MACRO-ECONOMIC VARIABLES AND LOAN DEFAULT RATE: EVIDENCE FROM THE BANKING INDUSTRY IN KENYA

YURUB HASSAN HARIBI

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENTOF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN FINANCE, FACULTY OF BUSINESS AND MANAGEMENT SCIENCES, UNIVERSITY OF NAIROBI

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DECLARATION

This research project is my original work and it has not been submitted to any university or college for examination.

Signed …………………… Date 04/11/2021

Yurub Hassan Harbi

D63/21954/2019

This research project has been submitted for examination with my authority and approval as the university supervisor.

Signed …………………… Date…**29ᵗʰ October, 2021**……

Mr. Ronald Chogi

Lecturer, Department of Finance and Accounting

Faculty of Business and Management Sciences, University of Nairobi

This research project has been submitted for examination with my authority and approval as the university co-supervisor.

Signed……………………… **Date** …November 1, 2021 **…………..**

Dr. Winnie Nyamute

Lecturer, Department of Finance and Accounting

Faculty of Business and Management Sciences, University of Nairobi

DEDICATION

This study is dedicated to my parents and my sisters for their unending support and encouragement throughout the project.

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ABBREVIATIONS

APT	Arbitrage Pricing Theory
CBK	Central Bank of Kenya
CPI	Consumer Price Index
CPV	Credit Portfolio View
GDP	Gross Domestic Product
GNP	Gross National Product
KES	Kenya Shillings
MPC	Monetary Policy Committee
NPLs	Non-Performing Loans
OLS	Ordinary Least Squares
ROA	Return on Assets
ROE	Return on Equity
USD	United States Dollar

ABSTRACT

In most of the global economies, one of the key sectors in boosting the economic growth is the banking industry. It facilitates the allocation of capital from surplus to deficit units. In essence, the sector determines the growth of countries' economies and future sustainability by offering varying services, such as permitting cross-border money transfers and assuring structured interaction between borrowers and savers. In a nation, enhancing client trust improves banking sector stability, which is important for long-term economic growth. However, the global banking sector has seen a rise in bad debts since 2007 when global financial crisis occurred, the global banking sector has seen a rise in bad debts, primarily as a result of Non-Performing Loans (NPLs) being treated as a balance sheet cost, resulting in a reduction in a bank's financial performance. The goal of this study is to determine the influence of macroeconomic variables on the default rate in the banking industry in Kenya. The research was influenced by the Arbitrage Pricing Theory (APT) and the Credit Portfolio View (CPV) model. The study used a descriptive research design. The population of the study was all the commercial banks licensed in Kenya of which a census study was undertaken. Quarterly and secondary data for the period 2011-2020 was collected from CBK website and analyzed by the study; the data collected was time series data. The current research utilized inferential statistics that entail multiple linear regression and correlation analyses. The results of the research showed that there is a positive significant correlation between the lending interest rate and default rate while there is a negative significant correlation economic growth and default rate as well as inflation rate and default rate. However, the study also established that fluctuation in exchange rates doesn't have a significant correlation with the default rate at the 5% significance level. The study also indicated that the coefficient of determination of the study was 18.6% and there was a significant effect of these macroeconomic variables on loan default rate for commercial banks in Kenya. Policy recommendations are made to the government officials and policy formulators in the financial sector, mainly the regulator, the CBK, and the Treasury, to majorly focus on the lending interest rate, economic growth, and inflation macro-economic variables when trying to mitigate the default rate of financial institutions. Further recommendations are generated towards financial institution's practitioners and consultants to monitor the lending interest rate, economic growth, and inflation macro-economic variables in order to regulate credit expansion in order to mitigate credit risk.

CHAPTER ONE INTRODUCTION

1.1   Background of the Study

In a good number of the global economies, the banking industry is one of the key sectors that boost economic growth. It facilitates the allocation of capital from surplus to deficit units. In essence, the sector determines the growth of countries' economies and future sustainability by offering varying services, such as permitting cross-border money transfers and assuring structured interaction between borrowers and savers (Muriithi & Louw, 2017). In a nation, enhancing client trust improves banking sector stability, which is important for long-term economic growth. However, since 2007 when there was global financial crisis, the banking sector globally has seen a rise in bad debts, primarily as a result of Non-Performing Loans (NPLs) being treated as a balance sheet cost, resulting in a reduction in a bank's financial performance (Amuakwa-Mensah & Boakye-Adjei, 2014).

The underpinning theory of this study was the Arbitrage Pricing Theory (APT), which was pioneered by Ross (1976), and it defines the returns of a firm as a combination of the macroeconomic variables changes, the systematic components and firms' specific characteristics. The other theory underpinning the current study was the Credit Portfolio View (CPV) model that was pioneered by Wilson (1997a) who argues that the default risks aren't independent of the business cycle and that default rates need to consider the status of the economy and the business cycle.

The problem of nonperforming loans (NPLs) is not only a global issue, but also a local one in Kenya. The banking sector in Kenya has experienced an increase in defaults

rise in defaults. From the supervisory reports (2020)of the Central Bank of Kenya, there has been a steady increase of NPLs from the year 1997 when they stood at Kshs. 56 billion to date to Kshs. 83 billion in 1998, Kshs, 97 billion in 1999 and recently in the year 2019 the NPLs stood at Kshs. 329.7 billion. Based on Kenya's experience since financial liberalization in 1993 with the financial reform process, NPLs continue to increase steadily, acting as a hindrance to the financial sector's expansion which consequently translate to adversely impacting the country's economic growth. The Central Bank of Kenya (CBK) efforts via fiscal policies have performed a significant role in market stabilization, although sometimes there is unexpected developments in the banking sector resulting from these interventions. In comparison with 20.08% in December 2013, for instance, private-sector annual lending growth appeared to stagnate in January 2014 at 20.47% (FSD, 2014).

1.1.1 Macro-Economic Variables

Macroeconomic variables are elements that affect a large portion of the population instead of a few select organizations, industries, or individuals, and are crucial to the general economy at both the national and regional levels. Commercial banks financial performance and operational efficiency aredetermined by macro-economic factors that are external to the bank and beyond its control (Agade, 2014). The entire legal, regulatory, and economic context in which a bank runs its business are knownas macro-economic variables. Macro-economic factors, which include; inflation, interest rates, economic growth, and currency exchange rate fluctuations can all have an indirect impact on commercial banks loan quality (Tsumake, 2016).

Interest rate denotes the cost of using money obtained from a lender or financial intermediary by the borrower. It can also be said to be a fee paid in order to use the borrowed funds from the lender by the one who borrows. It is the premium charged on capital that is borrowed (Ombaba, 2013). Lending interest rate designates price borrowers pay for funds obtained and thus, it is the debt service fee. Rise of interest rates results to additional debt obligation and indirectly the level of NPLs (Curak, Poposki & Pepur, 2012). When there is increase in real lending rate, the real value of the borrowers' debt rises as well, making it expensive to pay the debts. Banks charging high interest are consequently exposed to higher rate of defaults (Tsumake, 2016). The average lending rate charged by commercial banks is typically used to measure interest rates. In the current study, the weighted average lending rates published monthly by the CBK will be used to measure interest rates.

Gross Domestic Product (GDP) is characterized as the sum of the value of available goods or services produced by a given country's economy. It can also be defined as the total income earned by the individuals located in a certain jurisdiction (Anjom & Karim, 2016). A country's economic success is indicated by among other measures, the GDP. The real GDP is an economic measure that calculates the economic output value after adjusting for price changes (Nanteza, 2015). The growth in GDP reflects a conducive economic environment that benefits both business units and households. Incomes of households and businesses increase in a conducive economic condition and there is an improvement in borrowers' ability to service their debts (Curak, Poposki & Pepur, 2012). The GDP rate of growth is normally used as an economy performance measure. In this study this measure is going to be used.

The exchange rate is a means of transferring money between countries. The country's currency exchange rate determines its entire import and export process (Gurloveleen & Bhatia, 2015). The fluctuation stability or variability of the exchange rate is a major factor that defines the extent and direction of commerce and international trade. The major role of exchange rate in international trade is to fix prices and determine the nature of hedging to avoid risk associated with exchange rate fluctuations (Ramasamy & Abar, 2015). Losses on foreign denominated loans, which is common in developing countries financial markets may be caused by exchange rate. Changes in exchange rates may also affect households and business debt burden due to currency mismatch (Curak, Poposki & Pepur, 2012). Exchanges rates are normally measured by comparing the domestic currency per unit and a selected foreign currency rate. The Kenya Shilling (KES) to US Dollar (USD) exchange rate will be utilized as a proxy for currency exchange rate fluctuations.

Inflation can be defined as a general increment in the prices of goods and services in a country within a specific period of time (Nanteza, 2015). The Consumer Price Index (CPI) proxies the inflation in an economy. Alternatively, inflation/deflation is the change in general prices (Ramasamy & Abar, 2015). High inflation levels increases the capacity of a borrower to repay a loan through reducing the actual value of the outstanding debt. In addition, if salaries or wages remain constant, an increase in inflation can reduce a borrower's loan repayment capacity by reducing real income (Tsumake, 2016). Therefore, increment in inflation levels may lead to increase in the inability of borrowers to make payment through reducing the real value of money (Klein, 2013). The inflation rate will be used to measure inflation that will be utilized in this study, which is calculated by the annual percentage change over the period of

the general price index CPI.

1.1.2 Default Rate

Default risks emerges in case where there is a likelihood of either a partial or a full loan repayment not being made as stated in the loan agreement with the lending company. Default risk as the Basel Committee on Banking Supervision (1997) defines, is the lenders possibility of suffering losses as a result of a borrower failing to make pledged payments. In terms of banks, the committee defines default risk as the potential that a counterparty or borrower may fail to meet their obligations as per the terms of agreement. Default risk can generally be regarded as a risk that the actual return on an investment or advanced credit may differ from the anticipated return (Tsai & Huang, 1997). Default risk, according to Khalid (2012), is defined as losses sustained due to borrowers' reluctance or inability of making timely and fully repayment of the due amounts leading to reclassification of the issued loan as a non-performing loan. In accordance with Conford (2000) NPLs refers to any loan that is in arrears over a period of more than three months for the interest earned and principal paymentsor over three months for which interest has been refinancing, capitalized, or deferred by agreement or for which payment is not yet overdue for three months but is no longer expected. An NPL according International Monetary Fund (IMF), is one whose maturity date has passed yet some of the loan balance remains unpaid. According to Ahmad and Ariff (2007), NPLs are the loan values fractionthat remain due for ninety days or more.

Banks should take all measure possible in order to reduce loan delinquency. As a result, it is necessary to conduct individual exposure checks on a regular basis in order to monitor loan quality on a regularbasis (Ahmad & Ariff, 2007). The banks' liquidity is

damaged and has an adverse effect on their income due to non-performance of loans. The customer's deposit is also threatened. The failure to pay loans means that other borrowers are unable to reuse money (Conroy, 2003). Both the borrowers and the lenders are affected by the cost of delinquencies of loans according to Gorter and Bloem (2002). Legal fees, loss of interest, the opportunity cost of the principal amount, and other expenditures are included in the lender's costs. The decision to default, for the borrowers, is a tradeoff between the consequences in terms of lost reputation and the opportunity cost of neglecting the investments in order to finance the current debt.

Because loans are a major asset on a bank's balance sheet, a bank's credit risk management success is largely determined by the proportion of nonperforming loans (NPLs) to gross lending, also known as the NPL ratio. A high NPL to advance ratio indicates bad loan payback as a result of unreasonable lending practices and deteriorated credit management. Since a low ration indicates good default rate, it is henceforth appropriate (Thygerson, 1995). In this study, the NPL ratio was used as a default rate indicator.

1.1.3 Macro-Economic Variables and Default Rate

In various literature sources, there is significant distinction amongst factors that affect banking credit risk, factors affecting unsystematic credit risks and those affecting systematic credit risks. Specific borrower factors affect the unsystematic credit risk. Macroeconomic factors such as employment rates, economic growth, exchange rate variation, stock indices and inflation rates affect the systemic credit risk (Castro, 2013). Teker, Pala, and Kent (2013) states main systemic variables in credit risk that

include of nine economic factors; Balance of payments, inflation rate, GDP per capita, debt to GDP, fiscal balance, export growth rate, international reserves, exchange rate, efficiency and financial depth as well as three political factors which are corruption levels, government effectiveness and political stability.

Prochniak (2011) states before the emergency of the global financial crisis, the loan portfolio of banks had an increasing trend across various countries. There was a growing demand for the loans due to the growth of the economy and higher expectations from households, business and banks. However, the credit drop following the global crisis was as difficult as growth in times of credit boom. As a result of the weakening economy due to the financial crisis banks encountered a mirage of problems in NPLS because most of the borrowers could not be able to fulfil their financial obligations. The decline in GDP, investments, household consumption expenditures, the rise in business bankruptcies, and unemployment posed major challenges to banks, household and business owners. Additionally, the loan portfolio quality as wells as the financial indicators of banks deteriorated which shown that banks failed to properly assess credit risk during the credit boom period. Banks, as financial intermediaries, play an essential role in a country's financial system and overall economy. As a result, bank supervisors were concerned about these issues. The Basel III Agreement established criteria for considering macroeconomic factors when assessing credit risk. In order to construct exact internal credit risk assessment models Banks can choose the variables and analytical methodologies they want to use (Prochniak, 2011).

