Test to investigate the presence of pooling versus fixed effects, the Breusch-Pagan Lagrange Multiplier (LM) Test to investigate the presence of pooling versus random effects and Hausman Test to investigate the presence of random effects versus fixed effects. These are described in detail below:

2.0 Diagnostic Tests

2.1 Unit Root Tests

Several unit root tests applied in the time series literature have been extended to panel data. We use the Fisher Type unit root tests which allows for unbalanced panels. Maddala & Wu (1999) and Choi (2001) proposed a Fisher-type test. The unit root test checks for non-stationarity of the variables used in the model. The Fisher-type test uses p-values from unit root tests for each cross-section i. The formula of the test looks as follows (Baltagi, 2005):

$$P = -2\sum_{i=1}^{N} \ln p_i$$

This combines the *p*-values from unit root tests for each cross-section *i* to test for unit root in panel data. Note that $-2\sum_{i=1}^{N} \ln p_i$ has a χ^2 distribution with 2 degrees of

freedom. The null hypothesis of the Fisher Type Unit Root test is that all panels have unit root (non-stationary) versus the alternative hypothesis that the panels do not have unit root (they are stationary). The Fisher Type Unit Root tests provides four test statistics used to evaluate the rejection of the null, or failure to reject the null. the Fisher test has the advantage over the IPS (Im Pesaran Shin) test in that it does not require a balanced panel. The disadvantage is

that the *p*-values have to be derived by Monte Carlo simulations. Maddala and Wu (1999) find that the Fisher test with bootstrap-based critical values performs the best and is the preferred choice for testing nonstationary as the null.

2.2 F-Test: Pooled vs Fixed Effects

The question of whether to pool the data or not naturally arises with panel data. The restricted model is the pooled model and it represents a behavioral equation with the same parameters over time and across cross-sections. The unrestricted model, however, is the same behavioural equation but with different parameters across time or across cross-sections (Baltagi (2005)). One of the earliest studies around testing for poolability includes Balestra & Nerlove (1966) considered a dynamic demand equation for natural gas across 36 states over six years. Poolability (or lack of) comes down to the question of whether the parameters of this demand equation vary from one year to the other over the six years of available data.

Under a pooled regression, it is held that the fixed effects (individual specific effects) are jointly insignificant. Given the model below:

$$Y_{it} = \alpha + \mu_{it} + X'_{it}\beta + \varepsilon_{it}$$

It is held that $\mu_1 = \mu_2 = \cdots . = \mu_{n-1} = 0$

In testing for the presence of pooled vs fixed effects, this is the null hypothesis. This hypothesis is tested by an F test, which is based on loss of goodness-of-fit. This is a simple Chow test with the restricted residual sums of squares (RRSS) being that of the pooled OLS model and the unrestricted residual sums of squares (URSS) being that of the LSDV (fixed effects) regression. If the null hypothesis of the F-test is rejected, a fixed effect model is favored over OLS.

2.3 Pooled vs Random Effects: The Breusch-Pagan Lagrange Multiplier (LM) Test

For the random two-way error component model, Breusch & Pagan (1980) derived a Lagrange multiplier (LM) test to test $\sigma_\mu^2 = \cdots = \sigma_\lambda^2 = 0$. The null hypothesis in the LM test is that variances across entities is zero. This is, no significant difference across units (i.e. no panel effect). If the null hypothesis of the LM test is rejected, a random effect model is better than the pooled OLS. This LM test requires only OLS residuals and is easy to compute. This may explain its popularity (Baltagi, 2005)

2.4 Hausman Test

A critical assumption in the error component regression model is that $E(u_{it}|X_{it}) = 0$.

This is important given that the disturbances contain individual invariant effects (the μ_i)

which are unobserved and may be correlated with the X_{it}. In the case of the random effects model, the GLS estimator will be biased and inconsistent if $E(u_{it}|X_{it}) \neq 0$.

However, when using the fixed effects model, the Within transformation wipes out the individual specific effects μ_i and leaves the Within estimator β_{within} is unbiased and consistent.

Hausman (1978) suggests comparing β_{GLS} and β_{within} both of which are consistent under the null hypothesis that $E(u_{it}|X_{it}) = 0$, but which will have different probability limits if *H0* is not true. In fact, β_{within} is consistent whether *H*0 is true or not, while β_{GLS} is BLUE, consistent and asymptotically efficient under *H*0, but is inconsistent when *H*0 is false. Hausman Test therefore tests the null hypothesis that the extra orthogonality conditions imposed by the random effects estimator are valid, therefore that the Random Effects model provides consistent estimates. The fixed effects estimator, which does not impose those conditions, is consistent regardless of the independence of the individual effects. The fixed effects estimates are inefficient if that assumption of independence is warranted. The random effects estimator is efficient under the assumption of independence, but inconsistent otherwise.

