Firm Characteristics and Non-Performing Loans of Commercial Banks in Kenya

Winfred Ndanu Ngungu & Dr. Farida Abdul

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[1*]**Winfred Ndanu Ngungu & [2]Dr. Farida Abdul**.

[1*]**Postgraduate Student, MBA (Finance), Department of Accounting and Finance, School of Business, Kenyatta University.**

P.O. Box 43844 - 00100, Nairobi, Kenya.

Phone number: +254 720854201

wndanu@gmail.com

[2]**Senior Lecturer, Department of Accounting and Finance, School of Business, Kenyatta University.**

P.O. Box 43844 - 00100, Nairobi, Kenya.

Phone number: +254 722733170

farida.abdul@ku.ac.ke

Abstract

Banking in Kenya and the financial services in general have been identified as a pillar to achieving 2030 Vision. Banking facilitates macro-economic steadiness for long-term development which will transform Kenya to a middle economy country. The growing level of nonperforming loans among Kenyan banks has been a source of concern to all stakeholders. This research ascertained the impacts of firms-characteristics on nonperforming loans of Kenya's banks. The specific objectives were to assess the effect on liquidity, capital adequacy and bank size on non-performing loans of Kenyan banks. In addition, the research examined the moderating impact of interest rate on the relationship between firms' characteristics and non-performing loans of Kenyan banks. The research relied on market power, agency, liquidity preference and capital buffer theories. Causal design was utilized in this research. The targeted population was 40 banks that were operational from 2013 to 2017. The study used a census approach. Secondary data was gathered from the audited financials of these banks. Diagnostics tests were done for multicollinearity, stationarity and hausman. Data analysis was done based on descriptive analysis and panel regression analysis. The findings from the panel regression analysis indicated that liquidity had insignificant effect on non-performing loans of commercial banks in Kenya. Capital adequacy had a significant effect on non-performing loans of commercial banks in Kenya. Bank size had a significant effect on non-performing loans of commercial banks in Kenya. Additionally, the study findings revealed that interest rate had no significant effect on the relationship between firm characteristics and non-performing loans of commercial banks in Kenya. The study recommended that bank managers should be cautious when granting loans to customers by scrutinizing each application for credit regardless of the

levels of liquidity held by banks. The study also recommended that banks with larger assets can consider other investment options to diversify against the effect of high loan defaults.

Keywords: *Bank Size, Capital Adequacy, Financial Intermediation, Firm Characteristics, Liquidity, Non-performing Loans, Interest Rate.*

1.0 Introduction

1.1 Background of the Study

Banks are important due to the roles which they perform in the economic resources' allotment in countries. This boosts further investment and spurs economic expansion. The intermediation responsibility that is executed by banks of linking the surplus spending agents with the deficit spending agents in however hinge on bank loans. By implications, commercial banks intermediation role is affected by the level of NPLs (Ongore & Kusa, 2013; Soyemi, Akinpelu & Agunleye, 2013).

Non-performing loans are regarded as loans that exceed ninety days hence are past their due or not generating interest any longer (Edson, Joseph, Clifford, Manuere & Michael, 2012). Demirgunes (2016) opine that non-performing loan that is already defaulted or closed to being defaulted. They further explained that if the loan's interest and principal payment is unsettled by ninety days, it may be regarded as nonperforming loan. The NPLs are used as a pointer for financial steadiness and particularly banking system stability (Prasana, 2014). Hammami and Ouhibi (2015) indicated that NPLs is a lead on asset quality, risk on credit and effectiveness in the allotment of resource to prolific sectors.

The global financial crisis has proved and revealed that external funding sources can induce macroeconomic instability. Consequently, as indicated by Ouhibi and Hammami (2015) there are potential risks of financial system susceptibility in the economy. Mostly, the levels of NPLs in the banking sector is what is used in the evaluation of financial vulnerability. Notably when loans are issued, unfortunately a number of these loans turn into default thereby becoming non-performing which subsequently lead to bad debts which usually have detrimental impacts regarding banks overall performance (Hue, 2015). Non-performing loans has become an increasing problem over the years which is threatening banks sustainability (Alizadeh & Junaina, 2011). The causes of these non-performing are often non-uniform and multidimensional in literature. Non-performing loans therefore bring about misery to lenders due to the fact that a bank that is having too much of it reflected on its balance sheet can have its operations adversely affected as regarding its profits, liquidity, debt- servicing capacity, ability to generate additional bank income and lending capacity (Demirgunes, 2016). The increasing trend of nonperforming loans in Kenya is a source of concern because banks largely depend on lending activities for their sustainability and increasing levels of NPLs precedes collapses of banks.

The relationship between NPLs and firm characteristics stem from the notion that the levels of NPLs is affected by the state of affairs in banks which is indicated by their specific characteristic. The increasing levels of NPLs in the context of Kenya have been worrisome which is due to the fact the banks depend on lending activities for their sustainability.

1.2 Statement of the Problem

The stability of financial institutions is imperative in stimulation of economic development and, domestic and foreign investment, poverty lessening and employment creation (Ali, 2012). Banking in Kenya and the financial services in general has been identified as a success pillar to achieving 2030 Vision making Kenya a middle economy country by providing a facilitating macro-economic stability for long term development. The growing level of NPLs among

Kenyan banks has been a source of concern to all stakeholders. This is because NPLs makes a setback for the banks' balance-sheet on asset side, and have a setback on the income-statement as due to provisions for loans losses.