A close interrelationship between banking crisis, bank credit and business cycles

exists. Often deep and long-term recessions accompanied the financial crises. As indicated by financial instability hypothesis, the economy may be pushed to the brink by a prolonged period of prosperity that could lead to speculative euphoria and excess borrowing. During the recent global financial crisis, this viewpoint gained popularity, challenging consensus on models of macroeconomic based on agents' rational behavior (Bucher, Dietrich, & Hauck, 2013).

In the economic expansion faces, there are minimal NPLs since individuals and companies normally have enough sources of income and revenues enough to enable them settle their loans. However, while the booming period prolongs, credit is provided even to debtors of lower-quality, and as a result, the NPLs rises when the recession phase begins (Steiner, 2014). Unemployment rates may give further insight on the effect of economic conditions. As the unemployment rates rises there is an adverse effect on the cash flows of households, which as a result lead to increase in their debt burden. In the perspective of companies, an increase in employment rate may indicate a reduction in production following a reduction in the effective demand. This could reduce revenues and cause debtfragile conditions (Castro, 2013).

1.1.4 The Banking Industry in Kenya

The banking sector of Kenya is controlled by the Central Bank of Kenya (CBK), the Act of Banking, and also the Companies Act. The CBK is given the mandate of financial policies formulation and implementation, managing the banks liquidity, credit worthiness as well as maintain a proper monetary policy system. The CBK licenses the commercial banks which are financial institutions, for accepting deposits and issuing loan advances to their clients (Githaiga, 2015). As at June 30 2018, in Kenya only 43 licensed commercial banks and a mortgage finance bank were

operating. Thirty banks were owned by locals while 13 were foreign owned.

The Government of Kenya in the quest of ensuring asset quality has in deed made improved changes to both the Act of Banking (Cap 488) and also on the Guidelines that are prudent as a way of improving the provisions associated to bank license, capital adequacy, risk asset classification, risk management in general and also corporate governance (Thorsten et al, 2009). Owing to the strong emphasis on asset quality, banks have been subjected to tight monitoring and restrictions since 2001, when the NPL ratio peaked at 22.6 percent, in order to ensure that ratios remain within acceptable limits, resulting in improved asset quality higher profitability levels from the loan portfolio (Oloo, 2013).

Both global and local financial crises have affected Kenya's banking industry in the past. During the year 1980 and 2000, the financial industry in Kenya was branded with major financial disturbances, which ended with the collapse of a number of banks and other being taken under receivership (Muriithi & Louw, 2017). From the year 2015, three commercial banks have been placed under receivership in Kenya which has led to many people loosing trust with banks and the overall industry(AIB Capital, 2016).

The Kenyan banking sector has experienced an increase in defaults rise in defaults. According to the CBK supervisory report (2020), there has been a steady increase of NPLs from the year 1997 when they stood at KES 56 billion to date to KES 83 billion in 1998, KES 97 billion in 1999, and recently in the year 2019 the NPLs stood at KES 329.7 billion. Based on Kenya's experience since financial liberalization in 1993 with the financial reform process, NPLs continue to increase steadily, acting as a hindrance

to the financial sector's expansion which consequently translate to adversely impacting the country's economic growth. The Central Bank of Kenya (CBK) efforts via fiscal policies have performed a significant role in market stabilization, although sometimes there is unexpected developments in the banking sector resulting from these interventions. In comparison with 20.08% in December 2013, for instance, private-sector annual lending growth appeared to stagnate in January 2014 at 20.47% (FSD, 2014).

1.2 Research Problem

The demand for credit is normally higher in the economic boom period rather than in recession periodowing to the nature of business cycle. (Anila, 2010). Many economists view credit growth positively since it suggests a strong banking sector and a stable macroeconomic environment. The quality of loans, on the other hand, can be affected by excessive credit expansion. The negative consequences after a period of loan boom were due to poor loan quality and minimal supervision and among other factors (Babouček & Jančar, 2005). Borrowers and banks are widely recognized in this stage as beingoverconfident about the projects for investment and the capacity of repaying loans. The optimism ofbanks regarding future prospects for borrowers influence more liberal lending policies with reduced lending standards requirements. As results, this leads to banks experiencing high levels of NPLs andprovisions in the recession period when they are required to have strict credit policies and better prospects of reviving the economy of a country. Those lending fluctuations are more than proportional to economic changes, demonstrating that changes in bank loans tend to intensify the cycle of the business (Bouvatier, Lopez-Villavicencio & Mignon, 2012).

Based on Kenya's experience since financial liberalization in 1993 with the financial reform process, NPLs continue to increase steadily, acting as a hindrance to the financial sector's expansion which consequently translate to adversely impacting the economic growth of Kenya. CBK's fiscal policies initiatives have performed a key role in market stabilization, these actions sometimes lead to unforeseen events in the banking industry. In comparison with 20.08% in December 2013, for instance, private-sector annual lending growth appeared to stagnate in January 2014 at 20.47% (FSD,2014). According to the CBK supervisory report (2020), there has been a steady increase of NPLs from the year 1997 when they stood at KES. 56 billion to date to KES 83 billion in1998, KES 97 billion in 1999, and recently in the year 2019, the NPLs stood at KES 329.7 billion. In Kenya, the high proportion of NPLs remains a major supervisory challenge. This situation has negatively affected the profitability of banks. This tendency has threatened commercial banks' viability and sustainability and in addition, ruins the accomplishment of the objective for which they were expected which are intermediation and allocation funds in an efficient way from the surplus to the deficit units. It is imperative to investigate if macro-economic factors have any bearing on these NPLs increase in the financial sector in Kenya.

Several studies have been done on macro-economic factors and how they affect the default rates of financial institutions. In the global front, Alfred et al. (2011) modeled unexpected credit losses and empirically evaluated the connection between the losses, inflation, nominal interest rates, growth of Gross Domestic Product and the difference in market share, with a number of Macroeconomic variables. The study did not

include foreign exchange fluctuations as one of the macro-economic variables thus presenting a conceptual gap. Hogarth, Sorensen & Zicchino (2005) examined how macroeconomic factors affected the loan written off in the banking sector in UK where they used the VAR system. The variables included in the model were; annual inflation rate, nominal interest rates and output gap. Economic growth and foreign exchange fluctuations were not included in the study as part of the macro-economic variables thus presenting a conceptual gap. Patra and Padhi (2016), examined the bank's specific and macroeconomic factors in non- performing assets for Indian commercial banks. Determinants of NPLs from both the bank specific and macro-economic were examined in the study thus revealing a conceptual gap. A contextual gap exists since these studies were undertaken outside the context of Kenya.

Locally, Warue (2013) examined how both banks specific and macroeconomic factors, in Kenya, causes an effect to the NPLs of the commercial banks. The model developed in current study entailed creation of two macroeconomic credit risk models that consisted of a number of auto regression models and a multiple regression in each that considered the retroactive impact of default rate on bank loans. Determinants of NPLs from both the bank specific and macro-economic were examined in the study, thus presenting a conceptual gap. A survey by Awuor (2015) assessed the effects of firm specific variables on NPLs in Kenya and found a positive association amongst operational cost efficiency, liquidity, and earnings potential to NPLs levels. The study examined bank specific determinants of NPLs, thus presenting a conceptual gap. The growth rate of GDP, high unemployment rate, high real interest rate, and reserve ratio for loan losses increased non-performing loans significantly as concluded by Onchomba (2014) who assessed the link between macro-economic

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factors and Kenyan mortgage firms' NPLs. The study did not include inflation and foreign exchangefluctuations as part of the macro-economic variables thus resulting in a conceptual gap. The study was also conducted in the mortgage institutions context and not the commercial banks context, thus presenting a contextual gap.

The concept of macro-economic factors and NPLs may not be novel as evidenced by the numerous studies that have been done However, available literature is not sufficient to provide a framework for determining the impact on commercial banks' NPLs of macro- economic factors. The studies reviewed that related macro-economic factors and NPLs did not include all the macro-economic factors to be included in the study, which entailed; economic growth, prevailing lending interest rates,inflation, and foreign exchange fluctuations. The study by Awuor (2015) assessed the effects of firm specific variables on NPLs. A conceptual gap is presented in these studies. The global studies reviewed were not carried out in the Kenya resulting in a contextual gap. The study by Onchomba (2014) assessed the link between macro-economic factors and Kenyan mortgage firms' NPLs. The study did not was also conducted in the mortgage institutions context and not the commercial banks context, thus presenting a contextual gap. Thus, this research paper sought to identify and fill such conceptual and contextual knowledge gaps through establishing the impacts of specific macro-economic factors on the default rate of Kenya commercial banks. It also aims to add a wide variety of information on non-performing loans to the current local research base in this area. The research question intended to be addressed in the study; "What is the influence of macroeconomic factors on the default rate of commercial banks in Kenya?".

1.3 Research Objectives

The main objective of this study was to determine the influence of macroeconomic variables on the default rate in the banking industry in Kenya.

The specific objectives of the study were;

i. To identify the impact of the lending interest rate on the default rate in the bankingindustry in Kenya.

ii. To analyze the influence of economic growth on the default rate in the banking industryin Kenya.

iii. To investigate the effect of inflation on the default rate in the banking industry in Kenya.

iv. To determine the effect of exchange rate fluctuations on the default rate in the bankingindustry in Kenya.

1.4 Value of the Study

For bank stakeholders, the government, the regulatory authority for industry, investors and scholars, lending quality is of major importance. The study would provide researchers and academicians in future with a helpful basis for research on loan quality management in the banking and financial sector. Because this study was among the limited done relating to base macro- economic factors andthe NPLs levels in commercial banks, for that reason the findings were highly beneficial to researches in future and educational purposes due to the fact that it added on to the empirical literature and educational knowledge. Henceforth, this study acted as a benchmark which other future studies on related areas would review it and acts a source of secondary materials. The outcomes of the study would add to the current subject of information on loan quality in the context of macroeconomic factors. The findings of

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the study were used as a reference for researchers interested to investigate credit risk management and its significant effect on banks' financial performance. Through the study variables on policies and theories that guide them, research outcomes would be a source of important literature. Researchers interested in investigating complex relationships between the dependent and many independent variables would benefit from the study technique, which includes inferential statistics such as correlation analysis and multiple linear regression.

This study provided officials and policymakers with a basis for controlling regulating strategies to alleviate economic crises in the financial system as well as recommend and account for credit risks arising from the quality of loans. Commercial bank regulators, the CBK, the government, and policymakers would acquire vital information on the impact of macroeconomic factors on loan repayment in the banking industry. The government could utilize the study to help them make financial regulation policy. In their existing regulatory framework, policymakers would also learn how challenges and loopholes influence the banking sector operations. The investigation was also an insight on whether changes in the various macro-economic factors impact on loan defaults significantly. The CBK, primarily the Monetary Policy Committee (MPC), is responsible for establishing appropriate policies relating to macroeconomic factors and how to maximize loan repayment, particularly throughout economic cycles, such as booms and busts.

This study provided an overview into how the macro-economic factors would influence the loan repayment rates thus it is importance to consultants, management and shareholder of commercial banks. The findings of this study will be beneficial to

commercial banks because it will enable predicting the possibility of taking up a loan and becoming non- performing since it diminishes its value and additionally result in to damaging reputation. The shareholder wealth is increase when there are more performing loans. On the other hand, presence of NPLs diminishes the shareholder's earnings through deteriorated financial performance of banks. Understanding the impact of macroeconomic factors on the performance of loan would be of paramount significance to the Kenyan banking sector and stakeholders since this is linked to the banking sector sustainability, maximization of shareholder's wealth, improving confidence of customers and ultimately increasing the banks revenue. This helped management undertake decisions that are informed as far as loan is concerned.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter purposes to create insights on the theories of loan quality to help in the comprehension of its concepts, structures, and the empirical literature on how it is influenced by macro-economic factors. The significance of the chapter is to establish the probable knowledge gaps in the studies undertaken previously by scholars on the impact of macro- economic factors on the default rate of commercial banks.

2.2 Theoretical Foundation

The literature review explores the work conducted by other scholars on the influence of macro- economic factors on the default rate of commercial banks and other financial institutions. The section encompasses the detailed knowledge of related concepts and provides a platform on which the results will be built upon and in addition, overcome the shortcomings of the study. Theories are essential in the various sections as they establish the phenomena and principles that relate to the topic. The theoretical framework depicts the interrelationship between different ideologies and provides the guidelines for the project or business endeavor (Lyon, 1977). The study focused on the Arbitrage Pricing Theory (APT) and the Credit Portfolio View (CPV) model.

2.2.1 Arbitrage Pricing Theory

Ross (1976) pioneered the Arbitrage Pricing Theory (APT) that explains that the change in return or firm's value is due to changes in the fundamental macroeconomic variables, firm specific characteristics and the systemic components. Generally, during a boom and period of high demand, the likelihood of firms attaining

profitability is high hence translating to lower defaults. On the contrast in times of recession, it is difficult for a firm to maintain profitability, which increases the probability of a firm defaulting (Bangia et al., 2002). Carey (1998) and Frye (2000) indicates that during recession losses are quite high, this implies that the performance of firms is related to risk profile and directly connected to business cycle the macroeconomic condition.

The standard risk models developed by Vasicek (1987,1991,2002) generally provides effects for business cycle through one or more systematic risk factors that are not observed, based on Merton's (1974) option-based approach. There are numerous empirical literature that support the association of credit risk with business cycle effects namely; Fama and French (1989), Chen (1991), Jonsson et al. (1996), Helwege and Kleiman (1997), Wilson (1997a, b), and Carling et al. (2002). Koopman and Lucas (2005), Alves (2005), and Pesaran et al (2005) conducted more recent studies that focused on the dynamic behavior of the default rate and credit spread in accordance with business cycle development and confirmed the interrelation amongst the two. As indicated by the empirical review, there is a strong and an inverse association amongst realized defaults and business cycle.

