

**THE RELATIONSHIP BETWEEN SELECT MACROECONOMIC
VARIABLES AND LOAN DEFAULT RATE IN KENYA**

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DECLARATION

This research project is my original work and has not been presented for award of any degree in any University for examination purposes.

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DEDICATION

This project is dedicated to my father and mother who have given so much to get me here.

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ABBREVIATIONS AND ACRONYMS

CBK	Central Bank of Kenya
CPI	Consumer Price Index
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
KBRR	Kenya Banks' Reference Rate
KNBS	Kenya National Bureau of Statistics
KRA	Kenya Revenue Authority
MFI	Microfinance Institutions
MPC	Monetary Pricing Committee
NPL	Non-Performing Loans
OLS	Ordinary Least Squares
VIF	Variance Inflation Factor

ABSTRACT

Rising non-performing loans (NPLs) has been a concern for the banking industry in Kenya. This study therefore examined the relationship between select macroeconomic variables and the loan default rate among commercial banks in Kenya. The macroeconomic variables studied were inflation rate, lending interest rate, exchange rate of the US dollar to the Kenya Shilling and public debt as a percentage of the Gross Domestic Product (GDP). The loan default rate was represented by the net non-performing loans as a percentage of gross loans and advances. Secondary data extracted from the Central Bank of Kenya (CBK) monthly reviews for the period 2006-2013 was analyzed using Stata V14.1. A descriptive research design was adopted and summary statistics presented in tables. The study used an Ordinary Least Squares (OLS) model with Newey-West standard errors to estimate the model parameters. Public debt was the only independent variable that had a positive relationship with the loan default rate. Inflation, lending interest rate and the exchange rate were found to be negatively correlated with the dependent variable. Using p values, it was established that lending interest rate and the exchange rate were significant while inflation and public debt were not significant in the regression model.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Lending markets are greatly influenced by the macroeconomic environment (Gremi, 2013). The default decision by a borrower is an economic decision based on the prevailing macroeconomic conditions. Macroeconomic variables are factors which affect the entire economy as opposed to individual or bank-specific factors. They change depending on the stage of the economic cycle and include Gross Domestic Product (GDP) growth rate, exchange rates, balance of payments, unemployment, inflation and interest rates.

GDP growth rate has been found to have a negative correlation with the loan default rate. Makri, Tsagkanos and Bellas (2014) in their study on selected Eurozone countries confirmed that GDP growth rate has a strong negative relationship with non-performing loans. Interest rate and public debt exhibit a positive correlation with the default rate. Rising levels of these factors erode disposable income and the ability to pay for borrowers thereby increasing delinquencies and default rates. The relationship between non-performing loans (NPLs), inflation and exchange rates is indeterminate and may be positive or negative.

Several theories have been advanced to explain the relationship between the macroeconomic variables and the default decision. Possibly the earliest theory is the debt deflation theory developed after the great depression in the 1930s. Fisher (1933) suggested that falling commodity prices result in a stronger currency thereby increasing the real value of debt over time. This constrains borrowers and increases delinquency.

Borrowers then sell their assets in order to service some of their debts. An increase in supply of assets lowers prices further leading to a deflation spiral. Ben Bernanke, the American economist is credited with having introduced the financial accelerator theory of default. The accelerator effect refers to the amplifying of economic activity from seemingly small initial shocks. He argued that lenders, due to inability to fully observe the borrowers' actions, have to charge a premium on loans. The higher the premium, the higher the likelihood of default. The increased premium also lowers expenditure, magnifies the initial shock resulting in an accelerating effect.

NPLs in Kenyan commercial banks have been on an increasing trend in the last couple of years. There has been marked improvement in the last ten years with the percentage of net NPLs to gross loans advanced falling from a high of 5% in 2006 to a low of 1.2% in 2011. However since then, NPLs have been on a steady climb and have grown at a faster rate than the gross loans advanced. Between 2013 and 2014, net NPLs grew at 36.8% compared to 22.9% in gross loan advanced (CBK, 2014). Some of the players in the Kenyan banking sector attribute this to 'over-banking' of the population which is a situation where there are many small or medium sized banks instead of a few large banks. Smaller banks are not able to conduct proper screening and monitoring of customers increasing the possibility of loan defaults. Some of the determinants of NPLs are therefore bank-specific.

Since August 2015, three Kenyan banks have been placed under receivership. One of the banks put under receivership and two other banks declared losses for the financial year 2015. There has been concern that banks are under-capitalized and have been understating loan provisions for bad and doubtful debts in order to declare higher profits (Ngigi, 2016). The Central Bank has been quick to assure investors and the public that this shall not result in a financial crisis noting that the reasons involved were not similar

for the three banks. However, there is need to understand causes of rising NPLs in the face of rising interest rate and burgeoning public debt.

1.1.1 Macroeconomic Variables

Macroeconomics is the branch of economics that deals with the entire economy as compared to individual markets studied in microeconomics. The main macroeconomic variables are gross domestic output, unemployment, inflation rate, interest rates and exchange rates. Inflation is defined as the general rise in prices. In Kenya, inflation is determined by calculating the percentage change in the Consumer Price Index (CPI) over a year. The CPI is the weighted aggregate change for a given basket of goods for a given year in relation to the base year (KNBS, 2016). The advantage of measuring inflation using the CPI is that it is a good representation of general prices if the basket of goods is broad enough to cover consumer expenditure patterns.

Measuring inflation does present some challenges, the first being the substitution bias. There's an assumption that consumers continue to consume the same goods and/or services even when the prices are rising. The reality is that many consumers substitute the goods for cheaper ones when prices rise (Moulton, 1996). This is likely to result in a higher CPI than is the case. CPI also does not take into account a change in the quality of the goods in the basket. A change in price is attributed to inflation and not an improvement in the quality of the good which could very well be the case.

The last challenge is that over time, spending patterns could change making the basket of goods less representative of expenditure patterns (Lebow & Rudd, 2006). Consumption also varies across age groups and social classes. For example, electronic gadgets are among the most highly traded items in Kenya. However, the majority of the consumers are young people. If the CPI includes these items, the overall inflation rate might not be

applicable to older individuals who aren't buying the gadgets as much.

Interest rate is the amount charged by lenders for money lent out to borrowers. Lenders will consider different factors before arriving at a given interest rate. The risk profile of the borrower is important when setting interest rates. The riskier the customer, the higher the rate is likely to be (Ledgerwood, 1998). This is evident when looking at the rates charged by microfinance institutions (MFIs). Most MFIs charge relatively higher rates than the formal banking sector because the risk associated with their target market is high.

In Kenya, the Central Bank of Kenya (CBK) has the mandate of setting the base rate. This is done by the Monetary Pricing Committee (MPC) which is chaired by the CBK governor. The MPC sits at least once every two months and sets the rate depending on the prevailing economic condition and the desired monetary policy (CBK, 2016a). The meetings can be more frequent depending on the need and if the chair is requested in writing by at least four members.

In order to improve the pricing of loans and enhance competitiveness, the CBK introduced the Kenya Banks' Reference Rate (KBRR) in July 2014. It is computed as the average of the Central Bank Rate and the two-month weighted moving average of the 91-day Treasury bill rate (CBK, 2016b). Commercial banks will then add a markup on the KBRR when arriving at their lending rates. Since the interest rates vary from bank to bank, the monthly average lending rate shall be used as the interest rate in the model.

Exchange rate is the price of one currency in terms of another i.e. the number of units of one currency in terms of a unit of another currency. The exchange rate can be a spot rate (the price at which immediate transactions are carried out or within two working days of interbank transactions) or the forward rate (price for future delivery of currency).

Usually, the CBK publishes the bid, ask and mean price of commonly traded currencies for large transactions. Exchange rate regimes can be fixed, freely floating, managed float or pegged exchange rates. Kenya operates a freely floating regime which means that the exchange rate is determined by the forces of demand and supply though the government can intervene through monetary policy to achieve desired macroeconomic conditions (CBK, 2016c). For the purpose of this study, the monthly mean of the US dollar shall be used as the exchange rate.

