



BANK LENDING RATES AND NON PERFORMING LOANS OF COMMERCIAL BANKS IN KENYA

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Abstract: In the last ten years (2010 to 2019), non-performing loans in Kenyan commercial banks has been rising. Between the year 2011 and 2018, non-performing loans increased from 4.4 per cent and 12.7 per cent. High interest rates contribute to non-performing loans as they influence the borrowers' capacities to service the loans. However, despite the decrease in interest rates, after introduction of interest rate capping in 2016 non-performing loans have still been increasing. It was therefore essential to examine influence of bank lending rates on non-performing loans in commercial banks in Kenya. The study sought to evaluate moderating effect of central bank rate on association between bank lending rate and non-performing loans. The study was guided by information asymmetry theory. An explanatory research design was adopted. The target population comprised of all 39 commercial banks operating in Kenya that were currently operational. Since the sample size was small (39) a bank census was carried out and duration between 2016 and 2020 was covered in this study. The study used secondary data, which was acquired from Kenyan commercial banks' financial statements and from Central Bank of Kenya supervision reports. Moreover, the study made use of a data extraction tool to collect secondary data. In analysis of data, the study used inferential and also descriptive statistics and all statistical analysis was carried out with the support of STATA version 14. Descriptive statistics comprised of frequency distributions, percentages, mean, variances as well as standard deviation. On the other hand, inferential statistics were carried out using regression analysis. The study found that bank lending rates measured in terms of Commercial banks weighted average rates, has a significant and positive effect on non-performing loans of commercial banks in Kenya. Additionally, central bank rate has a moderating effect on the link between bank lending rates and non-performing loans in commercial banks in Kenya. The study therefore recommends that commercial banks' management in Kenya should develop proper strategies to increase the lending interest rates such as increasing the spread between federal funds rate and the rate that customers are charged by the bank in order to increase the loans' profitability.

Key Words: Bank Lending Rates, Central Bank Rate, Non-Performing Loans:

Introduction

In an economy, financial organizations bridge the gap or link the borrowers with depositors. This implies that those wishing to save the incomes for interest rate are free to save while those wishing to take loans and pay back with interest rate are free to have it (Tumwine & Kamukama, 2018). In the Kenyan economy, the financial sector is dominated by banking institutions. The primary role of these institutions is to take savings from people who want to use their money in future and provide loans to people who need it. The act of lending money to people started a long way back in the times of industrial revolution whereby the need for high amount of capital for project facilitation and successful completion triggered the pace of commercial activities (Etale & Ayunku, 2016). Among the key services offered by the banking institutions to their customers is lending. This can be done on long-term basis, short or even on medium term basis. The most key primary role that is highly valued or that the banking sector cannot survive with is lending.

The general perception of the banking institutions is that the sector uses customer's savings to provide loans to capable persons or even to invest the money in other assets that are expected to give interest in future (Wambari & Mwangi, 2017). This implies that among the key objectives of the banking institutions is to make maximum returns for their shareholders. This goal is attained through widening the spread of the interest rate which is gotten by increasing the lending rates as much as possible and on the other hand lowering the deposit rate as much as possible (Hakan & Gulumser, 2014). This is attainable due to the fact that most nations enable their banking institutions to set their own lending rates up to a certain regulated rate by the central bank of that particular country. Nevertheless, it should be clearly understood that the act of setting the rates of deposits as well as the rates of lending is a key mechanism for transmission of monetary policy (Sheefeni, 2016). Among the assets of the banking institutions, loans are included; this is because they are expected to bring return in the near future or after a certain period of time (Siddiqui, Malik & Shah, 2012). Nevertheless, in most cases this is not the case. This is because, some of the advanced loans fail to give the expected interest rate and end up being termed as the non-performing loans (NPLs).

