A SURVEY OF THE EFFECT OF CREDIT RISK STRESS TESTING LEVELS ON FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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DECLARATION

This research project is my original work and has not been presented for a degree or course in any other institution.

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DEDICATION

This project is dedicated to my children Martin Junior Ouma and Wema Achieng Ouma.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS/ACRONYMS

BCBS:	The Basel Committee on Banking Supervision
CBK:	Central Bank of Kenya
DEA:	Data Envelopment Analysis
DFAST:	Dodd-Frank Act Stress Testing
EAD:	Expected at Default
ERS:	Economic Recovery Strategy
GDP:	Gross Domestic Product
GoK:	Government of Kenya
IMF:	International Monetary Fund
LGD:	Loss Given Default
LLPs:	Loan Loss Provisions
NPLs:	Non-Performing loans
PD:	Probability of Default
ROA:	Returns on Assets
ROE:	Return on Equity Capital
SPSS:	Statistical Package for Social Sciences
TTC:	Through-the-Cycle
US:	United State

ABSTRACT

This study examined the effects of credit risk stress testing level on the performance of banks in Kenya. Financial sector stress test presents information on a system's possible losses beneath extraordinary but plausible shocks, helping policymakers evaluate the significance of the system's vulnerabilities. The specific objective of the study is to establish how credit stress testing levels affect the financial performance of commercial banks in Kenya. Profitability indicator used that is the Return on Assets (ROA) was used to assess the bank performance. The research was conducted using a Cross-sectional survey with a target population of 42 banks. The sample of the study consisted of listed commercial banks in the Nairobi Stock Exchange. Data was collected from secondary sources annual reports and accounts of targeted banks from the period 2013/2014 and 2014/2015. Descriptive, correlation and regression techniques were used in the data analysis. The study found that there is a relationship between Expected Loan Loss and Return on Assets at statistically significant ($r = .785$, $p<0.05$) at 95% confidence level. This indicates that if commercial banks in Kenya do not keenly scrutinize Return on Assets, then the expected Loan Loss might tremendously increase thus, high chances of credit risk testing. The study found that there was a significant relationship between credit risk testing levels and Expected Loan Loss -ELL, Exposure at Default - EAD, Probability of Default-PD, and Loss Given Default- LGD in Kenya Commercial Banks. As far as credit risk testing is concerned the study recommends that banks put in a strong policy that increases the loss given default so as only to allow the clients who are sure of not defaulting in the process repaying the borrowed loan. About the probability of default, the Kenya Commercial banks should introduce an active policy that allows them to access all financial and asset accounts of the defaulter to be able to reduce the probability of the borrower defaulting when he has obtained the loan. The study further recommends that commercial banks in Kenya should introduce policies that allow external monitoring and evaluation offices with the help of external auditors to thoroughly analyze the banks' exposure at default to curb the menace of banks closing down due to huge exposure at defaults.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Drehmann (2009) asserts that stress testing began from engineering and not finance. In its widest logic, stress testing is a method of testing the dependability of a system in challenging circumstances. In finance, it was initially used to check the performance of individual portfolios or the strength of own firm (micro stress tests). More recently, similar techniques have been employed to verify the stability of groups of financial institutions (Borio, Drehmann, & Tsatsaronis, 2014).

Triggered by the universal financial crisis of 2008, the case for stress testing emphasized the significance of monetary system stability to the macro-economic routine. Stress testing becomes one of the tools in use to evaluate the susceptibility of portfolios to irregular shocks and market situation (Blaschke, Jones, majnoni & Peria, 2001).

Innovation and expansion in the commercial services business, attached with outstanding raise in cross- border investment flows, improved the intricacy of managing commercial establishment and making certain the constancy of economic organization. Industrial monitors counter this difficult situation through enhancing collaboration with other controllers while persuading financial institutions to utilize additional advanced approaches to risk administration.

In the United States, risk management landscape changed in 2012 when US regulators uncovered Dodd-Frank Act Stress Testing (DFAST) conditions that required the largest American banks to perform stress testing. It advanced in 2014 when the Act broadened in 2014 to include midsized firms, those with $10-$50 billion in assets. In a 2015 GARP survey majority of respondents said their organizations had the right people and expertise to handle data management, risk model management, process management, and reporting requirements of DFAST. But technology gaps remain, especially as requirements continued to evolve, with regulators asking more complex questions that require larger data sets and faster turnarounds (Andries, Cocris, & Ursu, 2012).

In Nigeria, Banking institution realized the significance of credit risk management at the start of the global financial crisis. Stress testing and credit rating was implemented in the Nigerian banks to counter-act dilemmas and predict risks (Blaauw, 2009). The initial approaches employed by the Nigerian central banks are the continued efforts on research and dense monitoring. Banks hold that research and follow-up are the fundamental basis of changes like data producing establishments and the Treasury (Uchendu, 2009).

In recent years, Kenya has made considerable development in advancing the strength and effectiveness of its banking structure. Advancement of the management structure goes along with a write-off of non-performing loans and cutback in state's function in the commercial sector. The increase in interest, although still high have fallen of late, owing to lower loan loss requirements and general expenses, other than the lowest profit limitations, that suggest a certain level of competition. This came along with, a decrease in inflation and the financial shortfall and steady exchange rates, made possible a lower interest rate, but also improvements in institutions run by the state. However, the economic systems in Kenya keep on encountering challenges. The banking structure is still uneven, amid various small banks that serve niche markets, and do not contribute to competition in the sector. The influence of the Kenyan financial system is still limited (Beck, Cull, Fuchs, Getenga, Gatere, Randa, & Trandafir, 2010).

1.1.1 Credit Risk Stress Testing

Credit risk may cause liquidity risk, with increasing substantial risks (Matz &` Neu, 2006). Experience showed that amongst the various risks, the banking sector features, risk like market, liquidity, functional, and counterparty credit risk, credit risk is the most vital foundation of insolvency tribulations for banks (Buncic & Melecký, 2013). The ability to run stress tests on timely application allows an institution to expand an enhanced intellectual potential of events and tune responses as they unfold. (Oracle white, 2012).

An essential part of advanced stress testing structure contains a guide that places various macroeconomic situations of a bank to own variables that demonstrate measured risk. As a result, it is imperative bank administrators to possess, a credit risk stress test framework, that controls the flexibility of monetary policy in potential macroeconomic shocks and be able to review the impact of shocks. For a bank to manage credit, stress

testing, the basic condition in a consistent rating system is determining the creditworthiness of debtors.