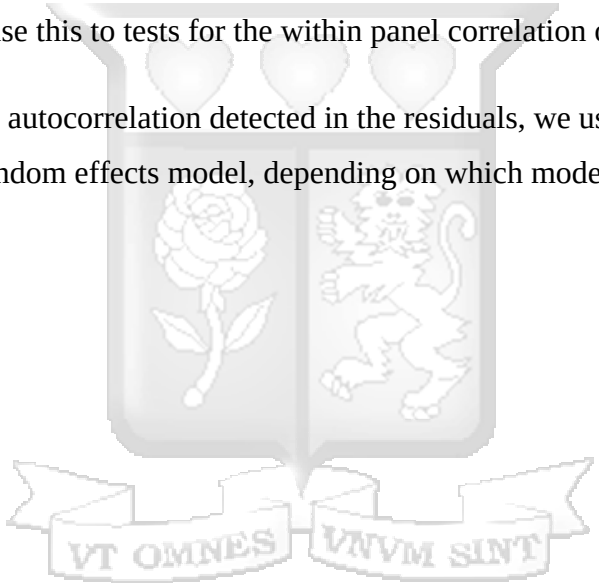
We conduct the Hausman test when both hypotheses of the F-test and LM test are all rejected. We run both the Fixed Effects Model and the Random Effects Model and implement the Hausman test to choose which model gives consistent estimates

More recently, Arellano (1993) provided an alternative variable addition test to the Hausman test which is robust to autocorrelation and heteroskedasticity of arbitrary form.

2.5 Testing for Autocorrelation

Serial correlation in linear panel-data models biases the standard errors and causes the results to be less efficient. A number of tests, including one by Baltagi-Wu (1999). Many of these tests make specific assumptions about the nature of the individual effects or test for the individual-level effects jointly. However, Wooldridge's test by Wooldridge (2002) is very attractive because it requires fewer assumptions and is easier to implement. We use this to tests for the within panel correlation of the residuals.

To adjust for any autocorrelation detected in the residuals, we use robust standard errors in the fixed or random effects model, depending on which model is chosen by the Hausman Test.



Appendix II: Diagnostic Tests for Bank Specific Variables

1) Unit Root Tests

Table 1: Unit Root Tests Results for the Bank Specific Variables

Indicator	Measure	Fisher Type test results with Drift Term
Financial Distress	Z-Score	P value: 0.0000
Leverage	Total Debt/Total Liabilities	P value: 0.0000
Overly Aggressive Activity 1	Net Loans/Deposits	P value: 0.0000
Overly Aggressive Activity 2	Total Fixed Assets/Total Assets	P value: 0.0000
Insider Lending	Total Insider Loans & Advances/Core Capital	P value: 0.0000
Capital Adequacy 1	Total Capital/ Total Risk Weighted Assets	P value: 0.0000
Capital Adequacy 2	Core Capital/ Total Risk Weighted Assets	P value: 0.0000
Credit Risk & Asset Quality	(Gross NPL's) /Gross Loans	P value: 0.0039
Management Efficiency	Operating Expenses/Revenues	P value: 0.0000
Earnings	ROA	P value: 0.0000
Liquidity	Net Liquid Assets/Total deposits & Short-Term Libs	P value: 0.0000
Market Risk	Relative Gap/Total Assets	P value: 0.0000
Size	Logarithm of Total Assets	P value: 0.0000

The unit root test results are presented in the table above. The Fisher-Type test which allows for imbalanced data is used. The test is augmented with a drift term. The results indicate that all the variables used in the study are stationary (no unit root). This is assessed at a 95% confidence interval (5% level of significance).

2) F-Test: Pooled vs Fixed Effects

The study estimates an F-Test to deterring the significance of the fixed effects present in the data set. The results are shown below:

F test that all fixed effects = 0:

F (44, 231) = 11.66

Prob > F = 0.0000

The results above support a rejection of the null hypothesis that fixed effects are all jointly insignificant. Therefore, a fixed effect model is better than a Pooled OLS model

3) The Breusch-Pagan Lagrange Multiplier (LM) Test: Pooled vs Random Effects:

The null hypothesis in the LM test is that variances across entities is zero. This is, no significant difference across units (i.e. no panel effect). If the null hypothesis of the LM test is rejected, a random effect model is better than the pooled OLS.