Among the key functions of the banking institutions, lending money is the most essential activity. This is because the banking sector receives its cash flow through charging interest on loans. The amount of money paid by borrowers to the banking institutions for use of borrowed money or borrowed asset is called bank lending rates. This lending rate gives a true picture of the extent to which borrowers are willing and able to payback their loans to the lenders and at the same time it shows an extent to which lenders are prepared to give out their money as an exchange of interest rate (Ng'etich & Wanjau, 2017). Due to the fact that it is very hard to predict the type of borrower and commence a banking relationship, it is advisable that lending institutions put into consideration the adverse selection problem together with the moral hazards. In case the banking institutions charge a very high interest rate, the problem of adverse selection might be induced since only the high risk borrowers will be willing to borrow at this high interest rate. Mishkin and Eakins (2012) suggest that the level of NPLs is linked with constant changes in the interest rates of lending. This is the case because the borrower's burden is broadened by the increased interest rate of lending hence leading to increased loan defaults.

In Europe, there was an increase in the rate of NPLs from 4% in 2008 to about 55% in 2017 in Ukraine (The World Bank, 2017). Sebastian (2018) argues that most of the countries in Europe are splitting down the gross NPLs into loan loss and net NPLs. He argues that the increased rate of NPLs is due to high rates of interest on lending in case the loan reserve fails to cover it sufficiently (Ghosh, 2018). Africa is one of the continents with highest level of NPLs. Equatorial Guinea, Chad, Central African Republic and Ghana all had NPL ratios of over 15 per cent in 2017, which is more than four times the global median. The country with the highest value in Africa is Equatorial Guinea, with a value of 36.68 and the country with the lowest value is Malawi, with a value of 2.83. In Kenya, non-performing loans have been increasing, despite the interest rate capping policy implemented in 2016. The trend of NPL before and after interest rate capping has remained the same. Studies on interest rates and NPL in Kenya show mixed findings. For instance, Mwangi (2014) found that lending interest rates have negative impact on NPL in Commercial bank in Kenya for the period between 2009 and 2013.

Statement of the Problem

In 2013, CBK mandated that banks write-off loan accounts that had not been serviced for more than 3 months from their accounting systems. Bad loans grew by 30.9%, from Ksh. 61.6 billion to Ksh. 80.6 billion, the highest level in six years, even exceeding growth in new credit extended by lenders. In addition, the bank supervision report by the CBK indicates that the ratio of gross NPLs improved from 5.2 % in 2013 - 12.7 % in 2018 (CBK 2013 to 2018). Further, Kenya has been experiencing high lending rates and low interest on deposits over the years. According to Sheefeni (2016), high lending rates influence the capacity of those borrowing to repay back their loans since the accumulation of

interest tend to be unbearable, hence making business to shy away from taking loans. In addition, Kihara (2017) argues that an increase in interest rate increases cost of loans charged on borrowers, making harder for clients to pay from their businesses and other activities.

In addition, high levels of non-performing loans negatively influence credit demand and supply hence decreasing lending to real economy a period when aid to the economy is required (Sheefeni, 2016). In addition, Ng'etich and Wanjau (2017) argues that the effect of past-due debts on the banks' profitability can be identified with a possible bank failure, hindrance to lending, decrease in profit level as well as negative economic advancement in society. In order to manage NPLs in Kenyan Commercial banks, it is important to understand how they relate with interest rates.

Studies conducted in Kenya on interest rates show mixed findings. For instance, Mwangi (2014) examined the interest rate and NPLs in banking sector in Kenya and found that interest rates have a negative influence of NPLs (2009 – 2013). However, Mwangi (2014) study was conducted before the introduction of interest capping in 2016 and the removal of interest rate capping in 2019. In addition, the study only looked at one component of interest rates, lending interest rate. Ng'etich and Wanjau (2011) studied influence of interest rate spread on NPAs' level and found that interest rate affects NPAs in banks positively (1999 - 2008). This study sought to examine the association between bank lending rates and NPLs of banking institutions.

