International Journal of Economics, Commerce and Management
United Kingdom Vol. VI, Issue 7, July 2018
http://ijecm.co.uk/ ISSN 2348 0386

DETERMINANTS OF CREDIT LOSSES FOR COMMERCIAL BANKS IN KENYA

Robert Mbau Wairimu
Moi University, School of Business and Economics, Kenya
mbaurobert@gmail.com

Josephat Cheboi
Moi University, School of Business and Economics, Kenya
cheboijos@gmail.com

Samuel Muthoga
Kenyatta University, School of Business and Economics, Kenya
sam.muthoga@gmail.com

Abstract

Continued erosion of capital and profits due to massive credit losses have led to collapse of many banks in Kenya in the past while others have been placed under receivership by the Central Bank of Kenya. This study therefore aimed at establishing the determinants of credit losses in Kenyan banking industry with specific objective being estimating whether GDP growth, credit growth, lending rates and credit quality do influence credit losses in Kenyan banking industry. The study adopted a longitudinal research design using secondary annual panel data collected for a period of 2008- 2016. A Random effect regression model was used and the findings indicated that credit growth and credit quality are major determinants of credit losses among commercial banks in Kenya while GDP growth and Lending rates are not significant drivers of credit losses. It is recommended that commercial banks need to maintain well balanced and diversified credit portfolios. There is also need for commercial banks to employ better credit management practices starting from customer recruitment to loan appraisal and processing, all through to loan monitoring. Lastly the study would recommend commercial banks to enhance loan recovery efforts for defaulted loans to reduce on the resultant credit losses.

Keywords: GDP growth, credit growth, lending rates, credit quality, credit losses

INTRODUCTION

Financial stability in any economy is dependent on the soundness and effectiveness of its banking sector. This is only possible if commercial banks maintain quality assets that generate adequate profits. The failure to maintain market discipline can cause financial instability and may lead to economic and political crisis in the event of bank failure (Kargi,2011).Kargi (2011) noted that credit creation remains the main source of revenue for commercial banks which has been achieved through the lending of various loan products targeted at specific bank clientele. These loans products are mainly credit cards, mortgages, personal unsecured loans, commercial business loans, invoice discounting among others. Lending by commercial banks often exposes the lenders to credit losses when the borrowers default on funds lent out. However, Santomero (2002) argued that commercial banks do experience credit losses whenever the value of its assets declines due to changes in the fiscal status of customers to whom credit has been advanced.

In the Kenyan banking industry, the market stability has been greatly affected by the collapse of many commercial banks over time. The collapse of nineteen financial institutions between the years 1993-2016 is testament to this challenge. Ngugi (2001) did identify credit losses as the major cause of bank failures in the 1990's. The desired financial stability in Kenya has been threatened over time by the deterioration in the economic environment. The Kenyan banking sector has been experiencing deteriorating quality of assets as a result of the significant rise in nonperforming loans and deteriorating macroeconomic environment. Kitua (2002) observed that the Kenyan banking business was likely to face challenges whenever there was a decline in the quality of loans held by the banks in the country.

Kithinji and Waweru (2007) argued that the problem in the Kenyan banking sector begun in the 1980's culminating in the financial crises of 1986 – 1990, which saw the collapse of several financial institutions and also the amalgamation of several other banks to form the Consolidated Bank of Kenya. Obiero (2012) identified credit risk as the second most important factor leading to banking failures in Kenya after poor management. Mwangi (2012) identified sources of credit risks among Kenyan commercial banks as limited institutional capacity, inappropriate credit policies and procedures, volatile interest rates, poor management, low capital and liquidity levels. Poor loan assessments and underwriting, inadequate credit monitoring environment and general laxity among the banks credit officers were also noted as major causes of credit losses.

The determinants of credit losses among commercial banks across the globe is however varied. Empirical studies have shown that GDP growth, Credit quality, Lending rates and Credit growth do impact the credit losses in the banking sector. Castro (2013), Rodgers (2013) and

Gizycki (2001) all found considerable influence of GDP growth on credit losses in Spanish, Australian and Greece banks respectively. On the other hand, Hess *et al* (2007), Keeton (1990) and Saurina *et al* (1996) all found that rapid expansion of credit is deemed to cause credit losses at a future date since some customers may be unable to meet future repayments while Naveed (2007), Sykes (1994) and Ahmad (2007) all found strong relationship between lending rates and credit losses in the banking sectors.