The Breusch-Pagan Lagrange Multiplier (LM) Test

Ho: No significant difference across units (i.e. no panel effect)

Test: Var(u) = 0

chibar2(01) = 179.25

Prob > chibar2 (p-value) = 0.0000

The test results indicate that for model 1 the null hypothesis is rejected, given the p-value of 0.0000. Random Effects Model is therefore better than a Pooled OLS model

4) Hausman Test

From the Lagrange Multiplier test (random effects) and the Chow Test (fixed effects) provided above, the results indicate that Pooled OLS is a sub-optimal method of analysis for the data set, given the existence of both fixed and random effects. In this case, a Hausman test becomes relevant in selecting between the Fixed Effects model and a Random Effects model. The Hausman Test tests the null hypothesis that the extra orthogonality conditions imposed by the random effects estimator are valid, therefore that the Random Effects model provides consistent estimates. The results are presented below:

Hausman Test:

Ho: difference in coefficients not systematic

chi2(12) statistic = 24.10

Prob>chi2 (p-value) = 0.0197

The p-value indicates a rejection of the null hypothesis at the 95% confidence interval. This means that a Fixed Effects Model is use for Model Specification 1

5) Testing for Autocorrelation

The results from the Wooldridge Test are shown below

Wooldridge test for autocorrelation in panel data

Ho: no first-order autocorrelation

F (1, 42) = 9.030

Prob > F (p-value) = 0.0045

The p-value indicates a rejection of the null hypothesis of "no autocorrelation in the residuals". A correction for this is made by using robust estimation of the standard errors of the model.

Appendix III: Diagnostic Tests for Bank Spreads

1) Unit Root Tests

Table 2: Unit Root Test Results for Spread Variables

Indicator	Measure	Fisher Type test results
Financial Distress	Spread -- Total Debt/Total Liabilities	P value: 0.0000
Leverage	Spread -- Net Loans/Deposits	P value: 0.0000
Overly Aggressive Activity	Spread -- Total Fixed Assets/Total Assets	P value: 0.0000
Overly Aggressive Activity	Spread -- Total Insider Loans & Advances/Core Capital	P value: 0.0000
Insider Lending	Spread -- Total Capital/ Total Risk Weighted Assets	P value: 0.0000
Capital Adequacy 1	Spread -- Core Capital/ Total Risk Weighted Assets	P value: 0.0000
Capital Adequacy 2	Spread -- (Gross NPL's) /Gross Loans	P value: 0.0000
Credit Risk & Asset Quality	Spread -- Operating Expenses/Revenues	P value: 0.0000
Management Efficiency	Spread -- ROA	P value: 0.0000
Earnings	Spread -- Net Liquid Assets/ Total deposits & Short-Term Libs	P value: 0.0000
Liquidity	Spread -- Relative Gap/Total Assets	P value: 0.0000
Market Risk	Spread -- Total Debt/Total Liabilities	P value: 0.0000
Size	Spread – Logarithm of Assets	P value: 0.0000

The unit root test results for the spread variables are presented in the table above. The Fisher-Type test which allows for imbalanced data is used. The test is augmented with a drift term. The p-values indicate that all the spread variables used in the study are stationary (no unit root). This is assessed at a 95% confidence interval (5% level of significance).

2) F-Test: Pooled vs Fixed Effects

The study estimates a Chow Test to deterring the significance of the fixed effects present in the data set. The results are shown below:

F test that all fixed effects = 0:
F (44, 231) = 10.02
Prob > F (p-value) = 0.0000

The results above support a rejection of the null hypothesis that fixed effects are all jointly insignificant. Therefore, a fixed effect model is better than a Pooled OLS model for the second model specification.

3) Pooled vs Random Effects: The Breusch-Pagan Lagrange Multiplier (LM) Test

The null hypothesis in the LM test is that variances across entities is zero. This is, no significant difference across units (i.e. no panel effect). If the null hypothesis of the LM test is rejected, a random effect model is better than the pooled OLS.