A credit rating measures a bank borrower's probability of defaults which takes into account the capacity and willingness of the debtor to reimburse his dues. The most important attribute of a rating system is its reliability; a reliable rating system allows a bank to group debtors by risk category, for further scrutiny (Technical Paper credit stress tests, 2003). Stress test is well known to assess the strength of the credit system of commercial banks in stimulating exposure to potential risk to severe shock similar to the financial crisis. The test works mainly to sudden macroeconomic fluctuations of the banking system and consequently plays a crucial role in the prediction and reduction of regular financial risk, which contributes system stabilization. Credit risk can trigger a liquidity risk with consequent risks cascade (Matz & Neu, 2006)). Experience has shown that among the various risks facing the banking sector, such as liquidity, market, services, counterparty credit risk, the credit risk is the main source of problems for insolvency banks (Buncic and Melecky, 2013). The capability to execute stress tests on timely application allows an institution to realize the potential of events better and accurately response as and when they happen. (Oracle White, 2012).

1.1.2 Financial Performance

The performance of bank should begin by measuring its capability to realize set objectives by the stakeholders. Bank financial results mean whether a bank is progressive in particular phase to achieve its set goals. However, financial performance consists of various diverse methods to assess how well an organization applies assets to generate income (Richard, 2009). Usually, four key ratios are used to measure the financial performance of a company. These are liquidity ratios, profitability ratios, efficiency ratios and solvency ratios (Julie et al., 2010). Solvency ratios point out the financial strength of a company since they evaluate a firm’s debt comparative to the assets and equity.

Bryn et al. (2010), Profitability Ratios shows management's capacity to translate sales into cash flow and profits. Liquidity ratios measure the ability of a company to meet its short-term financial obligations that are paying short terms loans when they fall due. Lastly, efficiency ratios indicate how well a company is using its business assets.

According to Devinaga Rahiah (2010), for one to realize bank performance it is core to consider Return on Equity Capital (ROE) and the returns on Assets (ROA). Return on Equity (ROE) ratio shows the profitability of a corporation by computing the total net income proceeds as a proportion of shareholders equity. ROE measures a firm's success by illuminating the amount of profit an organization makes with invested shareholders money. While, net income for the whole financial year is remunerated to the general stockholders after bonuses to the chosen stock (Maharma, 2014). The higher the percentage proportion, the added resourceful organization is in exploiting its equity foundation and the better it is to depositors.

According to Nizam & Hoshino (2015), Return on Assets (ROA) ratio illustrates a firm's profitability by dividing a firm's yearly income by the total assets. It gives information on what was generated from invested capital (assets) (Maharma, 2014). The higher the yield, the more competent management uses its asset. It is determined by contrasting net income to standard total assets, articulated as a percentage. In general, investment experts prefer the ROA of at least 5% of the company. However, there is an exemption that relates to banks that struggle to confirm ROA of 1.5% or beyond (Chaudhuri, (2008). For the purpose of this research, profitability pointer that Returns on Assets (ROA) will be applied to measure bank performance.

1.1.3 Credit Stress Testing Level and Financial Performance of Banks

Since the global financial crisis, credit stress testing has become prominent both as an internal risk management tool for financial institutions and a means for supervisors to maintain financial stability. Banks use stress tests tools to realize their risk experience. Bank controllers employ stress tests to prove that banks are capable of upholding sufficient levels of assets in stressful circumstances but credible (Guerrieri & Welch, 2012).

According to Kanno (2015) macro stress tests for credit risk are carried out in three phases. In phase 1, the macroeconomic variables are envisaged, given the predefined stress scenario at some risk horizon. In step 2, the impact of stressed macroeconomic variables is expected to produce credit risk parameters of a financial institution, usually in the form of Probability Default (PD) and Loss Given Default (LGD). Finally, at phase 3, the impact of the scenario highlighted is evaluated to estimate the value of the financial institution at risk (VaR), given the credit risk parameters, (Kanno, 2015).

Stress tests determine the firmness and flexibility of a financial system mainly by intentionally subjecting the problem to extreme and particularly adverse situations which were not planned prior (Guegan & Hassani, 2015). Credit risk is the most important risk that banks encounter, and the accomplishment of this relies on accurate measurement and practical control of credit risk more than any other risk (Giesecke, 2004). Increases in credit risk increase the minimal value of debt and equity that in shift doubles the cost of funds for a financial institution (Basel Committee, 1999). According to Arias, Jara-Bertin, & Rodriguez bank performance is negatively related to credit risk (Arias, Jara-Bertin, & Rodriguez, (2013).

Abbink (2011) argues that tests examine the position of the debt of a company, as well as exhibitions of position and credit. Not only the debt capacity, but its development structure, ease of reimbursement and contracts attached to them are extremely important. Essentially, the stress tests are vital to confidence in the continuity of a firm.

In response, commercial banks almost universally have undertaken to modernize their management systems and risk control. Moreover, it is in the realization of the consequence of the deterioration in credit value on the profitability of a financial system Major of this research is motivated.

In response, commercial banks have more or less generally undertaken a modernization of their systems management and risk control. Moreover, it is in the understanding of the significance of the weakening loan value on the prosperity of the banking sector and the financial system at large that this research is aggravated.

1.1.4 Commercial Banks in Kenya

Commercial banks in Kenya are managed by the Companies Act (Cap, 486), Central

Bank of Kenya Act (Cap, 491), Banking Act, (Cap, 488) and the diverse regulations subjected by the Central Bank of Kenya (CBK). According to central bank of Kenya supervision report (2016), currently "there are 42 licensed commercial banks and 1 mortgage finance company. Out of the 43 institutions, 39 commercial banks and the mortgage finance institution are privately owned while the Kenyan Government holds controlling stakes in the remaining 3 commercial banks". 25 out of the 39 are mortgage finance institutions are locally owned while 14 are foreign owned. The Central Bank of Kenya is responsible for financial performance and financial risk management by formulating and put into operation fiscal guidelines and nurturing solvency, liquidity, and appropriate operations of commercial banks in Kenya (Central Bank of Kenya, 2016).

According to the Financial Stability Report (2013), the Central Bank of Kenya published a prudential directive on stress tests by individualbanks that subscribed in the year 2013. Banks are expected to manage stress tests frequently and present the proceeds to CBK on a periodical footing, to facilitate the regulator advice and continuously practice proper emergency plan to defend banks against possible risks and vulnerabilities. Despite, the latest IMF mission in March 2014 recommended reforms practice to secure a sounder and provide better results, including conducting frequent stress tests.This in essence points towards effective risk management practices inside the banking division prompting the need to conduct a research to determine the benefits of stress testing as a risk operational tool in the banking sector.

1.2 Research Problem

Since the outburst of the financial predicament in 2007-2009 and the crisis of European sovereign debt, ensuing stress tests have boomed as an additional tool in quantitative risk management. The stress tests are often carried out implicitly, that is to say the adverse risk factors achievements (example macroeconomic factors) derived from an explicit scenario to convert using a quantitative model in achievements of unfavorable risk parameters. For example, the default probabilities, default values in case of default and default correlations.