The theory relates with the current study since the theory states that risk profile of financial institutions has a direct connection with business cycle and overall condition of macro economy. Thus, macro-economic factors are theoretically expected to link with the default risk of commercial banks. When the economic factors are indicating a boom fewer defaults are expected while more defaults are expected when the economic factors are indicating a recession.

2.2.2 Credit Portfolio View (CPV) Model

The model underpinning this study is the Credit Portfolio View (CPV) model pioneered by Wilson (1997a) which argues that default likelihood is related to the business cycle and that default rates need to consider the business cycle and the prevailing economic condition. In CPV, default probability is clearly associated with some macroeconomic variables and portfolio loss distribution is computed using Monte-Carlo simulations (Wilson, 1997b). The CPV model may be used for a 'mark-to-market' or a 'default mode' framework. In mark- to-market model, the credit portfolio losses are the mark-to market valuation losses, whereas in the next model the losses are only those originating from defaults that are considered (Wilson, 1997a; 1997b; 1998). Four steps involved in the default-mode CPV model. In the first step, the default rates average are connected to some macro indices. Such indices can be viewed as a combination of various macro variables. In the second step, time series models are used to describe evolutions of macro variables. In the model the structure of correlation is constructed in the third step while in the fourth and final steps the new values are simulated for macro variables and average default rates and production of portfolio loss distribution is made (Wilson, 1998).

The situation of the economy can be determined by using the transition matrices in the economic cycles postulated by the CPV (Crouhy, Galai & Mark, 2000). Credit Portfolio View transition matrices differ from the credit metrics matrices of migration (Hamisultane, 2008). Virolainen (2004) employed the CPV model to study the bankruptcies for industry specific corporate sector for times series between the year 1986-2003 and making estimation on the macroeconomic credit risk model for the Finnish corporate sector. From the findings, it was revealed that corporate sector

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default rates are significantly related to main macroeconomic factors for instance interest rates, GDP, andcorporate indebtedness.

The theory is applicable in this study since it argues that default likelihood is not separable from business cycle and that default rates need to consider the business cycle and the economic condition. Thus, macro-economic factors are theoretically expected to link with the default risk of commercial banks. The average default rate is associated to certain macro- indices, which can be viewed as various macro-variable functions. Thus, the macro variables utilized in the study, which entail; economic rates, prevailing interest rates, inflation, and foreign exchange fluctuations are theoretically expectedto be linked to the default rate.

2.3   Determinants of the Default Rate

This segment expounded on different determinants of loan repayments. They include; the lending rate, economic growth, inflation, and fluctuations in exchange rate.

2.3.1 Lending Interest Rates

Keynes (1936) denotes to interest rates as the cost incurred to borrow capital for defined time-period. Interest rates are normally used to refer to the credit cost in a country. It is the cost of existing resource claims in relation to potential resource consumption. The lending rate is the amount paid by the borrower to the lender as compensation for using money that does not belong to him or her for a certain period of time (Kwak, 2000).

The borrower's capacity to repay a loan is impaired by increase in the cost of credit. A

rise in interest rates without a corresponding rise in a borrower's disposable income raises the borrower's default risk. In contrast to a period with lower interest rates, a period with higher interest rates would have a comparatively higher default rate. In times of lower interest rates, the borrowers net returns improve which translate to ability of the borrower to perform hence reduce default rates (Memmel et al., 2012).

2.3.2 Economic Growth

Economic growth denotes the rise in the productivity of a country, comparing the productivity of one period against another period. Real term or nominal terms can be used in measuring it. Conventionally, Gross Domestic Product (GDP) or Gross National Product (GNP) are used in measuring the aggregate economic growth however other ways of measuring it are applied (Liu & Ryan, 1995).

The phase of the economic growth cycle has a notable effect on credit risk. In times of financial crisis and recession, the default risk is normally higher and in the contrast the default risk is lowers in times of boom (Liu & Ryan, 1995). Quagliariello (2007) established that Non-Performing Loans (NPLs), loan-loss provisions, and Return on Assets (ROA) follow economic growth cycles. Liu and Ryan (1995) theorized that the ratio of NPLs to the outstanding loan book values might periodically vary considerably for business loans due to economic conditions.

Credit providers observe macro and micro economic factors relevant to an industry type, in order for them in assessing a credit seekers application. Thus, the lenders have an added strength of analyzing a borrower's sound prospective cash flows with reference to employment opportunities, industry growth, and demand for a category of

a security. Macroeconomic factors have a major effect on the default rate. The primary indicator of macroeconomic factors is the GDP growth (Rajan & Dhal, 2003).

2.3.3 Inflation

Inflation is the rise in general price levels in an economy (Payne, 2008). Friedman (1992) famously proclaimed, "inflation is always and everywhere a monetary phenomenon." This suggests that sustained inflation is the result of sustained money supply growth rather than sustained negative real income growth or sustained velocity. The real economic output is affected by inflation and it associated unpredictability through imposing costs, and this can cause the prices mechanism to be an ineffective way of efficiently allocating resources (Friedman, 1977; Rahman & Serletis, 2009).

Mishkin and Adam (1997) posits that inflation means that the lenders that are paid a fixed interest rates on loans loses purchase power from earned interest since it is lower as a result of inflation whereas the borrower gains purchasing power. Inflation has a positive effect whereby the borrowers with loans having fixed nominal interest rates will have a debt relief as the real interest rate will reduce as the inflation rate increase. However, banks usually deal with the risk of inflation by either incorporating the inflation premium in the interest rates through creation of a higher specified interest rate or through issuing variable interest rates.

2.3.4 Exchange Rate Fluctuations

The presence of a floating exchange rate system, which is common in liberalized economies, lead to exchange rate to fluctuate. The changes in currencies exchanges rates are caused by a variety of factors that may be either fundamental or technical in

nature. Some of these factors comprise of variation in interest rates changes, inflation rate, demand and supply of currencies, capital flow, economy performance, supports and resistance levels among other factors. Since these elements are constantly evolving, the value of currency fluctuates constantly (Kandil & Mirzaie, 2002).

The currency of a particular country appreciates as the local interest rates rises. The association of default rate and exchange rate is indeed not monotonic and relies upon the association of interest rates and default risk. The rise in interest rates thus has two contrasting effects, including a reduction in the estimated amount of resources available because of the extreme higher anticipated costs resulting from higher defaults and increases in repayment, as debts are paid (Caporale, Cipollini & Demetriades, 2005).

Huge fluctuations in a currency can have a substantial effect on the overall economy. Currency depreciation shows a weakening economy whereas appreciation in currency show a thriving economy(Caporale, Cipollini & Demetriades, 2005). The phase of the economic growth cycle has a substantial effect on credit risk. In times of financial crisis and recession, the default risk is normally higher and in the contrast, the default risk is lowers in times of boom (Liu & Ryan, 1995). Inflation is also caused by changes in a currency. Therefore, hyperinflation may lead to drastic currency depreciation and vice versa is also true (Bogdanski, Tombini & Werlang, 2000). Mishkin and Adam (1997) posits that inflation means that the lenders that are paid a fixed interest rates on loans loses purchase power from earned interest since it is lower as a result of inflation whereas the borrower gains purchasing power.

2.4 Empirical Review

Numerous studies have been done on determinants of the default rates of financial institutions. In the global front, Yam (2016) investigated on the association of bank specific factors and macroeconomics factors, NPLS, sustainability and performance of commercial banks in Indonesia. The period of study was 10 years ranging year 2004-2013. The impacts of joblessness, debt levels, deflation, currency fluctuations, and GDP were studied. The financial institutions factors used were availability and equity markets, regulatory strength and marketable securities. The outcomes of the study demonstrated that both financial institutions and broader factors had a substantial influence on bank efficiency and NPL levels. The article focuses on both financial institutions and global NPL drivers, resulting in a conceptual gap.

Škarica (2014) investigated the determinant of variation in the NPLs ratio in a number of European developing markets through a panel data methodology for seven Countries in Central and Eastern Europe from the year 2007 to 2012. The study considered the countries entailing; Romania, Bulgaria, Czech Republic, Latvia, Croatia, Slovakia and Hungary. The study findings established that the main reason of the high NPLs level was the slow-down of an economy, which is demonstrable through large coefficients of GDP, inflation, and unemployment rate. The study did not include lending interest rate and exchange rate fluctuations as part of the macro-economic variables thus presenting a conceptual gap. The study also was not undertaken in the Kenyan context, which therefore leaves a contextual gap.

Mesai and Jouini (2013) investigated the factors that influence NPLs in three European countries: Italy, Greece, and Spain. The study was place between 2004 and 2008, and a total of 85 banks were sampled. The following demographic parameters

were addressed in the study: GDP growth rate, interest rates, and poverty rate. In this study, panel data approach was employed. According to the findings, NPLS are negatively related to GDP growth, bank profitability, and assets, and are directly related to joblessness, credit losses ratios, and lending rates. As part of the macro-ecosystem, the analysis excluded lending interest rates and currency rate variations.

Ofori-Abebrese, Pickson, and Opare (2016) examined the impact of macroeconomic determinants on bank loan performance in Ghana on a regional level. The information was gathered from 2008 to 2015. To investigate co-integration, the study used the ARDL limits estimation model, and the results demonstrated that the research findings had a long-term association. Government treasury bills and inflation are environmental factors that impact loan performance, according to the study's findings. Economic growth, lending interest rates, and currency rate changes were not included as macroeconomic factors in the research, resulting in a conceptual gap. In addition, there was no investigation.

Sheefeni (2015) looked at the factors of NPLs in Namibian commercial banks by bank. For the years 2001 to 2014, the hypothesis testing, time series modeling, co-integration testing, multiple regression, and error dissection models were used. The primary predictors of NPLs, according to the study, are the ROA and ROE, loan outstanding capital ratio, and log percent total assets. The study looked at bank-specific default rate drivers rather than macroeconomic causes, resulting in a conceptual gap. According to Rocco and Plakhotnik (2009), a conceptual framework creates the foundation for a study's research questions and objectives by anchoring them.

Chege and Bichanga (2016) investigated the impact of NPLs on the financial performance of Kenyan commercial banks. A survey method was used in the study, as well as a census of the 44 commercial banks. Between 2011 and 2015, secondary data was collected during a 5-year period. The outcomes of the study demonstrated that NPLs seemed to have a statistically significant impact on the financial performance using multiple linear regression. Other bank-specific characteristics such as total assets, ownership, and operational expenses had a significantly effect on financial performance, according to the study, but liquidity had no effect on profits.

Agade (2014) examined how macroeconomic factors influence the operational efficiency of the banking sector in Kenya. To undertake the study, descriptive research design was applied and secondary data was used. To analyze the data, multiple linear regression model was utilized and found out that the main factors that affected the Kenya banking sector operational efficiency included; lending rates, GDP, variation in exchange rates and inflation. The conclusion of the study was that there a significant and negative association amongst inflation and banking sector operational efficiency. The study related the macroeconomic factors to operational efficiency of commercial banks and not the default rate thus presenting a conceptual gap.

Murungi (2014) looked at the impact of macroeconomic factors on the financial performance of Kenyan insurance businesses. A descriptive correlation research approach was used to study the population of 46 insurance businesses in Kenya. Secondary data was used, which was collected during a five-year period from 2009 to 2013. The outcomes of the study revealed that the lending interest rate, GDP, claims,

and expenditure ratio were all statistically significant predictors of financial performance, whereas the inflation rate, currency rate changes, money supply, and company size were not. The interest rate, economic growth, claims ratio, and expense ratio were shown to be the key macroeconomic detriments in the study.

Using yearly secondary data, Gitonga (2014) explored how macroeconomic factors impact credit risk of commercial banks in Kenya's banking industry from 1990 to 2013. The model employed in the study was an OLS multiple linear regression model with an error correcting model applied to it. Exchange rate variations had a considerable but unfavorable influence on default risk, according to the study's findings. Household commercial bank loans to the private sector and inflation both had an inverse and substantial influence on credit risk, whereas interest rates had a positive and large impact. Economic growth was not included as one of the macroeconomic factors in the analysis.

Warue (2013) examined the effects of socioeconomic and financial institutions variables on NPLs in Kenyan commercial banks. Secondary data was used in the study, and a census of all 44 Kenyan commercial banks was undertaken between 1995 and 2009. The study findings revealed that per capita income had an inverse and significant effect on NPLs across various bank categories in terms of size while income per capita had a significant negative relationship with NPL levels across categories of bank ownership. The study concluded that bank-specific factors influence Kenyan commercial banks' NPLs at higher degree relative to macroeconomic factors. The study assessed bank specific determinants of the default rate and not macroeconomic determinants thus presenting a conceptual gap.

2.5 Conceptual Framework

Rocco and Plakhotnik (2009) characterizes a conceptual framework establishes the basis for research questions and objectives of a study through anchoring the study in the appropriate knowledge constructs. Clearly illustrated, the structure enables the researcher to make deductions. Determinants of the default rate are the independent variables in this study, which entailed; lending interest rate, economic growth, inflation, and exchange rate fluctuations. The default rate will be the dependent variable.