Various works have been conducted focusing on firm characteristics and their relationships with NPLs. Some of the findings of these studies include those of Adebola *et al.*, who reported that capitals have inverse effect on Islamic banks NPLs. Dimitrios *et al.*, (2011), Hassana et al. (2015) indicated that the bank capital and liquidity considerably affect the non-performing loans level of Greek bank. Messai and Jouini (2013) reported that liquidity of banks has effects on non-performing loans Greece, Spain and Italy. Makri *et al.*, (2014) indicated that liquidity of banks has positive effects on NPLs. Warue (2013) reveal that liquidity significantly affects banks none performing loans in Kenya. Awour (2015) focused on bank specifics and NPL and found out that liquidity has a positive relationship on NPLs. These studies are however characterized by various research gaps.

Several studies have obtained conflicting results in the effect of firms-characteristic on NPLs. This could be due to country specific macroeconomic back ground and therefore the outcome of these studies can't be directly adopted to the Kenyan background. This research seeks to seal these research gaps and add to research by ascertaining the effect of firm characteristic on NPLs and in addition ascertain the moderating impact of interest rate on linkage between characteristic of firm with NPLs of commercial banks in Kenya.

1.3 Research Objectives

i)   To ascertain the effect of liquidity on Non-performing Loans of commercial banks in Kenya.
ii) To examine the effect of capital adequacy on Non-performing Loans of commercial banks in Kenya.
iii) To evaluate the effect of bank size on Non-performing Loans of commercial banks in Kenya.
iv) To establish the moderating effect of interest rate on the relationship between firm characteristics and Non-performing Loans of commercial banks in Kenya.

2.0 Literature Review

2.1 Theoretical Review

Various theories were utilized in reinforcing the linkage of the various research variables.

2.1.1 Theory of Market Power

This preposition was brought forth in 1965 by Bhagwati. The theory posits two approaches to be associated with the Market Power which are the Relative Market Power (RMP) and Structure Conduct Performance (SCP) hypotheses. The SCP hypothesis is based on the link between firm conduct market structure, and performance. As put forward by Baye (2010), an industry structure may include concentration, technology and market conditions, Conduct entails various attributes which include advertising decisions, pricing decisions and decisions regarding research and development (R&D) undertaken by firms in a market.

Berger (1995) posits that entry barriers into an industry benefits banks as higher entry costs influence a firm's profitability in that higher costs of entry ensures that already existing firms keep hold of market share and thus monopoly profits since new firms will shrink this market share and subsequently profits. Market concentration leads to reduction in the collusion costs between already existing banks thereby leading to larger market share. As indicated by Shipho and Olweny (2011) banks functioning in a more intense market can collude and sometimes

have higher rates of interest on loans while paying on deposits the rates that are lower as compared to those banks which operate in less concentrated market irrespective of their efficiency.

The Relative Market Power (RMP) hypothesis, conversely, proposes that large banks are the only ones having variety and differentiated products and services can dictate prices and improve profitability. Large banks exercise market power which enables them have control of the market by having large number of customers whereas small banks possess smaller market shares which depicts a perfect competition and unable to enjoy such advantages (Olweny & Shipho, 2011; Berger, 1995). Market Power Theory therefore supports the link between bank size and NPLs.

2.1.2 Agency Theory

This idea was introduced by Meckling and Jensen (1976). This idea is well rooted in economic concepts and has its dominance in corporate governance literature. As put forward by Daily, Dalton and Canella (2003), two key points led to the eminence of this presumption. First is the notion that the theory and its prepositions are conceptually simple as they reduce the corporation into 2 foremost players that is executives and shareholders. The second point is the notion outlined by the theory of human beings being self-interested which generally is an accepted idea. In line with this notion, managers who are agents may put their various interests above that of their masters.

Agency theory provides vivid explanations on the agency problems emanating as a result of an agent negating the interest of his principal and not acting in his best interest. In the perspective of banks which is the case of this research, managers or management may not carry out their roles consistently with the various interests of the shareholders (who are the principal) who desire and demand the wealth maximization of shareholders be given key consideration. Managers however, may sometimes carry out activities that will best serve their own interests. Managers are obligated to be efficient in their dealings which are also reflected in the banks' quality of asset that is level of NPLs.

In the context of firms, agency relationships therefore explain the association existing among the providers of between corporate financiers and the managers assigned to carry out the affairs of firm management. As viewed by Meckling and Jensen (1976) agency relationship entails "an agreement that one or more parties (that is the principal approach another party (which is the agent) for purposes of performing some stipulated services on their behalf which includes the delegation of various tasks to the agent". Therefore, the theory, advocates for the concentration and delegation of control of the organization.

2.1.3 Capital Buffer Theory

Rob and Calem were the formulators of this presumption in 1996. The presumption is driven by the idea that banks have a propensity to increase capital when they achieve the least requirement of capital as regulated, the aim of which is to be safe from costs that come as a result of the violation of the stipulated capital levels. Rob and Calem (1999) explains that penalties and fines are always the result of a breach in the provisions of the regulations. Due to this, banks are inclined to hold capital that is in excess of the stipulated limit, the aim of which is to reduce the chances of not meeting the capital requirements. A u-shaped connection informs the risk taking and capital in the case of banks. Banks whose capitalization is lower have a propensity to take big risks under an expectation that the costs of bankruptcy can be passed over to an insurance company. Contrary, banks whose capitalization is adequate are inclined towards investing in portfolios that are risky under the expectation that the profitability

will be high the aim of which is to utilize them for continuous improvement of its capitalization (Rime, 2001).

Heider and Gropp (2009) opines that buffer capital executes a range of functions including promotional, protective, regulatory and operational. Promotional draws from the bank activities that are geared towards sustaining a substantial capital for expansion and meeting stakeholder's expectations. This protective function is exhibited through the capacity to protect against unforeseen losses while making sure that there is continuity and reliability of business. As opined by Volkov (2010), executives make sure that the capital being held is substantial and shield from costs that arises out of a violation of a requirement. Operational function draws from the enhancement of bank's activities that brings profits.