In Kenya the Central Bank conducts independent micro stress testing for banks. Based on the 2013 data, Stress tests return on credit risk would require a vital increase in non-

performing loans for a large bank to fail to meet the minimum statutory Capital Adequacy Ratios. Banks need to meet the least liquidity provision of 20% in case of a one-off 5% deposits withdrawal. In the event of an unexpected 5% depreciation of the shilling, banks have to comply with the exposure limit to 10% net open position in a foreign transaction to a common capital ratio. Besides, the proportions of loans in exchange constitute 23.3% of the banking sector credit and banks have to endeavor to balance investments and liabilities designated in foreign currency.

This shows a remarkable improvement compared to the 1990's when stress testing was not applied by banks. Further, research on stress testing on banks was conducted in Germany and Britain by Lane & Quack (1999) and focused on distinctive risk handling strategies, and no research has been done yet to ascertain the effect of credit risk stress testing levels on financial performance of banks in Kenya. This has prompted the basis for this research which aims to determine the effects of adopting credit risk stress testing on the performance of banks in Kenya.

Empirical studies done in Kenya have focused on risk management and among them is the effect of risk management practices on the financial performance of commercial banks in Kenya (Mwangi, 2012), the relationship between financial risk management practices and financial performance of commercial banks in Kenya (Siba, 2012). Mutua (2014) for instance, examined the effects of credit risk management on the financial performance of commercial banks in Kenya. The objectives of the study were to identify the type of credit risks that Commercial Banks in Kenya face and to ascertain the impact of credit risk management practice on the performance of commercial banks in Kenya. The study focused on interest rate risks in the risk recognition map and bank foreign exchange risks. To the researcher's knowledge, there are limited empirical facts on the association between credit risk stress testing levels and performance of commercial banks in Kenya.

This study seeks to bridge the research gap by responding to the research question, does a relationship between credit stress testing levels and performance of banks in Kenya exist.

1.3 Research Objective

1. To establish how credit stress testing levels affect financial performance of banks in Kenya.

1.4 Value of the Study

The study is significant to the banking industry, especially to risk management units. It highlights how stress tests are used and their importance, to assist risk managers to disseminate the status of business risk outline to senior management, assist risk managers to improve and identify the nature of a company's risk outline and help set limits. The Government policy makers will pursue reforms that will influence the Commercial banks risk management; in this regard economic growth is likely to be stimulated.

The study will advance the researcher's capacity to credit risk stress testing levels and to the whole public to increase exposure to the banking industry. The project will provide reference material for future researchers interested in new research on credit risk stress testing levels and its effects on financial performance of commercial bank.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter seeks to review and critically analyze the existing body of literature on a number of facets that characterize the credit stress testing level of financial institutions, in general, narrowing down credit stress testing on the performance of commercials banks .The chapter seeks to review literature touching on adoption of credit stress testing as a tool for risk management in the banking sector, how credit stress testing effect financial performance of banks and determinant of bank performance, The chapter also seeks to outline the study's theoretical framework upon whose lens it employs.

2.1 Theoretical Review

2.1.1 Corporate Risk Management Theory

There are many theories on Corporate Risk Management and amongst them is the fiscal economics approach to corporate risk management, which has subsequently been the most productive regarding extensions of theoretical models and pragmatic research. This study builds on Modigliani-Miller traditional paradigm of (Miller & Modigliani, 1958) that sets out the circumstances for the insignificance of financial configuration for the value of a company. This theory was afterward introduced in the field of risk management.

This approach further requires that equivocation resulted in lower instability of currency flow and lesser instability of the company's value. The justification for corporate risk management reasoned from indifference surroundings and incorporated higher obligation capability (Miller & Modigliani, 1963). Smaller expected costs of insolvency, progressive income tax charge, (Smith & Stulz, 1985), secure internal funding (Froot et al., 1993), equivalent to sequence (Geczy et al., 1997) and practical benefit in sequence (Stulz, 1996). The end outcome of equivocation, if useful to a company, should be high equivocation quality.

Facts' forecasting financial economics theories to risk management are weak. Even though, risk management results in the lesser unpredictability of a company's worth (Jin & Jorion, 2006). The requirement for all other effects, appearing to be little evidence of this be related to benefits particular to the theory. Plus the citation by Tufano (1996) found no evidence to support economic theories and instead focuses on the influence of managerial partiality. Resting on that, the assumptions of a greater debt capability appear to be positively confirmed, as revealed by Graham & Rogers (2002), Guay (1999) and Faff & Nguyen (2002). The internal financing theory was checked by Geczy et al. (1997) and Guay (1999) while discarded by Mian (1996) and Faff & Nguyen (2002). Judge (2006) found substantiation in financial distress to support the idea.

2.2.2 Agency Theory

Significantly another theory that informs this research is the agency theory. The agency theories broaden the testing of company property and division between management control and incentive extends. In the field, corporate risk management was revealed to manipulate management approaches towards risk management (Smith & Stulz, 1985). Also, theory clarifies a likely shift of concern among shareholders, board and liability possessor owing to asymmetries in the sharing of profits, which may affect a company engaged in excessive risk or one that does not participate in the net positive worth of tasks (Mayers & Smith, 1987). Therefore, the agency theory entails equivocation guidelines that define the significance control on a company's worth (Fite & Pfleiderer, 1995). These assumptions relates to the financial formation, and present similar forecast for financial theory.

Managerial motivation factor in the implementation of corporate risk management has been empirically tested in some in studies with an adverse effect (Faff & Nguyen, 2002; MacCrimmon & Wehrung, 1990; Geczy et al., 1997). In particular, positive evidence was established by Tufano (1996) in his study of the "gold mining industry in the US." The assumptions of financial policy were tested in studies of financial theory since both approaches give similar predictions in this regard. Overall, most of the empirical evidence seems to be contrary to the assumptions of the agency theory. However, a new perception on risk management is presented by the new institutional economics. The emphasis here is on the process of governance and socio-economic organizations that direct these courses of action, as Williamson (1998) described. Even though there is no

pragmatic study on new approaches to risk supervision in institutional economics, the theory proffers another justification of corporate performance.

Specifically, it predicted that risk management preparation could be indomitable by an institution or the conventional practice in a bazaar. A more actual insinuation of this premise is that shareholders might be fascinated in estimating mass property by reducing the risk of the company. At this point, this theory is related to the agency theory. Conversely, this theory also proposes that corporate exercises can be prejudiced by the ownership composition in broad. Also, the theory links security to the acquisition of particular property (Williamson, 1987). This engrosses that risk management is imperative in the convention between two sides devoid of diversification as an important business agreement and secure collaboration.

2.3 Determinant of Bank Performance

Financial performance is designed and deliberated differently by researchers in diverse procedures (Shah et al., 2011). It refers to the profitability of a company that is how the revenues exceed costs incurred to generate, (Mwangi & Iraya, 2014). Banks' performance determinants can be classified into macroeconomic determinants (internal) explicit to the bank and (External) (Al-Tamimi, 2010). Internal factors are internal banking entities that affect the performance of banks. These features are primarily given by internal decision of the board and the management. External factors are factors outside the control of the bank that influence financial performance.