This study tested the below null hypothesis:

H₀1: Bank lending rates has no statistically significant effect on NPLs in commercial banks in Kenya

H₀2: Central bank rate has a moderating effect on the relationship between interest rates and NPLs in commercial banks in Kenya

Literature Review

Theoretical Review

The study was anchored on the information asymmetry theory. Michael Spence, George Akerlof and Joseph Stiglitz developed the information asymmetry theory. In the year 2001, the three proponents of the theory won a Nobel Prize for their excellent contribution in economics. Akerlof was the first person to write on information asymmetry on his book "The Market for 'Lemons'" in years 1970. In this book, the author argued that the information seen by the car buyers is very different from the information possessed by the car sellers; this presents an incentive for the sellers to find customers for their goods which are of less market quality (Hossain, Rahman & Su, 2018). In the year 1973, this information was enriched by Michael Spence who wrote a book on "Job Market Signalling." In his book, he argued that staffs are uncertain investments for the organizations. This implies that when an employer is hiring new staff he/she is taking a risk since he has no information on the level of productivity of the employees. This act of employers taking risk was compared to a lottery. According to Spence, there is information asymmetry between employers and the staff which brings up scenarios whereby a persistent equilibrium trap is created by low-paying jobs. This trap does not in any way encourage the bidding up of salaries in various markets. Through Stiglitz, information asymmetry has been facilitated to reach mainstream acclaim. Market screening theory was used in co-authoring several papers which included very essential work of information asymmetry in both banking sector and insurance sector (Hossain, Rahman & Su, 2018).

The theory of information asymmetry holds that in a transnational relationship, asymmetric information prevails when one party is more informed as compared to the other party. In the financial decision perspective, the literature on the information asymmetry is concerned with influence of decisions made from the differing information as well as different parties (Brennan, Kirwan & Redmond, 2016). In the banking institutions, lenders take a great risk of advancing credit facilities to

borrowers since the lenders are not in apposition to tell the credit-worthy customers and those that are not, due to lack of enough information on the borrowers. Information asymmetries further leads to adverse selection which is referred to as “lemon Principle”. In 1970, Akerlof was the first person to describe the moral hazard problems.

This theory was used in this study to show how interest rates contribute to NPLs. In case the lenders are not in a position to differentiate credit-worthy customers from those who are not, then they charge all of them a normal interest rate that shows a reflection of their pooled experience. Nevertheless, increasing the rate of interest automatically eliminates some of the borrowers from the borrowing bracket. This filters the creditworthy borrowers from those who are not. In this case, through adverse selection there is displacement of high quality debtors by the low quality ones.

Empirical Review

Bank Lending Rates and NPLs in Commercial Banks

Viswanadham and Nahid (2015) examined determinants of NPLs. The researcher was limited to NBC Bank located in Dodoma, Tanzania. Methods of collecting data deployed during the study comprised interview, documentary evidence and questionnaire. Lending activities concentration, IR, GDP, ability for supervision of bank’s loan as well as economic situation were examined, and findings propose that GD, interest rate, supervision capacity of bank’s loan as well as economic situation influence the level of NPLs. The research examined Commercial Banks operating in Tanzania therefore, findings are not applicable to commercial banks in Kenya.

Munialo (2014) examined interest lending rates and NPL in the Kenyan banking sectors. Descriptive survey design was adopted. The research data used covered four years between 2009 and 2013. Lending rates was noticed to influence NPLs in banking sector in Kenya insignificantly. The author argued that regardless of the public view that commercial high lending rates influence NPLs positively, the study finding indicated that the association was insignificant. However, this research was done before the implementation of the interest rate capping in 2016 and its removal in 2019. Nonetheless, this study utilized primary data which is based on perceptions of the respondents.

In Kenya, Mwangi (2014) researched whether rate of interest influences NPLs in the banking industry. Moreover, descriptive survey design was deployed. Target group of interest comprised of the 43 licensed banking institutions in Kenya. Data collected was obtained for duration of five years between 2009 and 2013. The rate of interest was found to strongly influence the NPLs. Nevertheless, this research was done prior to the introduction of the capping act in 2016 and its removal in 2019, the study shows that the findings are contrary to Munialo (2014) who found insignificant association between interest rates and NPLs.

Maina (2016) investigated whether bank lending rates influences NPL of Kenyan commercial banks. Additionally, the researcher utilized descriptive research approach. Moreover, the study population composed all quoted commercial banks within Nairobi County. In order to select 57 participants to take part during the study, purposive sampling was employed. The major tool for obtaining data was structured questionnaire. The study found that bank lending rates impact the NPL in Kenya commercial bank. Therefore, the study arrived at a conclusion that there exists positive and also significant relation between bank lending rates and non-performing loan. However, the study utilized primary data based on perceptions of respondents.

