EFFECT OF SELECTED FACTORS ON NON-PERFORMING AGRICULTURAL LOANS IN COMMERCIAL BANKS IN KENYA

BOIYON GEOFFREY KIBET

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DECLARATION AND RECOMENDATIOS

Declaration

This research project is my original work and has not been presented for the award of any degree, diploma, or certificate in this or any other institution of higher learning.

Signature…………….............   Date………………………………

Boiyon Geoffrey Kibet

CM11/0515/09

Recommendation

This research project has been submitted for examination with our approval as the University Supervisors.

Signature…………………………   Date……………………………

Dr. Richard Nyaoga

Department of Accounting, Finance & Management Science,

Egerton University, Kenya.

Signature…………………………   Date……………………………

Mr. Robert Kingwara,

Department of Accounting, Finance & Management Science,

Egerton University, Kenya.

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DEDICATION

This research project is dedicated to Mum, Wife, Daughters Michelle & Shirleen, my son Roy and my late Dad for their belief in the value of education.

ACKNOWLEDGMENTS

ABSTRACT

Commercial banks play a crucial role in the agricultural sector in advancing affordable credit to improve their productivity, enhancing their food security, and expanding their income. Financing of the sector however continues to get the lowest levels of credit in Kenya compared to other sectors due to poor loan repayment. The objectives of the study were to establish the effect of Gross Domestic Product, determine the effect of real effective exchange rate; determine the effect of lending rate on agricultural non-performing loans, and to assess the effect of growth in loan portfolio on agricultural Non-performing Loan. Secondary data relating to commercial banks' lending to the agricultural sector for a period of 7 years from 2011 to 2017 were collected and using Statistical Package for Social Science computer software to carry out regression analysis procedure, correlation, and descriptive statistics. The portfolio at risk was used as a proxy to Non-preforming agricultural Loans and calculated by dividing the amounts in default by the outstanding loans. Results showed a general increase in the real Gross Domestic Product, gross agricultural loans, and real effective exchange rate over the study period and a decrease in the loan portfolio and the lending rates. Agricultural Non-Performing Loans had a strong positive correlation with real Gross Domestic Product (0.836, p<0.001), the real effective exchange rate (0.865, p<0.001), and a weak inverse correlation with the average bank lending rate (-0.48, p<0.01). Regression analysis generated an adjusted R^2 of 0.783 indicating that about 78.3percent of the variation in the dependent variable is due to independent variables and this was significant (df=4, F=25.393, P<0.001). A significant positive relationship between real Gross Domestic Product and Non Performing Agricultural loans suggests that with growth in the economy, non-performing loans go up that could lead to scaling down of the borrowing and the quality of agricultural loans which are dependent on the aged loan portfolio. An increase in new loans advanced showed lower Portfolio at Risk attributed to the increase in the denominator in its computation reduced percentage portfolio at risk. The cost of credit did not have a significant effect on agricultural Non-Performing Loans. It is therefore concluded that commercial banks to pay attention to the two factors (real Gross Domestic Product and real effective exchange rate) when providing loans to the agricultural sector to reduce the level of impaired loans. Equally Commercial banks should trade with high prudence to curb a possible impairment due to reckless lending and over-estimation of the borrower's ability to pay back.

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ASAL   Arid And Semi-Arid Lands

ASDS   Agriculture Sector Development Strategy

CFA   Communauté financière d'Afrique ("Financial Community of Africa")

CBK   Central Bank Of Kenya

CGAP   Consultative Group To Assist The Poor

DFI   Development Finance Institution

DRU   Debt Recovery Unit

EU   European Union

FSA   Financial Services Associations

GCC   Gulf Cooperation Council

GDP   Gross Domestic Product

IFC   International Finance Corporation

KDA   K-Rep Development Agency

KNBS   Kenya National Bureau Of Statistics

K-REP   Kenya Rural Enterprise Programme

KES   Kenya Shillings

MDG   Millennium Development Goals

MES   Micro-Enterprises

MFI   Micro-Finance Institutions

MSES   Micro And Small Enterprises

NEER   Net Effective Exchange Rate

NGO   Non-Governmental Organizations

NPL   Non-Performing Loan

OECD   Organization For Economic Co-Operation And Development

PAR   Portfolio At Risk

SACCO   Savings And Credit Cooperative Organizations

SMES   Small And Medium Enterprises

SRA   Strategy For Revitalization Of Agriculture

VAR   Vector Autoregression

INTRODUCTION

1.1   Background of the Study

The importance of commercial banks in agricultural lending cannot be denied. Commercial banks act as financial intermediaries between savers and borrowers leading to enhanced productivity and investment in the economy. The Kenyan economy depends on the agriculture sector, contributing 26 percent of the Gross Domestic Product (GDP) directly and another 27 percent of Gross Domestic Product indirectly through linkages with other sectors. The sector employs more than 40 percent of the total population and more than 70 percent of Kenya's rural people. Agriculture in Kenya is large and complex, with a multitude of public, parastatal, non-governmental organizations and private sector reports that agriculture directly contributes about 26 percent of the gross domestic product (GDP) annually and 25 percent indirectly. The sector accounts for 65 percent of the export earnings, and provides the livelihood (employment, income, and food security needs) for more than 80 percent of the Kenyan population and contributes to improving nutrition through the production of safe, diverse and nutrient-dense foods (Chipeta *et al*., 2015).

The sector is also the main driver of the non-agricultural economy including manufacturing, providing inputs and markets for non-agricultural operations such as building and construction, transportation, tourism, education, and other social services. The national food and nutrition policy predicts the goal of food self-sufficiency relies entirely on agriculture. In the Kenya vision 2030, agriculture has been identified as one of the six key sectors that are expected to deliver the 10 percent annual economic growth target. Agricultural development has particular and direct significance in attaining the first Millennium Development Goal (eradicating extreme poverty and hunger) and the seventh Millennium Development Goal (ensuring environmental sustainability). It forms the economic base for the majority of the poor in Africa and it constitutes a key economic sector for most of the developing sub-Saharan countries (Bellotti and Ye, 2019).

Despite the importance that agriculture plays in Kenya's economy, the sector is impacted by many factors, many of which constrain its performance. Among the many challenges are limited capital and access to affordable credit. Neglect of the agriculture sector by many countries is of utmost concern; because of several factors, including a "bias" by some countries against agriculture in favour of manufacturing, lack of finance, and other resources (UN,2009).

The agriculture sector received only an average of 4.04 percent of the total credit extended to the economy between the years 2000 and 2015 which is below Maputo declaration which required governments to allocate at least 10 percent national budgetary resources to agriculture and rural development policy implementation (Ali, 2015).

According to the Central Bank of Kenya bank supervision report (2015), gross loans and advances increased from Kshs 1.94078 trillion in 2014 to Kshs 2.1653 trillion in 2015 which translated to a growth of 11.57 percent. Despite this growth, most of the money went to personal borrowing as opposed to production sectors like agriculture. According to the report, the banks gave Kshs 551.063 billion to households/personal loans, trade (Kshs 42.362 billion), agriculture (Kshs 87.456 billion) manufacturing (Kshs 266.389 billion) and real estate (Kshs 293.989 billion) during this period under review. It further states, eight out of eleven sectors registered an increase in non-performing loans by Kshs 39.031 billion inclusive of the agriculture sector (CBK, 2016).

Farming in the country continues to get the lowest levels of credit between 4 and 6 percent from the year 2000 to 2015 compared to other sectors of the economy due to high risks associated with it such as drought, floods and the inability of small-scale farmers to provide collateral for their loans (CBK, 2015). Treasury data shows that total loans advanced to the agriculture sector shrunk by Sh13.737 billion in the year 2017 from Kshs 93.712 in 2016 to Kshs 79.975 in 2017 indicating that loan repayments were more than new disbursements. Loans issued to farmers represent less than 3 percent of the Sh1.6 trillion loaned out to the private sector by banks despite it contributing a fifth of the country's GDP (CBK, 2016).

Agriculture has been a source of distress to some lending institutions like Faulu Kenya which wrote off a bulk of loans issued to farmers in North Rift Kenya in 2010 due to defaults and the government-owned Agricultural Finance Corporation. Most of the lend out funds continue to be either difficult to collect or uncollectible altogether, (CBK, 2015). Since agriculture is the mainstay of the Kenyan economy, agricultural lending defaults or delinquency, is a major concern to policymakers because of its unintended negative impacts on agricultural financing. Should the financiers in this sector experience liquidity problems or introduce stringent requirements, the economy will largely stagnate or at worst depress and the country's balance of payments will be unfavourable. Some of the other impacts associated with default include the inability to revolving funds to other borrowers; unwillingness of other financial

intermediaries to serve the needs of small borrowers; and the creation of distrust (Kamau & Mohamed, 2015).

The costs of non-performing loans would also be felt by both the lenders and the borrowers. The lender has costs in delinquency situations, including lost interest, the opportunity cost of principal, legal fees, and related costs (Baku & Smith, 1998). Mucheke (2014) also concurs and adds that nonperforming loans eat into management time, increase administration costs and lead to lost focus whereas attention would be focused on getting more volumes to achieve the stated business objectives; it is shifted to getting the loans repaid.

The poor in the rural set up face a highly diverse range of financial needs and opportunities that need to be addressed effectively. Promoting an efficient, sustainable and widely accessible rural financing system remains a major development challenge in most sub-Saharan African countries (World Bank, 2016).

1.1.1 Agricultural Lending in Kenya

The agricultural sector has been a key driver of economic growth in Kenya for the past four decades and is the main source of livelihood for almost 80 percent of Kenyans (Onguka, 2018). Agricultural lending plays a very important role in society as small–scale farmers can access affordable credit; improve productivity, enhance their food security, and expand their income. Agricultural lending is a situation where farmers have greater engagement with the financial markets either to finance inputs, outputs, or both (Onguka, 2018).

Several institutions provide credit to the agriculture sector in Kenya. These include commercial banks; non-bank financial institutions and multilateral organizations. Commercial banks in Kenya are licensed and regulated according to the provisions of the Banking Act (Cap 488) and the regulations and prudential guidelines issued by the Central Bank of Kenya. The main commercial banks involved in agriculture lending and savings mobilization in Kenya are; Kenya Commercial Bank, Equity Bank, Transnational bank, Family bank, chase bank, Cooperative bank, Jamii Bora Bank, Diamond trust bank, CFC Stanbic bank and Sidian bank. Other institutions include development financial institutions (DFI) like AFC, rural SACCOs, FSA's, and MFI's. MFIs fill some of this financial gap with credit facilities to poor people, mainly based on the Grameen Bank group-based model (Safavian & Zia, 2018).

The existing financial products and methodologies do not allow the agriculture sector to have extensive reach as the need for the services demands despite huge investment in the financial sector in Kenya. For most Banks, financing agriculture is a high-risk activity because of low profitability in the sector, high nominal inflation, problems with collateral because of uncertain property rights, ineffective land markets, and the lack of well-established relationships between farmers and new producers.

Low farm profitability is a key factor in agricultural and rural finance problems, restricting the demand for and supply of credit in transitional economies. The existence of high levels of non-performing loans in the banking industry in Kenya negatively affects the level of private investment, impair a bank's ability to settle its liabilities when they fall due and constrain the scope of bank credit to borrowers (Von Pischke & Adams, 1980).

1.1.2   Concept of Loan Delinquency and Non-Performing Loans

A loan is delinquent when a payment is late. A delinquent loan becomes a defaulted loan when the chance of its recovery becomes minimal. Delinquency is measured because it indicates an increased risk of loss, cautions of operational problems and may help to foretell how much of the portfolio will eventually be lost because it never gets repaid. There are three broad types of delinquency indicators: collection rates which measure amounts paid against amounts past due; arrears rates measures overdue amounts against total loan amounts; and portfolio at risk rates which measures the outstanding balance of loans that are not being paid on time against the outstanding balance of total loans (Aidoo & Mensah, 2018).

A loan is non-performing when a payment is late. It is a situation when payments of interests and principal are past due by 90 days or more, or at least 90 days of interest payment have been capitalized, refinanced or delayed by agreement, or payments are less than 90 days overdue or when there are other good reasons to doubt that payment will be made in full (Ball, 2019). Non-Performing Loans can be treated as undesirable outputs or costs to loaning banks which decreases the bank's performance. Hennie and Sonja (2009) define non-performing loans as assets not generating income. This is when the principal or interest is due and left unpaid for 90 days or more. Loan defaults are inevitable in any lending. What banks do is to minimize the risk of defaults (Werhane *et al.*, 2019).