The Breusch-Pagan Lagrange Multiplier (LM) Test
Ho: No significant difference across units (i.e. no panel effect)
Test: Var(u) = 0
chibar2 (01) = 109.46
Prob > chibar2 (p-value) = 0.0000

The test results indicate that for model 2 the null hypothesis is rejected, given the p-value of 0.0000. Random Effects Model is therefore better than a Pooled OLS model

4) Hausman Test

From the Lagrange Multiplier test (for random effects) and the Chow Test (for fixed effects) provided above, the results indicate that Pooled OLS is a sub-optimal method of analysis for the data set, given the existence of both fixed and random effects. In this case, a Hausman test becomes relevant in selecting between the Fixed Effects model and a Random Effects model. The Hausman Test tests the null hypothesis that the extra orthogonality conditions imposed by the random effects estimator are valid, therefore that the Random Effects model provides consistent estimates.

However, on estimation of the Hausman Test, a negative chi-squared statistic is provided, which is an indication that the second model fitted on the spread data fails to meet the asymptotic assumptions of the Hausman test.

An alternative test is therefore used to select between the Random Effects and Fixed Effects Model. The Sargan-Hansen Test is a test of overidentifying restrictions where the null hypothesis is that the restrictions placed on the data are valid. In this case, the restriction is the assumption placed by the Random Effects model of no endogeneity inherent in the model (i.e. the x_{it} are independent of μ_i and v_{it}). The results from this test are reported after a standard random effects model estimation.

The results of this test are presented below:

Test of overidentifying restrictions: fixed vs random effects
Cross-section time-series model:
Sargan-Hansen statistic = 91.870
Prob>chi2 (p-value) = 0.0197

The p-value indicates a rejection of the null hypothesis at the 95% confidence interval. This means that the restriction placed by the Random Effects model is not valid and therefore, a Fixed Effects Model is used for Model Specification 2.

5) Testing for Autocorrelation

The results from the Wooldridge Test are shown below

Wooldridge test for autocorrelation in panel data
Ho: no first-order autocorrelation
F (1, 42) = 13.422
Prob > F (p-value) = 0.0007

The p-value indicates a rejection of the null hypothesis of "no autocorrelation in the residuals". A correction for this is made by using robust estimation of the standard errors of the model.

Appendix IV: Diagnostic Tests for Macro-economic Variables

1) Unit Root Tests

Table 3: Unit Root Test Results for Macroeconomic Variables

Variable	Measure	Fisher Type Test Result
Economic Growth	GDP Growth	P value: 0.0000
Central Bank Rate	CBR	P value: 0.0000
Interbank Activity	Annual Interbank Volumes/Aggregate Volumes	P value: 0.0000

The unit root test results are presented in the table above. The Fisher-Type test which allows for imbalanced data is used. The test is augmented with a drift term. The results indicate that the macro-economic variables used in the study are stationary (no unit root).

2) F-Test: Pooled vs Fixed Effects

The study estimates a Chow Test to deterring the significance of the fixed effects present in the data set. The results are shown below:

F test that all fixed effects = 0:

F (44, 240) = 14.73

Prob > F (p-value) = 0.0000

The results above support a rejection of the null hypothesis that fixed effects are all jointly insignificant. Therefore, a fixed effect model is better than a Pooled OLS model for the third model specification.

3) Pooled vs Random Effects: The Breusch-Pagan Lagrange Multiplier (LM) Test

The null hypothesis in the LM test is that variances across entities is zero. This is, no significant difference across units (i.e. no panel effect). If the null hypothesis of the LM test is rejected, a random effect model is better than the pooled OLS.

The Breusch-Pagan Lagrange Multiplier (LM) Test

Ho: No significant difference across units (i.e. no panel effect)

Test: Var(u) = 0

chibar2(01) = 326.22

Prob > chibar2 (p-value) = 0.0000

The test results indicate that for model 3 the null hypothesis is rejected, given the p-value of 0.0000. Random Effects Model is therefore better than a Pooled OLS model

4) Hausman Test

From the Lagrange Multiplier test (for random effects) and the Chow Test (for fixed effects) provided above, the results indicate that Pooled OLS is a sub-optimal method of analysis for the data set, given the existence of both fixed and random effects. In this case, a Hausman test becomes relevant in selecting between the Fixed Effects model and a Random Effects model. The Hausman Test tests the null hypothesis that the extra orthogonality conditions imposed by the random effects estimator are valid, therefore that the Random Effects model provides consistent estimates.

However, on estimation of the Hausman Test, a negative chi-squared statistic is provided, which is an indication that the second model fitted on the spread data fails to meet the asymptotic assumptions of the Hausman test.