Mwenda (2017) analysed the effects of lending interest rates on Kenyan commercial banks’ financial performance. The descriptive research approach was employed. The study employed a census in which all 43 Kenyan Commercial Banks registered with the CBK were chosen. The research entailed usage of secondary data. Data obtained was analysed by employing multiple regression analysis models.

Results established that lending rates have positive effect on financial institutions' financial performance since it is the key determining factor of interest income. Nonetheless, the dependent study variable was Kenyan commercial banks' financial performance, which is different from the non-performing loans.

Central Bank Rates, Interest Rates, Non-Performing Loans

Kavwele, Ariemba and Evusa (2018) conducted an assessment of moderating effect of CBK rates on association between interest rates and NPL in commercial banks. Data was gathered for variables for 4 quarters of financial year prior to induction of capping and 4 quarters of financial year after induction of capping. Paired sample T-test was employed in analysis to evaluate the link between variables. Results found that IR capping has significant negative influence on Kenya commercial banks' performance and particularly from interest earnings whose negative effect could however not be reimbursed by decrease in interest expense or rise in non-interest income, therefore reducing the profits. Further, the study found that CBK rates have substantial moderating influence on association between rate of interest and NPL Performance in commercial banks. Moreover, the research utilized descriptive research design, whereas explanatory research approach will be utilized in current research. Each research approach has limitations hence findings are not applicable to this study due to variation in research designs.

In Kenya, Ondieki and Jagongo (2013) evaluated the influence of lowering CBR on bank's prime rate: a case of Commercial Banks. Moreover, the study deployed descriptive research approach to examine study's general objective. This consisted group of techniques that explain the study variables by use of statistical logic. The findings indicated that regardless of combined efforts put by CBK to enable commercial banks to decrease lending rate, little benefit was achieved since major determinant relied on high NPLs' level, stiff industry competition, lending channels and barriers of internal policy. The CBK authority to effectively control channels was against the large number of beliefs that Kenyan banks would only function with vigour without visible and strong hand of regulator. Additionally, the researcher utilized descriptive research approach which differs from explanatory research IR hence findings are not applicable to the present study.

Ng'ang'a (2017) focused on moderating effect of CBK rates on correlation between IR and NPL in Kenyan commercial banks. Descriptive research approach was employed to analyse whether interest rate capping influences commercial banks' financial performance. Descriptive research was combined with content analysis. All the 42 banks in the country were the population of this project. Secondary data was used which comprised of information acquired from financial statement of the banks. The study revealed that central bank rates have a moderating effect on association between interest rates and NPL in selected commercial banks. Dependent variable was financial institutions' performance while the present study will be limited to non-performing loans therefore results are not applicable to the present study.

Ngondo (2018) assessed CBK rate on performance of loans in Kenyan commercial banks. Data was obtained using secondary data collection techniques for all commercial banks licensed for the period 2013 to 2017. However, full information was obtained for 35 commercial banks as some banks did not have information on some years for the study period. The study discovered positive significant correlation between lending rates and NPLs. Additionally, there is a moderating influence of the central bank rates on association between interest rate and loans performance. Nonetheless, the study failed to show moderating effect of CBK rates. In addition the study utilized descriptive research IR which differs from explanatory research IR hence findings are not applicable to the present study.

Conceptual Framework

Conceptual framework describes relationship between variables which are considered as essential. Bryman and Bell, (2011) suggest that conceptual framework uses diagrams to present the association between independent and dependent study variables. The independent variable was bank lending rates and the dependent variable was NPLs of commercial banks. The moderating variable was CBK rates.