According to the Central Bank of Kenya supervisory report (2015), loan book quality registered a decline with the non-performing loans (NPL) ratio increasing from 5.2 percent in December 2013 to 5.6 percent in December 2014 and 6.8 percent in 2015. The non-performing loans (NPL) increased by 36 percent to Kshs. 147.3 billion in December 2015 from Kshs. 108.3 billion in December 2014 and 32.4 percent to Kshs. 108.3 billion in December 2014 from Kshs. 81.8 billion in December 2013. This is against a raft of measures that the commercial banks have instituted to tame the runaway delinquency. Agricultural gross non-performing loans against gross agricultural loans stood at 5.8 percent way above the banking gross Non-Performing Loans of 5.6 percent in 2014.

1.1.3 Agricultural Lending and Non-Performing Loans

There is no global standard to define NPL at the practical level. Variation exists in terms of the classification system, the scope, and contents. A Non-Performing Loan is a loan that is in default or close to being in default. A loan is non-performing when payments of interests and principal are past due by 90 days or more, or at least 90 days of interest payment have been capitalized, refinanced or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons to doubt that payment will be made in full (IMF, 2009). NPLs can be treated as undesirable outputs or costs to loaning banks which decreases the bank's performance. Hennie and Sonja (2009) define NPLs as assets not generating income.

The relationship between agricultural lending and commercial banking can be said to be inter-related: farming community requires credit to increase agricultural productivity while the Commercial Bank's primary source of revenue is from lending activities. Many studies have pointed out that enhancing access to farm credit accelerates technological change, stimulates national agricultural productivity as it increases farm input consequently improving farm income. Macroeconomic and bank-specific factors coupled with agricultural market sensitivity directly or indirectly affect both the borrower's repayment capacity and the value of the bank's collateral (Onguka *et al*., 2018).

There has been a general perception among banks that credit exposure to the agricultural sector contributes to a bank's failure or its success (Onguka *et al*., 2018). Study by Sharma and An, (2018) proved that credit exposure to farmers does not necessarily contribute to failures in the banking industry because loans are negotiated in a competitive environment and thus banks have learned to employ credit risks model to hedge against defaults . The findings of their study

challenged the bank's view of agricultural lending and subjectivity of their lending processes. They posit that banks should improve the accountability of lending officers instead adopting a theoretically-driven approach without looking at the salient issues that would otherwise be hidden when making lending decision.

However, any limitation, when added to irregular availability of loans, affects the performance of bank loans. Examining non-performing loans, Klein (1999) explains that the performance of banks is measured in terms of loan disbursements rather than in several small-farmer borrowers. Research has shown that agriculture is a risky sector and this can be demonstrated by the factors associated with agricultural lending: - lower loan repayment, longer distance to serve farmers, poor infrastructure, and little knowledge about heterogeneous farm households (Ascui & Cojoianu, 2019).

1.1.4 Commercial Banks in Kenya

As of 31st December 2017, the banking sector comprised of forty-three commercial banks, and one mortgage finance company. Out of the forty-three banking institutions, forty are privately owned while the Kenya Government had majority ownership in three institutions and three banks are under receivership/or statutory management (CBK, 2017). Commercial banks in Kenya are licensed and regulated according to the provisions of the Banking Act (Cap 488) and the regulations and prudential guidelines issued by the Central Bank of Kenya.

Kenya's financial sector has grown significantly in size and complexity as it continues to support the overall economy and contribution to overall Gross Domestic Product (GDP) Banks have diversified their products and services such as, loans, debit and credit cards, electronic banking, mobile banking, agency banking and automated teller machines due to the stiff competition within and outside the sector (Masinde, 2017). Innovations in the banking sector has driven competition a notch higher with products more inclined to virtual platforms. Mobile money and online banking has grown tremendously in the past decades. Financial inclusion and access to loans has also increased but yet to realise the full potential because of the slow adoption of the virtual technologies by the larger population especially in the rural areas. Most rural population are unbanked and when they are, their revenues are either intermittent or inadequate to be channeled to the formal financial system. Due to this, innovations like mobile money tend not to be available to the many would be beneficiaries due to lack of cash flows in their account which is a key considerations in the virtual platforms.

Causes and treatment of Non-Performing loans were studied in detail by Gorter and Bloem (2001). They agreed that "bad loans" may considerably rise due to abrupt changes in interest rates. A study conducted by Espinoza and Prasad (2010) focused on macroeconomic and bank specific factors influencing non-performing loans and their effect in Gulf Cooperation Council Banking system. After a comprehensive analysis they found that high interest rates increase Non-Performing loans but the relationship was not statistically significant. Salas and Saurina (2002) find a negative relationship between bank size and Non-Performing Loan and argue that bigger size allows for more diversification opportunities. Hu and Philips (2004), report similar empirical evidence.

Recognizing that the agricultural sector is the backbone of the Kenyan economy, most banks have focused their products on smallholders' farmers and other agricultural value chain actors as a segment of its target market. Commercial banks active in agricultural financing in Kenya are Kenya Commercial Bank, Equity Bank, Transnational bank, Family bank, SBM, Cooperative bank, Jamii Bora Bank, Diamond trust bank, CFC Stanbic Bank, and Sidian bank, amongst others. These are banks that have at least 20 percent of their loan portfolio in the agricultural sector (CBK, 2017). However, the existence of high levels of Non-performing loans (NPL) in the banking industry in Kenya negatively affects the level of private investment, impair a bank's ability to settle its liabilities when they fall due and constrain the scope of bank credit to borrowers (Boermans & Willebrands, 2018).

1.1.5 The Effect of Non-Performing Loans on Profitability

Performance in terms of profitability is a benchmark for any business enterprise including commercial banks. However, increasing Non-performing Loans have a direct impact on profitability of banks by diluting returns on assets. Non-performing loans therefore have negative effect on return on Assets (ROA), a measurement of profitability. Non-performing loans eat away banks' profitability as it makes banks to incur huge loan loss provision. Nonperforming Loans Assets have opportunity costs, in that the non interest earning assets could have been invested elsewhere and provide incremental earnings. Further, provisions for losses on non-performing loans affect the profitability as there are costs associated to attempts to recover bad loans. Managers however, can use provisions for losses on non-performing loans for their own objectives which could include, use for profits smoothening ass supported by asymmetry of information theory and agency theory.

Berger *et al*. (1997) in study of Problem Loans and Cost Efficiency in Commercial Banks linked Problem Loans with Cost efficiency, which in turn affects profitability. Non–performing loans can be treated as undesirable outputs or costs to a loaning bank, which decrease the bank's performance (Chang, 1999). According to Kroszner (2002), non-performing loans are closely associated with banking crises. Batra (2003) noted that in addition to the influence on profitability, liquidity and competitive functioning, NPL also affect the psychology of bankers in respect of their disposition of funds towards credit delivery and credit expansion. Focus on Nonperforming loans leads to the credit risk management assuming priority over other aspects of bank's functioning Batra (2003). The bank's whole machinery would thus be pre-occupied with recovery procedures rather than concentrating on expanding business. Thus non-performing Loans impact the performance and profitability of banks. The most notable impact of Non-performing Loans is change in banker's sentiments which may hinder credit expansion.

Banks may incline towards more risk-free investments to avoid and reduce riskiness, which is Not good for the growth of economy. Michael *et al*. (2006), emphasized that non-performing Loan portfolio affect operational efficiency which in turn affects profitability, liquidity and solvency position of banks.

1.2   Statement of the Problem

Commercial banks play a crucial role in the agricultural sector in advancing affordable credit to improve their productivity, enhancing their food security, and expanding their income (Maloba, 2018). Financing of the sector however continues to get the lowest levels of credit in Kenya compared to other sectors due to poor loan repayment. According to the Central Bank's supervision report (2014), banking sector loan portfolio quality registered a decline with the non-performing loans ratio increasing from 5.2 percent in December 2013 to 5.6 percent in December 2014. Agricultural gross non-performing loans against gross agricultural loan portfolio stood at 5.8 percent way above the banking gross non-performing Loans of 5.6 percent in 2014. The increasing non-performing agricultural loan in the Commercial Banks lending to the sector has had a tremendous effect on the system as it discourages the refinancing of the defaulting members, which puts the defaulters once again into a vicious circle of low productivity (Sileshi *et al*., 2012).

Whether the default is random or influenced by the performance of the economy, the cost of loans, growth of the loan portfolio advanced to this sector, or exchange rates needed empirical investigation. This study sought to establish the effect of selected factors: GDP, real effective exchange rate, lending rate, and growth in loan portfolio on loan repayment. The factors were purposively chosen since existing literature looked at the effect of macro-economic factors on the general bank-level Non-performing Loans (Boermans & Willebrands, 2018).

Equally, most of the studies done on the sector were largely in different countries with different agriculture policy dynamics and context (Sileshi *et al*., 2012). There exists very limited literature on the effect of the selected factors on agricultural lending, especially in the Kenya context. The study covered data for 7 years from 2011-2017. This period was chosen to provide an expanded view and dataset that will reliably help the researcher draw a more representative conclusion. The period gives a good frame to examine the effect of the macro-economic factors in different economic environments (Aduda *et al*., 2013).

1.3   General Objective

The objective of this study was to determine the effect of selected macro-economic factors on non-performing agricultural loans among Commercial Banks in Kenya.

1.4   Specific Objectives

The specific objectives from the general study included:

(i)   To determine the effect of Gross Domestic Product on non-performing agricultural loans,

(ii)   To establish the effect of the real effective exchange rate on non-performing agricultural loans,

(iii)   To establish the effect of average lending rate on non-performing agricultural loans,

(iv)   To analyse the effect of growth in loan portfolio on non-performing agricultural loans.

1.5 Hypotheses

The following hypotheses were tested;

H_{01}: Gross Domestic Product has no significant effect on non-performing agricultural loans,

H_{02}: Real effective exchange rate has no significant effect on non-performing agricultural loans,

H_{03}: The average bank lending rate has no significant effect on non-performing agricultural loans,

H_{04}: Growth of agricultural loan portfolio has no significant effect on non-performing agricultural loans.

1.6 Significance of the Study

This study considered an important problem that is of interest to many stakeholders. The Central Bank of Kenya will utilize the results of the study in instituting a policy framework for the lending sector. Portfolio managers in banks will find the study useful also in identifying and taking remedial action on causes of non-repayment of loans and identifying who to lend to; corporate executives in formulating strategies on cash management and policymakers in formulating strategies that will effectively help in identifying control breaches and areas of risk early to employ a firm remedial strategy to minimize impairment of their loan portfolio.

Researchers will also find the study findings useful source of knowledge on agricultural loan portfolio management. Although the study relates to the Kenya situation, nonetheless, other developing countries with comparative economic growth will find the results of the study useful in their agricultural policy formulation. This study was intended to offer insights and lessons that will be directly relevant and useful to donors, investors, financial institutions, and others engaged in promoting financial services to the many millions of poor people dependent on agriculture.

1.7 Limitation of the Study and Delimitation

The researcher used secondary data mainly from published financial statements and Central Bank of Kenya reports which were highly consolidated data. The researcher mitigated against this by collecting disaggregated industry level comparable data to verify the obtained information from the Kenya National Bureau of Statistics. The research study was carried out within a banking sector that has a high level of confidentiality. However, the researcher obtained published reports from the regulatory authorities.

1.8   Scope of the Study

The study sought to establish the effect of four selected factors: GDP, real effective exchange rate, lending rate, and growth of loan portfolio on agricultural loan repayment. The four factors were purposively chosen since there is very limited literature on the effect of the factors on the performance of agricultural lending, especially in the Kenya context. The study focused on agricultural loan portfolio for seven years (2011-2017). This data set was chosen to mitigate the bias that may result from specific bank-related causes of default that may impair an objective generalization for the whole sector lending. This period was chosen to get the most up to date and an expansive data view to help the researcher draw a reasonable conclusion.

1.9   Operational Definition of Terms

Growth of loan portfolio: It is the increase in the diversity of loan products advanced to the agricultural sector by commercial banks.

Lending rate: The amount that a bank charges on money that it lends

Loan default: This term is used in this study to refer to the failure to repay completely either deliberately or due to circumstances beyond the control of the loanee.

Loan delinquency: This is a term used in this study to refer to loan arrears that have become 'past due'. It refers to late payment or falling into arrears when repaying a loan or postponement in recovery.