Determinants of the Default Rate   **Dependent Variable**

Independent Variables **Lending Interest Rate**
- Weighted

Default

Non-Performing Loans Ratio

- (Non-Performing Loans/

Inflation
- Consume Price (CPI)

Fluctuations in Exchange
- (KES/$_{t+}$ – KES/$
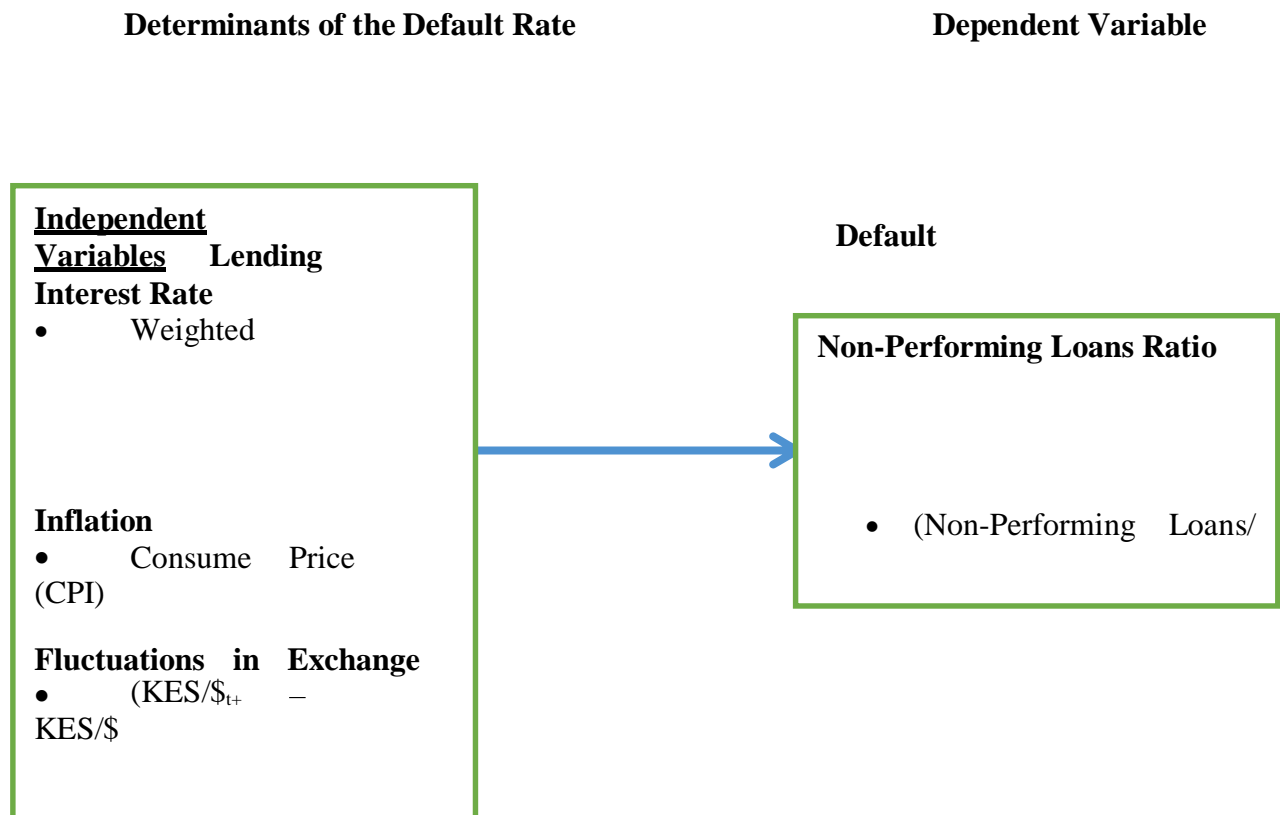
Figure 2.1: Conceptual Framework

2.6   Summary of Literature Review and Research Gaps

As shown in the empirical literature reviewed above, there exist a number of knowledge gaps. The studies reviewed did not include all the macroeconomic factors to be included in the current study which entail; inflation, lending interest rate, economic growth and exchange rate fluctuations thus presenting a conceptual gap. Some studies examined both the specific bank and macro-economic determinants of NPLs, thus presenting a conceptual gap. Additionally, some studies did not relate macroeconomic factors to the default rate, consequently leaving a conceptual gap. The foreign studies reviewed were undertaken outside the context of Kenya hence, there exist a contextual gap.

<p style="text-align: center;">**CHAPTER THREE: RESEARCH METHODOLOGY**</p>

3.1 Introduction

This chapter is the blueprint of the research study where it lays out the methodology of the study. The chapter covers several subsections, which include research design expounding on the design applicable to the study, target population detailing the population of interest under this study and sampling method applicable if any. Data collection is also looked into where data required is specified and how it is going to be collected. Finally, the chapter shows the data analysis technique that will be applied by the researcher.

3.2 Research Design

In this study, the researcher embraced a descriptive research design since to establish the relationship amongst the study variables was the main objective of this study. Aspects such as the variables applied in the study and data collection methods were included in the design (Polit & Beck, 2013). This research design was applied so as to determine the magnitude and nature of cause and impact association as well as to evaluate the effect of changes in the current norms and different processes. The current study was a formal since it borrowed from applicable theories and it used different literatures to guide it. In addition, it was an ex - post facto research study since the variables were measured rather than manipulated. It was a field environment with the country as the unit of study. This design considers factors such as the method of study, the variables applied in the research, and data collection methods.

3.3 Data Collection

Data collection process is very important because of the fact that it has an impact on

<p style="text-align: center;">30</p>

the authenticity of the study findings. This study used secondary data and comprised of data on; NPLs, gross loans and advances outstanding, weighted average lending rate, GDP, CPI, and exchange rates. The researcher precisely collected data from CBK, which publishes quarterly reports and bank supervision reports. Data on the NPL ratio and the weighted average lending rate was obtained from the bank supervision reports and data on foreign exchange changes was extracted from the CBK website. Kenya National Bureau of Standards (KNBS) reports entailed economic growth and inflation data was also collected. The study gathered quarterly data for a period of twenty years, from 2001 to 2020 and the data collected was time series/longitudinal data.

3.4   Data Analysis

In order to simplify the analysis, interpret and comprehend the data collected, it was arranged, tabulated and simplified. Upon organizing the data, the panel data was analyzed through aid of statistical analysis software known as SPSS Version 25. The researcher undertook correlation analysis so as to identify the association of variation in the average lending interest rate, GDP growth, CPI, and exchange rate fluctuations with the default rate whereas regression analysis was utilized in determining relationship amongst them. The OLS Regression was run on the collected data, which fulfilled the Best Linear Unbiased Estimates (BLUE) assumptions. Tables were used to present the quantitative findings of the analysis.

3.4.1 Diagnostic Tests

Various assumptions are made so as to ensure the validity of the linear regression models. The assumption includes; No Multi-collinearity, random sampling of

observation, zero conditional mean,linear regression model is "linear in parameters", spherical errors: no auto correlation and there is homoscedasticity and finally the optional assumption; normal distribution of error terms. The first five linear regression model assumptions, OLS Regression estimators as indicated by Gauss-Markov Theorem are the best linear non-biased estimators (Grewal et al., 2004). These assumptions are paramount when undertaking regression and violation of any of them would mean that the regression estimates are rendered unreliable and incorrect. Precisely violation would lead to incorrect meaning of the regression estimates of the variation of the estimate would be unreliable leading to confidence intervals which are extreme, either too wide or too narrow (Gall et al., 2006).

To guarantee that the assumptions are met such that the best linear unbiased estimators are available,the researcher ought to undertake diagnostic tests. Regression diagnostics evaluate model assumptions and test whether or not there are interpretations with a large, unjustified impact. The datacollected will be subjected to diagnostic test such as autocorrelation, multicollinearity, linearity and normality so as to find if it is appropriate for conducting linear regression model. The Shapiro Wilk test was used to test normality. Breuch-Pagan test was used to determine of homoscedasticity was done to test linearity.

Multicollinearity test of data was done using variance inflation factors (VIF) and Tolerance statisticsto identify the significant correlation among the predictor variables that were used in this study. Grewal Levy & Lehmann (2004) argue that the main sources of multicollinearity are low explained variables, small sample sizes, and low reliability measure in the independent variables. Durbin- Watson Statistic was used to

test the problem of auto-correlation.

3.4.2 The Model of Analysis

Multiple linear regression analysis was undertaken to accomplish the study objective, which examined if there is any impact the independent variables have on the default rate. The researcher also undertook the statistical test at a significance level of 95%, which implied that the margin of error is up to 5%. The below model was applied;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where:

Y = Default Rate denoted by the Non-Performing Loans Ratio α = Constant $\beta_1 - \beta_4$ = Beta coefficients

X_1 = Lending Interest Rate denoted by the Weighted Average Lending Rate

X_2 = Economic Growth denoted by the percentage change in the Gross Domestic Product X_3 = Inflation denoted by the Consumer Price Index

X_4 = Fluctuations in the Exchange Rate ϵ = error term

Table 3.1: Operationalization of the Study Variables

Variable	Measurement
Default Rate	It was denoted by the NPL ratio; (Non-Performing Loans/ Outstanding Loans and Advances) (Thygerson, 1995).
Lending Interest Rate	It was denoted by the Weighted Average Lending Rate$((\sum Li*Iri)/TL))$ (Ngumi, 2014).
Economic Growth	It was denoted by changes in GDP; $(GDPt+1 - GDPt)/ GDPt$ (Liu& Ryan, 1995).
Inflation	It was denoted by the CPI (Mishkin & Adam, 1995).
Exchange Rate Fluctuations	the changes in the KES/USD exchange rate; $(KES/\$t+1 - KES/\$t)/ KES/\$t$ (Kandil & Mirzaie, 2002).

3.4.5 Tests of Significance

In this study the confidence interval adopted was of 95%. Statistically, the findings were significant at the 0.05 level, which means that in order for a value to be significant it ought to be below the 0.05 significance level. In order to draw conclusions about the model's accuracy in forecasting loan default rate, a statistical inference model was applied. The overall model was tested for significance at the confidence level of 95%. Significance values were also applied in explaining the association amongst all the independent variables and dependent variables and further showed the standard errors and the deviation from the tested values.

CHAPTER FOUR: DATA ANALYSIS, RESULTS, AND INTERPRETATION

4.1   Introduction

The present chapter dwells on the analysis of data, discussion and interpretation of the findings obtained in the study. It is divided into several parts comprised of descriptive statistics, diagnostic tests, correlational analysis, regression analysis as well as interpretation and discussion of findings.

4.2   Descriptive Statistics

Descriptive statistics was undertaken to describe the data collected for each variable. The descriptive data was undertaken by the use of central tendency measure that involves the standard deviation and the mean. The variable is also expressed in terms of the maximum and the minimum, the kurtosis and skewness are also expressed as indicated in table 4.1.

Table 4. 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std . Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Loan Default Rate	80	3.40%	39.40%	13.5926%	11.73640%	1.321	.269	.129	.532
Lending Interest Rate	80	11.84%	20.21%	15.1065%	2.47382%	.665	.269	-.833	.532
Economic Growth	80	-5.70%	11.60%	4.6762%	2.71877%	-1.266	.269	2.780	.532
Inflation Rate	80	1.96%	29.30%	8.6932%	5.68625%	1.902	.269	3.878	.532
Exchange Rate Fluctuations	80	-8.72%	13.18%	0.4640%	3.36798%	.572	.269	3.063	.532
Valid	80								

Source: Author (2021)

Loan default rate is the dependent variable of the study in which the mean was 13.59% with a high standard deviation of 11.74%. The period with the highest loan default rate recorded 39.4% while the lowest loan default rate was 3.4%. The data is positively skewed with almost zero kurtosis that indicates a rather normal distribution.

Lending interest rate indicated the interest rates that were used by commercial banks to give loans to borrowers. The mean of the independent variable was 15.11% with a standard deviation of 2.47%.

20.21% was the maximum value while 11.84% was the minimum value. The variable

records skewness of .665 with a negative kurtosis of -.833 but all the same they were close to zero.

Economic growth represents the change in real GDP that had a mean of 4.68% with a standard deviation of 2.72%. The maximum economic growth was 11.6% while the minimum was a decline of economic growth of -5.7%. The skewness was -1.266 while the kurtosis of the variable was 2.78.

Inflation rate on the other hand had a mean of 8.7% with a standard deviation of 5.69%. The maximum inflation rate for the study period was 29.3% with the minimum inflation rate being 1.96%. The skewness of the variable was 1.902 and a kurtosis of 3.88.

Exchange rate fluctuation was determined by the changes in exchange rate denoted by the value of Ksh required to be exchanged for 1 USD. 0.46% was the mean fluctuation with 3.37% standard deviation. The maximum fluctuation was 13.18% while the minimum fluctuation was -8.72%. The variable had almost zero skewness but a sharper kurtosis of 3.063.

4.3 Diagnostic Tests

Diagnostic tests are carried out in order to ensure that the assumptions undertaken for analysis are complied with. This means that the diagnostic tests are pretested before the main analysis is undertaken to ensure that the data collected meets the relevant conditions for undertaking the analysis. Data that does not comply to the relevant condition is treated to ensure that it meets the conditions before a certain test is prescribed on the data. The diagnostic tests that were undertaken in this study were

linearity test, normality test, homoscedasticity test, tests of autocorrelations, multicollinearity tests, stationarity tests, optimal lag tests and model specification tests.