Public debt is the total of money owed by the government to other governments, multilateral organizations, private individuals or institutions and commercial banks. Governments borrow to finance the budget deficit also known as the finance gap which is the net of total budgeted expenditure less budgeted revenue. Primarily, governments raise money through taxation which can either be direct (such as personal or corporate taxes) or indirect taxation (Value Added Tax and excise taxes). Kenya Revenue Authority (KRA) projected to fund up to 86.3% of the 2014/2015 budget in tax revenues which it managed to do raising Sh 1.001 trillion. In the past, KRA has found it difficult to meet its target due to tax evasion and poor regulatory

Vision framework. In order to fill the financing gap, the government has had to borrow raising public debt from Sh 1.1 trillion in 2010 to Sh 2.4 trillion in 2014 (CBK, 2014). 2030 set out the path for Kenya to achieve middle-income status by the year 2030. The secretariat identified flagship projects in various sectors of the economy meant to spur economic growth towards this end. Majority of the projects identified require intensive capital investment to implement such as the Standard Gauge Railway and the Lamu Port-South Sudan-Ethiopia Transport corridor. The government has had to borrow heavily to finance these projects and in 2014, it issued a Eurobond of \$2.8 billion. The rebasing of the economy on September 30 2014 increased the size of the economy by 25% (“Kenya's

economy grows by 25% after recalculation”, 2014) increasing the debt capacity of the economy and making Kenya a lower middle income country. While the government says that the level of public debt is sustainable, experts are worried that the debt level is too high leaving the economy vulnerable to external shocks. This has already begun to be seen with the weakening currency increasing the debt burden of the country.

Reinhart and Rogoff (2008) observed that high level of public debt is almost always a precursor to financial crises such as the 1980s American crisis. Public debt shall be measured as percentage of GDP and it is expected that public debt and loan default will have a positive correlation. This is because public debt is serviced by tax collected from the citizenry. Higher taxes reduce disposable individual income and increase the rate of loan default.

1.1.2 Loan Default Rate

A loan is considered to be in default when the borrower falls behind in the scheduled monthly payments. Usually, the borrower is assumed to be delaying payment if he misses one payment and the lender will only issue a notice of default when the payment has been late by 90 days (Saba, Kooser & Azeem, 2012). This is however not a fixed timeline and differs among countries and different lenders depending on policy and borrower characteristics. This presents a challenge in acquiring standardized data on loan default because what one lender considers delinquent is default to another.

In the same study, Saba et al. 2012 observe that default is determined by the outcome of the delinquency. If the borrower resumed making payments, then the loan would be considered to be reperforming. The CBK through its Prudential Guidelines on Risk Classification of Assets and Provisioning has classified loans into five based on asset quality. The five categories are normal, watch, substandard, doubtful and loss. The CBK

requires banks to adequately provide for doubtful and bad debts. The default rate shall be calculated as the net NPLs divided by the gross loans which is also the measure of loan asset quality (CBK, 2011). Net NPLs are gotten by subtracting interest in suspense and specific provisions from the gross NPLs.

1.1.3 Relationship between Select Macroeconomic Variables and Loan Default Rate

Past studies have shown interest rates to have a positive correlation with default. A great number of the studies done have focused on the relationship between the two. Rising interest rate increase the monthly payments the borrower has to make thereby constraining his/her income. Failure to service the loans leads to an increase in the default rate. This relationship has been confirmed by Ekanayake and Azeez (2015) and locally, Warue (2013).

Inflation is known to have an indeterminate relationship with default rate. Initially, rising prices decrease the real value of the debt making it easier for borrowers to pay off their debts. Inflation erodes savings, disadvantages the lender but benefits the borrower. As inflation rises towards hyperinflation, a rise in default rates is likely. This is because wages are not generally adjusted for inflation as soon as prices rise (Škarica, 2014). However, since inflation in Kenya is usually a single or double digit figure, it is expected that there will be a negative relationship with the dependent variable.

Exchange rate has also been observed to have an indeterminate relationship with default rate. For export-oriented firms, a strengthening local currency makes their products less competitive than those from other countries. Revenues to these firms are likely to go down resulting in constrained cash flow and inability for the firms to meet their debt service requirements (Doğanlar, 2002). Kenya is heavily dependent on exports. The top revenue earners for Kenya are agriculture (specifically tea, coffee, horticulture) and

tourism both of which are heavily dependent on the exchange rate. For banks with a high proportion of their assets denominated in foreign currency, a strengthening local currency is likely to result in a higher level of exposure. It can also make it easier for local borrowers to pay off their foreign denominated loans. The net effect on the NPLs and bank performance depends on which of the two effects is stronger.

In their study on NPLs in the Eurozone, Makri et al. (2014) found that the level of the NPLs moved with the level of public debt. Because government borrows from commercial banks as well, heavy borrowing restricts the banks' ability to lend making it difficult for borrowers to refinance in the face of rising interest rates. Further, in order to finance the loan payments, the government may introduce contractionary fiscal measure such as reduction in wages to cut costs. This results in lower personal income and raises the level of unserviced loans. It is expected that the two variables will have a positive correlation.

When looking at macroeconomic variables, lagged forms of the variable can be included since the economy and consumer behavior do not adjust immediately (Brown, 1952). This could take a few months or even a year. Current macroeconomic levels might have less impact on the default rate than the previous period's rate. However, lagged variables are often associated with serial correlation in time-series.

1.1.4 Banking Sector in Kenya

There are 43 commercial banks and 1 mortgage finance company licensed by the Central Bank of Kenya. Of these, 26 are locally owned, 14 are foreign owned and 3 are publicly owned. Commercial banks are regulated by the Banking Act Cap 488. Banks are classified into three depending on a weighted index based on customer deposits, asset base, number of loan accounts, number of deposit accounts and capital reserves. Using

this categorization they are classified as large, medium or small banks. The top 6 banks have 49.9% of the market share, 16 medium banks command 41.7 % and the 20 small banks just 8.4% as at December 2014 (CBK, 2014).

There have been many innovations in the banking sector all aimed at widening the financial inclusivity, increasing transparency and efficiency and enhancing customer experience. Agency banking has enabled banks to increase their reach without having to incur huge setup costs driving up their profitability (Kambua, 2015). Mobile and internet banking have also enhanced bank efficiency and improved seamless integration of banking services and other financial services. Embracing emerging trends in the banking sector has had multiple benefits for the players involved. The banks have been able to increase their efficiency and lower operational costs thereby achieving higher returns. The customer experience has been enhanced and the government has been on target to achieve its financial inclusivity goal by bringing more people into the formal banking sector. This has made it easier to carry out its supervisory role through the CBK and to monitor the progress of growth.

In July 2014, the KBRR was introduced to ensure efficiency and transparency in the sector and improve loan pricing by increasing competition (CBK, 2016b). However, loans have remained highly priced necessitating legal action to cap interest rates. The International Monetary Fund in 2014 had warned that banks were under-providing for bad and doubtful debts in order to declare higher profits. After three banks were placed in receivership, the CBK advised banks to reclassify their loans in order to better reflect their financial position.

The spread between the lending and borrowing rates in Kenya is relatively high ranging between 8-10% in the last five years (World Bank, n.d.). The price of loans has been the

leading cause of default. Data collected by the CBK shows that net non-performing loans steadily increased from Sh 23.6 billion in 2006 and stood at Sh 48.54 billion in 2014. Gross loans advanced grew from Sh 473.1 billion to Sh 1.94 trillion during the same period (CBK, 2014). Loan default has therefore been on an increasing rate which is a concern not just for banks but also for borrowers and the government alike.

1.2 Research Problem

Loan default is a big concern for commercial banks and the government. One of the roles banks and other lenders play is financial intermediation. This is the process of linking savers to borrowers. NPLs reduce bank profitability and inhibit their intermediary function as a result of illiquidity and poor cash flow. If NPLs are left unchecked they can exceed bank core capital and precipitate a financial crisis as was the case during the 1990s. The causes of NPLs can be bank-specific or macroeconomic variables (Warue, 2013). The interdependence of the financial sector and the macro economy was highlighted during the Global Financial Crisis of 2008.

Locally, the level of net non-performing loans as a percentage of total outstanding loans has grown every year to its current 2.5% (CBK, 2014). This is a 35.8% growth from 2013 compared with a 22.9% increase in gross loans and advances during the same period. Net non-performing loans are therefore growing faster than total credit disbursed which could strain credit providers in the foreseeable future. This is a concern as gains made in the banking and financial sector could be eroded if the trend is not reversed.

Different studies have established the effect and significance of interest rates, exchange rate, inflation and public debt on NPLs. By focusing on the macro economy, this study will have focused on systemic risk beyond the control of the individual borrower. A review of most of the local literature (Kamunge, 2013; Musau, 2014 and Kariuki, 2014)

indicates that most studies focus on only some of the macroeconomic variables with a bias towards interest rates. As a result, some of the models used have had low predictive capability for the dependent variable. Further, none of the local studies have looked at the relationship between public and private debt. By adding more variables, it is hoped that the model used shall remedy these shortcomings. The purpose of this study is to establish the relationship between select macroeconomic variables and the loan default rate in Kenya.