Loan portfolio: This is simply a collection of loans i.e. loans of different scheme types

Non-performing loan: Non-performing loan is used in this study to refer to a loan that is in default or close to being in default. For this study a loan is deemed non-performing when payments of interest and principal are past due by 90 days or more, or at least 90 days of interest payments have been capitalized, refinanced or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons to doubt that payments will be made in full"

Portfolio at risk (PAR) - It is an index calculated by dividing the amounts in default by the outstanding loans. Portfolio at risk (PAR) was used as a proxy to NPL.

Procyclicality effect: This term has been used in the context of this study to refer to any aspect of economic policy that could magnify economic or financial fluctuations. Some examples of procyclic economic indicators are gross domestic product (GDP), labor, and marginal cost. Policies and fiscal behavior typically fall into procyclic patterns in periods of boom and bust.

CHAPTER TWO
LITERATURE REVIEW

2.1   Introduction

In this chapter, we dealt with theoretical reviews that support this study. The various determinants of non-performing loans were thereafter discussed with a major focus on macro-economic variables. Empirical studies on local and international setups similar to the ones in the current study were then reviewed and the research gap identified before making a summary of the literature review.

2.2   Theories Underlying the Study

Three different theories are supporting the study that is presented below. These are credit risk theory, loan pricing theory and financial theory.

2.2.1   Credit Risk Theory

This theory was put forward by Melton 1974. Melton introduced the credit risk theory otherwise called the structural theory which said the default event is derived from a firm's asset evolution modeled by a diffusion process with constant parameters. Such models are commonly defined "structural models "and based on variables related to a specific issuer. An evolution of this category is represented by the set of models where the loss conditional on default is exogenously specific. In these models, the default can happen throughout all the life of a corporate bond and not only in maturity (Barillas & Shanken, 2018). According to the study of Kau & Keenan (1999), a credit default represents the financial failure of an entity (a person or a company). The theory of credit default, therefore, represents a systematic understanding of the causes which directly lead to the effects associated with credit defaults. The evolution of the credit risk theory is causal framework for credit default hypothesized by Wilson (2007) which states that a credit default is caused by both delinquency and insolvency. Any risk factor can only be considered relevant if it has a demonstrable causal impact on delinquency or insolvency. The theory states that there should be direct causal connections between macroeconomic causes of changing the financial environment and their microeconomic effects on personal or corporate financial conditions. This theory is relevant to the study as it will help in delineating the salient factors contributing to the agricultural non-performing loans. The theory looks at a causal framework of the variables as they relate to each other in a standard environment.

2.2.2   Theory of Loan Pricing

This theory was advanced by Stiglitz & Weiss (1981) .Loan pricing theory holds that banks cannot always set high-interest rates. The theory argues that banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship. If banks set interest rates too high, they may bring adverse selection problems because high-risk borrowers are willing to accept these high rates (Stiglitz & Weiss, 1981).

Once these borrowers receive the loans, they may develop moral hazard behaviour or so-called borrower moral hazard since they are likely to take on highly risky projects or investments (Chodechai, 2004). This explains why it is not feasible for banks to set very high-interest rates with the goal of optimizing profit from loan sales to farmers and other agribusiness investors. The relevance of this theory is that if banks set up very high-interest rates, it could encourage the problem of adverse selection and moral hazard by attracting borrowers with very risky projects which may eventually drive the default rates up (Menkhoff *et al*., 2006).

2.2.3 Financial Theory

This theory was started by Minsky in 1974.It is also known as financial instability hypothesis. It attempted to provide an understanding and explanation of the characteristics of financial crisis. The theory suggests that, in prosperous times, when corporate cash flow rises beyond what is needed to pay off debt, a speculative euphoria develops, and soon thereafter debts exceed what borrowers can pay off from their incoming revenues, which in turn produces a financial crisis. As a result of such speculative borrowing bubbles, banks and lenders tighten credit availability, even to companies that can afford loans and the economy subsequently contracts.

The theory identifies three types of borrowers that contribute to the accumulation of insolvent debt: The "hedge borrower" can make debt payments (covering interest and principal) from current cash flows from investments. For the "speculative borrower", the cash flow from investments can service the debt, i.e., cover the interest due, but the borrower must regularly roll over, or re-borrow, the principal. The "Ponzi borrower" borrows based on the belief that the appreciation of the value of the asset will be sufficient to refinance the debt but cannot make sufficient payments on interest or principal with the cash flow from investments; only the appreciating asset value can keep the Ponzi borrower afloat. According to the financial

theory, in Kenya, a hedge borrower would have a normal loan and is paying back both the principal and interest; the speculative borrower would have a watch loan; meaning loans' principal or interest is due and unpaid for 30 to 90 or have been refinanced, or rolled-over into a new loan; and the Ponzi borrower would have a substandard loan, meaning the payments do not cover the interest amount and the principal is actually increasing. The primary sources of repayment are not sufficient to service the loan. The loan is past due for more than 90 days but less than 180 days. This theory is therefore applicable to this study. This theory is relevant to this study as it puts to light the character and nature of agricultural lenders and the factors that affect their loan repayment abilities.

2.3   Empirical Studies

Keeton and Morris (1987), introduced one of the earliest empirical studies on non-performing loans investigating the causes of loan losses on a sample of 2.500 banks in the USA. Their study showed that a substantial part of the variation in loan losses was due to differences in local economic conditions and to the unusually poor performance of particular sectors like agriculture and energy. On the other hand, only a minor part of the remaining variation in losses can be attributed to bank-level factors, such as banks deliberately taking greater risks and granting loans that they knew had a high probability of default (Keeton & Morris, 1987).

Literature that examines non-performing loans has expanded in line with the interest generated to the understanding of the factors responsible for financial vulnerability. This situation may be attributed to the fact that impaired assets play a critical role in financial vulnerability as evidenced by the strong association between non-performing loans and banking/financial crises in Argentina, East Asia, and Sub-Saharan African countries during the 1990s (Khemraj & Pasha, 2009). This section reviews the existing literature to set the framework to investigate the determinants of non-performing agricultural loans in Kenya. Non-performing loans are amounts advanced by financial institutions that are not earning income and full payment of principal which limits interest anticipation (Chikoko *et al*., 2012). For this study, the researcher reviewed literature that focuses on two macroeconomic factors: Gross Domestic Product and Real effective exchange rates and two bank-specific factors: lending rate and growth in the loan portfolio in the agricultural sector.

Sileshi *et al.* (2012) did a study that examined the determinants of loan repayment performance among smallholder farmers in East Hararghe zone using a two-limit tobit regression model. In

the study area, they found that regional government through and Non-Governmental organizations have extended credit facilities to farming households to narrow the gap between the required and the owned capital to use improved agricultural technologies that would increase production and productivity. However, there was serious loan repayment delinquency in the study area, which discourages the rural finance from promoting and extending credit. The study revealed that of the total sample households 71.4 percent and 28.6 percent households were partial loan defaulters and complete non-defaulters, respectively. The results indicate that agro ecological zone, off-farm activity and technical assistance from extension agents positively influenced the loan repayment performance of smallholder farmers, while production loss, informal credit, social festival and loan-to-income ratio negatively influenced the loan repayment of smallholder farmers.

Past studies on the effect on the selected factors are diverse and vast across the globe as highlighted below.

2.3.1 Gross Domestic Product and Non-Performing Agricultural Loans

The empirical literature on the interaction between the macroeconomic conditions and asset quality is vast and diverse. Evidence from past research studies portrays an inverse relationship between asset quality and economic growth. Existing literature links the phase of the business cycle with lending institutions' stability.

Farhan *et al.* (2012) carried out correlation and regression analysis to analyze the impact of selected independent variables (Interest Rate, Energy Crisis, Unemployment, Inflation, GDP Growth, and Exchange Rate) on the non-performing loans of the Pakistani banking sector. Top 10 Pakistani banks were selected as a sample. According to the results, Pakistani bankers perceive that interest rate, energy crisis, unemployment, inflation, and the exchange rate has a significant positive relationship with the non-performing loans of the Pakistani banking sector while gross domestic product growth has a significant negative relationship with the non-performing loans of the Pakistani banking sector.

Louzis *et al*. (2011), used dynamic panel data methods to examine the determinants of non - performing loans in the Greek banking sector, separately for each loan category consumer loans, business loans, and mortgages. The study is motivated by the hypothesis that both macroeconomic and bank-specific variables have an effect on loan quality and that these effects

vary between different categories of loans. The results showed that, for all loan categories, non-performing loans in the Greek banking system were explained mainly by macroeconomic variables (gross domestic product, unemployment, interest rates, and public debt) and management quality. Differences in the quantitative impact of macroeconomic factors among loan categories were evident, with non-performing mortgages being the least responsive to changes in the macroeconomic conditions.

Arpa *et al.* (2001), assess the effects of macroeconomic developments on risk provisions (calculated as the ratio of total provisions for loans to the sum of total loans and total provisions for loans) of Austrian banks for the period 1990–1999. They use a single-equation time series model in which the dependent variable, i.e. banks' risk provisions, is regressed on the growth rate real gross domestic product, real estate price developments, and real interest rates. The estimated model delivers a good empirical fit and all explanatory variables are highly significant. In particular, risk provisions rise when real gross domestic product growth declines, real interest rates fall and real estate prices increase. However, the authors consider the last-mentioned result at odds with expectations, because one would expect the value of mortgages to increase that when real estate prices rise, thus reducing the likelihood of loan losses. Shu (2002) used a similar single-equation time series model to examine the impact of macroeconomic developments on loan quality in Honk Hong for the period 1995–2002. The results show that the ratio of bad loans to performing loans falls with higher real gross domestic product growth, higher consumer price inflation rate, and higher property prices growth, whereas it rises with increases in nominal interest rates. The unemployment rate and performance of equity price growth are not significant.

Ahmad and Bashir (2013), did a study aimed at investigating the explanatory power of macroeconomic variables as determinants of NPLs. The study used time series data of NPLs ratio and nine macroeconomic variables over the period of 1990-2011. The study found that, corporate loan default increases as real gross domestic product decline, and that the exchange rate devaluation directly affects the repayment ability of borrowers. Salas and Saurina (2002), sought to understand the determinants of problematic loans of Spanish Commercial and Savings banks using a dynamic model and panel dataset covering the period 1985-1997. The findings of the study showed that real growth in GDP, rapid credit expansions, bank size, capital ratio, and market power all explain variation in non-performing loans. According to Espinoza and Prasad (2010), lower economic growth and higher interest rates elicit an increase

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in non-performing loans. The findings concur with the findings of Nkusu (2011) who used panel data techniques on a sample of 26 advanced economies in a study that spanned 10 years from 1998 to 2009, to quantify the relationship between the quality of Banks's loan portfolio and macro-financial susceptibilities. The findings indicate that non-performing loans play a central role in the linkages between credit markets frictions and macroeconomic vulnerabilities. The results confirm that a sharp increase in non-performing loans weakens macroeconomic performance, activating a vicious spiral that exacerbates macro financial vulnerabilities.

Basel (2013) using estimation technique method and panel data set Covering 75 countries over ten year period from 2005 to 2010 studied the macroeconomic determinants of non-performing loans. The Analysis presented that real GDP growth was the main driver of the non- performing loan ratio. Besides, exchange rate depreciations lead to an increase of non-performing loans in countries with a high degree of lending in foreign currencies to un-hedged borrowers.

Modragon and Glen (2011), looked at 22 advanced economies during the period 1996-2008 and found that the developments of loan loss provisions are driven mainly by real GDP growth, private sector leverage, and a lack of capitalization within the banking system. The results indicated that while economic growth is the main driver of loan portfolio performance, interest rates have second-order effects. Furthermore, they found the relationship between loan loss provisions and economic growth to be highly non-linear only under extreme economic stress: gross domestic product growth needs to decline by more than 6 percentage points (in absolute terms) in order to generate an increase in loan loss provisions equivalent to median emerging market bank profits; while a decline of more than 10 pp in growth implies significant capital losses, of at least 20 percent, for the median emerging market bank. In addition, they found higher loan loss provisions are associated with private sector leverage, poor loan portfolio quality, and lack of banking system penetration and capitalization. Khemraj & Pasha (2009) also found evidence of a significant inverse relationship between gross domestic product and non-performing loans (Rajha, 2016). This means that strong performance in the real economy results in lower non-performing loans. The results of the study showed that the impact of growth in real gross domestic product on non-performing loans is instantaneous. The empirical results, however, reveals that inflation is not an important determinant of non-performing loans in the Guyanese banking system.