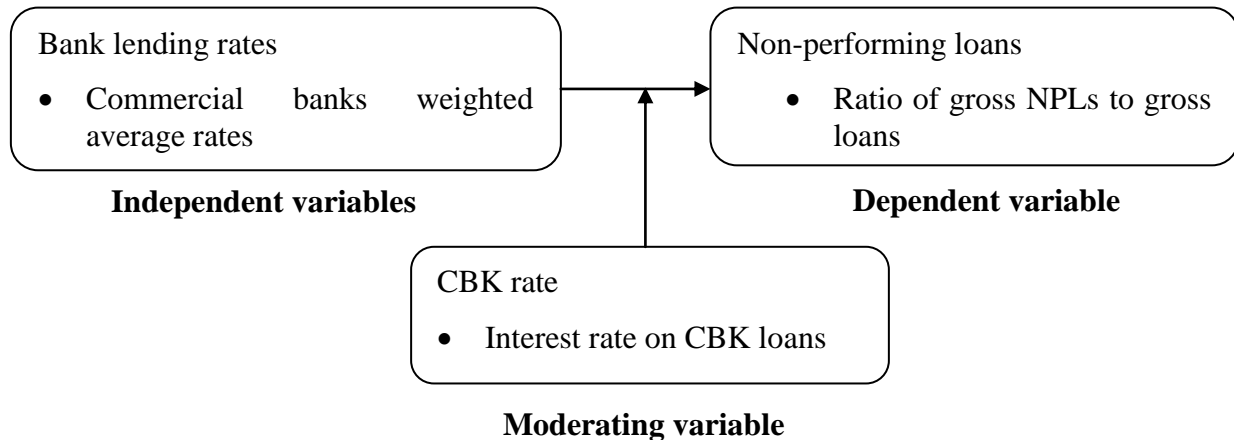


Figure 1: Conceptual Framework

Research Methodology

The research study used an explanatory research design which discloses that any research questions are aimed to describe event being studied. The target population of this study was all Kenyan commercial banks that have been in operational for a period between 2016 and 2020. The CBK (2019), reports that there were 39 operational Kenyan Commercial Banks. Study population was 39 Kenyan commercial banks that were operational between 2016 and 2020. Since study's sample size was not large (39), this was a census study therefore the entire population was included. Secondary panel data was utilized in this research study. Secondary data on credit size, bank lending rates, interest on deposits and NPLs of commercial banks was acquired from financial statements owned by Kenyan commercial banks and from CBK bank supervision reports. The study used a data extraction tool to gather secondary data. Bryman (2013) suggests that data extraction involves retrieving all categories and formats of data from unstructured data sources.

The secondary data generated panel data. This research involved a time period of 5 years and 39 commercial banks. In analysis of data, the research utilized both inferential and descriptive statistics and all statistical analysis was carried out using STATA version 14. Descriptive statistics comprised of frequency distributions, mean, percentages, variances as well as measures of dispersion (standard deviation). Inferential statistics were carried out using regression analysis. The study results obtained were displayed in both tables and also figures such as line graphs.

The study used Panel Vector Autoregressive Model (PVAM) to estimate a functional model where nonperforming loans were treated as dependent study variable whilst independent variables included credit size, bank lending rates and interest on deposits.

The functional relationship of the empirical model appeared as follows:

$$NPL = f(BLR)..... (1)$$

The regression model of the on-going study is as shown below;

$$NPL_t = \beta_0 + \beta_1 BLR_{1t} + \varepsilon_t \dots\dots\dots (2)$$

NPL_t is dependent variable (Non performing loans), B_0 is y intercept (Constant), β_1 are coefficients of determination, CS is Credit Size, BLR is Bank Lending Rates, IOD is interest on deposits, ε is error term, and t subscript represented time

In analysis of moderating impact of Central Bank Rate in association between interest rates and commercial banks' NPLs, this study will use step-wise regression analysis. If interaction of a predictor and a moderator on outcome of dependent variable is significant, a moderator is supported.

$$NPL_t = \beta_0 + \beta_1 BLR_{1t} + \beta_4 CBR_t + \beta_6 BLR_{2t} CBR_t + \varepsilon_t \dots\dots\dots (3)$$

NPL_t connotes dependent variable (Non-performing loans), B_0 connotes y intercept (Constant), β_1 connotes coefficients of determination, BLR is Bank Lending Rates (independent variable), CBR is Central Bank Rate (Moderating Variable), ε is the error term, and t subscript represented time.

The study utilized secondary data that is accessible to general public. As banking sector's or financial institutions' regulator, the CBK requires the KBA to compile data for all Kenyan commercial banks. One of the NSE's requirements is that firms listed on NSE disclose financial statement records to the public. The researcher utilized secondary data. Further, the researcher adhered to ethical consideration when employing secondary data. The researcher recognized other academicians, scholars as well as writers' effort so as to provide evidence to back up the assertions and claims of ownership of this research.