1.3 Research Objective

The general objective of the study is to establish the relationship between select macroeconomic variables and the default rate in Kenya.

The specific objectives of the study are:

1. To establish the relationship between interest rate and default rate in Kenya
2. To establish the relationship between inflation rate and default rate in Kenya
3. To establish the relationship between exchange rate and default rate in Kenya
4. To establish the relationship between public debt and default rate in Kenya

1.4 Value of the Study

The benefits of this study are multifaceted: to the commercial banks, borrowers and to the government. By looking at the macro economy, the focus is given to the entire economy rather than looking at individual borrower characteristics such as the Loan to Value ratio. The bank is able to understand the impact of the prevailing economic condition on its loan asset portfolio and to predict this impact in time. The borrower gains an understanding of what informs his default decision and how the changes in these macroeconomic variables are likely to influence his decision.

For the government, identification of these factors and their magnitudes will help in policy making. Due to the globalization of the world economy, the economic shocks in one country are likely to spill over to other countries. This means that the Kenyan economy is not isolated and a downturn in the world economy can very easily be transmitted to the local economy. For example, what started as a recession in the USA soon turned into the Global Financial Crisis. The aftermath of this was the European Debt Crisis which economies like Greece are still grappling to deal with. It is therefore important for the government to anticipate these changes and formulate policy on how to deal with negative shocks in the economy.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter looks at the main theories advanced to explain loan default. They include the debt deflation theory, the financial accelerator theory and the information asymmetry theory.

2.2 Theoretical Review

It outlines the structure of the study, how the studies on the relationship between variables have evolved and how these theories inform the research study.

2.2.1 Debt Deflation Theory

This theory was developed by Irving Fisher to explain the Great Depression of the 1930s. It confirmed the feedback mechanism between lending markets and economic performance. Deflation occurs when prices are falling in contrast to inflation which is the general trend of rise in prices. Falling price levels make the local currency stronger and increases the real value of debt over time. This increases the indebtedness of borrowers, placing an extra burden on them and makes it more difficult for them to service their loans (Fisher, 1933). Because most loans are collateralized, borrowers will often “distress sell” the assets used to secure the loans in an attempt to repay their loans. Increasing supply of assets in the market leads to further reduction in prices leading to even more deflation. This positive feedback mechanism is called a deflation spiral.

Wolfson (1996) observed that falling asset prices initiated and perpetuated the debt deflation process. He further observed that financial crises could cause debt deflation

which could in turn negatively impact the banking system. This confirms the feedback mechanism put forward by Irving Fisher. The debt-deflation theory suggests the relationship between the non-performing loans and the macroeconomic variables – exchange rates, interest rate and inflation rate.

2.2.2 Financial Accelerator Theory

The theory was developed by Ben Bernanke who theorized that small adverse shocks in the economy will have greater than normal effects on the financial markets. He suggested that credit rationing was caused by an increase in the agency costs. Since lenders are not able to observe the borrowers actions fully, an extra premium is charged on funds loaned otherwise known as the “agency cost of lending” (Bernanke, Gertler & Gilchrist, 1996). The premium charged and the net worth (the summation of internal funds and collateral of the loan) of the customer are inversely related. When the premium is increased, the net worth of the customer decreases leading to a decline in his/her spending. A decline in the expenditure magnifies the credit squeeze thereby leading to an accelerator effect.

Ćorić (2011) observed that the lower the net worth of the customer, the more divergent the interests of the borrower and lender are. Greater divergence will cause lenders to increase the premium or interest rate of the loan leading to an increase in the likelihood of default. The financial accelerator theory therefore influences default through the lending interest rate. It can also make the case for the loan to value ratio to be included as an independent variable as a proxy of the net worth of the customer.

2.2.3 Information Asymmetry Theory

This theory suggests that default occurs when there is information asymmetry between

the borrower and the lender. Due to the asymmetry, two problems arise: adverse selection and moral hazard, both a result of the agency problem. The bank in this situation becomes the principal while the borrower is the agent. Adverse selection happens when the lender is not able to observe all the characteristics of the borrower. This means that the lender cannot differentiate the credit worthy customers from those who aren't. The lender therefore sets the rates higher than they normally would to mitigate against any risk of default. Higher interest rates crowd out even the credit worthy borrowers leading to low borrowing levels and higher default rates (Pagano & Jappelli, 1993).

Moral hazard happens when the loan has already been disbursed to the borrower. The lender may not be able to observe the actions of the borrower who takes advantage of this information asymmetry. If the borrower does not face any consequences as a result of default, this may encourage delinquency and increase NPLs. Both adverse selection and moral hazard can be solved through information sharing through credit reference bureaus and other agencies (Jappelli & Pagano, 2002). The lender is able to assess the risk profile of the borrower before advancing the loan reducing the adverse selection problem. Because the credit score of the customer influences future borrowing, avoiding a poor score becomes an incentive for the borrower to make timely payments thereby reducing the moral hazard problem.

Pagano and Jappelli (1993) modeled the adverse selection theory of loan default and found out that information sharing increased the volume of lending. Information asymmetry affects loan defaults through the interest rate which lenders can use to deal with the adverse selection problem.

2.3 Determinants of Loan Default Rate

Different studies have established a relationship between macroeconomic variables and loan default rate. The variables include interest rate, GDP growth rate or per capita, unemployment rate, public debt, inflation and exchange rates.

2.3.1 Macroeconomic Variables

Some studies have shown inflation to have a strong negative correlation with NPLs. This relationship however exhibits two different facets depending on the level of inflation in the economy. Initially, as inflation rises, the default rate has been observed to decrease as the real value of the loan reduces. Borrowers will find it easier to service their loans. As inflation gradually rises, the default rate is likely to rise with it especially where the wages are 'sticky' and real income declines. Persistent inflation is also likely to increase the nominal rate and ultimately the NPLs (Škarica, 2014). Different authors do agree though that a significant relationship exists between the two variables (Ghosh, 2015 and Kariuki, 2014)

The single most important determinant on the individual's decision to default or not is the interest rate. Most of the studies on non-performing loans have looked at the relationship between interest rates charged and the effect on non-performing loans. Rising interest rates increase the financial obligation the borrower has to meet in terms of monthly payments. Messai and Jouini (2013) found that a rise in the real interest rates led to an increase in the NPLs in Italy, Greece and Spain. A positive relationship was also established between the real interest rate and NPLs in Kenya by Musau (2014). These findings were consistent with those of Kamunge (2013) who found that there was a positive correlation between interest rate volatility and default in Kenya.

The relationship between the exchange rate and non-performing loans can be both positive and negative. For an export-oriented firm, as the local currency strengthens, it becomes more difficult for the firm to service its loans. This is because cash inflows denominated in the foreign currency are worth less than before. This was the case in Sub-Saharan Africa during the 1990s where many firms involved in the agricultural sector were exposed to external macroeconomic shocks. However, for individuals or firms which hold debt denominated in the foreign currency, a strengthening local currency makes it easier to service debt payments resulting in declining non-performing loans. Khemraj and Pasha (2009) in their study on NPLs in Guyana found exchange rate to have a positive relationship with NPLs albeit a weak one.

High levels of public debt lead to higher levels of loan delinquency (Ghosh, 2015). This is because government is likely to introduce contractionary fiscal measures in order to raise revenue. Government is likely to raise taxes to raise revenue to meet its debt obligations. A higher level of taxes affects disposable income of the individual thereby affecting their cash flow position. When the borrower is constrained, he/she is likely to default in their loan payments. Furthermore, government may also increase taxes imposed on corporations thereby constricting the bank's ability to let its customers refinance. During times of financial constraint, customers who wish to avoid default are likely to refinance their loans. However, if this is not an option, such loans become delinquent.

Previous studies have found GDP growth rate to have a negative correlation to non-performing loans. Louzis, Vouldis and Metaxas (2012) found that a decline in the real GDP growth rate led to an increase in NPLs in Greece. Higher GDP growth rates indicate that the economy is growing and that income levels are rising. This increases the debt servicing capacity of the borrowers resulting in lower default rates (Khlein, 2013).

When the economy expands, more output is generated and consumed. The uptake of loans is higher when national output rises.

2.3.2 Bank-specific Variables

Capital adequacy is one of the factors that have been observed to be related with non-performing loans. Bank capital includes equity, retained earnings and long term debt. A bank is said to be thinly capitalized when a greater proportion of its capital is debt or leverage. Thinly capitalized banks tend to make riskier lending decisions and are likelier to have to have less stringent customer background checks than banks which have greater proportion of equity capital (Louzis et al., 2012). Consequently, the NPLs of such banks is likely to be high.