Inekwe (2013), also found that banks that have an inclination for taking on risk tend to experience greater loan delinquencies or non-performing loans. However, contrary to international evidence, the study showed that large banks are not necessarily more effective in vetting loan customers when compared to their smaller counterparts – since there is no significant relationship between the size of a banking institution and the level of non-performing loans. They also found that banks that are more aggressive in the credit market are likely to experience lower non-performing loans (Khemraj & Pasha, 2009b). Fofack (2005) studied causal analysis and macroeconomic implication on loan default in Sub-Saharan countries. The findings of the study showed that macroeconomic stability and economic growth are associated with a declining level of default; whereas adverse macroeconomic shocks coupled with a higher cost of capital and lower interest margins are associated with a rising scope of non-performing loans (Fofack, 2005).

Waweru *et al*. (2009), did a study to investigate the causes of nonperforming loans, the actions that bank managers have taken to mitigate that problem, and the level of success of such actions in Kenya. Using simple regression analysis and t-test, the results of the study indicated that the unfavourable economic environment was perceived as the most important external factor. Specifically, the national economic downturn leading to the depression of business, in general, is an important factor, so it is legal issues that lead to delays in settling commercial disputes. Internal factors affecting non-performing loans include the procedures used in banks for credit risk assessment particularly the lack of proper skills amongst loans officials. Other factors include the speedy process of evaluating loans mainly due to external pressure, the high interest rates charged, insider lending and owner concentration among others.

2.3.2 Real effective exchange rate (REER) and Non-Performing Loans

According to the World Bank, the real effective exchange rate (REER) is the weighted average of a country's currency relative to an index or basket of other major currencies adjusted for the effects of inflation. The weights are determined by comparing the relative trade balances, in terms of one country's currency, with another country within the index. It is the weighted wholesale price index of trading partners and the consumer price index for the home country. It is the value individual consumer will pay for an imported good at the consumer level. This price will include any tariffs and transaction costs associated with importing the goods. The real effective exchange rate is the nominal effective exchange rate (a measure of the value of a

currency against a weighted average of several foreign currencies) divided by a price deflator or index of costs (McMichael, 2009).

Fofack (2005) in a paper that investigated the leading causes of nonperforming loans during the economic and banking crises that affected a large number of countries in Sub-Saharan Africa in the 1990s using a pseudo-panel model, found that changes in the real effective exchange rate have a positive impact on the non-performing loans of commercial banks that operate in some sub-Saharan African countries with fixed exchange rate regimes. The author contends that this result is due to the large concentration of loans to the export-oriented agriculture sector, which was unfavourably affected by the appreciation in the currency of these countries during the 80s and early 90s. The results the study showed a dramatic increase in non-performing loans and heightened credit risks, with considerable gaps between the subpanels of CFA and non-CFA countries. These risks reflect the rapid accumulation of impaired loans, and are largely driven by macroeconomic volatility and terms of trade deterioration. They are particularly high in the agricultural sector and illustrate the extremely High vulnerability of African economies which, in the absence of diversification, remain heavily exposed to macroeconomic and exogenous shocks.

Babouček and Jančar (2005) did a study to empirically investigate transmission involving a set of macroeconomic variables describing the development of the Czech economy and the functioning of its credit channel over eleven years using unrestricted VAR model. They found that the real effective exchange rate appreciation does not deteriorate the NPL ratio indicating that changes in the real effective exchange rate have positive signs for the full sample, suggesting a positive covariance structure with nonperforming loans. More specifically, a real effective exchange rate appreciation may have weakened the performance of export-oriented sectors of the economy, and worsened the banking crisis, especially for economies that are highly dependent on exports.

Khemraj and Pasha (2009a), also did a study to ascertain the determinants of non-performing loans in the Guyanese banking sector using a panel dataset and a fixed effect. Their empirical results support the view that macro-factors, such as the real effective exchange rate and growth in real GDP impacts significantly on the level of non-performing loans. In particular, they observed that the real effective exchange rate has a strong positive association with the levels of non-performing loans reported by commercial banks suggesting that whenever there is a

deterioration in the international competitiveness of the domestic economy (as reflected by an appreciation in the real effective exchange rate). This indicates that whenever there is an appreciation in the local currency the non-performing loan portfolios of commercial banks are likely to be higher. In other words, whenever there is the deterioration in the competitiveness in the local economy the level of NPLs emanating from the key export oriented economic sectors is likely to increase.

Škarica (2014) did a study that sought to the determinants of the changes in non-performing loans (NPL) ratio is selected in European emerging markets. The model was estimated on a panel dataset using a fixed-effects estimator for seven Central and Eastern European countries between 2007 and 2012. Contrary to the expectation that exchange rate depreciations are, thus, expected to lead to an increase of NPL ratio (growth rate), in countries with a high degree of lending in foreign currency to unhedged borrowers, his analysis showed that the coefficient on the increase of net effective exchange rate (NEER) was not significant indicating that real effective exchange rate (REER) has no significant effect on non-performing loans.

2.3.3 Average Bank Lending Rate and Non-Performing Agricultural Loans

The interest rate is the price of money and the cost of using lenders' money for a specified period. There is an interest rate at which banks are lending (the offer rate) and the interest rate they are paying for deposits (the bid rate). The difference between them is called a spread. The spread between offer and bid rates provides a cover for administrative costs of the financial intermediaries and includes their profit. The spread is influenced by the degree of competition among financial institutions. It is expected that as the cost of borrowing increases (high-interest rates) loan delinquency also rises. Studies were done on this, however, seem to contradict each other on the whole effect of interest rate on loan delinquency (Ng'etich *et al*., 2011;Waweru & Kalani, 2008;Kwambai & Wandera, 2013).

Beck, Jakubik and Piloui (2013) in a study that sought to understand the macroeconomic determinants of nonperforming loans (NPL) across seventy-five countries using novel panel data set found that a decline in economic activity tends to affect non-performing loans with a time lag of a few quarters. With annual data, the impact is attributed to the concurrent growth rate of real GDP. They pointed out that the credit quality of loan portfolios across most countries in the world remained relatively stable until the financial crises hit the global economy in 2007-2008. Since then, the average bank asset quality worsened sharply due to the

global economic downturn. This is a strong indicator of the effect of economic growth as measured by GDP on loan performance.

Kalirai and Scheicher (2002) employ a simple linear regression to examine the interdependence of credit risk for Austrian banks and the state of the economy, portrayed by real gross domestic product, industrial production, consumer price inflation, money growth, interest rates, stock market indices, and other macroeconomic indicators. According to their estimates, during the period 1990–2001 the loan quality was influenced in particular by the short-term nominal interest rate, industrial production, the stock market return, and a business confidence index.
Espinoza and Prasad (2010) did a study that focused on macroeconomic and bank-specific factors influencing non-performing loans and their effects in the Banking System in the Gulf Cooperation Council (GCC). Their studies found that the non performing loans ratio of the banks deteriorated as interest rates rose and non-oil economic growth slowed, and the size of the banks played a role, as the larger banks as well as those with fewer expenses had less non-performing loans. After a comprehensive analysis, they found that higher interest rates increase the non-performing loans but the relationship was not statistically significant.

Bofondi and Ropele (2011) in their study that used single-equation time series approach to examine the macroeconomic determinants of banks loan quality in Italy in the past twenty years, as measured by the ratio of new bad loans to the outstanding amount of loans in the previous period. The study analysed the quality of loans to households and firms separately on the grounds that macroeconomic variables may affect these two classes of borrowers differently. According to the estimated models of the study the quality of lending to households and firms can be explained by a small number of macroeconomic variables mainly relating to the general state of the economy, the cost of borrowing and the burden of debt. This implies that the effect of interest rates is positive, denoting that an increase in interest rate increases debt burden subsequently causing a rise of non-performing loans.

Ayanda and Ogunsekan (2012) examined the farmer's perception of repayment of loans in the Ogun State of Nigeria. Both descriptive and Pearson moment correlation statistics were used to analyse the data. The findings obtained indicate that a significant and inverse relationship existed between interest rate, low farm output, and loan repayment. Okorie (1986) did a study in Ondo state Nigeria whose objective was to determine the major determinants of agricultural repayment. The study used the exploratory approach with the aid of a comprehensive structured

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questionnaire developed to collect data through document reviews and interviews with managers of commercial banks. The study concluded that the nature, time of disbursement, supervision, and profitability of enterprises which benefited from smallholder loan scheme in Ondo State Nigeria, contributed to the repayment ability and consequently high default rates. The study further observed that other critical factors associated with loan delinquencies are: type of the loan; term of the loan; interest rate on the loan; poor credit history; borrowers' income and transaction cost of the loans (Ndambiri *et al*., 2017; Wairimu & Gitundu, 2017).

Njuguna (2012), however in his study whose objective was to analyse and quantify the effect of volatile interest rates and their implications on default rates from commercial banks using regression analysis and T-test. The study observed that the rate of customer default depends on the type of loan, duration of the loan, the rate of growth of the economy, and the size of the financed enterprise. Contrary to Okorie's assertion, the study holds that the rate of customer default on loans depends on the type of loan advanced rather than interest rate regime thus financial control in the use of funds is a key determinant of the ability of the firm to repay borrowed funds. In congruence with Okorie, the study observed that the duration of the term loan and rate of growth of the economy has a bearing on the default rate noting that low growths in the economy increase rates of default and vice versa. The study further observed that the size of the firm is a significant factor when analysing the rate of default on loan obligations noting that large firms have lesser rates of default than small firms. This, the study posits can be attributed to better financial controls of the business, as most of the large businesses are corporate bodies.

Osero (2013) did a study to find out the relationship between macroeconomic factors and the level of nonperforming loans in the banking industry in Kenya using multiple regressions. The study established that there was a positive relationship between the level of nonperforming loans, interest rate spread, and lending rate. The lending rate had a higher relationship with the level of nonperforming than the interest rate spread. Nkusu (2011), in a study that sought to analyse the link between non-performing loans and macroeconomic performance using panel regressions and panel vector autoregressive model (PVAR), found empirical evidence of a positive correlation between the interest rate and non-performing loans. She stated that an increase in interest rate weakens loan payment capacity of the borrower, therefore, non-performing loans and bad loans are positively correlated with the interest rates. The study

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further states that the interest rate policy plays a very important role in the non-performing loan growth rates in a country/economy.

Kanyuru (2011) researched the determinants of lending rates of commercial banks in Kenya. She found out that the cost of funds (loans) was determined by taxation policies, core liquid asset requirement, transaction cost, CBK, and its regulatory role, management fees, and staff costs. The research further revealed that interest rates were majorly influenced by inflation, demand for loans, foreign exchange rates, and other macro and microeconomic environment factors.

2.3.4   Growth in Agricultural Loan Portfolio and Non-Performing Agricultural Loans

The empirical literature on the relationship between excessive loan growth and credit risk is scanty. It is expected that this variable has a significant positive relationship with non-performing loans since the literature shows that rapid credit growth is often associated with higher Non-performing loans. Excessive lending by commercial banks is often identified as an important determinant of non-performing loans (Keeton & Morris, 1987; Salas & Saurina, 2002; Fofack, 2005).

Past studies on U.S. microdata indicate rapid growth in loan portfolios may lead to a subsequent increase of non-performing loans. Sinkey and Greenawalt (1991) did a study of large U.S. banks during the period 1984-1987. Their study revealed that the average past loan growth is significantly positively related to the contemporaneous non-performing loans. They found that there is substantial cross-sectional heterogeneity in this link that cannot be explained with macro-economic factors. Berger and Udell (2004) examined the Procyclicality of bank lending in the U.S during 1980-2000. Their study revealed that credit standards are relaxed and more loans are granted as time passes by since a bank's last peak in loan losses. This result is evidence in favor of the "institutional memory hypothesis", i.e., the ability of loan officers to recognize potential loan problems fades out over time, lowering the credit standards and increasing the lending volume. The determinants of loan losses have also been studied at the international level and in countries outside the U.S (Sinkey & Greenawalt, 1991).

Espinoza and Prasad analyzed the extent to which macroeconomic factors affected non-performing loans of various banks within the Gulf Cooperative Council (GCC) countries and endeavored to ascertain the causes of overall non-performing loans in the Gulf Cooperative

Council banking sector. They used a dynamic panel of data retrieved from the database Bank wise, and ran panel vector autoregressive (VAR) models to determine the factors that affected the growth in Non-performing loans in the Gulf Cooperative Council banking system. The authors tested bank specific factors as well as macroeconomic factors such as non-oil real gross domestic product. Their studies found that found that a prior period of high credit growth could lead to increased non-performing loans in the future. In terms of the feedback effects, the authors noted that there is a strong but short-lived feedback effect from non-performing loans to economic growth .Laeven and Majnoni (2003) bank scope data from 45 countries in a bid to understand the factors influencing the loan loss provisioning and income smoothing of more than 1,000 large commercial banks during the period 1988-1999. They found that, on average, banks provision too little in good times of the cycle and are forced to overreact in bad times. They also noticed a significantly negative relation between loan growth and loan losses, suggesting an imprudent provisioning behavior of banks. Similarly, it examined the contemporaneous relation between loan loss provisioning of individual commercial banks and the business cycle during the period 1991-2001. Based on bank scope data from a subset of OECD countries they found a negative relationship between GDP growth and loan loss provisioning. The study identified that the relationships are partially mitigated by a positive contemporaneous link between loan loss provisioning and loan growth, which is in contrast to the findings from Laeven and Majnoni (2003).