2.1.4 Liquidity Preference Theory

Liquidity Preference perspective was introduced by Keynes (1936). It is premised on supposition that organizations have a desire to hold money for various motives the way individuals do. Liquidity covers any asset that can be converted to cash at ease and money is more liquid than other assets. Banks trade with liquid assets whose demand among the investors is occasional. When a liquid asset is not held for a given period a regard given is interest rate usually calculated through supply and demand for money. As stated by Keynes, money demand has three classifications based on motives; the transactional motive is driven by the need to hold cash for transacting purposes like for paying transport, salaries among others. Precautionary motive rests on the notion that cash is held for the purpose of catering for unforeseen things like illness or accidents. The, speculative reason is based on the desire to hold cash to meet future changes like exercising the right is buying stock. With a surge in price of stock, the rate of interest is anticipated to decline prompting investors to buy and anticipate for prices to rise. The amount of money in a country is called the money supply (Keynes 1936).

Investors are characterized by varied preference for liquidity with some having preference for assets that are not liquid. If an asset is more illiquid, the rate of interest will be more. Political flux in a country tends to affect the banks liquidity as evidenced by the 2008 violence after the elections. In such a scenario, investors withdrew cash from banks (Klein, 2013). The supposition of this concept gives theoretical reinforcement to the link between liquidity and non-performing loans. Banks with excess liquidity levels give out more loans to customers; this is with the aim of having high profitability. However, these banks are subsequently likely to have high levels of non-performing loans.

2.2 Empirical Review

Yusoff, Dahlan and Adebola (2011) conducted a study in Malaysia on the various determinant of banks non-performing loans. Research findings showed capital adequacy has a negative effect on Islamic banks non-performing loans. The study however, was set up on Malaysian Islamic banks; hence the deductions cannot be directly pertinent to that of Kenyan banks which is the premise of current research. The underlying regulations for Islamic banks vary from those of commercial banks.

Dimitrios, Angelos and Vasilios (2011) did an empirical investigation on the various determinants of Greek banks NPLs. The analysis was based on a panel data of the 9 biggest Greek banks. Data was utilised for 2003 to 2009 where the generalized method of moment was applied. Data analysis was carried out on different models for the various categories of loans (such as business loans, consumer loans and that of mortgages). Research findings indicated that the bank capital, bank size and liquidity significantly affect the NPLs level of Greek bank. The study however was based on Greek banks. It is therefore, not applicable to the Kenyan

context, as regulations differ from country to country. In sealing the background gap, the ongoing research focused on Kenyan banks that are commercial.

Jouini and Messai (2013) scrutinized on the factors influential to the nonperforming loans of banks. The examination covered on 85 banks for three countries (Spain, Greece and Italy) while focusing on the years 2004 to 2008. A method of panel data was utilised on the following variables the rate of growth of GDP, liquidity, unemployment rate and real interest rate. The outcomes disclosed that liquidity of banks has negative effects on loans that are not performing. The study however was centered on developed nations (Greece, Spain and Italy) unlike this study which will be on a developing country (Kenya). Countries are characterized by varying economic conditions.

Warue (2013) carried out a research on the connection between NPL and bank-specifics and macro-economic factors, and scrutinize the level at which they determine the happening of banks' NPLs. The research covers the period 1995-2009 utilising both secondary and primary data. Principally, a census of forty four Kenyan banks was taken. The study reveals that capital adequacy significantly affects banks nonperforming loans. Liquidity however had insignificant effect on non-performing loans of commercial banks. However, the moderating influence of interest rate on the association between liquidity and NPL wasn't analyzed.

Makri *et al.*, (2014) did an investigation on the factors predicting the NPLs levels for Eurozone's banking sector where 2000-2008 was the period under consideration. A dynamic panel regression method for our examination specially, a GMM was utilised. The research findings revealed a significant linkage of firm characteristic and NPL levels. The research specifically indicated significant consequence of liquidity on the levels of banks' NPLs in Eurozone. The study was thus premised on banks' in Eurozone unlike this enquiry which was on the Kenyan banking sector.

A research enquiry was undertaken by Prasanna (2014) on what determines NPLs in the context of India. Yearly panel data was used premised on a dataset of thirty one Indian banks. It relied on the period of 2000 to 2012. The research findings revealed that per capita income alongside savings have momentous impact on NPLs. The research however, ignored interest rate and its moderating impact on the connection between firm characteristic and nonperforming loans.

Awuor (2015) in the context of Kenya carried out a study which was based on secondary data collected from banks for a period of five years (2010 to 2014). The data was on levels of bank NPLs and bank specific characteristics notably, asset quality, operational cost efficiency, earnings capacity, liquidity and bank size. The research used multiple regression analysis. The study findings indicate that 15.6 percent of variations in bank NPL levels is explained by variations in the bank specific characteristics. Specifically, there is a negative relationship between bank size, asset quality and levels of bank NPLs. There is also a positive connection between liquidity, operational cost efficiency, earnings ability and levels of NPLs. Unlike this study, the progress research is going to be hinged on panel regression analysis with the moderating impact of interest rate on the connection of firm-characteristic and NPLs of Kenyan banks is going to be established.

Ouhibi and Hammami (2015) analysed the factors determining the soundness of the system of banking in terms of finance among South Mediterranean nations. 6 countries among the 10 were sampled and these are; Turkey, Tunisia, Egypt, Jordan, Lebanon and Morocco. An OLS method was utilised on a panel regression on the yearly frequency from 2000 - 2012. The outcomes disclose that firm characteristics significantly impact on banks' nonperforming loans.