4.3.1 Linearity Test

The linearity assumption means that data is capable of being represented in a linear format. It suggeststhat the characteristics of data collected from the variables can easily be fitted in a line. The scatterplot graph was used in the determination of linearity, homoscedasticity as well testing for autocorrelations. Data is therefore judged to be linear, when the distribution of residuals are randomly distributed, in the scatterplot graph, such that negative and positive residuals are uniformly distributed and there is no appearance of bias or pattern that suggests that residuals are more positively or negatively aligned.
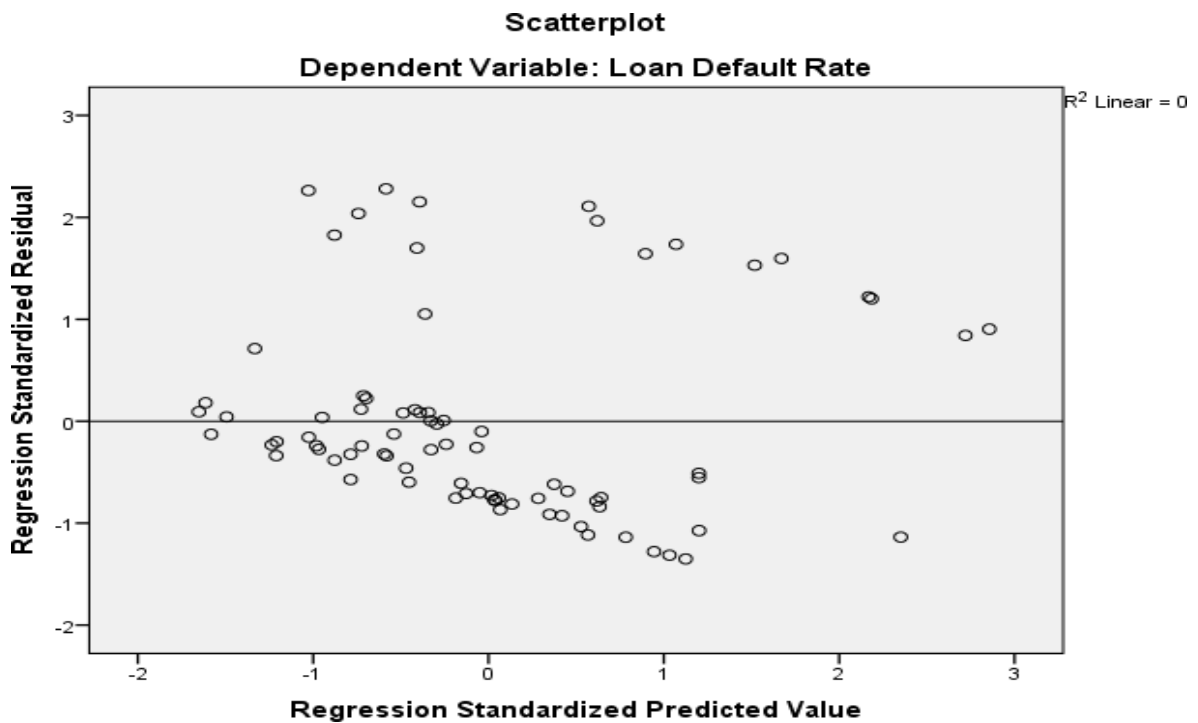
Figure 4. 1: Scatterplot

The scatterplot indicates that there appear to be slight bias on the negative side as there is more data points than the positive side. However, there is randomness that suggests that data is linear and may be expressed in a linear format.

4.3.2 Normality Test

Shapiro-Wilk test is used to test normality. The assumption is that data had to be approximately normally distributed which means that the data distribution for each independent variable has to have normal curve shape. The test may be undertaken by normal plots where the distribution of data is checked whether it is bell-shaped. Shapiro-Wilk test is also used where the p-value for each independent variable should be greater than 0.05. The independent variable that is not normally distributed means that the data has to be transformed in order to ensure that the normality assumption has been observed.

Figure 4. 2: Histogram
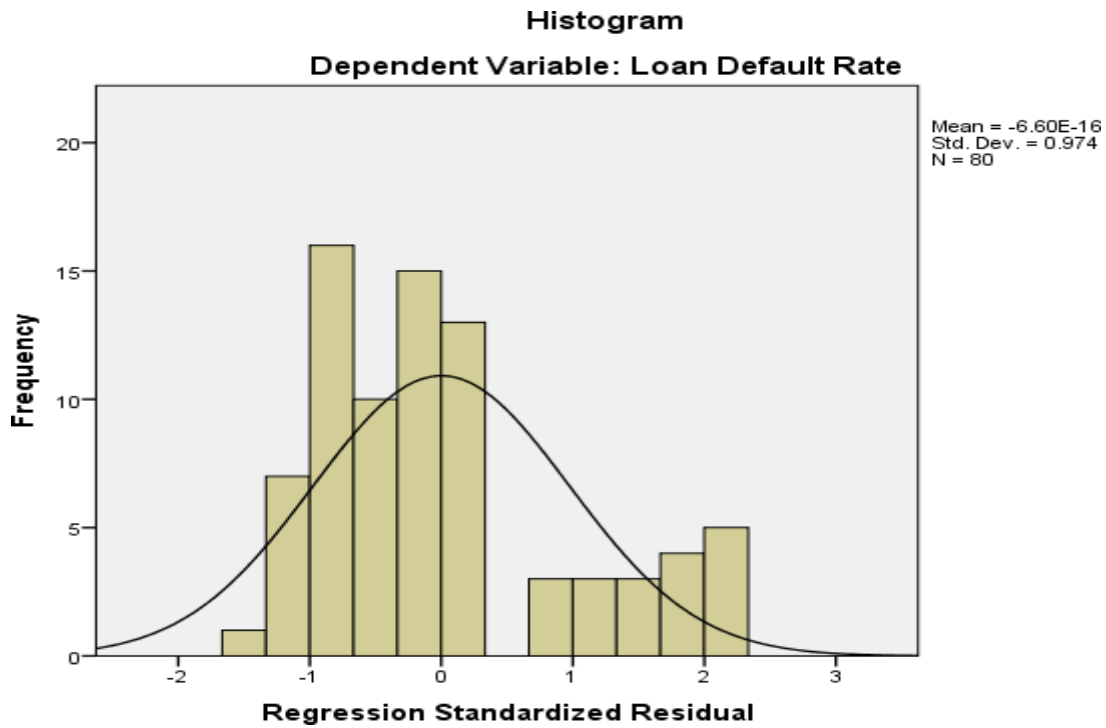
The histogram in figure 4.2 indicates that the data is slightly normally distributed. In order to test the normality for each independent variable, Shapiro-Wilk test was undertaken as indicated in table 4.2

Table 4. 2: Normality Test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Lending Interest Rate	.183	80	.000	.900	80	.000
Economic Growth	.160	80	.000	.891	80	.000
Inflation Rate	.186	80	.000	.799	80	.000
Exchange Rate Fluctuations	.142	80	.000	.933	80	.000

a. Lilliefors Significance Correction

The Shapiro-Wilk test indicates that the p values for each independent variable and therefore data foreach independent variable is not normally distributed. The data was therefore transformed, where thestandardized value for each independent variable was used in the analysis. The study also ensure thatnon-parametric tests were preferred in undertaking study analysis.

4.3.3 Test for Homoscedasticity

Table 4.3 summarizes the homoscedasticity test that was employed in this study for all predictor variables. The findings were determined using the Breusch-Pagan test. There is no formal Breusch-Pagan heteroscedasticity test in SPSS. However, there is a more complicated way to go about it. The standardized and unstandardized residuals are saved and transformed by finding the squares of them, and the resulting variable is then regressed with all of the study's predictor factors. The Breusch-Pagan test is the outcome of the Variance output Analysis.

Table 4. 3: Test for Homoscedasticity

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	204479.394	4	51119.849	2.289	.068[b]
	Residual	1674995.969	75	22333.280		
	Total	1879475.363	79			

a.   Dependent Variable: Ressquare

b.   Predictors: (Constant), Exchange Rate Fluctuations, Economic
Growth, Lending Interest Rate, Inflation Rate

Table 4.3 shows that the p value is greater than 0.05 and as a result the study failed to reject the null hypothesis which is there is no heteroskedasticity in the

data. The data was therefore found to be homoscedastic in nature.

When the Breush-Pagan Test is undertaken in Stata the Results are as indicated

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance
Variables: Lending Interest Rate Economic Growth Inflation Rate Exchange Rate
Fluctuations

$chi^2(4)$ = 8.33

$Prob > chi^2$ = 0.0801

The null hypothesis of Breush-Pagan Test indicates that there is no heteroscedasticity in the data. The p value is greater than 0.05 (value of 0.0801) that indicates that the results fail to reject the null hypothesis and therefore data is homoscedastic.

4.3.4 Test for Multicollinearity

Multicollinearity is tested in order to determine that there isn't any significant impact between the independent variables. Independent variables are expected to remain independent among themselves and therefore should not indicate significant correlation between themselves. Variation Inflation multi-collinearity is tested by the use of factors (VIF) where the rule of thumb suggests that VIF varying 1 to 10 indicates that there is no multicollinearity, while VIF values above 10 indicates that there exists multicollinearity between the study variables. Tolerance is also used to test multicollinearity, where value of more than 0.1 indicates that there is no multicollinearity where multicollinearity is assumed to exists when the Tolerance below 0.1. Table 4.4 shows the results for VIF and tolerance and indicates that there isn't multi-collinearity among all the independent variablesof the study.

Table 4. 4: Multicollinearity Statistics

Collinearity7 Statistics7

Model7		Tolerance7	VIF7
1	Lending Interest Rate	.947	1.056
	Economic Growth	.984	1.016
	Inflation Rates	.927	1.079
	Exchange Rate Fluctuations	.948	1.055

a. Dependent Variable: Loan Default Rate

4.3.5 Tests for Autocorrelation

The result on the autocorrelation test carried out using the Durbin-Watson Statistic is presented on Table 4.5.

Table 4. 5: Autocorrelation Test

Model	Durbin-Watson	M o d
1	.120	

el Summary[b]

a.   Predictors: (Constant), Exchange Rate Fluctuations, Economic Growth, Lending Interest Rate, Inflation Rate

b.   Dependent Variable: Loan Default Rate

The Durbin-Watson statistic has a range of 0 to 4 points. A value of 2 is displayed if there is no association between variables. A positive autocorrelation exists if the values fall below point 0 up to a point less than 2, and a negative autocorrelation exists if the values fall below point greater than 2 up to 4. In statistics, numbers that lie within the M1.5 to 2.5 range are regarded reasonably typical, but those that fall beyond the range are cause for worry.

Field (2009), on the other hand, believes that values more than 3 and less than 1 are cause for alarm. As a result, the data throughout this group is sequential manner auto connected since it does not satisfy the threshold of 0.12 for the Durbin-Watson Statistic. As a result, as a cure for synchronization, variables were transformed by normalizing the research variables.

4.3.6 Stationarity Test

Stationarity test was done by the use of Augmented Dickey Fuller test. Stationarity test is done on time series data to indicate whether data is either stationary or non-stationary. Data is stationary if the increase or decrease in the variable is not affected or does not result from the cyclic increase or decrease in data but through a real increase or a decrease in the variable. One of the methods in which stationarity in data is tested is by comparing the R squared with the Durbin Watson Statistic. Data that depicts

presence of stationarity has DW statistic being greater than R squared value. Table 4.5 indicates that DW statistic is 0.12 while R squared is 0.186 that indicates that data is non-stationary.

4.3.7 Model Specification Test

In order to undertake a model specification test, the study used Akaike Information Criteria (AIC) where an objective manner of determining model fits is determined. It is a trade-off between number of parameters added to the model and the incremental number of errors. The model with the better fit has lower AIC values.

Akaike's information criterion and Bayesian information criterion (BIC)

```
-------------------------------------------------------------------------
      Model|   Obs   ll(null)  ll(model)   df      AIC        BIC
           +------------------------------------------------------
         1 |   80   58.38608   66.59976    5   -123.1995  -111.2894
         2 |   80   58.38608   66.59501    4    -125.19   -115.6619
-------------------------------------------------------------------------
            Note:  N=Obs used in calculating BIC; see [R] BIC note
```

The AIC and the BIC model indicates that dropping exchange rate fluctuations variable from the model, the values of AIC and BIC becomes lower and therefore a better model. The study therefore advocated for the drop of the exchange rate fluctuations from the model.

4.4 Correlational Analysis

Coefficient of determination assesses two or more factors in order to control or determine the degree to which the variables' values are linked (Higgins, 2005). Correlation, which spans from -0.1 to +0.1, measures the degree and connectivity of a linear link between two elements (Skeran & Roger, 2009). Because Pearson's correlation is a parametric test, it is often used. However, in this investigation, a non-parametric test will be used. Because the independent variables failed normality tests, Spearman's correlation was used.

			Loan Default Rate	Lending Interest Rate	Econ Growth	Inflation Rate	Exchange Rate

Table 4. 6: Correlations Relations

			Loan Default Rate	Lending Interest Rate	Econ Growth	Inflation Rate	Exchange Rate
Spearman's rho	Loan Default Rate	Correlation Coefficient Sig. (2-tailed)	1.000 .				
	Lending Interest Rate	Correlation Coefficient Sig. (2-tailed)	-.137 .225	1.000 .			
	Economic Growth	Correlation Coefficient Sig. (2-tailed)	-.274* .014	-.115 .310	1.000 .		
	Inflation Rate	Correlation Coefficient Sig. (2-tailed)	-.295** .008	-.128 .260	-.058 .611	1.000 .	
	Exchange Rate Fluctuations	Correlation Coefficient Sig. (2-tailed) N	-.027 .813 80	-.079 .485 80	.120 .288 80	-.008 .946 80	1.000 80

*. Correlation is significant at the 0.05 level (2-tailed).