Jimenez and Saurina (2006) in a study that sought to understand the relationship between rapid credit growth and deterioration in credit standards using panel dataset and fixed-effect model, the study found strong empirical support of a positive, although quite lagged, the relationship between rapid credit growth and loan losses. They pointed out that a rapid increase in loan portfolios is positively associated with an increase in non-performing loan ratios later on. According to the study, those loans granted during boom periods have a higher probability of default than those granted during periods of slow credit growth. They argue that during boom periods collateral requirements are relaxed a situation that accelerates the probability of loan impairment unlike during recession periods when banks curtail credit growth and are much more cautious, both in terms of the quality of the borrowers and the loan conditions.

Khemraj and Pasha (2009) in a study that sought to ascertain the determinants of Non-performing loans in the Guyanese banking sector using a panel dataset and a fixed-effect model found that banks that are more aggressive in the credit market are likely to incur lower Non-

performing loans, which conflict with previous studies. Foos, Norden, and Weber (2009) did a study to investigate whether loan growth affects the riskiness of individual banks in 16 major countries using bank scope data from more than 16,000 individual banks during 1997-2007. They found that loan growth leads to an increase in loan loss provisions during the subsequent three years, to a decrease in relative interest income, and lower capital ratios (Khemraj & Pasha, 2009a). Their study further showed that loan growth also had a negative impact on the risk-adjusted interest income.

Afolabi (2010) conducted a study to analyze loan repayment among small scale farmers in the Oyo state of Nigeria. The study specifically identified the socio-economic characteristics of the respondents by descriptive statistics while an Ordinary least square (OLS) was used to quantitatively determine the characteristics of these particular farmers that influenced their level of loan repayment. The findings of the study indicated that loan repayment was positively influenced by the amount of loan granted among other things suggesting that growth in the loan advanced to the farmers increased the risk of default.
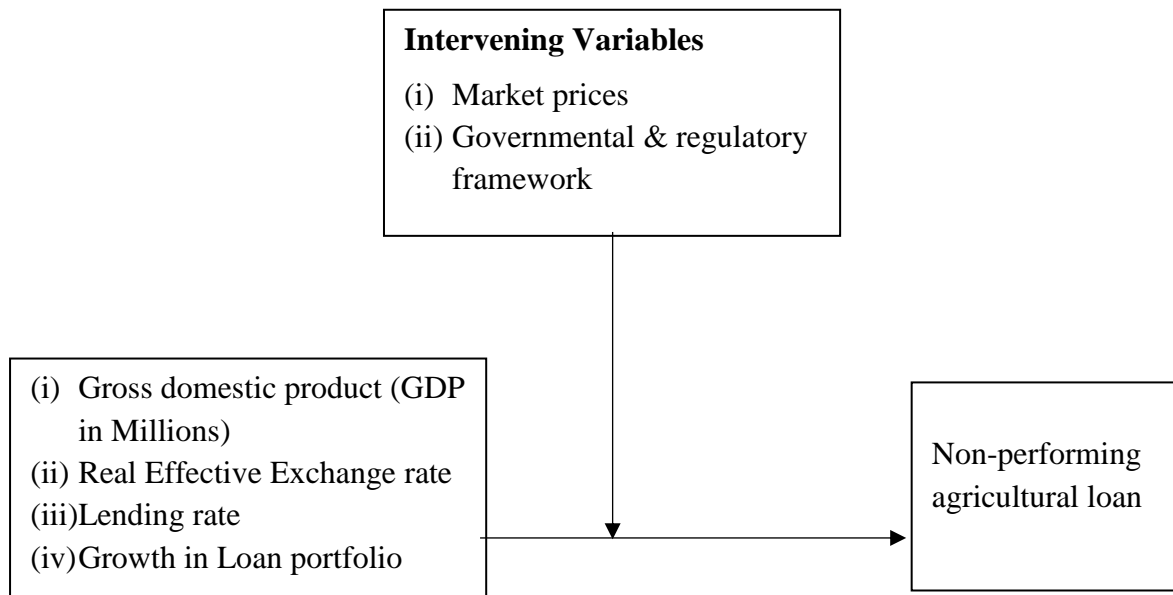
2.4   Summary of Literature and Research Gap

The study literature first from existing theories that try to explain the causes of non-performing loans. The theory of credit default which represents a systematic understanding of the causes which directly lead to the effects associated with credit defaults holds that credit defaults come about as a result of the effect of macroeconomic factors on the financial environment and their effects on personal or corporate financial conditions. The theory associates credit default to some causal relationship between the macroeconomic factors and loan performance. The theory of loan pricing supports the need for banks to avoid setting high-interest rates (Stiglitz & Weiss, 1981). The theory of loan pricing argues that banks should consider the problems of adverse selection and moral hazard. If banks set interest rates too high, they may bring adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behaviour or so-called borrower moral hazard since they are likely to take on highly risky projects or investments (Chodechai, 2004). If banks set up very high-interest rates, it could encourage the problem of adverse selection and moral hazard by attracting borrowers with very risky projects which may eventually drive the default rates up.

The literature to show that most of the studies were geared towards finding out the determinants of non-performing loans in the banking sector generally. There exists very limited literature on the effect of broad macroeconomic factors on the performance of agricultural lending, especially in the Kenya context. This study, therefore, seeks to add to the current agricultural loan portfolio management knowledge by seeking to demystify the effect of the selected factors: GDP, real effective exchange rate, lending rate, and growth in agricultural loan portfolio on agricultural sector loan non-performance.

2.5   Conceptual Framework

From the literature review, various empirical studies cited probable causes of non-performing agricultural loans as linked to external and bank-specific factors. This study focused on two external and two bank-specific variables to carry an empirical study to investigate the probability of these variables contributing to nonperforming agricultural loans in Kenya. The concept model of this study was to establish the effect of gross domestic product (GDP), real effective exchange rate, lending rate, and growth in agricultural loan portfolio on non-performing agricultural loans. The dependent variable was the ratio of agricultural Non-performing loans to total (gross) loans. The independent variables were the real GDP, a real effective exchange rate (REER), lending rates and growth in the agricultural loan portfolio. From the conceptualization of the study variables, the conceptual framework for this study was as shown in figure 1 below:

Independent Variable   **Dependent Variable**

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                        ┌─────────────────────────────────┐
                        │ Intervening Variables            │
                        │ (i)  Market prices               │
                        │ (ii) Governmental & regulatory   │
                        │      framework                   │
                        └─────────────────────────────────┘
                                        │
                                        │
┌───────────────────────────────────┐  │           ┌──────────────────────┐
│ (i)  Gross domestic product (GDP   │  │           │                      │
│      in Millions)                  │  ▼           │  Non-performing      │
│ (ii) Real Effective Exchange rate  │──────────────▶  agricultural loan   │
│ (iii)Lending rate                  │              │                      │
│ (iv) Growth in Loan portfolio      │              └──────────────────────┘
└───────────────────────────────────┘
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Figure 1: Conceptual Framework

Source: Researcher's Conceptualization

In line with the theoretical framework and literature reviewed, the concept model of this study focused on four factors: GDP and Real effective exchange rate, lending rate, and growth of loan portfolio as the independent variables. Market prices and government regulations are the intervening variables. These intervening variables are hypothetical variables that explain causal links between the independent and dependent variables. In this study, market prices, and government regulation are thought to have a significant effect on the association between the independent variables (GDP, REER, average bank lending rate, and growth in loan portfolio).

In line with the credit default theory, there is a causal relationship between GDP and NPL. Gross domestic product (GDP) is believed to have an inversely proportional relationship with loan default. Growth in the economy increases borrowers' income and ability to repay debts and it generally increases overall financial stability and vice versa. An increase of NEER represents an appreciation of the domestic currency which weakens the debt servicing capabilities of export-oriented firms thus increasing the NPL ratio. However, it could also positively affect private debtors whose loans are denominated in foreign currency, reducing the NPL ratio. For this study, however, it is assumed that loans are denominated in local currency.

The theory of loan pricing asserts that if banks set interest rates too high, they may bring adverse selection problems because high-risk borrowers are willing to accept these high rates and later take on highly risky projects or investments that increase the probability of non-performing agricultural loans. An increase in interest rates weakens borrowers' debt-servicing capacity, more so if loan expected rates are variable. NPL is therefore expected to be positively related to interest rates (Stiglitz & Weiss, 1981).

Furthermore, non-performing loans are expected to increase following rapid credit growth as high loan levels could indicate high debt burdens thereby raising the likelihood of running into debt servicing problems. The dependent variable here is the ratio of non- performing agricultural loans to total agricultural loans measured as:

NPL (percent) = (Agricultural NPL*100)

Total Agricultural Loans Advanced

Market prices, and governmental & regulatory framework are the model intervening variables but are assumed by this model not to have a significant effect on the dependent variable.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1   Introduction

This chapter discusses the methodology that was used in examining the effect of selected factors on nonperforming agricultural loans. The chapter looks at the research design adopted for the study, the population of the study, sampling design, validity and reliability of research instruments, data collection, and data analysis.

3.2   Research Design

For this study, the correlational research design was adopted. Correlational research design examines the extent to which two or more variables relate to one another (Mugenda & Mugenda 2012). The researcher preferred this design because it helps in establishing the relationships of the independent variables and the dependent variables without the researcher controlling either of them. The researcher found the design ideal in helping to determine the current status of the relationships and associations of the variables of the study. It was also efficient in collecting large amounts of data and determining the current status of that population concerning the variables of the study without manipulation.

3.3   The Target Population of the Study

According to Cooper and Schindler (2006), population refers to the total collection of the elements about which the researcher wishes to make inferences. For this study, the population was all Commercial Banks in Kenya and the unit of analysis was the banks that lend to the agricultural sector in Kenya. According to the Central Bank of Kenya, there are ten commercial banks active in agricultural lending in Kenya. These include Kenya Commercial Bank, Equity Bank, Transnational bank, Family bank, Chase bank, Cooperative bank, Jamii Bora Bank, Diamond trust bank, CFC Stanbic bank and Sidian bank (formerly K-Rep bank Ltd). These are banks that have at least 20 percent agricultural loans in their portfolio. Purposive sampling of the agricultural loan portfolio was adopted to ensure only data relating to agricultural lending is considered to enhance the reliability and relevance of the study.

3.4   Validity and Reliability of the Research Instrument

Mugenda (1999), defined reliability as the degree to which a research instrument yields consistent results as they are measured by the corresponding standards irrespective of the target groups and time interval separating the tests. To ascertain this (reliability), the researcher used

authentic CBK and KNBS reports and published financial statements. This enabled the researcher to ensure the reliability and authority of the data.

Validity refers to the accuracy and the meaningfulness of inferences, which are based on the research results. It is the degree to which the results obtained from the analysis of the data represent the phenomenon. Content validation was done by measuring the degree to which data collected using data collection schedules represents the agricultural lending domain. Mugenda and Mugenda (2008), argue that the usual procedure in assessing the content validity of a measure is to use a professional expert in a particular field. The researcher sought expert opinion in the field of study especially from the researcher's supervisor and back it up with the appropriate data sources.

3.5   Data Collection

This study used secondary data. Secondary data was appropriate for the study since Commercial Banks submit their loan portfolio performances monthly to Central Bank of Kenya which are published .Secondary data collected with the use of data collection schedules. The secondary data on gross loans and nonperforming loans for the banking industry was collected from the Central Bank of Kenya's annual bank supervision reports. Data on macroeconomic indicators were collected from economic survey reports of the Kenya National Bureau of Statistics (Mogaka *et al*., 2015). This enabled the researcher to get quantified data that was helpful to conclude. Data was collected related to a period of seven years from 2011-2017. This period has been chosen to get the most up to date and an expansive data view to help the researcher draw a reasonable conclusion.