Hassana, Rehman and Ilyas (2015) did an analysis on bank-specific and NPLs in Pakistan. A survey questionnaire was utilised in this research. The results displayed a strong impact by various bank-explicit factors like credit assessment, bank size capital adequacy, monitoring of credit and speedy credit expansion on NPLs, but interest and liquidity had a weak significance on NPLs. The conclusion from the research was that capital sufficiency and bank size have a considerable impact on levels of NPLs. The research however was based on questionnaire which can be subjective in nature as compared to quantitative data which was used in this study. Furthermore, the analysis was centered on Pakistan whereas this study is going to be focusing on Kenyan banks.

Hue (2015) did a research on the key factors contributing to NPLs for Vietnam's banking system. The study focused on the period spanning from 2009-2012. An OLS method for panel data became applicable in analysing the connection between the NPLs and various bank characteristics. The research was built on regression analysis with the outcomes revealing that bank size significantly contribute to the banks' NPLs level. The examination was focusing on Vietnam and this ongoing research is on Kenya's banks.

2.3 Conceptual Framework

The conceptual structure shows the linkage between the variables in visual form. The model depicts liquidity, capital adequacy; bank size (firm characteristics) as the predictor variables even as nonperforming loans serves as the outcome variable. Interest rate (CBR) being the moderating variable is expected to impact the linkage existing between firm characteristic and NPL.
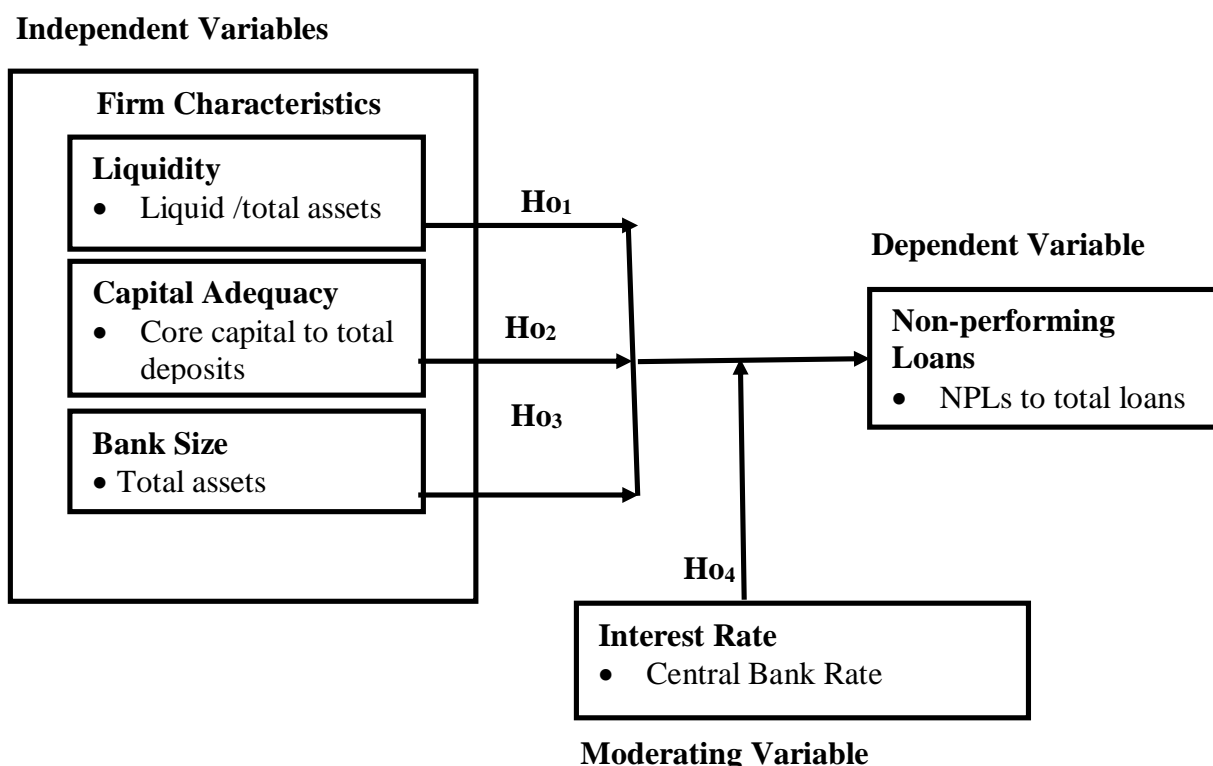

Figure 1: Conceptual Framework

Source: Researcher (2020)

3.1 Research Methodology

Causal design was used in this research. This research design was utilized since the investigations aimed at assessing the effect of firm characteristics on non-performing loans of commercial banks in Kenya. The study's population of interest was Kenyan banks. The entire number of banks fully operational 2013 to 2017 was 40 in number. The research utilized secondary panel data spanning the same range of years.

4.0 Data Analysis, Presentation and Interpretation

4.1 Descriptive Analysis

The descriptive analysis of the study sought to provide the basic features of the study variables. It presented statistics such as standard deviation, mean, minimum and maximum number of observation and as well as the total number of observations. These statistics aided in providing more understanding of the research variables. The descriptive statistics are therefore presented in Table 1.

Table 1: Descriptive Statistics

Variable	No. of Obs	Mean	Std. Dev.	Min	Max
NPL	180	3.25	0.70	1.04	4.53
Liquidity	180	0.18	0.16	0.03	0.59
Capital Adequacy	180	0.15	0.05	0.03	0.38
Bank Size	180	4.64	0.56	3.57	5.74
Interest Rate	180	9.70	1.13	8.50	11.50

Source: Research Findings (2019)

Table 1 presents the descriptive statistics of the study which were based on descriptive analysis. All the research variables namely NPLs, liquidity, capitals, size and interest rate had a total number of observations of 180 each. Non-performing loans had 3.25 as mean and a corresponding standard deviation of 0.70. This therefore was an indication that non-performing loans over the study period had been highly volatile. Also, non-performing loans had a minimum and maximum value of 1.04 and 4.53 respectively. Liquidity of commercial banks had a mean value of 0.18 and a standard deviation of 0.16. As such, liquidity had been relatively stable over the years. This indicated that the liquidity regulation by the Central Bank of Kenya has been efficient over the years as evidenced by minimal fluctuation.