Bank profitability has also been established to have a significant relationship with NPLs in commercial banks. Makri et al. (2014) found the return on equity to be negatively related with NPLs in the Eurozone. This confirmed the ‘bad management’ hypothesis suggested by Louzis et al. (2012) where they observe that poor management influences the attitude of a bank towards risky investments and leads to higher NPLs. The quality of management determines the performance of banks and because return on equity and return on assets are measures of profitability, both ratios can be used as a proxy of management quality.

Bank size is another factor that has been observed to influence the level of NPLs. Ekanayake and Azeez (2015) in their study on the determinants of NPLs among Sri Lankan commercial banks found that the size of the bank was inversely related to the level of NPLs. They inferred that this was because larger banks have more resources at their disposal to thoroughly screen their customers and have more opportunities to

diversify their revenue streams. Bigger banks are also able to monitor their customers better than smaller banks do.

2.4 Empirical Review

Kariuki (2014) studied the effects of macroeconomic variables on credit risk in the Kenyan banking system. He used non-performing loans as the dependent variable and time series data from 1990-2013. The independent variables were lending interest rate, exchange rate, GDP per capita growth, inflation and growth of domestic credit extended to the private sector. A census design was used for all 43 commercial banks in Kenya and regression model used to analyze the data. He found that interest rate had a positive correlation with credit risk while GDP growth per capita, inflation, exchange rate and domestic credit all had a negative correlation with the dependent variable.

Musau (2014) looked at the relationship between bank-specific factors, macroeconomic factors and NPLs. The population of study was all the commercial banks licensed by the Central Bank of Kenya. Since a census was conducted, there was no sampling and the entire group was used for the study. Secondary data from 2000-2013 gathered from the CBK and the IMF was analyzed using a multiple regression. A dynamic econometric model was used to analyze the data. He established a positive relationship between the inflation rate, real interest rate, credit growth, bank liquidity and the NPLs while GDP and capital adequacy were negatively correlated to NPLs.

Mboka (2013) also looked at the effects of macroeconomic variables on NPLS of banks in Kenya. He used systematic random sampling to arrive at a sample of 15 out of the 44 commercial banks. A descriptive design was used and data analyzed using means and percentages. The data was also presented using tables and figures and a linear regression used to estimate the parameters. GDP growth rate, exchange rate volatility, banking

sector development index and the inflation rate were found to positively correlate with the level of NPLs from the positive coefficients of the regression model. Interest rate was the only factor that negatively varied with NPLs.

In their study to determine the factors affecting the performance of commercial banks in Kenya, Ongore and Kusa (2013) looked at both bank-specific and macroeconomic variables. They used panel data for 37 commercial banks from 2001-2010. To deal with the problem of heteroskedasticity, generalized least squares was preferred over Ordinary Least Squares (OLS). The bank-specific variables used were bank performance measured by return on assets, capital adequacy of the bank, asset quality, management efficiency and the liquidity ratio. Yearly GDP and the inflation rate were the macroeconomic variables introduced in the model. Even though the two were found to be negatively related with performance, the study concluded that the bank-specific factors were more significant in explaining the independent variable.

Using pooled and fixed effects panel methods, Warue (2013) studied the effects of macroeconomic and bank-specific variables on NPLs in Kenyan commercial banks. She categorized the banks into large, medium and small banks. The macroeconomic regressors in the econometric model were real GDP, GDP per capita, inflation and the lending interest rate. Bank specific factors included credit risk management techniques, quality management factor and bank structures. A census was conducted and secondary and primary data used for the period 1995-2009. GDP per capita, real GDP and inflation were found to be negatively correlated to the level of NPLs while the lending interest rate was positively correlated. All the factors were significant across all the bank size categories with the exception of inflation which was only significant to the large banks category.

Abid, Ouertani and Ghorbel (2014) looked at the relationship between macroeconomic variables, bank-specific variables and the NPLs using a restricted Generalized Method of Moments (GMM) to estimate the parameters. Dynamic panel data from 16 Tunisian banks for the years 2003-2012 was analyzed. They also included lags of the macroeconomic variables in the baseline model. GDP growth rate, inflation and the real lending rate were found to have a positive relationship with NPLs. Because most of the loans in Tunisia are on a floating rate, an increase in interest rates makes it more difficult to service loans resulting in greater delinquencies.

In their study to determine the micro and macro determinants of NPLs, Messai and Jouini (2013) looked at panel data made up of 85 banks across Italy, Greece and Spain. The choice of the three countries was informed by the large number of defaults experienced following the 2008 financial crisis. They used purposive sampling to select the banks which were the largest banks across the three countries. A regression analysis was run for the period 2004-2008. The bank-specific variables used were profitability on assets which was established to have a negative relationship with NPLs, loans losses reserves and change of loans granted both of which were positively correlated. For the macroeconomic determinants, GDP growth rate was negatively correlated while unemployment and the real interest rate were positively correlated.

Gremi (2013) focused on the macroeconomic factors affecting the quality of lending in Albania. Credit risk was used as the dependent variable measured by the level of NPLs. The independent variables used were inflation, GDP growth rate, unemployment rate, interest and the exchange rates. He used quarterly data gathered from several secondary sources including the Bank of Albania. Regression analysis using OLS based on the Gauss-Markov theorem was used to analyze the relationship. Inflation and GDP growth had negative coefficients and were found to be statistically significant in explaining

credit risk. The interest and exchange rates were positively correlated to the level of NPLs and were also significant in the model. Unemployment was the only variable that presented a different result from the anticipated outcome. It had a negative coefficient and was found not to be significant in the model.

Louzis et al. (2012) in their study of mortgage, consumer and business portfolios looked at the macroeconomic variables and bank specific factors influencing NPLs. They used quarterly panel data for nine commercial banks in Greece for the period between 2009 and 2013. A dynamic approach that included lagged variables of the independent variables was used and a regression model ran of the data. They found that negative GDP growth rate, high unemployment, lending rates, public debt and management quality increased the level of NPLs. Business loans were greatly influenced by the level of real GDP and unemployment while interest rates were the main determinant of consumer loans. Mortgages were the least responsive of the three to macroeconomic variables studied.

Espinoza and Prasad (2010) focused on NPLs in the Gulf Cooperative Council between 1995 and 2008. They used a dynamic panel data set of 80 banks across four countries. The dependent variable underwent a log transformation to normalize the data and ensure the data was symmetrically distributed. Using OLS, fixed effects, difference GMM and system GMM methods, non-oil GDP growth and the interest rate were found to be negatively and positively related to NPLs respectively. They also used a panel Vector Auto Regression model to estimate the feedback effects between the variables. The results were the same in the short term.

2.5 Conceptual Framework

The conceptual framework could be defined as the way in which the researcher answers the research question (Woolridge, 2009). It shows the interaction the independent variables have with the dependent variable and any modifying or control variables. The conceptual framework gives the pictorial representation of the research problem but does not specify how to solve the problem.

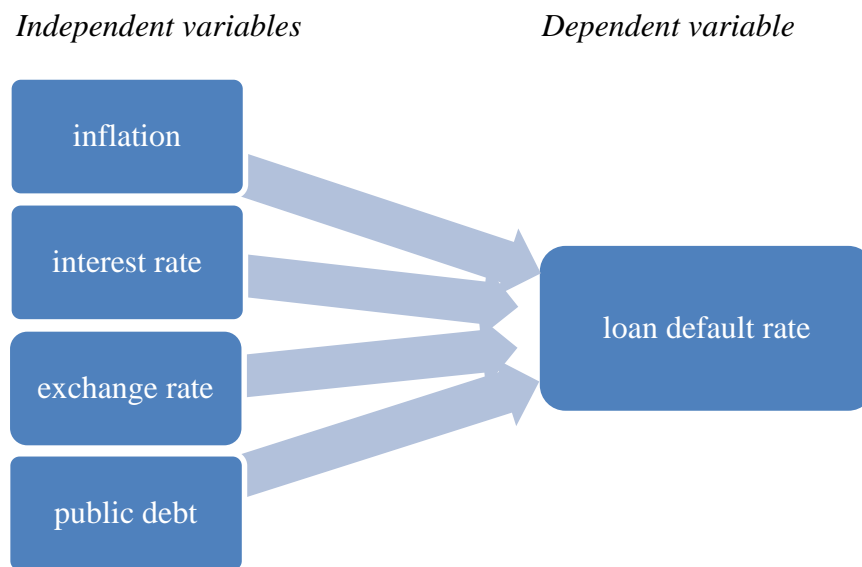


Figure 2.1 Diagrammatic Representation of the Relationship between the Variables

Figure 2.1 shows the expected relationship between the independent variables: inflation, interest rate, exchange rate and public debt with the loan default rate as the dependent variable. It is expected that the relationship will be linear and no moderating variables shall be included in the model.