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

The correlation between the independent variables and the dependent variable is the important correlation and indicates that the microeconomic variables have negative correlations, lending interest rates have a correlation of -.137, economic growth has a correlation of -.274, inflation rate a correlation of -.295, while exchange rate fluctuations correlation of -.027. The findings therefore indicate that increasing macroeconomic variables of interest rates, economic growth. Inflation rate and exchange rate fluctuations have negative correlation against loan default rate. However, all the macroeconomic variables have weak correlations against loan default rate with interest rates and exchange rate fluctuations having insignificant correlations against loan default rate.

4.5 Regression Analysis

The predictor variables connection between the cause and effect used throughout the research with the response variable was assessed using a multiple linear regression model. Because not all variablesused during this research were normally distributed as shown in the Shapiro-Wilk tests, standardization of the data series was performed as a remedy for correcting non-normal distribution. Similarly, since the data series displayed autocorrelation, as displayed in Table 4.5, lagged transformation was applied to the predictor variables as a remedy for autocorrelation. A significance level of 5% was utilized for the analysis of multiple linear regression. The critical value of this study was undertaken at 95% level of confidence where F statistic was applied to determine the effect of macroeconomic variables on loan default rate.

4.5.1 Regression Model

The regression model provides a summary of regression output that indicates the strength of the modelthat is measured by the determination coefficient. R square of the model shows that the model was able to explain 18.6% of the changes in loan default rate, while the other factors that are not includedin the model explain the other 81.4%. The macroeconomic variables are therefore able to explain loan default rate to an extent of 18.6%.

Table 4. 7: Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.431[a]	.186	.142	10.86997%

a.   Predictors: (Constant), Zscore: Exchange Rate Fluctuations, Zscore: Economic Growth, Zscore: Lending Interest Rate, Zscore:

Inflation Rate

b.   Dependent Variable: Loan Default Rate

Source: Author, (2021).

4.5.2 Analysis of Variance

The variance analysis is undertaken by the use of ANOVA where the significance of the impact of macroeconomic variables on the loan default rate is assessed. The p-value determines the significance where a p-value of less than the alpha value of 0.05 indicates that the study should reject the null hypothesis, while the study would fail to reject the null hypothesis if the value of the p-value is greater than 0.05.

Table 4. 8: ANOVA TABLE

ANOVAª

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2019.982	4	504.996	4.274	.004[b]
	Residual	8861.719	75	118.156		
	Total	10881.701	79			

a. Dependent Variable: Loan Default Rate

b.   Predictors: (Constant), Zscore: Exchange Rate Fluctuations, Zscore: Economic Growth, Zscore: Lending Interest Rate, Zscore: Inflation Rate

Source: Author (2021).

Table 4.8 indicates that the p-value is 0.004 which is less than 0.05. It indicates that the null hypothesis should be rejected, and the study would therefore conclude that there is a significant effect of macroeconomic variables on loan default rate.

4.5.3 Regression Coefficients

The regression coefficients are used to indicate the extent to which a unit change in the independent variable would cause on the dependent variable after the independent variable is increased by unit, holding all other

factors constant.

Table 4. 9: Table of Coefficients

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	13.593	1.215		11.185	.000
Zscore: Lending Interest Rate	2.360	1.257	.201	1.878	.064
1 Zscore: Economic Growth	-3.490	1.233	-.297	-2.831	.006
Zscore: Inflation Rate	-2.290	1.270	-.195	-1.803	.075
Zscore: Exchange Rate Fluctuations	-.119	1.256	-.010	-.094	.925

a. Dependent Variable: Loan Default Rate

Source: Author, (2021)

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$
According to table 4.9 the regression model

Is transformed into $Y = 13.59 + 2.36X_1 - 3.49X_2 - 2.29X_3 - 0.11X_4 + 1.215$

This indicates that when all factors are held constant, then lending interest rate is increased by one unit, then loan default rate would increase by 2.36%. This would be expected as increasing lending interest rates would mean that loans would become very expensive and the rate of default would increase significantly.

Economic growth on the other hand if increased by one unit while all the others are

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held constant, loan default rate would decrease by 3.49%. Increasing economic growth implies that there is more goods and services will be produced in the economy and therefore the rate of loan default would be expected to decrease.

Increasing inflation rate on the other hand by one unit would lead to a decrease in loan default rate by 2.29%. This implies that inflation rate would make the existing loans cheaper if they are paid at the prevailing interest rates. This would therefore lead to a decrease in loan default rate.

Increasing exchange rate fluctuations on the other hand would lead to a low decrease in loan default rate. Correlation between exchange rate fluctuation and loan default rate was almost zero, however, the rise in exchange rate would cause a decrease in loan default rate albeit insignificantly.

4.6 Interpretation and Discussion of Findings

This research aimed at establishing the impact of macroeconomic variables on the default rate in the banking industry in Kenya. It specifically focused on unravelling the impact of the lending interest rate, inflation, exchange rate fluctuations on the default rate and economic growth among commercial banks in Kenya. The research findings exhibited that there were weak correlations between macroeconomic variables and loan default rate. The significant correlations at 5% significant level were between inflation rate and economic growth while the correlation between interest rates and exchange rate fluctuations was insignificant. However, the coefficient of determination indicated that the regression model adopted by the study was only able to explain 18.6% of the variations in loan default rate, and hence the other 81.4% was determined by other factors that were not in the model. The study found that there was a significant impact of macroeconomic variables on loan default

rate in Kenya banking sector. This was because the F test that was conducted by the study had a p-value of 0.004.

Lending interest rate revealed a positive effect on loan default rate while economic growth and rate of exchange fluctuations had negative effect on loan default rate. However, the study also established that fluctuation in exchange rates doesn't have a significant correlation with the default rate at the 5% significance level. The individual effect of macroeconomic variables on loan default rate, indicated that rise in interest rates led to an increase in loan default rate. However, the increase in inflation rate, economic growth and exchange rate fluctuations led to a decrease in loan default rate, albeit at insignificant levels for exchange rate fluctuations.

The study finding that the macro-economic variables significantly predict the default rate is in tandem to the Arbitrage Pricing Theory (APT) which implies that the risk profile of financial institutions has a direct connection with business cycle and overall condition of macro economy. Thus, macro- economic factors are theoretically expected to link with the default risk of commercial banks. When the economic factors are indicating boom fewer defaults are expected while more defaults are expected when the economic factors are indicating a recession. The study finding is also congruent to the Credit Portfolio View (CPV) model that argues that the default risks are not independent of the business cycle and that default rates need to consider the status of the economy and the business cycle. The study finding is also in tandem to Tsumake's (2016) assertion that macro-economic factors, which include; inflation, interest rates, economic growth, and currency exchange rate fluctuations can all have an indirect impact on commercial banks loan quality.

The study finding is in agreement with Castro's (2013) assertion that macroeconomic factors such as economic growth, employment rates, exchange rate variation, stock indices and inflation rates affect the systemic credit risk. It is also consistent to Teker, Pala, and Kent's (2013) assertion that main systemic variables in credit risk that include of nine economic factors; Balance of payments, inflation rate, GDP per capita, debt to GDP, fiscal balance, international reserves, export growth rate, exchange rate, financial depth and efficiency and three political factors which are corruption levels, government effectiveness and political stability.

The research finding is not in line with Yam's (2016) research finding that macroeconomic factors significantly impacted on the sustainability of bank performance and the level of NPLs. The research finding is also contrary to Škarica (2014) study that investigated the determinant of variation in the NPLs ratio in a number of European developing markets and study findings established that the main reason of the high NPLs level was the slow-down of an economy, which is demonstrable through large coefficients of GDP, inflation, and unemployment rate.
The research finding is not in tandem with Ofori-Abebrese, Pickson, and Opare (2016) study which focuses on the influence of macroeconomic factors on the loan performance of banks in Ghana. The study findings revealed that the macroeconomic variables had a long-term relationship with loan performance.

The study finding that lending interest rates has a positive correlation that is significant with the default rate is congruent to Curak, Poposki and Pepur (2012) assertion that rise of interest rates results to additional debt obligation and indirectly the level of NPLs. It is also congruent to Tsumake's (2016) assertion that when the real lending rate rises, the real value of the borrowers' debt rises as well, causing debts to

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be more expensive. Banks charging high interest are consequently exposed to higher rate of defaults. However, the study finding that lending interest rates do not have a significant influence to the default rate contradicts these assertions.

The study finding that lending interest rates has a significant positive correlation with the default rate is congruent to Mesai and Jouini (2013) explored the determinants of NPLs in three European countries, which entailed Italy, Greece, and Spain. The study findings established that that NPLS differ directly with the lending rates. The study finding is also in tandem to Gitonga's (2014) study which investigated the how macroeconomic factors affect credit risk of commercial banks in Kenya banking industry. The study findings indicated that interest rates had a positive and significant impacton credit risk. The study did not include economic growth as one of the macro-economic variables thus presenting a conceptual gap. Finally, the current study finding supported the study finding of thestudy carried out by Onchomba (2014) which evaluated the link between macro-economic factors and Kenyan mortgage firms' NPLs. The study finding indicated that high rate of real interest rate significantly increased non-performing loans. However, the study finding that interest rates of lendingdo not have any significant relationship with the default rate contradicts these assertions.

The study finding that economic growth has a significant negative correlation with the default rate is congruent to Curak, Poposki & Pepur's (2012) assertion that the growth in GDP reflects a conduciveeconomic environment that benefits both business units and households. Incomes of households andbusinesses increase in a conducive economic condition and there is an improvement in the ability of borrowers to settle their debts. The study finding is also in tandem to Steiner (2014) assertion that in the

economic expansion faces, there are minimal NPLs since individuals and companies normally have enough sources of revenues and income enough to enable them service their loans. However, while the booming period prolongs, credit is provided even to lower-quality debtors, and as a result, the NPLs rise when the recession phase begins. However, the study finding that there is no significant relationship between economic growth and the default rate contradicts this assertion.

The study finding that economic growth has negative correlation significance with the default rate is congruent to Mesai and Jouini's (2013) study which explored the NPLs determinants in three European countries, which entailed Italy, Greece, and Spain. The study findings established that NPLS differ inversely with the GDP growth rate. However, the study finding that economic growth doesn't poses a significant relationship with the default rate contradicts this assertion.

The research finding that exchange rate fluctuations do not poses a significant correlation nor relationship with the default rate is not in tandem to Curak, Poposki & Pepur's (2012) assertion that losses on foreign denominated loans, which is common in developing countries financial markets, may be caused by exchange rate and that changes in exchange rates may also affect households and business debt burden due to currency mismatch. The current study is not congruent to the study by Gitonga (2014) which investigated the how macroeconomic factors affect credit risk of commercial banks in Kenya banking industry. The study findings revealed that exchange rate fluctuations had a significant but negative effect on default risk.

The study finding that inflation has a significant positive correlation with the default

rate is congruent to Tsumake's (2016) assertion that high inflation levels increases the capacity of a borrower to repay a loan through reducing the actual value of the outstanding debt. In addition, if salaries or wages remain constant, an increase in inflation can reduce a borrower's loan repayment capacity by reducing real income. Therefore, increment in inflation levels may lead to increase in the inability of borrowers to make payment through reducing the real value of money. However, the study finding that economic growth does not have a significant relationship with the default rate contradicts this assertion.

The study finding that inflation has a significant positive correlation with the default rate is congruent to Agade's (2014) study which examined how macroeconomic factors influence the operational efficiency of the banking sector in Kenya. The conclusion of the study was that there a significant and negative association amongst inflation and the default rate. However, the study finding that economic growth does not have a significant relationship with the default rate contradicts this assertion. The study finding is also not congruent to Gitonga's (2014) which investigated how macroeconomic factors affect credit risk of commercial banks in Kenya banking industry. The study findings revealed that inflation had an inverse and notable impact on credit risk,

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This part contains a summary of the study findings, as well as findings and conclusions for policy planners. In addition, the study's shortcomings are explored, as well as suggestions for further studies.

5.2 Summary

This study focused at establishing the impact of macroeconomic variables on the default rate in the Kenyan banking industry. It specifically focused at unravelling the impact of the lending interest rate, economic growth, inflation, and fluctuation of exchange rate on the default rate among commercial banks in Kenya. The analysis of the collected data and the result interpretation were therefore carriedout in accordance with the stated general and specific goals.

To meet the study's goals, multiple linear regression and correlation analysis were used extensively. Economic growth and inflation are highly connected with the default rate within the 5% significance level, according to the analysis of the correlation utilized in the study. The default rate has a positive significant link with the lending interest rate, but the default rate has a negative significant correlation with economic growth and inflation rate. However, at the 5% significance level, the analysis found that fluctuations in exchange rates do not have a meaningful link with the default rate. Multiple linear regressions revealed that a model incorporating the lending interest rate, economic growth, inflation, and exchange rate variations predicts the default rate of Kenyan commercial banks to the least extent possible, with a co-efficient of

determination of 18.6%. The model, which includes the lending interest rate, economic growth, inflation, and currency rate variations, could not significantly predict the default rate of Kenyan commercial banks, according to the data. However, these macroeconomic variables have a major impact on the loan default rate of Kenyan commercial banks.