Capital adequacy was reported to have a mean and standard deviation of 0.15 and 0.05 respectively. The implication of these statistics was that capital adequacy relatively fluctuated within the study period. The minimum and maximum values were 0.03 and 0.38 respectively. This implied that the movements in capital adequacy of commercial were within a small range. Bank size had a mean of 4.64 and a standard deviation of 0.56 which indicated that the size of commercial banks had some fluctuations within the period of the study. The minimum and maximum values of bank size were 3.57 and 5.74 respectively. Interest rate had a mean of 9.70 and a standard deviation of 1.13, thus, implying that interest rate had been characterized by minimal fluctuation over the study period. The minimum and maximum values were 8.50 and 11.50 respectively.

4.2 Diagnostic Tests

This section presents the various diagnostic tests that were carried out in the study. The diagnostic tests included multicollinearity, stationarity and normality tests. Hausman test was further carried out for purposes of selecting the best panel regression model for estimation.

4.2.1 Multicollinearity

Multicollinearity is considered as the scenario where the independent variables are highly correlated. To assess the multicollinearity levels of the predictor variables, the correlation matrix was therefore applied. Table 2 presents the correlation Matrix

Table 2: Correlation Matrix

	Liquidity	Capital Adequacy	Bank Size
Liquidity	1.0000		
Capital Adequacy	0.2193	1.0000	
Bank Size	-0.1832	-0.3245	1.0000

Source: Research Findings (2019)

Table 2 depicts the study findings on the test for multicollinearity. The test was based on the correlation matrix in line with Greene (2008). The threshold for this test was 0.8 or -0.8. Notably, none of the correlation coefficients was beyond the threshold of 0.8. Therefore, the study variables did not suffer from severe multicollinearity level.

4.2.2 Stationarity Test

In carrying out a panel regression analysis, the data set is required to be stationary. The presence unit root leads to wrong inferences and ultimately wrong conclusions. The study tested for stationarity with the use of Hadri LM Test as indicated in Table 3.

Table 3: Hadri LM Test for Unit Root

Variable	Test statistic	P-value
NPL	-1.0708	0.8579
Liquidity	-0.4978	0.6907
Capital Adequacy	-0.4384	0.6694
Bank Size	1.4601	0.0721
Interest Rate	-1.0480	0.8527

Source: Research Findings (2019)

The null hypothesis for this test was that all the panels to be used are stationary. Non-performing loans had a p-value of 0.8579, liquidity had a p-value of 0.6907, capital adequacy had a p-value of 0.6694, bank size had a p-value of 0.0721 and interest rate had a p-value of 0.8527. The results indicated that the p-value for all the research variables were above the threshold of 0.05, therefore the study failed to reject the null hypothesis which stated that all the panels were stationary.

4.2.3 Hausman Test

The study carried out a Hausman test so as to select the right model analysis purposes. Outcome is presented in Table 4.

Table 4: Hausman Test

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. hausman Fixed .

                 ──── Coefficients ────
                 (b)          (B)          (b-B)        sqrt(diag(V_b-V_B))
                 Fixed        Random       Difference   S.E.
    ─────────────────────────────────────────────────────────────────────
     Liquidity   .5686869     .504295      .0643919     .1474424
    CapitalAde~y  1.952164    1.166989     .7851748     .
      BankSize   1.993778     1.254875     .7389027     .1375611
    ─────────────────────────────────────────────────────────────────────

                        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(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =        18.69
              Prob>chi2 =      0.0003
              (V_b-V_B is not positive definite)
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Source: Research Findings, 2019

The results from the hausman test indicated a p-value of 0.0003 obtained, which was notably below the threshold of 0.05. As such, the null hypothesis was rejected; therefore, the fixed effect model was utilized in the study.

4.3 Panel Regression Analysis

The study applied panel regression analysis which was based on direct effect model and moderation effect model.

4.3.1 Direct Effect Test

The direct effect test sought to establish the effect of firm characteristics on non-performing loans of commercial banks in Kenya as contained in Table 5.

Table 5: Effect of Firm Characteristics on Non-Performing Loans

NPL	Coef.	Std. Err.	Z	P>|z|	[95% Conf.	Interval]
Liquidity	.5686869	.3323615	1.71	0.089	-.0883691	1.225743
Capital Adequacy	1.952164	.5740148	3.40	0.001	.8173762	3.086952
Bank Size	1.993778	.1802659	11.06	0.000	1.637405	2.350151
_cons	-6.383203	.849756	-7.51	0.000	-8.063112	-4.703293

R^2 =0.4808

F statistics =43.52

Prob> chi2 =0.0000

Source: Research Findings (2019)

Table 5 indicates that liquidity, capital adequacy and bank size were satisfactory in explaining the variations of non-performing loans of commercial banks. This was further supported by R^2 of 0.4808 which implied that liquidity, capital adequacy and bank size collectively explained the movements in non-performing loans of commercial banks in Kenya. The findings in Table

5 further indicated that the overall model used was significant as evidenced by a p-value of 0.0000

The coefficient of each of the variables provided various findings. Liquidity had a coefficient of 0.569 which implied that a unit increase in liquidity leads to a corresponding increase in non-performing loans by 0.569. Similarly, capital adequacy positively influences the non-performing loans of commercial banks. Furthermore, a unit increase in bank size leads to a corresponding 1.994 increase in non-performing loans of commercial banks in Kenya, implying that bigger banks give out more credit and as such, higher NPLs.