An alternative test is therefore used to select between the Random Effects and Fixed Effects Model. The Sargan-Hansen Test is a test of overidentifying restrictions where the null hypothesis is that the restrictions placed on the data are valid. In this case, the

restriction is the assumption placed by the Random Effects model of no endogeneity inherent in the model (i.e. the x_{it} are independent of μ_i and v_{it}). The results from this test are reported after a standard random effects model estimation.

The results of this test are presented below:

Test of overidentifying restrictions: fixed vs random effects

Cross-section time-series model:

Sargan-Hansen statistic = 7.389

P-value = 0.0605

The p-value of 0.0605 indicates that the null hypothesis cannot be rejected at the 95% confidence interval. This means that the restriction placed by the Random Effects model is valid and therefore, a Random Effects Model is used for Model Specification 3.

5) Testing for Autocorrelation

The results from the Wooldridge Test are shown below

Wooldridge test for autocorrelation in panel data

Ho: no first-order autocorrelation

F (1, 42) = 15.269

Prob > F (p-value) = 0.0003

The p-value indicates a rejection of the null hypothesis of "no autocorrelation in the residuals". A correction for this is made by using robust estimation of the standard errors of the model.

Appendix V: SU-IERC Approval

Strathmore UNIVERSITY

17th May 2019

Ndungu Roseanne
P.O.Box 558-502
Nairobi
roseannendungu@gmail.com

Dear Roseanne,

REF Protocol ID: SU-IERC0475/19

DETERMINANTS OF FINANCIAL DISTRESS IN KENYAN COMMERCIAL BANKS
We acknowledge receipt of your application documents to the Strathmore University Institutional Ethics Review Committee (SU-IERC) which includes:

1. Study Protocol submitted 13th May 2019
2. Cover letter listing all submitted documents 13th May 2019
3. Proposal declaration page signed by supervisors 13th May 2019

The committee has reviewed your application, and your study *"Determinants of Financial Distress in Kenyan Commercial Banks"* has been granted **approval**.

This approval is valid for one year beginning **17th May 2019** until **17th May 2020**

In case the study extends beyond one year, you are required to seek an extension of the Ethics approval prior to its expiry. You are required to submit any proposed changes to this proposal to SU-IERC for review and approval prior to implementation of any change.

SU-IERC should be notified when your study is complete.

Thank you

Sincerely,

STRATHMORE UNIVERSITY INSTITUTIONAL ETHICS REVIEW COMMITTEE (SU-IERC)
17 MAY 2019
TEL: +254 (0)703 034 000
P. O. Box 59857 - 00200
NAIROBI - KENYA

Prof Florence Oloo
Secretary
Strathmore University Institution Ethics Review Committee

Appendix VI: List of Commercial Banks in Kenya as at the year 2012

Name of Commercial Bank
1 Equity Bank Ltd
2 Kenya Commercial Bank Ltd
3 Barclays Bank of Kenya Ltd
4 Standard Chartered Bank (K) Ltd
5 Cooperative Bank of Kenya Ltd
6 Citibank N.A.
7 I&M Bank Ltd
8 CFC Stanbic Bank Ltd
9 Diamond Trust Bank Ltd
10 NIC Bank Ltd
11 Commercial Bank of Africa Ltd
12 Imperial Bank Ltd
13 Baroda Bank Ltd
14 Chase Bank Ltd
15 Prime Bank Ltd

16 National Bank of Kenya Ltd
17 Family Bank Ltd
18 Bank of Africa (K) Ltd
19 Bank of India
20 African Banking Corporation Ltd
21 Victoria Commercial Bank Ltd
22 Habib Bank Ltd
23 Habib A.G. Zurich
24 Gulf African Bank (K) Ltd
25 Fina Bank Ltd
26 Trans-National Bank Ltd
27 K-Rep Bank Ltd
28 First Community Bank Ltd
29 Guardian Bank Ltd
30 Giro Commercial Bank Ltd
31 Consolidated Bank of Kenya Ltd
32 Oriental Commercial Bank Ltd
33 Development Bank of Kenya Ltd

34 Fidelity Commercial Bank Ltd
35 Paramount Universal Bank Ltd
36 Credit Bank Ltd
37 Jamii Bora Bank Ltd
38 Middle East Bank (K) Ltd
39 Housing Fin. Co. of Kenya Ltd
40 Dubai Bank Ltd
41 UBA Bank (K) Ltd
42 Equatorial Commercial Bank Ltd
43 Ecobank Kenya Ltd

Source: Central Bank of Kenya