2.6 Summary of Literature Review

From the studies looked at above, it is clear that the economy does affect loan default rates in Kenya and other countries. The economic cycle has a huge effect on the financial sector and its stability. Locally, majority of the studies have looked at the rate of interest and the GDP growth rate. While the impact of interest rates cannot be over-emphasized,

the studies have tended to understate the impact of the economic environment on the consumer's default decision. Looking at the macroeconomic factors involved removes the focus from a microeconomic perspective of the rational consumer and broadens it to include systemic risks beyond the control of the borrower. This study aims at establishing these factors and the extent of interaction with the borrower's default decision.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter sets out the research design, the data collection methods and the data analysis tools that were used in the study. It also sets out the tests that were done to ensure reliability of the data.

3.2 Research Design

Fraenkel, Wallen and Hyun (1993) define research design as the plan by which the researcher answers the research problem. It includes the data collection tools and the data analysis techniques the researcher intends to use. The study adopted a descriptive research design which is appropriate when studying relationships and effects of variables on other variables (questions of who, what and how much). It studies existing relationships as compared to exploratory research which looks at entirely new relationships.

3.3 Data Collection

The study used secondary data from the CBK. Data on select macroeconomic variables was extracted from CBK monthly reports. Monthly data from the year 2006-2013 was used in the study. Cooper and Schindler (2010) point out that it is inefficient to collect primary data where reliable secondary data exists. Since data on macroeconomic variables is frequently collected by different agencies and the government, the researcher relied on secondary data. Due to the rebasing of the national accounts in 2014, the study used data up to 2013 in order to have an unbroken time series.

3.4 Data Analysis

The study used Stata as the statistical package of data analysis. Mean and standard deviations were used to analyze the data. Descriptive analysis (which includes mean, standard deviation, maximum and minimum values) is useful in identifying trends at a glance. To correct for non-constant variance and autocorrelation in the error term, the study used regression with Newey-West standard errors. Though OLS produces consistent and unbiased parameters under heteroskedasticity and autocorrelation, the standard errors are no longer efficient and cannot be relied on to make inferences. The advantage of using Newey-West estimates is that the order of autocorrelation and the exact nature of the heteroskedasticity which is often difficult to determine and prone to misspecification do not have to be known (Woolridge, 2009).

The OLS regression for the study is specified as:

$$npl_i = \beta_1 + \beta_2 inf + \beta_3 intrate + \beta_4 er + \beta_5 pd + \varepsilon_i$$

Where:

npl is the loan default rate: net non-performing loans as a percentage of gross loans and advances;

$\beta_0, \beta_1 \dots \beta_4$ are the parameters to be estimated from the regression analysis;

inf is the inflation rate;

intrate is the interest rate: monthly average lending rate;

er is the exchange rate: mean US dollar to Kenya shilling rate;

pd is the percentage of public debt to GDP;

ε_i is the error term that measures the effect of all other variables not included in the model.

The loan default rate is the dependent variable while inflation, interest rate, exchange rate and public debt are the independent variables. Pearson's correlation coefficient was used to test the strength of the linear relationship between the macroeconomic variables and default. The F test was used to test the joint significance of the parameters in the regression. Hypothesis testing using the p-statistic was also carried out to determine the significance of the parameters in the model. The tolerance and Variance Inflation Factor (VIF) were used to test for multicollinearity among the variables.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The data was analyzed using Stata V14.1. Tests to confirm the assumptions about the error term were made. Due to the problem of non-constant variance and serial correlation of the error term, an OLS regression using Newey-West standard errors was run to estimate the relationship between the variables. Newey-West errors are robust under autocorrelation and heteroskedasticity and are efficient unlike normal standard errors.

4.2 Descriptive Statistics

Descriptive statistics are simple summary statistics used to describe the data and include the mean, mode, median, standard deviation, maximum and minimum values, skewness and kurtosis.

Table 4.1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
npl	96	3.234	1.381	1.3	6.9
inf	96	11.645	7.333	3.2	31.5
intrate	96	15.272	2.175	12.9	20.3
er	96	78.159	8.266	62.03	99.83
pd	96	48.044	4.354	41.3	58.1

Table 4.1 above shows the means of the variables and their standard deviations. Average loan default rate remained below 5% during the period under study hitting a maximum of 6.9% in January 2006 and a minimum of 1.3% in April 2012. The exchange rate

exhibited the highest standard deviation with inflation having the second highest standard deviation. This was mainly caused by the high inflation rates in 2008 following the post-election chaos. Lending interest rates remained high during the period under study with a mean of 15.272%. The CBK has often decried the high lending rates and large interest spreads by commercial banks. Public debt remained below 50% over the period in average although current figures indicate public debt to GDP of over 50%. Heavy borrowing since 2014 has increased public debt notably after the government issued a Eurobond of \$2.8 billion. Public debt stood at 58.9% of GDP as at December 2015.

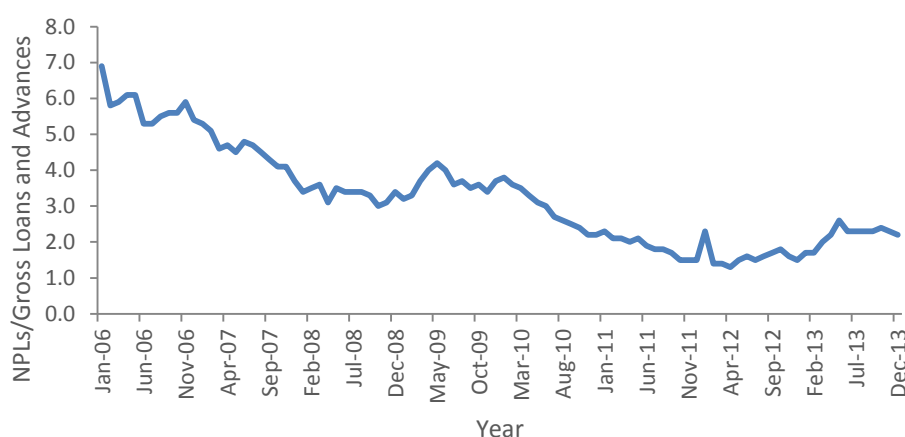


Figure 4.1 Loan Default Ratio

The percentage of non-performing loans as shown in Figure 4.1 had been on a declining trend up until 2012 where the graph starts rising again. It recorded a high of 6.9% in January 2006 and the lowest figure was 1.3% in April 2012.

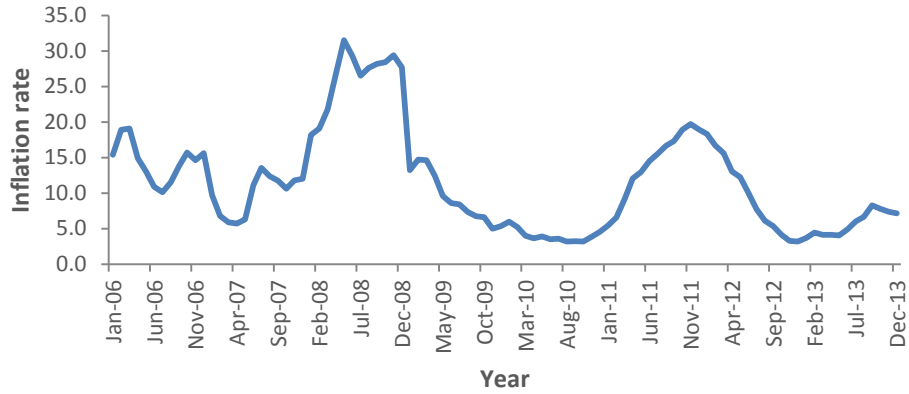


Figure 4.2 Inflation Rate

As shown in Figure 4.2 inflation does not exhibit any general trend. It peaked in 2008 following the post-election violence reaching a record 31.5%. It decreased sharply that year following tighter monetary policy, rose again in 2011 but has remained below 10% since July 2012.