4.3.2 Moderating Effect Test

The test for moderation effect was based on the approach by Whisman and McClelland (2015). The approach is based on two steps. The first step introduces the moderating variable as an explanatory variable. This is for purposes of ascertaining whether interest rate is an explanatory variable. Table 6 depicts moderation test, step one.

Table 6: Moderation Test, Step One

NPL	Coef.	Std. Err.	Z	P>|z|	[95% Conf.	Interval]
Liquidity	.5464239	.3283985	1.66	0.098	-.1028375	1.195685
Capital Adequacy	1.763354	.5737255	3. 07	0.003	.6290682	2.89764
Bank Size	1.745052	.2126816	8.20	0.000	1.324569	2.165535
Interest Rate	.0314389	.014708	2.14	0.034	.0023604	.0605174
_cons	-5.503476	.9346878	-5.89	0.000	-7.351404	-3.655548

R^2 =0.4972
F statistics   =34.61
Prob> chi2 =0.0000

Source: Research Findings (2019)

The findings of the study in Table 6 indicate an R^2 of 0.4972. This was an indication that the variables had strong explanatory power on NPLs. The findings indicated the firm characteristics and interest rates collectively explained 49.72% of the variations in NPLs. This was further supported by an F statistic of 34.61 and a p-value of 0.0000. Therefore, implying that the model was significant.

The findings in Table 6 indicate that with all other variables held constant, interest rate had a significant effect on non-performing loans of commercial banks in Kenya. The second step of the moderation test was however utilized to further confirm whether interest rate was simply an explanatory variable or whether it had a moderating effect on the relationship between firm characteristics and NPLs. Table 7 show the moderation test, step two

Table 7: Moderation Test, Step Two

NPL	Coef.	Std. Err.	Z	P>|z|	[95% Conf.	Interval]
Liquidity	.9325437	.8577034	1.09	0.279	-.7635058	2.628593
Capital Adequacy	2.296196	3.400893	0.68	0.501	-4.428836	9.021227
Bank Size	1.57992	.3277451	4.82	0.000	.931827	2.228014
Interest Rate	-.0331011	.1331845	-0.25	0.804	-.2964642	.230262
Interest Rate *Liquidity	-.0415651	.0825139	-0.50	0.615	-.2047306	.1216004
Interest Rate *Capital	-.0461545	.3426775	-0.13	0.893	-.7237757	.6314666
Interest Rate *Bank Size	.0169629	.0238928	0.71	0.479	-.0302835	.0642094
_cons	-4.884904	1.686485	-2.90	0.004	-8.219813	-1.549996

R^2 =0.5011
F statistics =19.65
Prob> chi2 =0.0000

Source: Research Findings (2019)

The step two for the moderation tests sought to assess whether interest rate had a moderating effect on the relationship between firm characteristics and non-performing loans of commercial banks in Kenya. In assessing the moderation effect of interest rate, each of the firm characteristics namely liquidity, capital adequacy and bank size was interacted with interest rate to ascertain the effect on non-performing loans of commercial banks in Kenya. The second step of the moderation test therefore sought to establish whether the interaction of interest rate and each of the firm characteristics was significant in predicting non-performing loans of commercial banks in Kenya.

4.4 Hypothesis Testing

This section provides the various results on hypothesis tests. The various hypotheses were analyzed using panel regression based on 0.05 significance level. These were in line with the specific objectives of the study as contained in Table 5 to Table 7.

H_{01}: Liquidity has no significant effect on Non-Performing Loans of Commercial Banks in Kenya.

The study sought to assess the effect of liquidity on non-performing loans of commercial banks in Kenya. A corresponding null hypothesis which stated that liquidity has no significant effect on NPLs was formulated. The study findings indicated that liquidity had a p-value of 0.089 which was an indication of non-significance. Therefore, liquidity had no significant effect on non-performing loans of commercial banks in Kenya. The study therefore failed to reject the null hypothesis.

The study findings on the effect of liquidity on NPLs were in agreement with previous studies. Jouini and Messai (2013) researched on the factors influencing the nonperforming loans of banks. The outcome of the study revealed that liquidity of banks had weak effect on non-performing loans. Awuor (2015) in the context of Kenya carried out a study on bank characteristics and non-performing loans of commercial banks. The study found that liquidity had an insignificant effect on non-performing loans of commercial banks. Hassana *et al*. (2015) did an analysis on bank-specific and NPLs in Pakistan and established that liquidity of banks was found to have an insignificant effect on non-performing loans.

H$_{02}$: Capital Adequacy has no significant effect on Non-Performing Loans of Commercial Banks in Kenya.

The second objective of the study was to establish the effect of capital adequacy on NPLs. In view of this specific objective, a null hypothesis was formulated which stated that capital adequacy has no significant effect on Non-performing Loans of Commercial Banks in Kenya. The findings of the study in Table 5 provided a p-value of 0.001 which was an indication of significance. The null hypothesis stated that capital adequacy has no significant effect on Non-performing Loans of Commercial Banks in Kenya was therefore rejected at 0.05significance level. The findings can be traced to the notion that banks with capital buffers may have an incentive to give out more loans and advances to customers/borrowers, thus increasing the levels of non-performing loans of commercial banks.

The study findings concurred with those of previous studies. Yusoff, Dahlan and Adebola (2011) conducted a study in Malaysia on the various determinant of banks non-performing loans. Research findings showed capital adequacy has a significant effect on Islamic banks non-performing loans. Dimitrios *et al.* (2011) in their study on the various determinants of Greek banks NPLs. The study indicated that bank capital significantly affects the NPLs level of Greek bank. The analysis was based on a panel data of 9 biggest Greek banks. Makri *et al.*, (2014) did an investigation on the factors predicting the NPLs levels for Eurozone's banking sector and found that capitals are having strong effect NPL levels.