2.3.1 Internal Factors

The bank-specific issues are internal variables that manipulate the prosperity of a particular bank. These are obstacles in the bank's range that influence the bank and vary from one bank to another. The size and composition of loan range, the policy interest charge, work output, the condition of information technology, the intensity of risk, value of management, the size of banks, property and others.

The C.A.M.E.L.S approach is the commonly applied financial analysis approach for evaluating management and financial performance of banks, and it was initially implemented by the regulators of the North American Bank, to assess lending US

institution early on the 1970s. C.A.M.E.L.S evaluation system is established on an assessment of six essential operations basics of a financial institution: (C)Capital adequacy, (A) Asset quality, (M) Management adequacy, (E) Earnings power, (L) Liquidity and (S) for Sensitivity to market risk (Cengiz Erol Hasan& Baklaci Berna Aydoğan Gökçe Tunç, (2014). This framework is further discussed below;

2.3.1.1 Capital adequacy

The first indicator of the CAMELS model is capital adequacy. Capital adequacy is the intensity of capital needed by the banks to allow them endures risks like credit, market and operational risks that they are susceptible to attract possible losses and protect bank debtors. The ratios used to predict the adequacy of capital are Shareholders' equity/total assets (E/TA) and on-balance-sheet FX position/shareholders' equity (FX/E), (Hasan & Aydoğan, 2014).

The capital is seen as a cushion to safeguard depositors and support fiscal systems stability and effectiveness in the globe (Bharathi & Parikh, 2012). Capital Adequacy Ratio (CAR) illustrates the in-house strength of a bank to bear losses in a crisis. The capital adequacy ratio is directly comparative to the flexibility of banking crisis. It also has a direct result on bank productivity by shaping its extension to uncertain but profitable business enterprise (Sangmi & Nazir, 2010).

Liao (2013) examined whether the adoption of fair-value-accounting decreases the relevance of banks' capital adequacy ratios (CARs) in explaining insolvency risks. Using data from Taiwanese banks from 2004 to 2010, Liao found that the CARs stand on fair value was higher than cost versus the risk of insolvency for banks whose quality of disclosure was greater.

2.3.1.2 Asset Quality

The second indicator is assets quality. The bank's asset is an additional bank factor that influences the financial performance of a bank. Asset sales may have differing effects on the quality of corporate credit. First, asset sales might indicate an increased credit risk consequence from distress or enhance domestic liquidity and thus credit quality (Venkiteshwaran, 2014).

The bank's assets comprise current assets, credit portfolio, fixed assets and added

investments. The ratios used to predict the quality of assets are the loans being tracked (net) / total loans and receivables (LF / LR) and fixed assets / total assets (FA / TA) (Hasan & Aydoğan, 2014). A loan is a core commercial banks asset which they build income. The value of loan portfolio has a direct influence on the financial performance of banks. Losses are the greatest risk bank face from an outstanding loan (Dang, 2011). Therefore, the higher the ratio of nonperforming loans, the lower the yield, and large unproductive loan affect the financial performance of the bank (Sangmi &Nazir, 2010).

Ezeoha (2011) studied the major determinants of the quality of bank assets using the Nigerian case to reveal how consolidation can increase the occurrence of non-performing loans in the banking setting. The study found out that the deterioration of asset quality and growing credit crisis were exacerbated by the inability of banks to make optimal use of their enormous capacity of assets to improve their income profiles.

2.3.1.3 Management Efficiency

With increased competition in the banking sector, proficiency and success have become the rule; banks are continually striving to improve the efficiency of their staff (Bharathi & Parikh, 2012). The ability of management to effectively organize resources, profits maximization, reducing operating costs can be calculated by financial ratios. Ratios are used to predict the adequacies of the management are the loans under follow-up (net) / total loans and receivables (LF / LR) and other operating expenses / total assets (OE / TA) (Hasan & Aydoğan, 2014).

According to Chen, Guo, & Huang (2009), these tools are useful for assessing the quality of management, total expenditures, and total revenues and operating expenses to total expenses more, and operating profits are high about total income. In a nutshell, successful supervision is in the provision of functional effectiveness and revenue making. The qualities of management determine the intensity of operating expenses and, as a result, influence prosperity (Athanasoglou et al., 2005).

2.3.1.4 Earnings and Profitability

Earning and profitability of a financial institution relates to, its ability to make income to improve its equity and cash plus pays its debts. In addition, it should be able to measure the overall performance and effectiveness of a company, the two main varieties

of profitability ratios are estimated in relation to sales and profitability relative to savings (Pandey, 2011). Theoretically, more efficient bank is expected to grow profits given that it is capable to exploit its net premiums and net underwriting income (Charumathi, 2012).

Although banks frequently earn income in the course of generating interest activities, fee income and other innovative activities have become important components of income in modern banks. Bank profits are, therefore, distinguished by instability and risk activities. Evaluate the gains, therefore, can be difficult. Ratios used to predict earnings profitability are income accessible to ordinary stockholders/total assets (ROA), income accessibility to ordinary stockholders/total equity (ROE),income prior taxes/total assets (I/TA) and total income/total expense (TI/TE), (Hasan & Aydoğan, 2014).

2.3.1.5 Liquidity

Liquidity estimates the capacity of a firm to meet its present obligation (liabilities), which implies that a bank must have sufficient money to cope with transitional requirements changes (Olweny & Shipho, 2011). It is vital for a company to be capable of gathering its liability as they befall. The ratios used to predict liquidity are TC liquid assets/total assets (TLA/TA) and FX liquid assets/FX liabilities (FXLA/FXL) (Hasan & Aydoğan, 2014).

A swift measure of liquidity entails setting up a connection between cash and added current assets to existing obligation. Banks with additional liquid assets are less likely to fail since they can make cash even in complicated situations. However, an entity should make sure it doesn't experience liquidity deficiency and doesn't contain excess liquidity. It is, therefore, important that banks keep enough liquid assets to convene their obligations (Apostolos et al., 2011).

The most familiar ratios to demonstrating the extent of liquidity or lack of it are the quick and current ratio. The current ratio is calculated by dividing the current assets by the current liabilities, and quick ratio creates a connection between liquidity ratio assets and current liabilities additional ratios includes interval measure, cash ratio, and

networking capital ratio (Pandey, 2011).

Arif & Nauman (2012) examined the liquidity risk in Pakistani banks and assessed its effect on bank profitability. They confirmed that liquidity risk affects banks profitability significantly with a liquidity gap and a non-performance as both factors increasing the risk of liquidity.