5.3 Conclusions

The conclusion of the study is presented in this chapter. The conclusion is produced in accordance with the general and particular objectives of the investigation. The study's main goal was to see how macroeconomic variables affected the default rate in Kenya's banking industry. The goal of this study was to figure out how the lending interest rate, economic growth, inflation, and currency rate variations affect the default rate among Kenyan commercial banks.

Although the model was able to explain 18.6% of the variations in loan default rate, this study came to the conclusion that macroeconomic factors had a major impact on loan default rate. However, according to this study, lending interest rates have a positive significant relationship with default rates, but economic growth and inflation rates have a negative significant relationship with default rates. The study also found that exchange rate fluctuations have no substantial impact on the default rate.

5.4 Recommendations

The findings of this study in terms of macroeconomic factors and the default rate will be useful to those who do future research in the field of finance. The study's findings will be used as a reference for future scholars interested in macroeconomic factors

and the default rate. The report will pique the interest of academics and encourage them to conduct more research on the default rate. Similarly, the paper will serve as a valuable resource for future academics and researchers interested in macroeconomic indicators and default rates. As a result, the research made recommendations to meet the interest in a timely manner.

Because it has been put in place that the loaning money long - term interest rates have a favorable connection with the savings rate, while productivity recovery has a significant direct correlations only with cost of borrowing, governments in the finance sector, primarily the control board, the CBK, and the Treasury, also must concentrate macroeconomic determinants when trying to reduce the default rate. The findings of the study project will be used by major government organizations and agencies to design policies and procedures to enhance the financial sector. The results of this study will be used by the government and other relevant agencies to guide the design and application of relevant policies and regulations.

The study's findings, which show that interbank interest ratio has a significant significant relationship with savings rate while job expansion has a negative significant relationship with default rate, lead to specific suggestions for financial services specialists and consulting firms to measure economic variables in order to regulate monetary expansion and help alleviate credit risk.

5.5   Limitations of the Study

The current study was a formal study that used a deductive research strategy since it was directed by relevant literature and theories in order to further examine the theories

and empirical literature results. The use of theories and past empirical literature helps to provide the framework for understanding the study problem at hand. However, there were no previous studies on the impact of government bond rates on the performance of the equities market section. Due to time and cost constraints, the research was limited to the Kenyan capital markets sector, which does not clearly indicate the current conclusion if other areas of the economy are included.

Despite the fact that this study relied on secondary data, there were a number of significant problems, including the fact that some of the data was not easily available, particularly data on exchange rate variations. As a result, it came at a high price and took a long time to get. Because the data acquired was not used in its original form, it had to be manipulated and more computations were required. There were potential delays as a result of data processing and editing before to compilation.

5.6 Recommendations for Further Study

Exploring the influence of macroeconomic variables on the default rate is critical for financial sector policymakers, particularly the CBK and National Treasury, as well as financial sector practitioners and consultants. The current study, however, was conducted in the setting of commercial banks; the same study may be conducted on other financial institutions as well as across many sectors of the economy to determine if the current study's findings hold true. The current study was conducted primarily in Kenya; however, new research may be conducted in Kenya, Africa, or throughout the world to see if the current findings of the studies are valid. The first and only financial indicators included in this study were the lending dividend yield, income development, prices, and currency rate variations. Other macroeconomic variables may be studied to see if they have an influence on the default rate.

Although this study only used secondary data, it may be followed up by primary data investigations. This might either support or refute the study's conclusions. Multiple linear regressions and correlation analyses were used as statistical analytical tools in this study. Proper quantitative analytic approaches, such as summary analysis, clustered analyses, multidimensional scaling, cointegration test, and determinants analysis, can be integrated into future investigations.

REFERENCES

Agade, R. (2014). *The effect of macroeconomic variables on operational efficiency of the banking sector in Kenya.* Unpublished MBA Project, University of Nairobi.

Ahmad, N. H. & Ariff, M. (2007). Multi-country study of bank credit risk determinants.AIB Capital, (2016). *Banking sector report.* AIB Capital Ltd

Alfred, H., Andreas, D., Rainer, J. & Kilian, P. (2011). Integrating macroeconomic risk factors intocredit portfolio models. *The Journal of Risk Model Validation*, 5(2): 3–24.

Alves, I. (2005). *Sectoral fragility.* European Central Bank.

Amuakwa-Mensah, F. & Boakye-Adjei, A. (2015). Determinants of non-performing loans in Ghana banking industry. *Int. J. Computational Economics and Econometrics*, 5: 35- 54.

Anila, M. (2010). *The influence of the macroeconomic factors on the level of the credit risk inAlbania.*

http://icbme.yasar.edu.tr/eproceedings/Full%20Papers/Anila%20Mancka.pdf.

Anjom, W. & Karim, A. M. (2016). Relationship between non-performing loans and macroeconomic factors with bank specific factors: A case study on loan portfolios in SAARC countries perspective. *Elk Asia Pacific Journal of Finance and Risk Management*, 7(2): 1-29.

Awuor, F. (2015). *Effects of selected bank specific factors on none performing loans amongst commercial banks in Kenya.* Unpublished MBA Project, University of Nairobi.

Babouček, I. & Jančar, M. (2005). *Effects of macroeconomic shocks to the quality of the aggregate loan portfolio.* Czech National Bank Working Paper No. 1/2005: Prague, Czech National Bank.

Bangia, A., Diebold, F.X., Kronimus, A. , Schagen, C. & Schuermann, T. (2002). Ratings migrationsand the business cycle, with applications to credit portfolio stress testing. *Journal of Bankingand Finance*, 26(2-3): 445-74.

Basel Committee on Banking Supervision, (1997). *Risk management practices and regulatorycapital: Cross-sectional comparison.* www.bis.org on 30/6/2015.

Bouvatier, V., Lopez-Villavicencio, A. & Mignon, V. (2012). *Does the banking sector structure matter for credit procyclicality? Economic Modelling*, 29: 1035-1044.

Bucher, M. Dietrich, D. & Hauck, A. (2013). Business cycles, bank credit, and crises.

Caporale, G., Cipollini, A., & Demetriades, P. (2005). Monetary policy and the exchange rate duringthe Asian crisis: Identification through heteroskedasticity. *Journal of International Money andFinance*, 24:39-53.

Carling, K., Jacobson, T., Linde, J. & Roszbach, K. (2002). *Capital charges under Basel II: Corporate credit risk modelling and the macro economy.* Swedish Central Bank Working Paper Series, 142.

Carry, M. (1998). Credit risk in private debt portfolio. *Journal of Finance*, 53(4):

1363-1387.

Castro, V. (2013). Macroeconomic determinants of the credit risk in the banking system: The case ofthe GIPSI. *Economic Modelling*, 31: 672-683.

CBK, (2020). *CBK bank annual supervisory report.* Central Bank of Kenya.

Chege, L. M. & Bichanga, J. (2016). Non-Performing Loans and Financial Performance of Banks:

An Empirical Study of Commercial Banks in Kenya. *International Journal of Managementand Commerce Innovations,* 4(2): 909-916.

Chen, N. (1991). Financial investment opportunities and the macroeconomy. Journal of Finance,46(2): 529-544.

Conford, A. (2000). *The Basel committee's proposals for revised capital standards: Rationale, designand possible incidence.* G-24 Discussion paper series, United Nations, No.3.

Conroy, D. J. (2003). *The challenges of micro financing in Southeast Asia.* Institute of SoutheastAsian Studies: Singapore.

Crouhy, M., Galai, D. & Mark, R. (2000). A comparative analysis of current credit risk models. *Journal of Banking & Finance*, 24: 59- 117.

Curak, M., Poposki, K. & Pepur, S. (2012). Profitability determinants of the Macedonian banking sector in changing environment. *Procedia-Social and Behavioral Sciences*, 44: 406-416. *Economics Letters,* 120: 229-231. *Extra Credit*, (May/June): 4-9.

Fama, E. F. & French, K. R. (1989). Business conditions and expected returns on stocks and bonds. *Journal of Financial Economics*, 25: 23-49.

Friedman, M. (1977). Nobel lecture: Inflation and unemployment. *Journal of Political Economy,* 85(3): 451-472.

Friedman, M. (1992). *Money mischief: Episodes in monetary history.* New York: Harcourt BraceJovanovich.

Frye, J. (2000).*Depressing recoveries.* http://www.chicagofed.org/publications/publicpolicystudies/emergingissu es/index.cf m.

FSD Kenya, (2014). *Annual report 2014*. Financial Sector Deepening Kenya.

Gall, M.D., Gall, J. P., & Borge, W. R. (2006). *Educational research: An introduction.* (8th Ed.),New York; Pearson.

Githaiga, J. W., (2015). *Effects of credit risk management on the financial performance ofCommercial Banks in Kenya.* Unpublished MBA Masters Thesis, University of Nairobi.

Gitonga, W. K. (2014). Effects of macroeconomic variables on credit risk in the Kenyan banking system. *International Journal of Business and Commerce, 3(9): 1-26.*

Gorter, N. & Bloem, M. (2002). *The macroeconomic statistical treatment of Non-Performing Loans.* Publication of the Organization for Economic Corporation & Development.

Grewal, D., Levy, M., & Lehmann, D. (2004). Retail branding and customer loyalty: An overview. *Journal of Retailing 80 (10): 101-116.*

Gurloveleen, K. & Bhatia, B. S. (2015). An Impact of macroeconomic variables on the functioning of Indian Stock Market: A study of manufacturing firms of BSE 500. *J Stock Forex Trad.,* 5:160-176.

Hamisultane, H. (2008). *Modèles de gestion du risque de crédit.* Investment System R&D, Documentn°1.

Helwege, J. & Kleiman, P. (1996). Understanding aggregate default rates of high yield bonds. Hoggarth, G., Logan, A. & Zicchino, L. (2005). Macro stress tests of UK banks. *BIS Papers*, 22: 392– 408.

Jonsson, G., Jon, M., Fridson, S. & Zhong, H. (1996). Advances in default rate forecasting. *Journal of Finance,* 28: 449-470.

Kandil, M., & A. Mirzaie (2002). Exchange rate fluctuations and disaggregated economic activity in the U.S: Theory and evidence. *Journal of International Money and Finance*, 21(1): 1-31.

Keynes, J. M. (1936). *The general theory of employment, interest, and money.* New York: Harcourt,Brace.

Khalid, A.C. (2012). The impacts of assets quality on profitability of private banks in India: A case study of JK, ICICI, HDFC and YES Banks. *Journal of African Microeconomic Review,* 2 (1):1–22.

Klein, N. (2013). *Non-performing loans in CESEE: Determinants and macroeconomic performance.*

IMF Working Paper, WP13/72: International Monetary Fund.

Koopman, S. J. & Lucas, A. (2005). Business and default cycle for credit risk. *Journal of Applied Econometrics*, 20: 311-324.

Kwak, S.Y. (2000). An empirical Analysis of the factors determining the financial crisis in Asia. *Journal of Asian Economics*, 13: 261-83.

Liu, C. C. & Ryan, S. (1995). The effect of bank loan portfolio composition on the market reaction to and anticipation of loan loss provisions. *Journal of Accounting Research 33: 77–94.*

Lyon, J. (1977). *Linguistic semantics: An introduction*. Cambridge, U.K.: Cambridge UniversityPress.

Memmel, C., Sachs, A. & Stein, I. (2012). Contagion in the interbank market with stochastic loss given default, *International Journal of Central Banking*, 8**:** 177– 206.

Merton, R. (1974). On the pricing of corporate debt: The risk structure of interest rates. *Journal ofAccounting Research 33: 77–94*

Messai, A. S. & Jouini, F. (2013). Micro and macro determinants of non-performing loans. Mishkin, F. & Adam, P. (1997). Inflation targeting: Lessons from four countries. *Federal Reserve Bank of New York, Economic Policy Review, 3: 9-110.*

Muriithi, S. M. & Louw, L. (2017). *The Kenyan banking industry: Challenges and sustainability: In managing knowledge and innovation for business sustainability in Africa*. Springer International Publishing.

Murungi, D. U. (2014). Relationship between macroeconomic variables and financial performance of insurance companies in Kenya. Unpublished MBA Project, University of Nairobi.

Nanteza, H. (2015). Economic determinants of non-performing loans (NPLs) in Ugandan commercialbanks. *Taylor's Business Review*, 5(2): 137-153.

Ofori-Abebrese, G., Pickson, R. B. & Opare, E. (2016). Macroeconomic factors and the performanceof loans of commercial banks in Ghana: A case study of HFC Bank. *European Journal of Economics, Finance and Administrative Sciences,* (87): 38-46.

Oloo, O. (2013). *Banking survey 2013*. Think Business Ltd, Nairobi.

Ombaba, M. K. (2013). Assessing the factors contributing to non–performance loans in Kenyan Banks. *European Journal of Business and Management*, 5(32): 155-162.

Onchomba, O. F. (2014). *The relationship between macroeconomic factors and non-performing loans in mortgage firms in Kenya*. Unpublished MBA Project, University of Nairobi.

Patra, B. & Padhi, P. (2016). Determinants of nonperforming assets-bank-specific and macroeconomic factors: A panel data analysis of different group of commercial banksoperating in India. *Theoretical & Applied Economics*,23(4): 215-236

Payne, J. E. (2008). Inflation and inflation uncertainty: Evidence from the Caribbean region. *Journalof Economic Studies, Emerald Group Publishing,* 35(6): 501-511.