3.6   Data Analysis

The collected data were processed by editing, coding, classifying, and tabulating to ease processing and analysis. The trends in the loan portfolio and NPL are calculated by plotting graphs of the variables over time. Regression analysis was used to establish the effect of the selected factors on non-performing agricultural loans. Regression analysis assessed the strength of the relationship among a set of predictor variables on the criterion variable. In this study, the independent variables included gross domestic product, real effective exchange rate, lending rate, and growth in the loan portfolio and the dependent variable is nonperforming agricultural loans. F-test was used to test for significant differences between the factor means. The following regression equation was used:

$$Y = a + \beta_1 x_1 + \beta_2 \chi_2 + \beta_3 \chi_3 + \beta_4 \chi_4 + \varepsilon$$

Where:

Y	=	Non performing agricultural loans (percent)
A	=	Constant
X_1	=	Gross Domestic Product (GDP)
X_2	=	Real Effective Exchange Rate (REER)
X_3	=	Lending rate
X_4	=	growth in the loan portfolio
$\beta_1, \beta_2, \beta_3, \beta_4$=		are the coefficient of the independent variables i.e. X_1, X_2, X_3, X_4
ε	=	random error term.

Non-performing Loans (NPL) will be measured as accounts whose principal or interest remains unpaid 90 days or more after the due date. NPL level measurement (IMF, 2005; Banking Act, 2008) formula is as under:

NPL (percent) = Agricultural NPL*100/ Total Agricultural Loans Advanced

Quarterly averages were used for the entire study period for all the variables in the study as obtained from the Central Banks supervision reports.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

The chapter contains descriptive data analysis and inferential analysis, interpretation, and discussions of the results of each objective. The findings on each of the four objectives compared and contrasted with earlier studies contained in the literature. Study hypothesis testing is also included.

4.2 Descriptive Statistics

Table 1: Summary Statistics of Selected Indicators

Variables	Min	Max	Mean	SD
Total agricultural non-performing loans (Billions of KES)	4.00	10.14	6.14	2.00
Real GDP (Millions of KES)	807482	1147736	96790	10649
Real GDP growth (percent)	3.50	7.50	5.48	0.95
Real effective exchange rate	82.24	103.52	92.92	7.88
Gross agricultural loans (Millions of KES)	45.13	100.09	72.70	17.20
Growth in loan portfolio	-8.65	13.61	2.24	6.24
Lending rate	13.65	20.21	16.41	2.03

KES, Kenya Shillings; GDP, Gross Domestic Product; SD, standard deviation

Results in Table 1 show the summary statistics of the selected variable used in this study. There was a general increase in all the values (the real GDP, gross agricultural loans, and real effective exchange rate) used in this study over time except for the loan portfolio and the lending rates. Total agricultural non-performing loans ranged from KES 4-10.14 Billion during the study period and the real effective exchange rate ranged between KES 82.24 per USD and KES103.52 per USD over the study period. The effect of the increase in the exchange rate manifest as a boost to economic growth where the lower exchange rate makes exports cheaper and increases the demand for domestic goods. The increase in demand for domestic goods could have led to an increase in the demand for loans for agriculture that ranged between KES 45.13 and 100.09 million. The lending rates were expected to be constant after Kenya enacted a law capping interest rates charged by commercial banks to be four units above the base lending rate by the Central Bank. During the study period, the lending rate ranged between 13.65 and 20.21 percent.
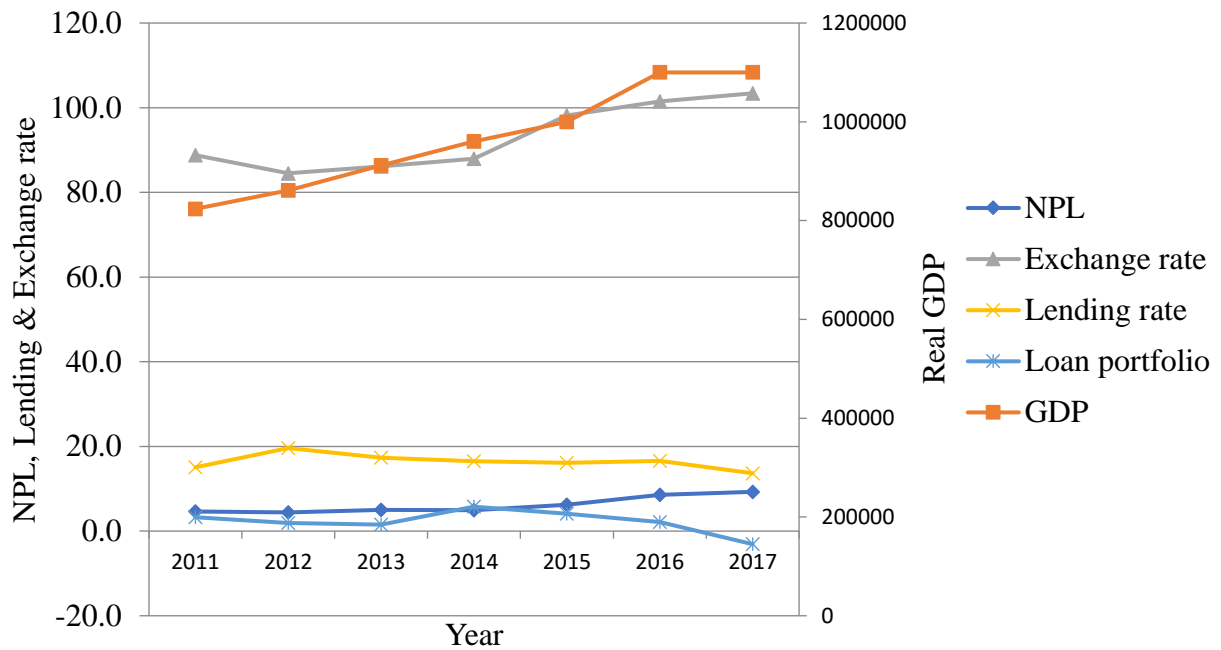
Figure 2: The Trend of the Key Indicators: Non-Performing Agricultural Loans (Billions, KES); GDP (Billion, KES), Exchange Rate and Lending Rate

Trend analysis (Figure 2) of the explanatory variables indicated a steady increase in GDP and NPL between 2011 and 2017. GDP recorded the highest value in 2016 and the non-performing loans had the highest value in 2017. The real effective exchange rate decreases between 2011 to 2014 then increased exponentially between 2014 and 2015 then a steady increase between 2015 and 2017 with a slight increase in the exchange rate. The lending rate increased between 2011 and 2012 then decreased steadily from 2012 to 2017. The growth in loan portfolio decreased between 2011 and 2013 then increased slightly in 2014 but dropped again from 2015 to 2017 with 2017 recording the lowest growth in the loan portfolio.

4.3 Correlation Analysis

Table 2: Correlation between Key Variables

Variables	Agricultural NPL	Real GDP	Real effective exchange rate	Average bank Lending Rate
Real GDP	0.841^{***}	1.000		
Real effective exchange rate	0.865^{***}	0.812^{***}	1.000	
Lending rate	-0.480^{**}	-0.414^{*}	-0.462^{*}	1.000
Growth in loan portfolio	-0.241	-0.237	-0.138	0.0640

GDP, Gross Domestic Product; $^{*}p< 0.05$, $^{**}p< 0.01$, $^{***}p< 0.001$

Source: Research Data

Table 2 shows the correlation results for dependent and independent variables. The results indicate that the ratio of non-performing agricultural loans of commercial banks had a strong positive correlation with real GDP (0.841, $p<0.001$). According to the study results (Table 2), there was a significant positive correlation between agricultural NPL and real effective exchange rate (0.865, $p<0.001$).

Additionally, the average bank lending rate has no effect on the non-performing agricultural loans as the study results (Table 2) revealed that agricultural NPL had a weak inverse correlation with the average bank lending rate (-0.48, $p<0.01$).Growth in loan portfolio does not have any effect on the non-performing agricultural loans as shown by the study results (Table 2) that indicate that growth in loan portfolio does not have any correlation with non-performing agricultural loans.

The results (Table 2) also indicate the relationship between the independent variables. There was a significant positive correlation (0.812, $p<0.001$) between real effective exchange rate and growth in real GDP, a weak inverse correlation between average bank lending rate and real GDP (-0.414, $p<0.05$) and between the average lending rate and real effective exchange rate (-0.462, $p<0.05$). However, there was no significant correlation between growth in the loan portfolio, real GDP, real effective, and average bank lending rate.

4.4   Regression Analysis

Table 3: Regression Coefficients

Coefficients	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0percent Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-11.3	3.471		-3.256	0.003	-18.48	-4.121
Real GDP, (KES Millions)	6.91E-06	0	0.369	2.336	0.029	0	0
Real effective exchange rates (Average exchange rate against USD)	0.131	0.04	0.517	3.258	0.003	0.048	0.214
Growth in loan portfolio	-0.025	0.03	-0.078	-0.847	0.406	-0.086	0.036
Average Commercial Bank Lending Rate	-0.083	0.1	-0.084	-0.831	0.415	-0.289	0.123

a. Dependent Variable: Total Agricultural non-performing loans (Kshs, Billions)

Source: Research Data

The causes of non-performing agricultural loans in commercial banks in Kenya were investigated using linear regressions with non-performing loans as the dependent variable and real GDP, real effective exchange rate, average bank lending rate, and growth in the loan portfolio as the independent variable. The results are presented in Table 2 above. The study established the economic model as follows:

$$Y = -11.30 + 0.0000069 X_1 + 0.131X_2 - 0.83X_3 - 0.25X_4$$

According to the regression equation established, taking all variables constant at zero, the ratio of non-performing loans will decrease at 11.3percent at 95 percent level of confidence. The coefficients in Table 4 above depict a positive relationship between agricultural NPL and real GDP ($\beta_1 = 0.0000069$) and also a positive relationship between agricultural NPL and real effective exchange rate ($\beta_2 = 0.131$). However, the relationship between the average bank lending rate and growth in agricultural loan is not significant. Average bank lending rate and

growth in loan portfolio had weak inverse relationship with non-performing agricultural loans but not significant at 95 percent confidence interval.

4.4.1 Robustness of the Model

Table 4: Statistics Describing the Robustness of the Model

Model Summary

Model	R	R Square	Adjusted R Square	SE	Change Statistics				
					R Square Change	F	df1	df2	Sig. F Change
1	.903[a]	0.815	0.783	0.9295684	0.815	25.393	4	23	0

a. Predictors: (Constant), Average Commercial Bank Lending Rate, Growth in loan portfolio, Real GDP, (KES), Real effective exchange Millions rates (Average exchange rate against USD)

Model summary estimates entailed testing the 'goodness of fit' of the model to the actual data and the extent to which the independent variables explained the variation in the dependent variables. Table 5 shows that the adjusted R^2, which is the coefficient of determination measuring the proportion of variation in non-performing agricultural loans in commercial banks in Kenya is 0.783 indicating that about 78.3percent of variation in the dependent variable in the regression model are due to independent variables while 21.7 percent is due to other factors not captured in the model.

4.4.2 Analysis of Variance (ANOVA) of the Regression Model

Table 5: ANOVA Model

ANOVA Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	87.768	4	21.942	25.393	.000[b]
	Residual	19.874	23	0.864		
	Total	107.642	27			

a. Dependent Variable: Total Agricultural non-performing loans (Kshs, Billions)

a. Predictors: (Constant), Average Commercial Bank Lending Rate, Growth in loan portfolio, Real GDP, (KES Millions), Real effective exchange rates (Average exchange rate against USD)

Table 6 shows that the F-statistics is 25.393 and is significant at a 99 percent confidence interval (P<0.0001). Thus, the independent variables in the model jointly influence non-performing agricultural loans in commercial banks in Kenya. The model was therefore considered robust or fitted well to the actual data of the variable.

4.5   Hypotheses Testing

The decision factor in the test is that if P value observed is less than the critical P-value at the confidence level of 0.05, then the null hypothesis is rejected and the alternative hypothesis is accepted. If the if P value observed is higher than the critical P-value at the confidence level of 0.05, then the null hypothesis is fails to be rejected.

H_{01}:   Gross Domestic Product has no significant effect on non-performing agricultural loans

The first research objective was achieved by evaluating the null hypothesis that Gross Domestic Product has no significant effect on non-performing agricultural loans. This was evaluated using the regression results from the overall regression model in table 4. From the regression model, the beta coefficient is 0.0000069 with a p-value of 0 .029, which is lower than the critical p-value of 0.05. Based on t-test, the study rejected the null hypothesis that gross domestic product has no effect on non-performing agricultural loans. The positive relationship between non –performing loans and real gross domestic product however, contradicts results by (Salas & Saurina, 2002; Fofack, 2005; Mwega, 2016) whose studies found that as GDP increase the NPL decreased. It is often expected that as real gross domestic product increases, the real incomes of all economic agents also increase leading to an increase in their repayment capacity.