Furthermore, Prasanna (2014) on what determines NPLs in the context of India. The research findings revealed that capitals had strong influences on NPLs in India. Ouhibi and Hammami (2015) while studying the factors determining the soundness of the system of banking in terms of finance among South Mediterranean nations reported that capital adequacy significantly impact on banks' nonperforming loans. Hassana *et al* (2015) did an analysis on bank-specific and NPLs in Pakistan and found that capitals have strong influences on non-performing loans.

H$_{03}$: Bank Size has no significant effect on Non-Performing Loans of Commercial Banks in Kenya.

The study further sought to assess the effect of bank size on non-performing loans of commercial banks in Kenya. In line with this specific objective, a null hypothesis was formulated which stated that bank size has no strong effect on NPLS. The study findings in Table 4.6 revealed that bank size had a p-value of 0.000 which indicated significance at the threshold of 0.05. The study therefore failed to reject the null which stated that bank size has no significant effect on Non-performing Loans of Commercial Banks in Kenya. Large banks are able to get large deposits and therefore do more aggressive lending both at conventional and digital banking and be able to absorb more risk and therefore increasing the non-performing loan levels of banks. On the other hand, small banks obtain more expensive deposits and have less lendings.

The study findings on the effect of bank size on non-performing loans of commercial banks were in agreement with the findings of Dimitrios *et al.* (2011), Makri *et al.*, (2014), Awuor (2015), Ouhibi and Hammami (2015), Hassana *et al.* (2015) and Hue (2015). Dimitrios, Angelos and Vasilios (2011) did an empirical investigation on the various determinants of Greek banks NPLs. The analysis was based on a panel data of the 9 biggest Greek banks. Research findings indicated bank sizes significantly affect the NPLs level of Greek bank. Makris *et al.*, (2014) in their study on the factors predicting the NPLs levels for Eurozone's banking sector found a strong linkage among bank size and NPLs in Eurozone. Awuor (2015) in the context of Kenya reported a strong effect on size on loans. Ouhibi and Hammami (2015) analysed the factors determining the soundness of the system of banking in terms of finance

among South Mediterranean nations. The study findings revealed that bank size significantly impact on banks' nonperforming loans. Hassana *et al*. (2015) did an analysis on bank-specific and NPLs in Pakistan. The study findings indicated that bank size has a considerable impact on levels of NPLs. Hue (2015) while focusing on factors contributing to NPLs in the context of Vietnam found that bank size significantly contributes to the banks' NPLs level. The findings of the study that bank size has significant effect on non-performing loans largely collaborate those of previous studies. This is because bank size forms a key component of banks as it reflects their total assets.

H_{04}: Interest rate has no significant moderating effect on the relationship between firms' characteristics and Non-Performing Loans of Commercial Banks in Kenya.

The study sought to test the null hypothesis which stated that interest rate had no significant moderating effect on the relationship between firm characteristics and non-performing loans of commercial banks in Kenya. The hypothesis was further broken down into three null sub hypotheses for purposes of assessing the moderating effect of interest rate on the relationship between each of the firm characteristics and non-performing loans of commercial banks in Kenya.

The first null sub hypothesis stated that interest rate had no significant moderating effect on the relationship between liquidity and non-performing loans of commercial banks in Kenya. The findings in Table 7 revealed that the interaction between interest rate and liquidity (interest rate*liquidity) had a p-value of 0.615 which indicated non significance. Therefore, at 0.05 significance level, the null sub hypothesis stated that interest rate had no significant moderating effect on the relationship between liquidity and non-performing loans of commercial banks in Kenya was not rejected.

The second null sub hypothesis stated that interest rate had no significant moderating effect on the relationship between capital adequacy and non-performing loans of commercial banks in Kenya. The regression outcome in Table 7 indicated that the interaction between interest rate and capital adequacy (interest rate*capital adequacy) had a p-value of 0.893 which was not significant at 0.05 significance level. The study therefore failed to reject the null sub hypothesis that stated interest rate had no significant moderating effect on the relationship between capital adequacy and non-performing loans of commercial banks in Kenya.

The third t null sub hypothesis stated that interest rate had no significant moderating effect on the relationship between bank size and non-performing loans of commercial banks in Kenya. The study results depicted in Table 7 indicated that the interaction between interest rate and bank size (interest rate*bank size) had a p-vale of 0.479 which indicated non significance. As such, at 0.05 significance level the study failed to reject the null sub hypothesis that stated interest rate had no significant moderating effect on the relationship between bank size and non-performing loans of commercial banks in Kenya.

Thus, the test for the moderating effect of interest rate on the relationship between firm characteristics and non-performing loans of commercial banks in Kenya revealed that interest rate was an explanatory variable as it depicted significant explanatory influence on non-performing loans of commercial banks in Kenya. The moderation test further revealed that interest rate does not moderate the relationship between the various firm characteristics and non-performing loans as none of the interaction effect was significant.

5.1 CONCLUSION

The conclusion of the study was informed by the various findings of the study. With respect to liquidity, the study revealed that liquidity was not significant in predicting the NPLs. The study

concluded that liquidity of commercial banks was not key in determining their levels of non-performing loans.

With regards to capital adequacy, the study indicated that capital adequacy was significant in determining the non-performing loans of commercial banks. The conclusion of the study was that the levels of non-performing loans of commercial banks in Kenya were highly influenced by the capital adequacy levels of banks. This was expected as the funded banks were able to manage non-performing loans.

The research discovered that size had a significant effect on NPLs. The conclusion was that bank size was a key in determining the levels of non-performing loans of commercial banks in Kenya. The larger the size of banks is, the more the loans which they disburse and as such translating to increasing levels of non-performing loans. Large banks also have ability to disburse different types of loans i.e. digital, corporate, retail and government lending which creates different types of exposure.