Pesaran, M.H., Schuermann, T., Treutler, B.J. & Weiner, S.M. (2005). Macroeconomic Dynamics and Credit Risk: A Global Perspective. *Journal of Money, Credit, and Banking*, 38: 1211- 1261.

Polit, D. F., & Beck, C. T. (2013). *Essentials of nursing research: Appraising evidence for nursing practice*. Lippincott Williams & Wilkins.

Prochniak, M. (2011). Determinants of economic growth in Central and Eastern Europe: The global crisis perspective. *Post-Communist Economies*, 23(4): 449-468.

Quagliariello, M. (2007). *Banks' riskiness over the business cycle: A panel analysis on Italian intermediaries.* Applied Financial Economics 17: 119–138.

Rahman, S. & Serletis, A. (2009). The effects of exchange rate uncertainty on exports.

Rajan, R. & Dhal, S. (2003). Non-performing loans and terms of credit of public sector banks in India:An empirical assessment. *Reserve Bank India Occas. Pap., 24: 81-121.*

Ramasamy, R. & Abar, S. K. (2015). Influence of macroeconomic variables on exchange rates. *Journal of Economics, Business & Management*, 3(2): 276-281.

Rocco, T., & Plakhotnik, M., (2009). Literature reviews, conceptual frameworks and theoretical frameworks: Terms, functions and Distinctions. *Human Resource Development Review 8(1), 120-130.*

Ross, S. A. (1976). The arbitrage pricing theory of capital asset pricing. *Journal of Economic Theory,* 13(3): 341-360.

Sheefeni, J. P. S. (2015). Evaluating the impact of bank specific determinants of non-performing loans in Namibia. *Journal of Emerging Issues in Economics, Finance, and Banking,* 4(2): 1525-1541.

Škarica, B. (2014). Determinants of non-performing loans in Central and Eastern European countries. *Financial theory and practice,* 38(1): 37-59.

Steiner, A. (2014). Reserve accumulation and financial crises: From individual protection to systemicrisk. *European Economic Review,* 70: 126-144.

Teker, D., Pala, A. & Kent, O. (2013). Determination of sovereign rating: Factor based ordered probit models for panel data analysis modelling framework. *International Journal of Economics and Financial Issues,* 3(1): 122-132.

Thorsten, B., Robert, C., Michael, F., Jared, G., Peter, G., John, R., & Mircea, T. (2009). *Banking sector stability, efficiency, and outreach in Kenya.* The World Bank Policy Research WorkingPaper 5442.

Thygerson, K. J. (1995). *Management of financial institutions*. New York: HarperCollins College Publishers.

Tsai, D. H. & Huang, F. W. (1997). Management quality and bank efficiency: Empirical evidence forTaiwanese banks. *Management Review, 18 (3): 35-55.*

Tsumake, G. K. (2016). *What are the determinants of non-performing loans in Botswana* Unpublished Masters Thesis, University of Cape Town

Vasicek, O. (1987). *Probability of loss on loan portfolio*. KMV Corporation. Vasicek, O. (1991). *Limiting loan loss probability distribution*. KMV Corporation. Vasicek, O. (2002). Probabilityof loss on loan portfolio. KMV Corporation.

Virolainen, K. (2004). *Macro stress testing with a macroeconomic credit risk model for Finland*. Bank of Finland, Research Discussion Papers.

Warue, B. N. (2013). The effects of bank specific and macroeconomic factors on non- performing loans in commercial banks in Kenya: A comparative panel data analysis. *Advances in Management & Applied Economics*, 3(2): 20-33.

Wilson, T. (1997a). Portfolio credit risk: Part I. *Risk,* 10(9): 111-117. Wilson, T. (1997b). Portfolio credit risk: Part II. *Risk,* 10(10): 56-61. Wilson, T. (1998). *Portfolio credit risk.* FRBNY Economic Policy Review.

Yam, J. H. (2016). Impact of macroeconomics and bank specifics on non-performing loans and banking sustainability performance. *International Journal of Innovation and AppliedStudies,*18(4): 972-989.

APPENDICES

Appendix I: List of Commercial Banks in Kenya as at 31st December 2020

1. Absa Bank Limited

2. African Banking Corp. Ltd

3. Bank of Africa Kenya Ltd

4. Bank of India

5. Bank of Baroda (K) Ltd

6. Stanbic Bank Ltd

7. Chase Bank (K) Ltd (In Receivership)

8. Citibank N.A.

9. Consolidated Bank of Kenya Ltd

10. Co-operative Bank of Kenya Ltd

11. Credit Bank Ltd

12. Development Bank (K) Ltd

13. Diamond Trust Bank (K) Ltd

14. Dubai Bank Ltd (In Receivership)

15. Dubai Islamic Bank (Kenya) Ltd

16. Ecobank Limited

17. Spire Bank

18. Equity Bank Ltd

19. Family Bank Ltd

20. Guaranty Trust Bank

21. First Community Bank Ltd

22. Gulf African Bank Ltd

24. Habib Bank A.G. Zurich

25. HFC Ltd

26. Imperial Bank Ltd (In Receivership)

27. I & M Bank Ltd

28. Jamii Bora Bank Ltd

29. KCB Bank Kenya Ltd

30. Mayfair Bank Ltd

31. Middle East Bank (K) Ltd

32. M Oriental Bank Ltd

33. National Bank of Kenya Ltd

34. NCBA Bank Kenya

35. Paramount Universal Bank Ltd

36. Prime Bank Ltd

37. Sidian Bank

38. Standard Chartered Bank (K) Ltd

39. SBM Bank (Kenya) Ltd

40. Transnational Bank Ltd

41. UBA Kenya Bank Ltd

42. Victoria Commercial bank Ltd

Source: Kenya Bankers Association Website (2020)

Appendix II: Data Collection Form

Data		Gross Non-Performing Loans	Gross Outstanding Loans and Advances	NPL Rati0	Weighted Average Lending Rate	GD P	Economic Growth	CP I	KES/US D	Exchange Rat eFluctuation s
Year	Quarter									
2010	4									
2011	1									
	2									
	3									
	4									
2012	1									
	2									
	3									
	4									
2013	1									
	2									
	3									
	4									
2014	1									
	2									
	3									

	4									
2015	1									
	2									
	3									
	4									
2016	1									
	2									
	3									
	4									
2017	1									
	2									
	3									
	4									
2018	1									
	2									

	3								
	4								
2019	1								
	2								
	3								
	4								
2020	1								
	2								
	3								
	4								

Appendix III: Research Data

		Default Rate	Lending Interest Rate	Economic Growth	Inflation	Exchange Rate	Fluctuations in Exchange Rates
2020	Q4	0.141	0.119967	-0.014	5.263333	109.1718	0.006219
2020	Q3	0.1364	0.11845	-0.011	4.306667	108.4971	0.018538
2020	Q2	0.1313	0.1192	-0.057	5.31	106.5224	0.017478
2020	Q1	0.1254	0.1219	0.049	6.263333	104.6926	0.021856
2019	Q4	0.1201	0.1235	0.055	5.443333	102.4533	-0.01377
2019	Q3	0.1238	0.12465	0.052	5.033333	103.8833	0.021669
2019	Q2	0.127	0.1248	0.053	5.59	101.68	0.01097
2019	Q1	0.1278	0.124933	0.055	4.396667	100.5767	-0.01473
2018	Q4	0.127	0.125567	0.065	5.606667	102.08	0.013973
2018	Q3	0.125	0.1271	0.066	4.696667	100.6733	-0.00287
2018	Q2	0.1197	0.132367	0.06	3.986667	100.9633	-0.00636
2018	Q1	0.1181	0.136067	0.062	4.49	101.61	-0.01722
2017	Q4	0.123	0.136767	0.051	4.983333	103.39	-0.00042
2017	Q3	0.1045	0.1367	0.044	7.523333	103.4333	-3.2E-05
2017	Q2	0.0991	0.1366	0.044	10.79667	103.4367	0.001194
2017	Q1	0.095	0.136533	0.052	8.77	103.3133	0.013439
2016	Q4	0.073	0.136867	0.072	6.5	101.9433	0.005987
2016	Q3	0.08769	0.16795	0.052	6.333333	101.3367	0.003102
2016	Q2	0.084	0.181467	0.061	5.356667	101.0233	-0.00734
2016	Q1	0.0768	0.179267	0.05	7.023333	101.77	-0.00297
2015	Q4	0.068	0.173467	0.055	7.35	102.0733	-0.01752
2015	Q3	0.0538	0.16295	0.061	6.143333	103.8933	0.070992
2015	Q2	0.0571	0.155733	0.056	6.993333	97.00667	0.056602
2015	Q1	0.0575	0.1562	0.057	5.816667	91.81	0.01962
2014	Q4	0.0544	0.159767	0.056	6.18	90.04333	0.017554
2014	Q3	0.0543	0.15995	0.046	7.543333	88.49	0.012085
2014	Q2	0.0571	0.166767	0.06	7.033333	87.43333	0.012702
2014	Q1	0.0563	0.17	0.052	6.78	86.33667	0.002167
2013	Q4	0.0518	0.1696	0.035	7.423333	86.15	-0.01178
2013	Q3	0.0524	0.16655	0.064	6.996667	87.17667	0.025809
2013	Q2	0.0533	0.1743	0.075	4.366667	84.98333	-0.0175
2013	Q1	0.0502	0.179	0.061	4.076667	86.49667	0.0091
2012	Q4	0.0453	0.183233	0.047	3.53	85.71667	0.013159
2012	Q3	0.046	0.20055	0.05	6.383333	84.60333	-0.00185
2012	Q2	0.0446	0.202133	0.043	11.77667	84.76	0.014604
2012	Q1	0.0433	0.200533	0.042	16.87	83.54	-0.08723
2011	Q4	0.0445	0.1792	0.044	19.18667	91.52333	-0.03507
2011	Q3	0.0481	0.1446	0.061	16.50667	94.85	0.098733
2011	Q2	0.053	0.139033	0.066	13.16	86.32667	0.050118
2011	Q1	0.0601	0.139567	0.075	7.05	82.20667	0.016948
2010	Q4	0.0624	0.1389	0.116	3.843333	80.83667	0.001776
2010	Q3	0.0696	0.1408	0.079	3.333333	80.69333	0.013141

2010	Q2	0.0621	0.144767	0.076	3.676667	79.64667	0.038328
2010	Q1	0.0618	0.1492	0.066	5.033333	76.70667	0.018365
2009	Q4	0.08	0.147967	0.008	5.646667	75.32333	-0.00483
2009	Q3	0.082	0.1383	0.019	7.513333	75.6889	0.009193
2009	Q2	0.087	0.148833	0.021	10.21	74.9994	-0.02797
2009	Q1	0.089	0.147733	0.039	14.17	77.1578	-0.00712
2008	Q4	0.092	0.1444	0.018	18.70333	77.7111	0.061353
2008	Q3	0.074	0.1327	0.032	18.06	73.2189	0.131766
2008	Q2	0.065	0.139933	0.032	17.53333	64.6944	0.029382
2008	Q1	0.045	0.138933	-0.006	10.62667	62.8478	0.004904
2007	Q4	0.034	0.133167	0.056	5.72	62.5411	-0.06615
2007	Q3	0.038	0.12955	0.069	5.436667	66.9711	0.00611
2007	Q2	0.042	0.132833	0.089	2.626667	66.5644	-0.03223
2007	Q1	0.048	0.1366	0.063	3.28	68.7811	-0.00887
2006	Q4	0.05	0.138933	0.052	7.056667	69.3967	-0.04516
2006	Q3	0.057	0.1359	0.058	5.003333	72.6789	-0.01626
2006	Q2	0.061	0.1375	0.0663	4.73	73.88	0.027936
2006	Q1	0.067	0.132667	0.041	8.876667	71.8722	-0.00683
2005	Q4	0.071	0.1302	0.059	4.273333	72.3667	-0.0231
2005	Q3	0.112	0.1293	0.074	7.633333	74.0778	-0.02792
2005	Q2	0.146	0.131067	0.074	14.24	76.2056	0.015848
2005	Q1	0.232	0.124367	0.025	14.32	75.0167	-0.0301
2004	Q4	0.29	0.122033	0.053	35.91956	77.3444	-0.08274
2004	Q3	0.3	0.1223	0.032	34.77876	84.3208	0.062949
2004	Q2	0.32	0.124633	0.05	32.7462	79.3272	0.000715
2004	Q1	0.33	0.132033	0.067	31.45966	79.2705	0.042772
2003	Q4	0.35	0.140967	0.052	30.54666	76.019	-0.0242
2003	Q3	0.3542	0.14815	0.069	30.40485	77.904	0.056727
2003	Q2	0.3598	0.176067	0.04	30.88385	73.722	-0.03736
2003	Q1	0.365	0.1878	-0.017	28.83576	76.583	-0.0371
2002	Q4	0.377	0.182433	0.005	28.07633	79.534	0.009225
2002	Q3	0.3786	0.1813	-0.025	27.88859	78.807	0.001831
2002	Q2	0.3782	0.185367	0.002	27.22362	78.663	0.007751
2002	Q1	0.3786	0.191133	0.047	26.70707	78.058	-0.00799
2001	Q4	0.379	0.1989	0.032	27.28455	78.687	-0.00328
2001	Q3	0.381	0.1949	0.062	27.36856	78.946	0.004147
2001	Q2	0.394	0.196867	0.063	26.7391	78.62	0.011151
2001	Q1	0.394	0.201967	0.022	26.38487	77.753	-0.01295
2000	Q4					78.773	