The influence of the growth of gross domestic product on non-performing agricultural loans can be discussed under two broad factors, macroeconomic and bank-specific factors. Macroeconomic factors are central for the aggregate performance of an economy since each of the economic agents does not work in isolation. The macroeconomic factors relate to factors that influence economic stability, economic growth, unemployment rate, the cost of servicing debt, the debt burden, exchange rate movements, terms of trade and some other factors that are most probably to have a substantial role in explaining the performance of non-performing loans of the banking system. The bank-specific factors which represent endogenous variables include many factors such as rapid credit growth, lenient credit terms, interest margin, credit

orientation, regular monitoring of loan quality and poor risk assessment (Negera, 2012). In this study, the growth in real Gross Domestic Product could have increased the money supply in the banks leading to an increase in appetite to increase loan portfolio exposing a bank to increase the bank-specific factors outlined above. On the other hand, we can only link the increase in NPL to weak macro-economic controls by the government that leads to as indicated above the increase in insider lending in Kenyan banks during the period. Equally, a vast majority of the agricultural borrowers are small scale in nature whose demand for credit in diverse. During times of economic boom majority borrows heavily since they have high affinity for loans from the financial institutions. This often results in high default rates when the macroeconomic environment gets a shock and considering the volatile nature of Kenyan economy against the world economies, agricultural lending is largely affected by the macroeconomic shocks.

H02:   Real effective exchange rate has no significant effect on non-performing agricultural loans

The second research objective was achieved by evaluating the null hypothesis that real effective exchange rate has no significant effect on non-performing agricultural loans. This was evaluated using the regression results from the overall regression model in table 4. From the regression model, the beta coefficient is 0.131 with a p-value of 0 .003 which is lower than the critical p-value of 0.05. Based on t-test, the study rejected the null hypothesis real effective exchange rate has no effect on non-performing agricultural loans. In the model, an increase in the effective exchange rate by KES 1 results in an increase in non-performing agricultural loans by KES 0.131 Billion.

The results of the present study are consistent with international evidence which has shown that the real effective exchange rate has a significant positive impact on non-performing loans (Khemraj & Pasha, 2009). This indicates that whenever there was an appreciation in the local currency the non-performing loan portfolios of commercial banks are likely to be higher. There is also evidence in the literature of a positive association between non-performing loans and real effective exchange rates (Fofack, 2005). The influence of exchange rate results from the large concentration of loans in the agricultural sector that is export oriented is often adversely affected by the appreciation in the currency. Appreciation of local currency against the dollar mostly have had shocks in the revenues of majority of export based products. This results in

lower revenues since the dollar is exchanged for less of local currency thus affecting the ability of such borrowers to substantially pay the loans.

H$_{03}$: **The average bank lending rate has no significant effect on non-performing agricultural loans**

The third research objective was achieved by evaluating the null hypothesis that average bank lending rate has no significant effect on non-performing agricultural loans. This was evaluated using the regression results from the overall regression model in table 4. From the regression model, the beta coefficient is $=$-0.083 with a p-value of 0.415 which is higher than the critical p-value of 0.05. The study failed to reject the null hypothesis that average bank lending rate has no significant effect on non-performing agricultural loans. There is a negative but non-significant association between the average lending rate and non-performing loans ($\beta3_{=}$-0.083). The lending rate is a direct cost to loanees who service the loan from the proceeds of investments achieved using the loans. Higher lending rates will mean a higher repayment amount. The influence of the lending rate as shown by the model is not a direct casual-effect relationship. This is because the capacity of the borrowers to service their loans does not depend per se on the interest rates charged but by the general performance of the economy and the macro-economic variables that influence the profitability of the investment opportunities.

The interest rate also affects the nominal amount (size) of bad debts. This means that as interest rates increase, the amount of money to be expected as non-performing will increase in nominal values, and therefore, there is an increase in the debt caused by the increase in payments of interest rates and hence the rise of non-performing loans (Bofondi & Ropele, 2011). However, increase in lending rate affect the annuity payments or loan repayment period where the monthly annuities are not rescheduled. In both cases there is likely to be default. Increased monthly installment will serve to affect the borrower's cash flows often resulting in default whereas rescheduled loans result in borrower's fatigue especially if the period is extended for too long.

H$_{04}$: **Growth of agricultural loan portfolio has no significant effect on non-performing agricultural loans**

The fourth research objective was achieved by evaluating the null hypothesis that ggrowth of Agricultural loan portfolio has no significant effect on non-performing agricultural loans. This was evaluated using the regression results from the overall regression model in table 4. From

the regression model, the beta coefficient is =-0.025 with a p-value of 0406 which is higher than the critical p-value of 0.05 .The null hypothesis that growth of agricultural loan portfolio has no significant effect on non-performing agricultural loans is not rejected. For this variable, although the coefficients for the model was not significant, it is worth discussing the negative signs associated with the coefficients.

One of the challenges encountered by banks when lending is to precisely predict whether a loan will be fully serviced as per the agreement or loan defaults will occur within the repayment period. Banks use diverse internal techniques such as client screening to minimize loan default rates and consequently minimize levels of non - performing loans. The results of this study show that whenever the loan portfolio grow, the non-performing loans decreased. Increasing the loan portfolio was an indication of an increase in risk appetite by commercial banks as a result of the increase in real incomes and a general good macroeconomic environment. Ekrami and Rahnama (2009) stated that the high amount of non-performing loans represents high credit risk. However, since 2005 commercial banks embarked upon an upgrading of their risk management and control systems (Ekrami & Rahnama, 2009). This was after the issuance of the Risk Management Guidelines (RMGs) in 2005 and the adoption of the Risk-Based Supervision approach of supervising financial institutions in 2005. Growth in loan portfolio when well managed and proper appraisal are done does not necessarily result in default as per the study findings. However, there is a high likelihood that the banks flex terms and conditions especially during periods of economic boom which may introduce subjectivity in the appraisal process. This often results in high spikes of loan default in the subsequent periods.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1   Introduction

This chapter presents the summary of the study findings, conclusions and policy implications, and suggestions for further research.

5.2   Summary of Findings and Discussions

The study adopted the correlational research design and applied multiple linear regression models on secondary data to determine the relationship between non-performing agricultural loans and four selected factors (real gross domestic product, real effective exchange rate, Average commercial bank lending rate, and growth in agricultural loan portfolio). The study used data for the period of seven years from 2011-2017. The real gross domestic product (GDP), a real effective exchange rate (REER), and growth in agricultural loan portfolio were used as independent variables. The Non-performing loan was used as the dependent variable. The factors were selected since past studies had found them to affect the general bank Non-performing Loans but no research has been conducted in the country on the effect of the factors on agricultural non-performing loans. The population of this study comprised forty two commercial banks in Kenya but the target population is ten commercial banks' lending to the agricultural sector in Kenya. Those banks whose agricultural loan portfolio is above twenty percent of their loan book. The data were analysed using Statistical Package for Social Science software.

The overall regression model is statistically significant in the prediction of the outcome. Study variables: real gross domestic product, real effective exchange rate, growth in the loan portfolio, and average commercial rate explain 78.3 percent of the variation in the NPL (R-squared=0.783). Thus, the independent variables in the model jointly influence non-performing loans in commercial banks in Kenya. Contrary to previous studies; Khemraj and Pasha (2009); Salas and Suarina (2002); Fofack (2005); Jimenez and Saurina (2005), this study found a significant positive relationship between real gross domestic product (GDP) and non-performing loans. This suggests that with growth in the economy, non-performing loans go up pointing to a high percentage of potential borrowers scaling down their borrowing as shown by a negative correlation between growth in agricultural loans and real gross domestic product (0.841, p<0.001). The study also found a significant positive correlation between agricultural non-performing loans and real effective exchange rates. It, therefore, follows that exchange

rates positively affect the paying ability of the borrowers especially those borrowers whose produce is paid in foreign currency. If the Kenya shillings for example gains against the denomination the farmers are paid in, it essentially means their earnings are lowered as the foreign currency will exchange for a few shillings which affect their revenues.

The study did not find any significant relationship between average commercial bank lending and growth in the agricultural loan portfolio and nonperforming agricultural loans. The cost of credit is expected to have a negative impact on agricultural loans ordinarily as it affects the monthly payment amounts the borrowers are expected to pay. This study, however, found the effect to be quite insignificant which means that if the bank does their appraisal well and gives their clients an appropriate loan amount, chances of it having repayment issues will be reduced no matter the cost of credit. Most agricultural loan borrowers are appraised with a high degree of prudence resulting in the below-average amount of loan issued. This effectively buys down the risk of defaults unless when there is a huge effect of the vagaries of nature or where the loan is misapplied like paying financing living expenses instead of productive assets that generate income streams.

Equally the study shows that commercial banks that extend relatively higher levels of credit to the agricultural sector may not necessarily incur higher non-performing loans mainly attributed to the diversified nature of the agricultural loans owing to the small nature of the amounts advanced to many clients in the sector. The diverse and minute nature of agricultural borrowers help hedge against massive loan default as it is not possible for all loanees to exhibit the same loan character nor bear the same financial abilities. Equally, since the portfolio at risk is calculated by dividing the amounts in default by the outstanding loans, an increase in new loans advanced serve to show lower PAR which as per the assumptions of this study is used as a proxy to Non-Performing Loans.

5.3   Conclusions and Policy Implications

This study attempted to ascertain the effect of four selected factors (real Gross Domestic Product, real effective exchange rate, average commercial lending rate, and growth in agricultural loans on agricultural non-performing loans in the Kenya banking sector using linear regression analysis. The study has shown that macro-factors, such as the real effective exchange rate and growth in real Gross Domestic Product impacts significantly the level of non-performing loans and in this case positively to the agricultural sector default.

In particular, the study found evidence of a significant positive relationship between real GDP and non-performing agricultural loans. This means that strong performance in the real economy may result in higher non-performing agricultural loans because loans are issued to probably few borrowers which affect the ability of the commercial banks to diversify their portfolio. This is coupled with the fact that the sector is quite fragmented with many small borrowers who are normally affected by the micro and macro-economic environment. Risk of default, therefore, increases in absolute terms. During times of economic booms, micro and small outfits at the farm levels who are the majority of the banking sector loan portfolio tend to scale down their borrowing for investment in the sector as the farm productivity often satisfy their short term financial needs easily.

The study found that the real effective exchange rate has a positive association with the levels of agricultural non-performing loans reported by commercial banks suggesting that whenever there is a deterioration in the international competitiveness of the domestic economy (as reflected by an appreciation in the real effective exchange rate) this translates into higher agricultural non-performing loans. The revenues accrued from the imports reduces with the strengthening of the shillings against the foreign currency that the exporters are paid in. Tea sub-sector in Kenya for example experience huge capital gains from the deterioration of Kenyan Shillings against the dollar resulting in high revenues to the farmer who will subsequently have more loan repayment ability.

The results also showed that the average bank lending rate is not an important determinant of non-performing loans in agricultural lending in Kenya. This is contrary to the international evidence: Okorie (1986); Espinoza & Prasad (2010); Bofondi & Roplelle (2011); Ayanda & Ogunsakin (2012), whose study findings pointed out that banks which charge relatively higher real interest rates and have a penchant for taking on risk tend to experience greater risk. Cost of credit do have an impact on the annuities that the loanee have to commit to during the loan period. However, when there is prudence in loan appraisal and application of the disbursed funds in the intended productive assets, cost of credit will have minimal effect on the ability to pay a loan.

From the study findings, commercial banks must pay attention to the two factors (real GDP and real effective exchange rate) when providing loans to the agricultural sector to reduce the level of impaired loans. Specifically, commercial banks need to consider the international

competitiveness of the domestic economy since this may impair the ability of borrowers from the key export-oriented sectors that are paid in domestic currency to repay their loans which in turn would result in higher non-performing loans. The banks active in agricultural lending should also take the performance of the real economy into account when extending loans given the reality that loan delinquencies are likely to be higher during periods of economic boom. Finally, commercial banks should constantly review the complexity and diversity of the new loans to the agricultural sector and periodically like quarterly do aging analysis to ensure that the growth in agricultural loans do not serve to window dress the portfolio at risk percentage while the absolute amounts in default are increasing. However, as much as the growth in agricultural loans and average lending rates were not significant, their effect on the agricultural loan portfolio cannot be underrated. Commercial banks should trade with high prudence to curb a possible impairment due to reckless lending and over-estimation of the borrower's ability to pay back.