Results and Discussions

Descriptive statistics

There were 160 observations from 32 commercial banks in Kenya covering 5 years (2016 to 2020). The findings discovered that NPL for commercial banks was 0.178 million and standard deviation was 0.136 million. Minimum NPL was 0.014% and maximum was NPL was 0.708 million. The BLR measured using commercial banks weighted average rates for the period between 2010 and 2019 among commercial banks in Kenya was 12.881 million and standard deviation was 1.105 million. Minimum BLR was 9 million and maximum amount was 17.7 million.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
NPL	160	.1776875	.136042	.014	.708
BLR	160	12.88125	1.10523	9	17.7
CBR	160	9.21906	1.188213	7.1667	10.6667

Diagnostic Tests

OLS is a commonly used for approximating linear models. To examine the relationship between Diagnostic tests were used to test the OLS assumptions method. Among the diagnostic tests utilized were the normality test, heteroscedasticity test, autocorrelation test, linear test, Hausman test, multicollinearity test, and the unit root test.

Test for Normality

Shapiro–Wilk test is used to determine whether or not a population is normally distributed. If the p-value is greater than the alpha level, the null hypothesis that the data is from a normally distributed population can be accepted. From the results, NPLs (0.111) and bank lending rate (0.123) were normally distributed as p-values were above 0.05. This denotes that independent and dependent variables were all normally distributed.

Table 2: Shapiro-Wilk Test

	Statistic	df	Sig.
Non-Performing Loans	.961	160	.111
Bank Lending Rate	.936	160	.123

Heteroscedasticity Test

Cook-Weisberg test was employed to assess heteroscedasticity. There exists no heteroscedasticity in null hypothesis, whilst in alternative hypothesis it is present. The influence of breaking homoscedasticity assumption is equal to the extent of heteroscedasticity. The p-value of 0.0001 was above 0.05 (significance level) meaning that in the dataset, there exist constant variance. This denotes that in data set there was homoscedasticity.

Table 3: Breusch-Pagan Test for Heteroskedasticity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of NPL

chi2(1) = 15.78

Prob > chi2 = 0.0001

Autocorrelation Test

To examine whether simple OLS regression or random effects regression ought to be used Breusch-Godfrey was used. The null hypothesis in LM test is that between entities variances are zero. This proposes that there is no key variation between units. Table 4 shows that p-value (0.0000) is below 0.05 (significance level), we can therefore conclude that across entities variances are not zero, which implies that there is panel effect (there is significant variation across units).

Table 4: Breusch-Godfrey LM test

Breusch and Pagan Lagrangian multiplier test for random effects

$NPL[Bank, t] = Xb + u[Bank] + e[Bank, t]$

Estimated results:

	Var	sd = sqrt(Var)
NPL	.0185074	.136042
e	.0044418	.0666468
u	.011853	.1088713

Test: Var(u) = 0

chibar2(01) = 153.48

Prob > chibar2 = 0.0000

Linearity Test

Scatterplots are essential in testing linearity among variables in a study. In Figure 2, scatter plot shows positive linear correlation between BLR and NPL ratio of commercial banks. In addition, bank lending rates (Commercial banks weighted average rates) can explain 6.8 per cent of NPLs of commercial banks measured using Ratio of gross NPLs to gross loans.