2.3.1.6 Sensitivity to market risk

CAMELS' final factor is sensitivity to market risk. Ratios used to predict sensitivity to market risk are on-balance-sheet FX position/shareholders' equity (FX/E) and FX assets/FX liabilities (FXA/FXL) (Hasan & Aydoğan, 2014). Market risk is measured as the probability of an adverse change in the value of a position with the current market price as average (Dowd, 2005). This involves changes in the rate of the shares, interest rates, exchange rates, commodity prices and bonds. (Olweny & Shipho, 2011). The evaluation focus is on how management could check and categorize the financial problems arising from these phenomena (Hays, Stephen & Arthur, 2009). Sensitivity to market risk focuses on the ability of an organization to identify and manage exposures to market risk.

2.4 Empirical Review

In general, stress tests have been widely discussed in the literature, especially from the perspective of macro stress testing (Cihak, 2004; Alfaro & Drehmann, 2009; Rouabah et al., 2010; Buncic & Melecky, 2011; Foglia, 2009; Borio et al., 2012). The financial crisis of the 90s guided policymakers, researchers, and practitioners to be more aware of the susceptibility of monetary systems. Amid the few methods, stress testing is believed to be the most reliable means for checking vulnerability (Crockett, 1997).

Pain (2003) established an observed association between the provision for loan losses of banks and the macroeconomic pointers like GDP increase, credit increase, actual interest charge, and portfolio absorption in residential loans stress exercises held by the Bank of England. In this context, credit risk models with macroeconomic variables are used. However, the study by Pain (2003) is different from this study since it focuses on macroeconomic variables.

Jobst (2007) studied the generalized parametric methods of measuring the aggregated operational risk in conformity with regulatory capital necessities applicable to "operational risk in the New Basel Capital Accord (Basel II)" (Jobst,2007). Jobst carried out an incorporated evaluation of operational risk disclosure and the reliability of existing regulations on capital operational risk support on comprehensive parametric inference. However, the study by Jobst (2007) is different from this study since it was not on credit risk stress testing, but operational risk.

Mwangi (2010) in her study Stress Testing a Case of the Kenyan Banking System, sought to carry out a conventional stress test for the Kenyan banks so as to investigate how much stress the banking system could endure as well as how particular banks could survive shocks. The impacts of shocks were measured by examination changes in capital and the capital adequacy ratio. She discovered that the adequate provisioning for loan losses was significant for banks not to erode their capital base, which results in lower lending levels and could even lead to a financial crisis. The study differs from the current study since it does not cover aspects of credit stress testing, but stress testing as a whole.

Siba (2012) examined the correlation between financial risk management practices and financial performance of commercial banks in Kenya. As a result, banks encompass effective risk supervision practices and that there is a close connection between the performance of banks and the effectiveness of banks' risk management practices. The study differs from the current study to the extent that the current study will focus on the effects of credit stress testing levels on financial performance.

Mwangi (2012) conducted a study "on the impact of risk management practices on the financial performance of commercial banks in Kenya," focusing on foreign exchange risk. The study differs from the current study because it does not cover aspects of credit

stress testing. Regardless of the many contributions on how the credit risk parameters fluctuate over the economic series, credit portfolio stress tests continue comparatively inadequate to date, mainly because of the limited accessible information.

Among the few contributions were Peura & Jokivuolle (2004) and Rosch & Scheule (2007). There is a broad range of research on the macroeconomic perspective of credit risk. The key issue is how to mold the potential for aggregate credit in an economy or particular sectors such as businesses and households, correspondingly.

2.5 Conceptual framework

The study is conceptualized as follows;

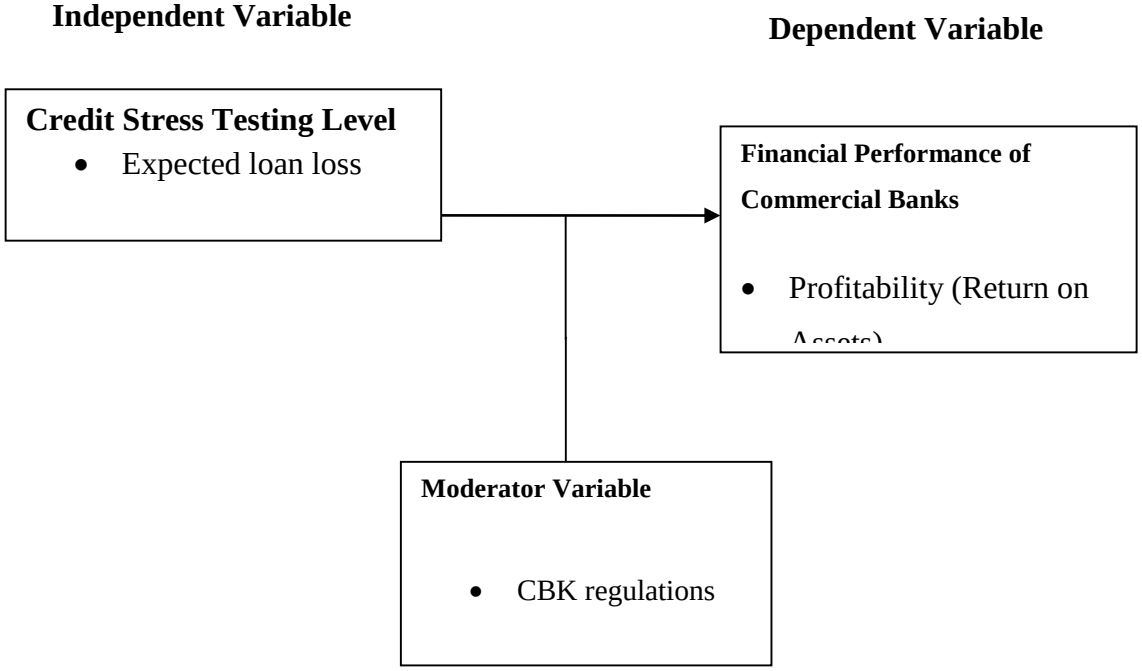

Figure 1: Conceptual Framework

2.6 Summary of Literature Review

It is evident from the literature that the credit risk stress tests are essential to optimize the performance of financial institutions. A defensive credit risk stress test establish an appropriate credit risk environment, to operate as part of a healthy credit process, to manage a proper credit management process that involves identification, analysis, and monitoring, adequate credit risk control. Credit stress test is a method to establish bank resilience to shocks. The expanded requirements for credit stress testing are the new reality of financial institutions. Credit stress tests, in particular, could be a strategic tool

which will provide valuable and timely advice on potential vulnerabilities, and understand the costs, profitability and even product performance (Oracle white paper, 2012).

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the research design, target population, sample design, data collection procedures and data analysis.

3.1 Research Design

The research design is the schema used to create a response to the research problems; this substantially encompasses a structure and study design (Mugenda & Mugenda, 2003). This study was carried out using a cross-sectional survey that sought to discover the differences in credit stress testing among banks listed in the calendar years 2013, 2014 and 2015. This was considered fitting because it concerned a detailed study of credit stress testing levels and its effect on the financial performance of commercial banks in Kenya. Mainly a research design according to Sekaran and Bougie, as an action and scheduled plan, that is based on the research questions and structure to specify the relationship between variables and procedures for each research activity (Sekaran & Bougie, 2010).