The study established that interest rate had no significant moderating effect on the relationship between firm characteristics and non-performing loans of commercial banks in Kenya. The study therefore concluded that the relationship between liquidity and non-performing loans was not influenced by interest rate. The study further concluded that the relationship between capital adequacy and non-performing loans was not affected by interest rates. Lastly, the conclusion of the study was the linkages between bank size and non-performing loans were not impacted by interest rate. However, interest was an important explanatory in explaining non-performing loans which were high when interest rate was high and low as interest rate goes down.

6.1 Recommendations

The recommendations for policy was guided by the study findings as they are based on only variables which significantly predicted the levels of NPLs. The study established that capitals had strong influences on non-performing loans in Kenya. The study therefore recommended that bank management should build up additional buffers above the minimum stipulated capital requirements. Bank managers should therefore scrutinize each application for credit regardless of the levels of capital held by banks. The inquiry discovered that bank size had a significant effect on NPLs in Kenya. The inquiry recommended that banks with larger assets can consider other investment options to diversify against the effect of high loan defaults.

REFERENCES

Adebola, S. S., Yusoff, W. S. B. W. & Dahalan, J. (2011). 'An ARDL Approach to the Determinants of No-Performing Loans in Islamic Banking System in Malaysia', *Kuwait Chapter of Arabian Journal of Business and Management Review*, 1(2): 20-30.

Ali, S. (2012). The Impact of macroeconomic variables on non-performing loans in the Albanian Banking system. MCSER Publishing. *Academic Journal of Interdisciplinary Studies.*

Alizadeh, J. & Junaina, M. (2011). Sensitivity of non-performing loans to macroeconomic variables. Malaysia Banking Sector: Panel evidence. IDOSI publications. Available: *World Applied Sciences Journal.* ISSN: 1818-4952. 28(12): 2128-2135, 2013.

Awuor, F (2015). *Effects of Selected Bank Specific Factors on Non-performing Loans Amongst Commercial Banks in Kenya.* A Project University of Nairobi.

Badar, M. & Javid, A. Y. (2013). 'Impact of Macroeconomic Forces on Non-performing Loans: An Empirical Study of Commercial Banks in Pakistan', *Wseas Transactions on Business and Economics*, 1(10): 40-48

Cooper, D. & Schindler, P. (2009). Business Research Methods. (9thed.) McGraw Hill 78 Companies

Demirgunes K. (2016), the effect of liquidity on financial performance: evidence from Turkish Retail industry. *International journal of economics and finance vol 8 no 4;2016 E-ISSN 1916-9728*

Dimitrios, P., Angelos,L. T. V. &Vasilios, L. M. (2010). 'Macroeconomic and Bank Specific Determinates of Non-performing Loans in Greece's, Comparative Study of Mortgage, Business and Consumer Loan Portfolios', Bank of Greece working paper No 118.

Ekanayake, E.M.N.N. & Azeez, A.A., (2015), 'Determinants of non-Performing loans in licensed commercial banks: evidence from Sri Lanka', *Asian Economic and Financial Review*,.5 (6), 868,

Joseph, M.T., Edson, G., Manuere, F., Clifford, M.& Michael, K. (2012). 'Non-Performing Loans in Commercial Banks: A Case of CBZ Bank Limited in Zimbabwe', *Interdisciplinary Journal of Contemporary Research in Business*, 4(7): 467-488

Klein, N. (2013). Non-performing loans in CESEE: Determinants and impact on macroeconomic performance. *International Monetary Fund Working Paper*, 72, Europe.

Lawrence, E.C., (1995), 'Consumer Default and the Life Cycle Model', Journal of Money Credit and Banking no. 27, pp.939-954,

Louzis, D. P., Vouldis, A. T. & Metaxas, V. L. (2011). 'Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios', *Journal of Banking & Finance,* 36(4):1012-1027.

Makri, V., Tsagkanos, A. & Bellas, A. (2014). 'Determinants of Non-Performing Loans: The Case of Eurozone', *Panoeconomicus*, 2:193-206.

Mboka, T. M. (2013). *Effects of macro-economic variables on nonperforming loans of commercial banks in Kenya* (Doctoral dissertation, University of Nairobi).

Messai, A. S. & Jouini, F. (2013). 'Micro and Macro Determinants of Non-performing Loans', *International Journal of Economics and Financial Issues*, 3(4): 852-860.

Nkusu, M., (2011), 'Non-performing loans and macro financial vulnerabilities in advanced economies', IMF Working Paper 11/161,

Ongore, V. O. & Kusa, G. B. (2013). 'Determinants of Financial Performance of Commercial Banks in Kenya', *International Journal of Economics and Financial Issues*, 3(1): 237-252.

Ouhibi, S. & Hammami, S. (2015). 'Determinants of Non-performing Loans in the Southern Mediterranean Countries', *International Journal of Accounting and Economic Studies*, 3(1): 50-53.

Saba, I., Kouser, R. & Azeem, M., (2012), 'Determinants of Non-Performing Loans: Case of US Banking Sector. *The Romanian Economic Journal*, no. 95, pp. 44

Soyemi, K. A., Akinpelu, L. & Ogunleye, J. O. (2013). 'The Determinants of Profitability among Deposit Money Banks (DMBS) in Nigeria Post Consolidation', *Global Advanced Research Journal of Economics, Accounting and Finance*, 2(5): 93-103.

Warue, B. N. (2013). 'The Effects of Bank Specific and Macroeconomic Factors on Non-performing Loans in Commercial Banks in Kenya: A Comparative Panel Data Analysis', *Advances in Management & Applied Economics*, 3(2): 135-164.

Whisman, M. A., & McClelland, G. H. (2005). Designing, Testing, and Interpreting Interactions and Moderator Effects in Family Research. *Journal of Family Psychology, 19*(1), 111-120. http://dx.doi.org/10.1037/0893-3200.19.1.111