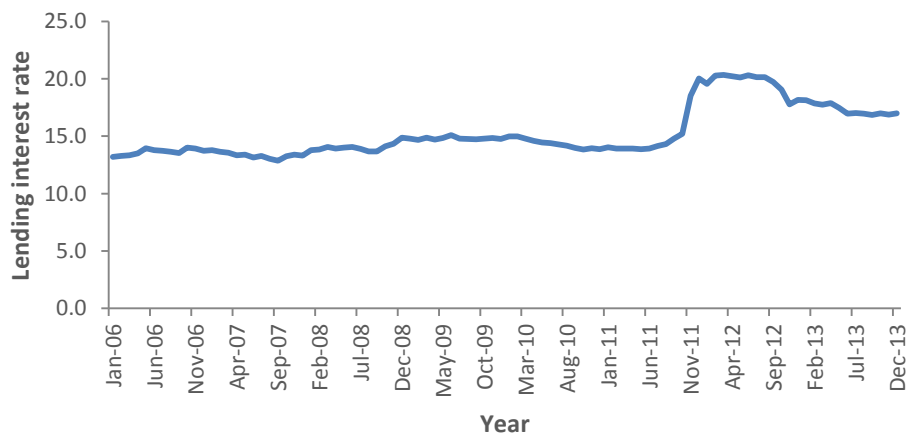


Figure 4.3 Interest Rate

Lending interest rate has remained fairly stable, fluctuating within a ten point margin as displayed in Figure 4.3. The highest rate was 20.3% in June 2012 and the lowest was 12.9% in September 2007. The mean lending interest rate over the period was 18.73%.

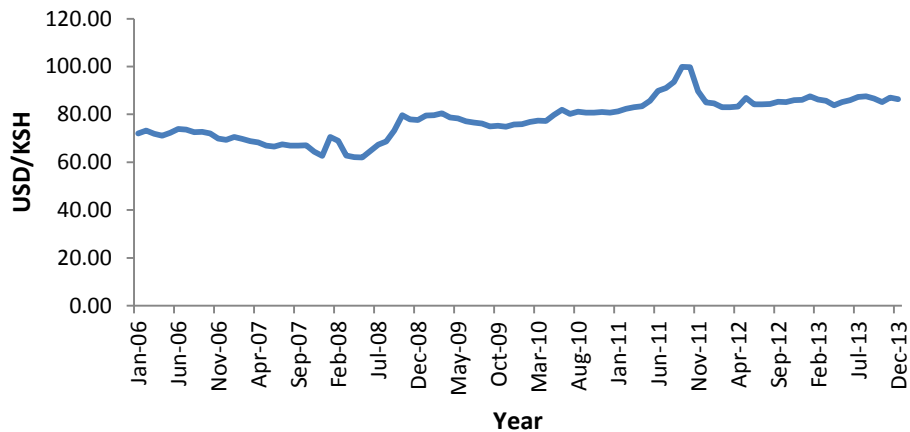


Figure 4.4 Exchange Rate

Figure 4.4 shows the movement of the Kenya Shilling against the US dollar. The shilling has gradually depreciated, reaching a low of Sh 99.83 to the dollar in September 2011 and a high of Sh 62.03 in May 2008. The standard deviation from the mean was 15.39 indicating that the exchange rate was spread out over a bigger range.



Figure 4.5 Public Debt

Public debt during the period under study had a mean of 45.4% as a percentage of GDP. Figure 4.5 shows the lowest value as 41.3% in November 2008 while the highest was 58.1% in October 2011. After the rebasing of the economy, the economy was able to support higher debt levels and the government was able to issue a \$2.8 billion Eurobond

in 2014. This pushed up public debt which stood at 58.9% as at December 2015.

4.3 Correlation Analysis

The Pearson correlation matrix shows the relationship between the variables in the model. Pairwise correlations at the 5% significance level were used and the results presented in Table 4.2.

Table 4.2 Correlation Coefficients

	npl	inf	intrate	er	pd
npl	1.0000				
inf	0.1652	1.0000			
intrate	0.1078		1.0000		
er	-0.6725*	-0.2004	0.5888*	1.0000	
pd	0.0000	0.0502	0.0000	0.5318*	1.0000
	-0.7402*	-0.2991*	0.8241	0.0000	
	0.0000	0.0031	0.0000		
	-0.1365	-0.2775*	-0.0230		
	0.1849	0.0062			

* Correlation is significant at 5% level

Inflation has a negative correlation with interest rate, exchange rate and the public debt as a percentage of GDP. Interest rate has a positive correlation with the exchange rate but a negative correlation with public debt levels while the exchange rate positively correlates with public debt. Multicollinearity can be detected in a number of ways including by the absolute value of the pairwise correlations and the VIF figure (Dormann et al., 2013). Correlation coefficients greater than 0.7 are an indication of multicollinearity. None of the coefficients exceed this number implying no

multicollinearity. This is also confirmed by checking the VIF figures as shown in Table 4.3 below. VIF figures above 10 are an indication of multicollinearity (Dormann et al., 2013). Since none of the figures exceed this number, it is concluded that there is no multicollinearity in the model.

Table 4.3 Variance Inflation Factor

Variable	VIF	1/VIF
inf	1.14	0.878120
intrate	2.05	0.488608
er	2.82	0.354914
pd	1.90	0.525451
Mean VIF	1.98	

4.4 Diagnostic Tests

Diagnostic tests were carried out to test assumptions made about the error term. The classical linear model assumes that the errors follow a normal distribution, have a constant variance, are not correlated with the independent variables and are not correlated with each other. The study therefore tested for normality of the errors, for constant variance (homoskedasticity) and for autocorrelation.

4.4.1 Test for Normality

The null hypothesis that the residuals are normally distributed was tested against the alternative hypothesis that the residuals are not normally distributed. The results of the normality test are given in Table 4.4 below.

Table 4.4 Test for Normality

Shapiro-Wilk W test for normal data					
Variable	Obs	W	V	z	Prob>z
R	96	0.981	1.553	0.975	0.165

The Shapiro-Wilk significance value is 0.165 which is greater than the critical p-value of 0.05. The study therefore failed to reject the null hypothesis and concluded that the residuals were normally distributed. The same conclusion was drawn by looking at the normal P-P plot of regression standardized residuals.

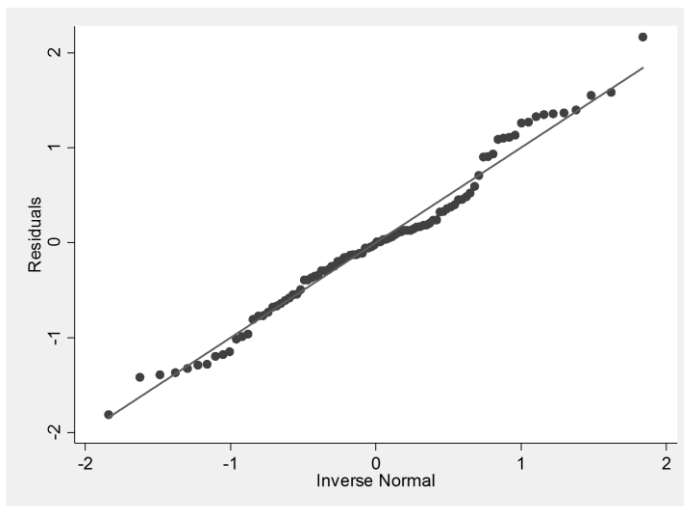


Figure 4.6 Normal Probability Plot

The standardized residuals closely followed the diagonal line with a few outliers as shown in Figure 4.6 above indicating that the residuals were normally distributed.

4.4.2 Test for Homoskedasticity

The Breusch-Pagan test which follows a Chi-Square distribution was used to test the null hypothesis of constant variance against the alternative for non-constant variance.

Table 4.5 Test for Homoskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of npl

chi2(1) = 22.59

Prob> chi2 = 0.0000

The Chi-Square statistic from Table 4.5 was less than the significance value of 0.05 and the null hypothesis was therefore rejected. It was concluded that there was heteroskedasticity in the residuals.

4.4.3 Test for Autocorrelation

The Breusch-Godfrey LM statistic was used to test the presence of serially correlated errors up to the fourth order. It was preferred because it can test for higher order autocorrelation unlike the Durbin-Watson statistic which tests for first order autocorrelation. The results are shown below.

Table 4.6 Test for Autocorrelation

Breusch-Godfrey LM test for autocorrelation

lags(p)	chi2	Df	Prob> chi2
4	76.710	4	0.0000

H0: no serial correlation

The p value associated with the Chi-Square statistic was less than the significance value of 0.05 as presented in Table 4.6. The null hypothesis was rejected and it was concluded that the errors were serially correlated. OLS using Newey-West errors to correct for heteroskedasticity and autocorrelation was therefore preferred.

4.5 Regression Analysis

The regression was run with Newey-West standard errors and a lag order of 4 specified. This means that the model only considered autoregression up to the fourth order with higher orders ignored. The rule of thumb is that the lag chosen (L) should be $L = \sqrt[4]{N}$ (Baum, 2006). N is the number of observations which is 96 in the study making the ideal number of lags $\sqrt[4]{96} = 3.13 \sim 4$.