3.2 Target Population

The target populations were 42 banks registered by the Central Bank of Kenya for a period of two years (2013-2015) at the end of December 2015. See "Appendix I" attached.

3.3 Sample Design

The sample size included banks listed on NSE (Eleven in total) during the specified period. The study focused only on listed banks because of the ease of availability of data at the Nairobi Stock Exchange. The sampled banks were identified in "Appendix II".

3.4 Data Collection

This study used secondary data acquired from banks. Data included the annual audited financial statements for 2013-2015. Whereas other relevant, appropriate data were acquired from the commercial banks listed on NSE and their books of account.

3.5 Data Analysis

Data for this research were quantitative. A quantitative analysis was performed for the numerical data obtained from the secondary data. This was done using descriptive statistics using Statistical Package for Social Sciences (SPSS) Version 23.0. To determine the relationship between the effects of credit risk stress testing levels (independent variable) and financial performance (dependent variable), a multiple regression analysis was performed. The results were submitted to the following model to test the extent of the relationship.

$Y = \beta 0 + \beta 1\ ELL + \varepsilon$

Where:

Y = Financial Performance (FP) measured by Return on Assets

ELL = Expected Loan Loss

Bo= Constant

B1= Coefficient of Expected Loan Loss (ELL)

ε= Error or random term

The variables will be operationalised as follows:

Table 1.1: Operationalisation of Variables

Variable	**Indicators**	**How it is measured**
Financial performance of commercial Banks	Profitability (Return on assets)	Profit before tax/Average total assets
Credit Stress Testing Levels	Expected Loan Loss	PD(Probability of Default)*LGD(Loss Given Default)*EAD(Expected at Default)

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The chapter presents data on credit stress test levels and how it affects the financial performance of commercial banks in Kenya. It thus envisages the listed commercial banks in Kenya, to be specific, from the Central Bank of Kenya and with close consultation of Nairobi Security Exchange. It should be noted that the yearly data which have been serialized with regards to its both dependent and independent indicators were obtained from the audited. The yearly time series data for independent-dependent variables were extracted from the financial statement that as the usual case, been audited each year, in this case, it entails the years of 2013/2014 and 2014/2015, and to the extension, the other crucial and supportive data were extracted from Central Bank of Kenya guide.

4.2 Response Rate

All the data covering a period of 2013/2014 to 2014/2015, was obtained from the audited annual financial statements of the Barclays Bank, CFC Stanbic Holdings, Diamond Trust Bank of Kenya, HF Group, Kenya Commercial Group, National Bank of Kenya, NIC Bank, Standard Chartered Bank, Equity Bank and The Cooperative Bank of Kenya from the custodian of the banks daily operations, that is the Central Bank of Kenya. It regulates the banking sector and thus, the response rate had hit 100%, as ideally was desired by the study. The data included both bank ROA and Expected Loan Loss. It is of great importance to understand that the response rate of the study is satisfactorily considered, and thus it can be said with a lot of confidence that it surpassed a rate of 70 % therefore, it is rated as very good. This is measured against Mugenda *et al* (1999) a 50% response rate is adequate, 60% good and above 70% rated very good. The rate of response demonstrates a willingness of the bank management to participate in the study.

4.3 Finding of the study

This section is a representation of the findings of the study which are subdivided into descriptive statistics and inferential statistics as explained below.

4.3.1 Descriptive Statistics

To assess the credit risk stress level on performance of commercial banks in Kenya, a clear model was developed; it encapsulated two variables that were going to give specific direction to the study. They were dependent and independent variables where; dependent variable only contained (ROA) and independent variable contained three variables to the side of expected loan loss (ELL) to be (Exposure at Default - EAD, Probability of Default-PD, Loss Given Default- LGD). In designing the models, SPSS version 23, was used and to the extension, ROA was employed as the core financial performance indicator.

The Table 4.1 below presents the descriptive statistics and the distribution of the variables considered in this research: dependent variable (financial performance of commercial banks-Return on Assets; ROA) and independent variable contained three variables to the side of expected loan loss (ELL) to be (Exposure at Default - EAD, Probability of Default-PD, Loss Given Default- LGD).

The descriptive statistics considered were mean and standard deviation. It should be noted that mean is a degree of central tendency employed to explain the most representative value in a set of values. On the contrary, it should be understood that standard deviation demonstrates how far the distribution is from the mean. Therefore, it can indicate that most of the sample means will be close to the center population means, consequently indicating that the sampled mean has a decent chance of being near to the population mean and, it signifies that it is a good estimation point of the population mean. Once more, it should be have concern that, a large standard deviation elucidates that the given sample mean will be a poor estimation of the population mean as postulated by (Harvill, 1991). The pertinent results are presented in Table 4.1.

Table 4.1 Descriptive statistics

	N	Mean	Std. Deviation
	Statistic	**Statistic**	**Statistic**
FPCB	**11**	**2.2036**	**1.14723**
Measured by Return on Assets ROA			
PD	**11**	**34.36**	**3.107**
LGD	**11**	**0.655**	**0.1508**
EAD Ksh. Millions-	**11**	**538.18**	**61.938**
ELL Ksh. Millions-	**11**	**11938.09**	**2576.867**

Source: Research Findings

Table 4.1 shows that financial performance of commercial Banks Measured by Return on RateROA having a mean of 2.2036, and standard deviation of 1.14723. This clearly indicated that financial performance of commercial Banks (FPCB) Measured by Return on Assets ROA is, on average, 2.2036 across all the years under study. Mean value of Probability of Default-PD was 34.36. The Loss Given Default- LGD, had a mean of 0.655, and a standard deviation of 0.1508. The above results gives a crystal clear reflection that most of the sampled banks means were proportionally distributed and thus, showing the credit risk stress level on performance of commercial banks in Kenya. The Exposure at Default in Ksh. Millions- EAD had a mean of 538.18 and a standard deviation of 61.938. This shows that banks are equally exposed to default and thus might contribute to credit risk testing on performance of commercial banks in Kenya. The Expected Loan Loss in Ksh. Millions-ELL was hitting a mean of 11938.09 and to the extension, a standard deviation of 2576.867. This indicates that the commercial banks in Kenya have not yet fully exploited the credit stress testing level to combating the expected loan loss.

4.3.2 Inferential Statistics

The study sought to understand the inferential statistics of the credit risk testing level on performance of commercial banks in Kenya by not only analyzing but also critically analyzing the summary model below. The Table 4.2 displays the results.