Commercial banks should carefully monitor loan growth on the individual level, since high rates of loan growth are associated with of bank risk-taking. Moreover, they should be aware of the development of aggregate credit growth, since our results show that banks reduce their lending standards and become more risky during periods of excessive lending growth at the country level. This even affects those banks that do not exhibit high rates of individual loan growth compared to their competitors. With respect to aggregate credit growth this study therefore, provides support for the introduction of countercyclical capital buffers which should reduce credit growth and the build-up of systemic risk during booms.

5.4   Suggestion for Further Research

This study focused on the data on the flexible interest regime. With the enactment of interest cap legislation that effectively specified loan pricing, it would be of great interest to see the effect of the enactment on non-performing agricultural loans; the growth of agricultural loan portfolio and financial inclusion

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APPENDICES

Appendix I: Commercial Banks in Kenya

1.	African Banking Corporation Ltd(ABC Bank)	30) KCB Bank Kenya Limited
2.	Bank of Africa Kenya Ltd	31)Middle East Bank Kenya
3.	Bank of Baroda (Kenya) Ltd.	32) National Bank of Kenya
4.	Bank of India	33)NIC Bank
5.	Barclays Bank of Kenya	34)Oriental Commercial Bank
6.	CFC Stanbic Holdings	35)Paramount Universal Bank
7.	Charterhouse Bank (statutory management)	36) Prime Bank (Kenya)
8.	Citibank N.A. Kenya	37) SBM Bank
9.	Commercial Bank of Africa(CBA)	38) Sidian Bank
10.	Consolidated Bank of Kenya	39)Spire Bank
11.	Co-operative Bank of Kenya	40) Standard Chartered Kenya
12.	Credit Bank	41)Trans-National Bank Kenya
13.	Development Bank of Kenya	42)United Bank for Africa
14.	Diamond Trust Bank(K) Ltd	43) Victoria Commercial Bank
15.	Ecobank Kenya Ltd	
16.	Equatorial Bank	
17.	Equity Bank (Kenya) Ltd	
18.	Family Bank Limited	
19.	Fidelity Commercial Bank Limited	
20.	First Community Bank	
21.	Giro Commercial Bank	
22.	Guaranty Trust Bank (Kenya) Limited	
23.	Guardian Bank Limited	
24.	Gulf African Bank Limited	
25.	Habib Bank	
26.	Habib Bank AG Zurich	
27.	Imperial Bank Ltd (under receivership)	
28.	I&M Bank	
29.	Jamii Bora Bank	

Source: CBK bank supervision report 2017

Appendix II: Commercial Banks Lending toAgricutural Sector in Kenya

1. Kenya Commercial Bank,

2. Equity Bank,

3. Transnational Bank,

4. Family Bank,

5. SBM Bank(formerly Chase Bank),

6. Cooperative Bank,

7. Jamii Bora Bank,

8. Diamond Trust Bank,

9. CFC Stanbic Bank

10. Sidian Bank (formerly K-Rep Bank Ltd).

Source: CBK bank supervision report 2017

Appendix III: Sample of Collected Data

Real GDP, (KES Million)	MONTH	Qrt	Real GDP (KES Millions)	percent Real GDP growth	Real effective exchange rates(Average exchange rate against USD)	Gross agricultural loans (Kshs, Billions)	Growth in the loan portfolio (percent)	Total Agricultural non-performing loans (Kshs, Billions)	Average Commercial Bank Lending Rate
2010	**Dec**	**Q4**	789,245	11.6		**49.4**		4.6	
2011	Mar	Q1	845,684	7.5	82.24	**45.125210**	-8.65	4.219	13.96
2011	Jun	Q2	818,325	6.6	86.12	**50.93819**	12.88	4.90	13.9
2011	Sep	Q3	807,482	6.1	93.01	**57.86940**	13.61	5.10	14.42
2011	Dec	Q4	823,748	4.4	93.87	**55.09778**	-4.79	4.219	17.92
2012	Mar	Q1	880,802	4.2	84.13	**52.47081**	-4.77	4.10	19.91
2012	Jun	Q2	853,430	4.3	84.12	**56.24349**	7.19	4.10	20.21
2012	Sep	Q3	847,709	5	84.23	**57.91751**	2.98	4.40	20
2012	Dec	Q4	862,398	4.7	85.57	**59.23459**	2.27	5.050	18.32
2013	Mar	Q1	934,348	6.1	86.72	58.13246	-1.86	4.41	17.9
2013	Jun	Q2	917,590	7.5	84.61	57.51131	-1.07	5	17.43
2013	Sep	Q3	902,361	6.4	87.25	57.71071	0.35	5	16.95
2013	Dec	Q4	892,522	3.5	85.9	61.54876	6.65	5.588	16.96
2014	Mar	Q1	982,917	5.2	86.33	63.90459	3.83	6	17
2014	Jun	Q2	972,761	6	87.25	67.38948	5.45	5.20	16.67
2014	Sep	Q3	944,087	4.6	88.24	73.06993	8.43	4	16.4
2014	Dec	Q4	942,421	5.6	89.88	76.99497	5.37	4.670	15.98
2015	Mar	Q1	1,039,239	5.7	91.52	75.40361	-2.07	5.14	15.62
2015	Jun	Q2	1,026,664	5.5	95.84	85.58032	13.50	5.61	15.57
2015	Sep	Q3	1,001,479	6.1	102.97	92.11161	7.63	5.66	16.08
2015	Dec	Q4	994,519	5.5	102.38	89.61098	-2.71	8.435	17.35
2016	Mar	Q1	1,095,133	5.4	101.91	92.54925	3.28	7.529	17.93
2016	Jun	Q2	1,091,534	6.3	101.04	100.08832	8.15	8.7	18.14
2016	Sep	Q3	1,058,497	5.7	101.34	97.44762	-2.64	8.8	16.54
2016	Dec	Q4	1,055,139	6.1	101.73	97.32024	-0.13	9.1	13.69
2017	Mar	Q1	1,147,736	4.8	103.41	89.31823	-8.22	9.3	13.65
2017	Jun	Q2	1,143,183	4.7	103.34	88.1877	-1.27	8.65	13.66
2017	Sep	Q3	1,108,133	4.7	103.52	91.39533	3.64	10.14	13.68
2017	Dec	Q4	1,111,532	5.3	103.35	85.44977	-6.51	9.000	13.68

Appendix IV:Data Collection Schedules

Gross Non-Performing Loans in Millions

	Period						
Sectors	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Agriculture							
Manufacturing							
Building & Construction							
Mining & Quarrying							
Energy & Water							
Trade							
Tourism/Hotel/Restaurant							
Real Estate							
Financial Services							
Personal/Household							
Total							

Source: CBK Supervision Reports 2011,2012,2013,2014, 2015, 2016 and 2017

Gross Loans (In Millions)

Sectors	Period						
	2011	2012	2013	2014	2015	216	2017
Agriculture							
Manufacturing							
Building & Construction							
Mining & Quarrying							
Energy & Water							
Trade							
Tourism/Hotel/Restaurant							
Real Estate							
Financial Services							
Personal/Household							
Total							

Source: CBK Supervision Reports 2011,2012,2013,2014, 2015, 2016 and 2017

Agricultural Portfolio at Risk (% PAR

	Period						
	2011	2012	2013	2014	2015	2016	2017
Amount of agricultural portfolio at risk							
%PAR							

Source: CBK Supervision Reports 2011, 2012, 2013, 2014, 2015, 2016 and 2017

Gross Domestic product

	Period						
	2011	2012	2013	2014	2015	2016	2017
Real GDP,2001 prices(KES Billions)							
% Real GDP growth							

Source: Kenya national bureau of statistics 2011, 2012, 2013, 2014, 2015, 2016 and 2017

Real effective exchange rate against USD

|	Period						
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Real effective exchange rates(against USD)							

Source: CBK Supervision Reports 2011, 2012, 2013, 2014, 2015, 2016 and 2017

Average Commercial Banks Lending Interest Rates

Interest rates	Period				
	2011	**2012**	**2013**	**2014**	**2015**
Average Commercial Bank Lending Rate					

Source: CBK Supervision Reports 2011, 2012, 2013,2014,2015,2016 and 2017

Appendix V: Key Data Analysis Output
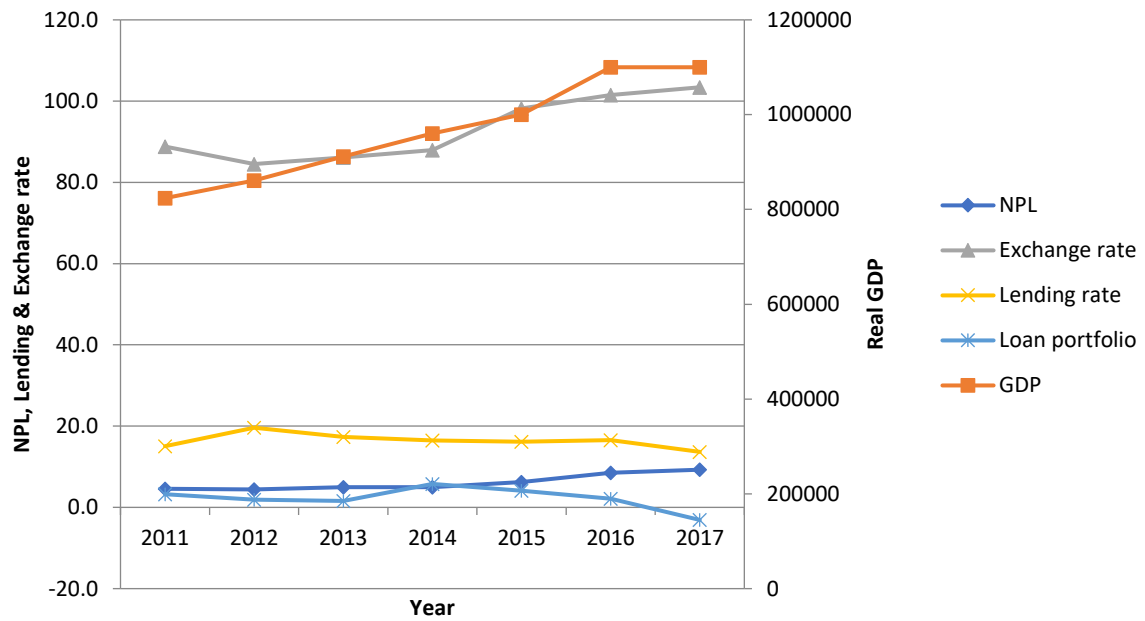
Appendix VI: Abstract page of publication

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Effect of selected factors on non-performing agricultural loans in commercial banks in Kenya

Boiyon Geoffrey Kibet, Richard Nyaoga* & Robert Kingwara*

School of Business, Egerton University, Kenya
*Department of Accounting and Finance, Egerton University, Kenya.

Email address:
boiyon2003@yahoo.com

Abstract: Commercial banks plays a crucial role in agricultural sector in advancing farmers affordable credit to improve their productivity, enhancing their food security and expanding their income. Financing of the sector however continues to get the lowest levels of credit in Kenya compared to other sectors due to poor loan repayment. This study aimed to establish the effect of macro-economic factors of Gross Domestic Product (GDP), real effective exchange rate and the lending rate on agricultural non-performing loans (NPL) and to assess the effect of growth in loan portfolio on agricultural NPL. Secondary data relating to commercial banks' lending to the agricultural sector for a period of 7 years from 2011 to 2017 was collected from forty-two commercial banks in Kenya. Results showed that agricultural NPL had a strong positive correlation with real GDP (0.836, $p<0.001$), real effective exchange rate (0.865, $p<0.001$) and weak inverse correlation with the average bank lending rate (-0.48, $p<0.01$). The study concluded that improvement on borrowers' appraisal to establish appropriate loan amount is critical in reducing NPL no matter the cost of credit when there is less effects of the vagaries of nature. The banks active in agricultural lending should also take the performance of the real economy into account when extending loans given the reality that loan delinquencies are likely to be higher during periods of economic boom. Finally, commercial banks should constantly review the complexity and diversity of the new loans to the agricultural lending and periodically like quarterly do aging analysis to ensure that the growth in agricultural loans do not serve to window dress the portfolio at risk percentage while the actual amounts in default are increasing.

Keywords: Agricultural loans, credit, non-performing loans, macro-economic environment, GDP, interest rates

Appendix VII: Research Permit

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