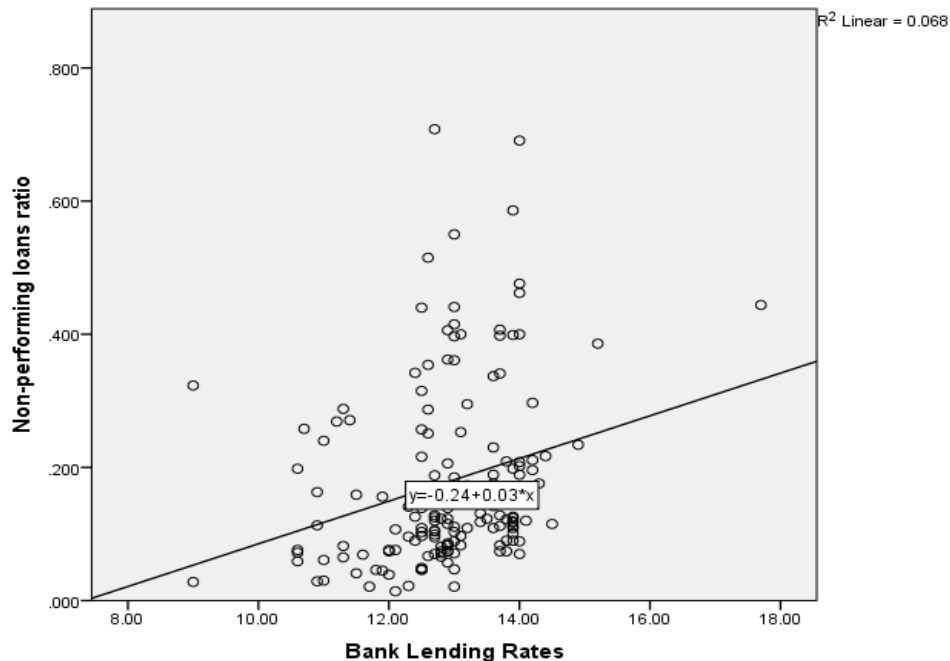


Figure 1: Bank Lending Rates and NPL ratio

Unit Root Test

The IPS presents test for unit root presence in panels that incorporate data retrieved from the cross section and time series dimensions. Under null hypothesis, there exists unit root, whilst under alternative hypothesis there exist partial unit root. Concerning the Bank lending rates, null hypothesis is that bank lending rates, measured using of Commercial banks weighted average rates, in all panels (32 Commercial banks) contains unit roots and alternative hypothesis was that some panels are stationary. The null hypothesis can be rejected because p-value of 0.000 was below 0.05 (significance level) and hence bank lending rates measured in terms of Commercial banks weighted average rates has partial unit root.

Concerning CBR, the null hypothesis is that CBR, measured in terms of interest rate on CBK loans all panels (32 Commercial banks) contains unit root. We can therefore reject null hypothesis because p-value (0.000) was below 0.05 and CBK, measured using interest rate on CBK loans has partial unit root. In regard to dependent variable, NPLs measured by employing Ratio of gross NPLs to gross loans, the null hypothesis is NPLs in all panels (39 Commercial banks) contains unit root. We can fail to accept null hypothesis because p-value of 0.000 was below 0.05 and hence NPLs measured in terms of Ratio of gross NPLs to gross loans has partial unit root.

Table 5: IPS Unit-Root Test

Variable	t-statistic	p-value	Fixed-N exact critical values		
			1%	5%	10%
NPL	-1.4266	0.000	-2.200	-1.950	-1.850
BLR	-1.8684	0.000	-2.200	-1.950	-1.850
CBR	-1.9569	0.000	-2.200	-1.950	-1.850

Hausman Test

The null hypothesis in present research was that alternative hypothesis was fixed effect while random effect was preferred model. The p value (0.4662) was greater than 0.05 alpha value (at 95 per cent confidence interval). This meant, null hypothesis was not rejected, and the study would have to deploy random effects model.

Table 6: Hausman Test

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
BLR	.0400959	.0392575	.0008384	.0011506

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(1) = (b-B)' [(V_b-V_B)^(-1)] (b-B)
 = 0.53
 Prob>chi2 = 0.4662

Regression Analysis

Weight of relationship between study variables was measured by using regression analysis. The regression model was as follows:

$$NPL_t = \beta_0 + \beta_1 BLR_{1t} + \varepsilon_t$$

NPL_t is dependent variable (Non performing loans), B_0 is y intercept (Constant), β_1 are coefficients of determination, BLR is Bank Lending Rates, ε is error term, and t subscript represented time

The r-squared for the link between bank lending rates and NPLs of Commercial Banks was 0.0678. This implies that independent variable (bank lending rates) explain 6.78% of the dependent variable (non-performing loans). For F-test, p-value of 0.000 was below 0.05 (significance level). This implies that model used is a good fit for the data. Within each of commercial banks, the bank lending rates explains 24.93% of NPLs of Commercial Banks. The p-value for F-test was 0.000, which is below 0.05 meaning that the model used is good fit for research data.