Table 4.2: Model Summary of Inferential Statistics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	**0.825[a]**	**.757**	**.567**	**1.38551**

a. Predictors: (Constant), Expected Loan Loss in Ksh. Millions-ELL, Exposure at Default in Ksh. Millions- EAD, Probability of Default-PD, Loss Given Default- LGD

Source: Research Findings

Mentioning to the above table 4.2 the study establishes the adjusted R-square to be 0.567 which translates to 57%. It is worth noting here that 57% of the deviation in the dependent variable (ROA) is described by the independent variables (probability of default- PD, loss given default-LGD, and exposure at default-EAD). This infers in a part, that there is a strong explanatory power for the whole regression.

Table 4.3: Correlations

		ROA	PD	LGD	EAD	ELL
ROA	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	11	11	11	11	11
PD	Pearson Correlation	.069	1			
	Sig. (2-tailed)	.034				
	N	11	11	11	11	11
LGD	Pearson Correlation	.058	-.068	1		
	Sig. (2-tailed)	.036	.843			
	N	11	11	11	11	11
EAD	Pearson Correlation	.064	.025	-.513	1	
	Sig. (2-tailed)	.033	.943	.107		
	N	11	11	11	11	11
ELL	Pearson Correlation	.785**	.329	.785**	-.011	1
	Sig. (2-tailed)	.0430	.324	.004	.974	
	N	11	11	11	11	11

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Research Findings

The result from the above Table 4.3 gives the strengths, the directions and the existing relationships of the variables. The relationship between Expected Loan Loss and Return on Assets is positive and statistically significant ($r = .785$, $p<0.05$) at 95% confidence level. The relationship between Return on Assets (ROA) and Probability of Default (PD) is moving towards positive direction at .019. This is thus showing a positive strength, but weak at 19 percent and .034level of confidence against the expected .05. This indicates that commercial banks in Kenya cannot allow companies and Individuals to borrow which they cannot pay in the expected time, guaranteeing probability default. This reflects that Kenyan commercial banks monitor the credit history of their borrowers and the nature of their investments closely, to avoid their defaults in present

and in future times. This is contributed by the banks through their efforts to minimizing the probability of defaults by their customers and thus increasing the chances of the return of assets. Therefore, Kenyan commercial banks have been implementing the credit risk stress in their daily performances.

The results from the above Table 4.3 also demonstrates that there a association between Return on Assets (ROA) and Loss Given Default (LGD) at .058 which translates to 58 percent. This indicates that the commercial banks have put in mechanisms to get back a fractional loss due to default by the company or even an individual. This therefore further cushions the credit risk testing level by the commercial banks in Kenya.

Table 4.4: Analysis of Variance, ANOVAb

Model		Sum of Squares	df	Mean Square	F	Sig.
1	**Regression**	**37.131**	**4**	**10.542**	**14.500**	**.041[b]**
	Residual	**11.518**	**6**	**1.920**		
	Total	**13.161**	**10**			

Source: Research Findings

The model has the explanatory power because F-statistics in the table 4.6 above is 14.5 at a level of significance of .041. Therefore, the earlier indicated null hypothesis that; there is no significant relationship between credit risk testing and Expected Loan Loss –ELL which includes, (Exposure at Default - EAD, Probability of Default-PD, Loss Given Default- LGD), in Kenya commercial Banks is rejected and the alternative is accepted.

4.4 Interpretation of the Findings

The relationship between Expected Loan Loss and Return on Assets is positive and statistically significant ($r= .785$, $p<0.05$) at 95% confidence level. This indicates that if commercial banks in Kenya do not keenly scrutinize Return on Assets, then the expected Loan loss will tremendously increase thus, high chances of credit risk testing. The study revealed that was there was a significant relationship between credit risk

testing and Expected Loan Loss –ELL in Kenyan commercial Banks. This means that the Kenya Commercial Banks have appreciated the Credit Risk Testing due to the 2008/2009 world financial crisis and thus they have been keen to implementing it even in the years of 2013/204 to 2014/2015.

The result from the Table 4.3 indicates that commercial banks in Kenya cannot allow companies and individuals to borrow which they cannot pay in the expected time, guaranteeing probability default. This reflects that Kenyan commercial banks monitor the credit history of their borrowers and the nature of their investments closely, to avoid their defaults in present and in future times. This is contributed by the banks through their efforts to minimizing the probability of defaults by their customers and thus increasing the chances of the return of assets. Therefore, Kenyan commercial banks have been implementing the credit risk stress in their daily performances. The Kenyan commercial Banks have further put in mechanisms to get back a fractional loss due to default by the company or even an individual. This therefore further cushions the credit risk testing by the commercial banks in Kenya.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The chapter itself therefore puts forth the report summary of the study findings, and thus the main conclusion that have been extracted from the data that has been analyzed and interpreted in chapter four. It entails discussion of the findings, conclusions made, policy implications and recommendations for further research as per the findings which remained to study the effect of credit risk stress testing level on financial performance of banks in Kenya.

5.2 Summary

The key objective of the study was to determine the effect of credit risk stress testing level on financial performance of banks in Kenya. The yearly time series data for independent-dependent variables were extracted from the financial statement that as the usual case, been audited each year, in this case, it entails the years of 2013/2014 and 2014/2015, and to the extension, the other crucial and supportive data were extracted from Central Bank of Kenya guide.

To assess the credit risk stress level on performance of commercial banks in Kenya, a clear model was developed; it encapsulated two variables that were going to give specific direction to the study. They were dependent and independent variables where; dependent variable only contained (ROA) and independent variable contained three variables to the side of expected loan loss (ELL) to be (Exposure at Default - EAD, Probability of Default-PD, Loss Given Default- LGD). In designing the models, SPSS version 23, was used and to the extension, ROA was employed as the core financial performance indicator.

From the study findings there is a significant relationship between credit risk testing level and Expected Loan Loss in Kenya commercial. This means that the Kenya Commercial Banks have appreciated the Credit Risk Testing due to the 2008/2009 world financial crisis and thus they have been keen to implementing it even in the years of 2013/204 to 2014/2015. Thus the Kenya Commercial Banks have slowly and surely are valuing the Credit Risk Testing due to the 2008/2009 world financial crisis and

accordingly they have been keen to implementing it even in the years of 2013/204 to 2014/2015.

Kenya commercial banks cannot allow companies and Individuals to borrow what they cannot pay in the stipulated time, which they know that can guarantee to probability default. This reflects that Kenyan commercial banks monitor the credit history of their borrowers and the nature of their investments closely, to avoid their defaults in present and in future times. This is contributed by the banks through their efforts to minimizing the probability of defaults by their customers and thus increasing the chances of the return of assets. Therefore, Kenyan commercial banks have been implementing the credit risk stress in their daily performances. The Kenyan commercial Banks have further put in mechanisms to get back a fractional loss due to default by the company or even an individual. This therefore further cushions the credit risk testing by the commercial banks in Kenya.