The F test was used to test the joint significance of the independent variables in the model. The null hypothesis that the coefficients are jointly equal to zero was tested against the alternative hypothesis that the coefficients are not equal to zero. The p value is less than the significance value (α) which is 0.05 and the F calculated value 23.78 greater than the critical value of 2.53. The null hypothesis was rejected indicating that the coefficients are jointly significant in the regression model. Newey-west estimators do not return the R-squared and adjusted R-squared values.

Table 4.7 Model Coefficients

Regression with Newey-West standard errors		Number of obs =96				
maximum lag: 4		F(4,91) =23.78				
		Prob>F =0.0000				
npl	Coef.	Newey-West Std. Err.	t	P> t	[95% Conf.	Interval]
inf	-.007	.021	-0.34	0.738	-.0482	.034
intrate	-.153	.073	-2.09	0.040	-.298	-.007
er	-.123	.034	-3.59	0.001	-.191	-.055
pd	.076	.058	1.32	0.190	-.038	.191
_cons	11.617	1.793	6.48	0.000	8.056	15.178

From the results obtained in Table 4.7 above, the regression equation can be written as:

$$npl = 11.617 - 0.153int - 0.123er$$

The constant of 11.617 represents the loan default rate if the values of all the independent variables were zero. An increase in the inflation rate by one percent would lead to a decrease in NPLs by 0.007%. A decrease in the lending interest rate by one percent would lead to an increase in loan default by 0.153%. Strengthening of the local currency against the dollar by one shilling would reduce NPLs by 0.123% while a percentage increase in the level of public debt would result in an increase of NPLs by 0.076%. P values of interest rate and exchange rate are less than the critical value of 0.05% which means that the two are significant determinants of the dependent variable. The constant is also significant in the model. However, inflation and public debt are not significant.

4.6 Discussion of Research Findings

Inflation was found to negatively correlate with loan default. This is because rising inflation reduces the real value of the loan making it easier for borrowers to service their debt. At higher rate of inflation, it would be expected that rising inflation would lead to an increase in NPLs due to an erosion of purchasing power especially if wage increments do not match the rate of inflation. Though the relationship confirmed what the literature proposed, it was found to be insignificant as a determinant of loan default.

The negative coefficient for interest rate indicates an inverse relationship between the lending interest rate and loan default. The simple explanation is that lower interest rates lead to higher demand for credit otherwise known as a 'loan boom'. The increase in loans advanced ultimately leads to an increase in NPLs (İslamoğlu, 2015). Conversely,

an increase in the interest rate discourages borrowing leading to a reduction in gross loans advanced and ultimately NPLs. In Kenya, this has been the case. Due to the high interest rates charged by commercial banks, a lot of people have chosen to borrow from Saccos and investment/saving groups known as 'chamas' both of which offer cheaper and easier credit terms.

The exchange rate was found to be negatively correlated with the loan default rate. Kenya is an export-oriented country mainly dealing with agriculture, horticulture, manufacturing and tourism. All these industries are highly vulnerable to exchange rate fluctuations. A strengthening local currency reduces the demand for exports abroad constricting cash inflows for the firms involved. Export-oriented firms will find it more difficult to service loans in these circumstances. These findings were consistent with those of Khlein (2013) who found that a depreciating currency increased NPLs in Central, Eastern and South-Eastern Europe.

A rise in public debt was found to cause a similar change in the loan default rate. In order to service debt payments, government has to collect sufficient taxes. Increasing taxes reduce disposable income for the citizenry making it more difficult for them to service their debts. This results in higher loan defaults. Since 2013, the government has reviewed both VAT and excise taxes in order to boost tax revenues. The taxes are mainly for funding the budget and servicing of public debt. Ali and Daly (2010) arrived at the same conclusion after studying the level of NPLs in relation to public debt in Australia and the USA.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the study findings, policy recommendations, limitations of the study and the areas for further research.

5.2 Summary of Findings

Rising NPLs have been a concern for the banking sector in Kenya. Kenya has had a financial crisis in the 1990s when several banks went under. Recently, there has been renewed interest in banks after three banks were put under receivership. This research study focused on the relationship between select macroeconomic variables and loan default rate. Specifically, the study sought to find out the relationship between the loan default rate and the inflation rate, lending interest rate, exchange rate and the level of public debt in Kenya. Net non-performing loans as percentage of gross loans and advances was used as a measure of the loan default rate while the monthly average of the US dollar to the Kenya shilling was used to proxy the exchange rate.

Secondary monthly data was collected from the CBK regarding commercial banks. A normal OLS regression analysis was ran and tests to confirm the assumptions about the error term conducted. Though the error term followed a normal distribution, it exhibited non-constant variance and was also serially correlated. A regression with Newey-West standard errors was therefore preferred in order to eliminate the bias caused by heteroskedasticity and autocorrelation.

Public debt was found to have a positive relationship with the loan default rate while

inflation, interest rate and the exchange rate all exhibited a negative relationship with loan default rate. Inflation reduces loan default rate by reducing the real interest rate thereby making credit cheaper for borrowers. High lending interest rate have discouraged borrowing leading to a reduction in demand for loans and subsequently, a reduction in loan defaults. All variables were jointly significant in the model though only interest rate and the exchange rate were individually significant variables in the regression model.

5.3 Conclusion and Recommendations

From the results obtained in the study, it can be concluded that there is a significant relationship between the economic cycle and the health of the financial sector. With the exception of public debt, inflation, interest rate and the exchange rate all showed a negative relationship with the loan default rate. The inflation rate was found to have a direct negative effect on the loan default rate, similar to that of Gremi (2013). Rising inflation makes it easier for borrowers to pay off their loans because inflation erodes the real value of the loan. In spite of this, the government needs to monitor the rate of inflation in order to keep NPLs in check. Studies in other economies such as Turkey (Abid et al., 2014) have shown that double-digit inflation is likely to increase the loan default rate due to erosion in the purchasing power and a rise in the nominal interest rate.

Interest rate was initially expected to have a positive relationship with the loan default rate. The regression coefficient was negative indicating an inverse relationship between the two variables. Though the lending interest rate had a negative relationship with loan default, this is because the high interest rate has discouraged borrowing. Commercial banks should therefore set lower rates to encourage borrowing. However, the rate should not be too low as this would cause a growth in NPLs if proper screening is not done and loans are given to uncreditworthy borrowers. This can be countered by information

sharing among lenders. The operationalization of credit bureaus in 2009 has been a major deterrent to loan defaulting by borrowers since then.

Public debt was observed to have a positive relationship with NPLs though not significant in the regression model. This could be because the government has avoided over-borrowing in the domestic market in order to keep interest rates stable. Since some of the loans are concessional and include a grace period, the long term impact remains to be seen when the loans payments become due. There is therefore need to monitor public indebtedness and the effect it will have on the future loan default rate.

The effect of exchange rate on loan default rate was indeterminate a priori but was found to have a negative relationship with loan default. The exchange rate was also one of the significant variables in the model. Kenya being an export-oriented economy remains vulnerable to exchange rate fluctuations. While a stronger currency reduces the loan default thereby benefitting commercial banks, it also makes local goods uncompetitive disadvantaging exporters. The CBK being the regulatory body therefore needs to ensure that the local currency is neither too strong nor too weak to achieve desirable economic impact.

5.4 Limitations of the Study

The study used data up to 2013 meaning more recent data was left out. Due to the rebasing of the economy in 2014, the GDP figures after the rebasing could not be used without breaking the time-series. The study might therefore not give a reflection of the current default scenario. Due to the short period of time under study, long term inferences cannot be made from the results. A longer period can be considered in order to make conclusions about the long term effects of macroeconomic variables on the loan default rate.

Some of the variables that were of interest such as per capita income and unemployment had to be omitted due to insufficient data points. The data for the two variables is provided on an annual basis and could therefore not be useful in the monthly analysis. The research was initially meant to look at the relationship between macroeconomic variables and mortgage default rate. However due to lack of sufficient data, the study had to change the dependent variable to loan default rate. Banks were also unwilling to divulge information regarding their individual products from fear that the data might be used by competitors.

5.5 Suggestions for Further Research

The study looked at the data between 2006 and 2013 which is a relatively short period. A study over a longer period of time would give more insight into the long term relationship between the variables. Further research can also be done to include other macroeconomic variables that would theoretically influence default decisions such as unemployment and GDP per capita. Income for example is one variable that can influence loan defaults.