According to the findings, BLR measured in terms of Commercial banks weighted average rates, has significant positive effect on commercial banks' NPLs as illustrated by beta coefficient of 0.0254654. This means, unit increase in BLR across time and Commercial banks would lead to a 0.0254654 increase in NPLs. Because the p-value of 0.000 was below significance level (0.05) the link was significant. Moreover, the findings concur with Maina (2016) findings that there exists positive and also significant relation between bank lending rates and non-performing loan in Kenya commercial bank. Moreover, these findings conform to Mwenda (2017) arguments that lending rates have positive

effect on financial institutions' financial performance since it is the key determining factor of interest income.

Table 7: Regression Results

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Random-effects GLS regression                Number of obs    =    160
Group variable: Bank                        Number of groups =    32

R-sq:  within = 0.2493                      Obs per group:  min =    5
        between = 0.0056                    avg =    5.0
        overall = 0.0678                    max =    5

Wald chi2(1) =    41.88
Prob > chi2  =    0.0000

corr(u_i, X) = 0 (assumed)

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NPL	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
BLR	.0392575	.0060663	6.47	0.000	.0273678	.0511472
_cons	-.3279981	.0808398	-4.06	0.000	-.4864412	-.169555
sigma_u	.11287287					
sigma_e	.07155979					
rho	.71329837	(fraction of variance due to u_i)				

Moderation of Central Bank Rate

The study evaluated moderating effect of CBR on the link between dependent and independent variables. The interaction between the Bank Lending Rates and Central Bank of Kenya has insignificant positive effect on commercial banks' non-performing loans (standardized beta coefficient=-0.0009309, p-value=0.014). Therefore, CBR had a significant moderating effect on the link between bank lending rates and non-performing loans.

Table 8: Moderation of Central Bank Rate

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Random-effects GLS regression                Number of obs    =    160
Group variable: Bank                        Number of groups =    32

R-sq:  within = 0.2828                      Obs per group:  min =    5
        between = 0.0049                    avg =    5.0
        overall = 0.0789                    max =    5

Wald chi2(2) =    49.58
Prob > chi2  =    0.0000

corr(u_i, X) = 0 (assumed)

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NPL	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
BLR	.0435157	.0061973	7.02	0.000	.0313693	.0556622
BLR_CBR	-.0009309	.0003789	-2.46	0.014	-.0016736	-.0001883
_cons	-.272596	.0826193	-3.30	0.001	-.4345269	-.110665
sigma_u	.11307557					
sigma_e	.07021983					
rho	.72168821	(fraction of variance due to u_i)				

Conclusion and Recommendations

The study therefore concludes that bank lending rates measured in terms of Commercial banks weighted average rates, has significant positive influence on commercial banks'. This means that increase in bank lending rates would enhance the commercial banks NPLs in Kenya. The researcher also concludes that CBR has a significant moderating effect on the link between BLR and NPLs in Kenyan commercial banks. This implies that increase in central bank rate has significant effect on the link between bank lending rate and NPLs in Kenyan commercial banks.

The study discovered that bank lending rate has significant positive influence on NPLs of Kenyan commercial banks. The commercial banks' management should therefore develop proper strategies to increase their lending interest rates to increase their profitability on loans. Increase in profitability of loans is as a result of greater spread between the rate the bank charges its customers and federal funds rate. In these circumstances, demand for loans by the end users and company increases, improving bank profits. Because short-term rates grow at lower rates than long-term rates, spread between long-term and short-term rates increases when interest rates increase.

Areas for Further Research

The researcher focused on banking sector hence, findings cannot be generalized to other sectors in Kenya. As such, additional studies ought to be done to assess the relationship between lending rates and non-performing loans in other sectors in Kenya. This study found that lending rates explain 6.78% of the NPLs of Kenyan commercial banks. The study hence suggests more research on other factors influencing NPLs of Kenyan commercial banks. Further, the researcher measured NPLs in terms of Ratio of gross NPLs to gross loans. The study proposes further studies to examine how bank lending interest rates influence NPLs measured by employing NPLs as a percentage of total loans.

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