5.3 Conclusion

The study brought an exposed that Kenyan Commercial Banks are using Credit risk testing in their daily performance contrary to what was not expected when the study had not yet been carried out. This might be due to 2008/2009 world financial crisis which had hit almost all financial sectors in the world. Thus, Kenya Commercial Banks, are linking their credit risk testing with Expected Loan Loss –ELL which constitutes; Exposure at Default - EAD, Probability of Default-PD, and Loss Given Default- LGD.

5.4 Policy Recommendations

As far as credit risk testing is concerned the study recommends that banks put in a strong policy that increases the loss given default so as to only allow the clients who are sure of not defaulting in the process repaying the borrowed loan. This will tighten the loop holes which most of the time contributes to the default.

With the regard to the probability of default, the Kenya commercial banks should introduce a strong policy that allows them to access all financial and asset accounts of the defaulter in order to be able to reduce the probability of the borrower defaulting when he has accessed the loan.

The study further recommends that banks should diversify loans to customers to

minimize the risk of default. This will significantly reduce the number of loan defaulting. Concerning earnings ability, the study recommends that banks should plough back in to the business much of their profits at the expense of shareholders for efficient and continued business operation. This will reduce the chances of a bank facing financial crisis and thus embracing credit risk testing strategy.

Concerning liquidity, the study recommends that banks should continue lending to their potential customers to increase their profitability through interest rates. Banks should also raise liquid holdings in order to reduce liquidity risk. Further the study recommends that banks should develop strategies to meet their short term obligation through enhanced disbursement of loans to their customers therefore implementing credit risk testing.

Commercial banks in Kenya should introduce policy that allows external monitoring and evaluation offices with the help of external auditors to thoroughly analyze the banks' exposure at default to curb the menace of banks closing down due to huge exposure at defaults.

5.5 Limitations of the Study

The major disadvantage of the revelations of this study is that it may be not generalized to all banks in Africa. It should be noted that the few specifics can be borrowed from this study to guide the operation of other banks in Africa even though they are in different contexts, and facing different challenges. It should also be noted that, different banks may have different strategies for managing risks. Commercial banks financial risk management keeps on evolving and thus needs the management that thinks quickly and also flexibly adapts to current ideas floated by both the young and the old staff members. This creates a high breeds of ideas. The outcomes hence may not reflect the true effect of financial risk management across the banks for a period of 2013/2014 to 2014/2015.

5.6 Recommendations for Further Studies

This study considered the effect of credit risk stress testing levels on financial performance of banks in Kenya but no other African Countries. Therefore, further studies should be conducted to investigate other commercial banks from other countries to ascertain whether the 2008/2009 world financial crisis gave a lesson to other African commercial Banks in Africa.

This study focused on the effect of credit risk stress testing levels on financial performance of banks in Kenya. Similar studies should also be done on other kinds of financial institutions so that it can be established whether there is consistency on the effect of effect of credit risk stress testing on financial performance. It is suggested that a study be conducted on the same but this time in Microfinance Institutions (MFI) and Development Financial Institutions (DFI) by use of a questionnaire to determine if indeed credit risk testing has indeed an effect on financial performance.

As a result of the limiting factors mentioned previously it was not possible to carry out a comprehensive research on each of the variables and determine in detail how much each of the variables contributes to credit risk testing. Thus further research can be done on these variables**.**

It should also be noted that, different banks may have different strategies for managing risks. Commercial banks financial risk management keeps on evolving and thus needs the management that thinks quickly and also flexibly adapts to current ideas floated by both the young and the old staff members. This creates a high breeds of ideas.

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APPENDICES

Appendix I: List of Commercial Banks in Kenya as at 31st December 2015

1. African banking Corporation Ltd
2. Bank of Africa Kenya Ltd.
3. Bank of Baroda (K) Ltd.
4. Bank of India
5. Barclays Bank of Kenya Ltd.
6. Charterhouse Bank Ltd
7. CFC Stanbic Bank Ltd.
8. Chase Bank (K) Ltd
9. Citibank N.A Kenya
10. Commercial Bank of Africa Ltd.
11. Consolidated Bank of Kenya Ltd.
12. Co-operative Bank of Kenya Ltd.
13. Credit Bank Ltd.
14. Development Bank of Kenya Ltd
15. Diamond Trust Bank Kenya Ltd
16. Dubai Bank Kenya Ltd
17. Ecobank Kenya Ltd
18. Equatorial Commercial Bank Ltd.
19. Equity Bank Ltd
20. Family Bank Ltd.
21. Fidelity Commercial Bank Ltd.

22. Fina Bank Ltd
23. First Community Bank Ltd
24. Giro Commercial Bank Ltd
25. Guardian Bank Ltd
26. Gulf African Bank Ltd.
27. Habib Bank A. G Zurich
28. Habib Bank Ltd.
29. Victoria Commercial Bank
30. I & M Bank Ltd.
31. Jamii Bora Bank Ltd.
32. Kenya Commercial Bank Ltd.
33. K-rep Bank Ltd
34. Middle East Bank (K) Ltd.
35. National Bank of Kenya Ltd.
36. NIC Bank Ltd.
37. Oriental Commercial Bank Ltd
38. Paramount universal Bank Ltd
39. Prime Bank Ltd
40. Standard Chartered Bank Kenya Ltd
41. Trans-National Bank Ltd
42. UBA Kenya Bank Ltd

Source: Central Bank of Kenya (www.centralbank.go.ke).

Appendix II: Listed Commercial Banks

1. Barclays Bank of Kenya Ltd (BBK)
2. CFC Stanbic Holdings Ltd –
3. I&M Holding Ltd
4. Diamond Trust Bank Kenya Ltd (DTB)
5. HF Group Ltd
6. Kenya Commercial Bank Ltd (KCB)
7. National Bank of Kenya Ltd (NBK)
8. NIC Bank Ltd
9. Standard Chartered Bank Ltd (StanChart)
10. Equity Bank Ltd – listed in 2006
11. The Co-operative Bank of Kenya Ltd

Appendix III: Commercial Banks NSE 2016 raw data

Name of the Bank	Financial performance of commercial Banks Measured by Return on Assets ROA	Probability of Default-PD	Loss Given Default-LGD	Exposure at Default in Ksh. Millions-EAD	Expected Loan Loss in Ksh. Millions-ELL
Barclays Bank	0.24	30	0.6	500	9000
CFC Stanbic Holdings	1.4	32	0.7	600	13440
I&M Holdings	1.3	36	0.9	450	14580
Diamond Trust Bank Kenya	2.6	38	0.5	510	9690
HF Group	0.8	39	0.8	480	14976
KCB Group	4	31	0.7	500	10850
National Bank of Kenya	2.1	33	0.6	580	11484
NIC Bank	2.6	36	0.4	560	8064
Standard Chartered Bank	3.3	31	0.8	490	12152
Equity Group Holdings	3	37	0.7	620	16058
The Co-operative Bank of Kenya	2.9	35	0.5	630	10395