The population of interest was commercial banks which is one part of the lending markets. Future studies can be done to look at the effects of these variables on loan defaults in Saccos and MFIs. The high interest rate charged by commercial banks has been one of the reasons for growth in Saccos. MFIs on the other hand are known to charge relatively higher rates than other formal lenders. The effect of interest rate on default rates in commercial banks might therefore differ from that in Saccos and/or MFIs.

The capping of interest rates will make the case for further research on loan defaults. A comparison can be done of loan defaults under the previous regime and the current

capped interest rate regime. Further research on specific loan products such as residential mortgages can also be undertaken in order to ascertain what specific factors influence defaults on home loans.

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APPENDICES

APPENDIX I: DATASET 2006-2013

YEAR	NPL Ratio (%)	Inflation (%)	Interest Rate (%)	Exchange Rate (USD/KSH)	Public Debt (% of GDP)
Jan-06	6.9	15.4	13.2	71.98	54.0
Feb-06	5.8	18.9	13.3	73.20	53.8
Mar-06	5.9	19.1	13.3	71.87	53.1
Apr-06	6.1	14.9	13.5	71.16	53.3
May-06	6.1	13.1	14.0	72.27	53.4
Jun-06	5.3	10.9	13.8	73.88	50.4
Jul-06	5.3	10.1	13.7	73.62	50.3
Aug-06	5.5	11.5	13.6	72.62	44.7
Sep-06	5.6	13.8	13.5	72.68	49.2
Oct-06	5.6	15.7	14.0	72.02	49.1
Nov-06	5.9	14.6	13.9	69.95	49.0
Dec-06	5.4	15.6	13.7	69.40	47.7
Jan-07	5.3	9.7	13.8	70.54	47.5
Feb-07	5.1	6.8	13.6	69.73	47.4
Mar-07	4.6	5.9	13.6	68.78	45.3
Apr-07	4.7	5.7	13.3	68.31	45.5
May-07	4.5	6.3	13.4	66.97	44.9
Jun-07	4.8	11.1	13.1	66.56	43.8
Jul-07	4.7	13.6	13.3	67.51	44.4
Aug-07	4.5	12.4	13.0	66.99	44.2
Sep-07	4.3	11.7	12.9	66.97	44.1
Oct-07	4.1	10.6	13.2	67.11	43.8
Nov-07	4.1	11.8	13.4	64.42	44.1
Dec-07	3.7	12.0	13.3	62.68	43.5
Jan-08	3.4	18.2	13.8	70.56	43.6
Feb-08	3.5	19.1	13.8	68.98	43.4
Mar-08	3.6	21.8	14.1	62.85	43.5
Apr-08	3.1	26.6	13.9	62.14	42.8
May-08	3.5	31.5	14.0	62.03	43.4
Jun-08	3.4	29.3	14.1	64.69	42.8
Jul-08	3.4	26.5	13.9	67.32	41.4

Aug-08	3.4	27.6	13.7	68.73	41.7
Sep-08	3.3	28.2	13.7	73.22	44.5
Oct-08	3.0	28.4	14.1	79.65	43.5
Nov-08	3.1	29.4	14.3	77.88	41.3
Dec-08	3.4	27.7	14.9	77.71	43.9
Jan-09	3.2	13.2	14.8	79.54	43.1
Feb-09	3.3	14.7	14.7	79.69	43.7
Mar-09	3.7	14.6	14.9	80.43	42.9
Apr-09	4.0	12.4	14.7	78.66	43.3
May-09	4.2	9.6	14.9	78.35	42.7
Jun-09	4.0	8.6	15.1	77.16	44.0
Jul-09	3.6	8.4	14.8	76.61	44.2
Aug-09	3.7	7.3	14.8	76.23	44.5
Sep-09	3.5	6.7	14.7	75.00	44.2
Oct-09	3.6	6.6	14.8	75.24	44.6
Nov-09	3.4	5.0	14.9	74.91	44.4
Dec-09	3.7	5.3	14.8	75.82	52.8
Jan-10	3.8	6.0	15.0	75.89	52.5
Feb-10	3.6	5.2	15.0	76.90	53.6
Mar-10	3.5	4.0	14.8	77.33	46.9
Apr-10	3.3	3.7	14.6	77.27	47.5
May-10	3.1	3.9	14.5	79.75	48.1
Jun-10	3.0	3.5	14.4	81.92	48.1
Jul-10	2.7	3.6	14.3	80.23	50.5
Aug-10	2.6	3.2	14.2	81.07	51.2
Sep-10	2.5	3.2	14.0	80.78	52.0
Oct-10	2.4	3.2	13.9	80.79	51.2
Nov-10	2.2	3.8	14.0	80.97	51.3
Dec-10	2.2	4.5	13.9	80.75	51.0
Jan-11	2.3	5.4	14.0	81.27	50.7
Feb-11	2.1	6.5	13.9	82.36	54.2
Mar-11	2.1	9.2	13.9	82.99	56.0
Apr-11	2.0	12.1	13.9	83.42	54.6
May-11	2.1	13.0	13.9	85.70	52.9
Jun-11	1.9	14.5	13.9	89.86	54.2
Jul-11	1.8	15.5	14.1	91.10	55.3
Aug-11	1.8	16.7	14.3	93.62	57.4
Sep-11	1.7	17.3	14.8	99.83	56.6

Oct-11	1.5	18.9	15.2	99.78	58.1
Nov-11	1.5	19.7	18.5	89.72	46.5
Dec-11	1.5	18.9	20.0	85.07	45.1
Jan-12	2.3	18.3	19.5	84.59	46.0
Feb-12	1.4	16.7	20.3	82.97	46.8
Mar-12	1.4	15.6	20.3	83.06	47.5
Apr-12	1.3	13.1	20.2	83.22	48.5
May-12	1.5	12.2	20.1	86.83	48.9
Jun-12	1.6	10.1	20.3	84.23	49.6
Jul-12	1.5	7.7	20.2	84.21	42.4
Aug-12	1.6	6.1	20.1	84.32	43.3
Sep-12	1.7	5.3	19.7	85.28	44.6
Oct-12	1.8	4.1	19.0	85.18	45.0
Nov-12	1.6	3.3	17.8	85.94	46.1
Dec-12	1.5	3.2	18.2	86.03	46.4
Jan-13	1.7	3.7	18.1	87.61	48.0
Feb-13	1.7	4.5	17.8	86.24	46.9
Mar-13	2.0	4.1	17.7	85.64	47.7
Apr-13	2.2	4.1	17.9	83.82	49.9
May-13	2.6	4.1	17.5	85.12	50.5
Jun-13	2.3	4.9	17.0	86.01	51.7
Jul-13	2.3	6.0	17.0	87.28	52.7
Aug-13	2.3	6.7	17.0	87.60	53.0
Sep-13	2.3	8.3	16.9	86.65	53.1
Oct-13	2.4	7.8	17.0	85.15	53.2
Nov-13	2.3	7.4	16.9	86.99	53.7
Dec-13	2.2	7.2	17.0	86.31	54.5

APPENDIX II: LIST OF BANKS

No	Bank Name	No	Bank Name
1	African Banking Corporation Ltd	23	Guaranty Trust Bank Ltd
2	Bank of Africa (K) Ltd	24	Guardian Bank Ltd
3	Bank of Baroda (K) Ltd	25	Gulf African Bank Ltd
4	Bank of India	26	Habib Bank A.G. Zurich
5	Barclays Bank of Kenya Ltd	27	Habib Bank Ltd
6	CFC Stanbic Bank (K) Ltd	28	Housing Finance Co. of Kenya
7	Chase Bank Ltd	29	I&M Bank Ltd
8	Citibank N.A. Kenya	30	Imperial Bank Ltd
9	Commercial Bank of Africa Ltd	31	Jamii Bora Bank Ltd
10	Consolidated Bank of Kenya Ltd	32	K - Rep Bank Ltd
11	Co-operative Bank of Kenya Ltd	33	Kenya Commercial Bank Ltd
12	Credit Bank Ltd	34	Middle East Bank (K) Ltd
13	Development Bank of Kenya Ltd	35	National Bank of Kenya Ltd
14	Diamond Trust Bank (K) Ltd	36	NIC Bank Ltd
15	Dubai Bank Ltd	37	Oriental Commercial Bank
16	Ecobank Kenya Ltd	38	Paramount Universal Bank
17	Equatorial Commercial Bank Ltd	39	Prime Bank Ltd
18	Equity Bank Ltd	40	Standard Chartered Bank (K)
19	Family Bank Ltd	41	Trans - National Bank Ltd
20	Fidelity Commercial Bank Ltd	42	UBA Kenya Ltd
21	First Community Bank Ltd	43	Victoria Commercial Bank
22	Giro Commercial Bank Ltd		