In light of the above, credit losses are an avoidable element in commercial banking because certain customers will default in the course of servicing their debts. Proper identification of the underlying determinants of credit losses among commercial banks is the first step in the estimation of the expected losses given a particular loan portfolio. The current study therefore analyses the major determinants of credit losses in the banking industry in Kenya.

Statement of the Problem

The general economic situation has supported the banking sector to grow significantly but not without a multitude of challenges such as default challenges that have had operations of the commercial banks beleaguered and therefore significantly hampering their sustainability. Of particular interest to the sustainability of the commercial banks is the challenge of credit losses that has significantly adversely affected the performance of these institutions (Mungure 2015). It is important to appreciate the role played by quality loan portfolios on financial performance for a good number of the lending institutions when their influence on liquidity, loan extension capacity, revenues generated as well as the level of profitability for the commercial banks is put into perspective (Krauss & Walter, 2009). Financial lenders often incur heavy losses as a result of credit losses due to the fact that when the lenders register huge amounts of unsettled loans on their balance sheet, liquidity, profitability as well as debt- servicing capacity operations of the institution are unfavourably affected (Mungure, 2015).According to Kohansal and Mansoori (2009), restrictions resulting from self-funding, insecurity relating to the output level as well as time difference between the effort and yield usually provide the justification for making credit facilities necessary. The area of concern for the borrowers is loan repayment (López, 2007).

The trends for credit losses is not only local but also regional. In Tanzania there has been an increase in the number of loan defaulters in commercial banks as well as pension schemes. Barongo (2013) revealed that credit losses in Tanzania increased by a whopping 250% from Tsh. 2,173.22 million to Tsh. 9,800.07 million. In Kenya, KPMG (2016) report indicated that credit losses increased by more than 8.3%. The Equity bank annual report 2016 indicated an increase in credit losses from the previous figures (Equity Bank, 2017). As a result of that, banks are already shying off from lending and have cut down their credits. These trends

are not healthy for the economy and it was worthy investigating the determinants of credit losses among commercial banks. In addition to that, the study is also motivated by existing knowledge gaps in the previous studies. Studies such as Onkoba (2010) focused on the effects of CRM on the financial profits on CB's in Kenya, Ngare (2008) focused on credit risk management practices as adopted by various CB's in Kenya while Mwirigi (2006) conducted an assessment of credit risk techniques in commercial banks in Kenya. These studies have not given the determinants of credit losses a quantitative look and thus this study sought to fill this knowledge gap.

Objectives of the Study

I. To establish whether GDP growth affects credit losses in commercial banks in Kenya.
II. To determine whether Credit Growth influences credit losses in commercial banks in Kenya.
III. To investigate whether credit Quality affects credit losses among commercial banks in Kenya.
IV. To establish whether lending rates affects credit losses in commercial banks in Kenya.

LITERATURE REVIEW

Credit Losses

Credit losses arise when all recovery efforts fail to bear full resolution from the defaulting customer. Debt recovery is an important step in the credit function of commercial banks that helps lenders convert losses into income as well as free up capital for future lending. It's a strategic process that aims at generating good habits and a payment culture among the bank customers. Loan default for commercial banks in Kenya have been attributed to both internal bank weaknesses as well as with other externalities normally outside the influence of the commercial banks themselves. Weaknesses in the credit granting process of the individual commercial banks include errors in product promotion, credit evaluation and analysis, loan approval and disbursement process often lead to credit being advanced to underserving borrowers ending up in default.

To minimise credit losses arising from the increasing non-performing loans commercial banks in Kenya have continued to be innovative on various strategies in the debt recovery in order to rehabilitate the defaulted accounts. Among the strategies in use by many commercial banks in Kenya are robust account monitoring, debt restructures, use of internal debt recovery units, outsourcing debts to debt recovery agencies, staff trainings to build capacity and

competence, use of CRB's, deployment of efficient information and support systems, and adopting well defined processes and procedures in debt recovery.

Gross Domestic Product Growth

Gross Domestic product refers to the market value of all goods and services produced in a country over a given period of time. GDP measures the value of a nation's production which is also measured as the value of all expenditures of final goods and services. The GDP growth rate measures how fast an economy is growing and it represents the most important indicator of the economic health of a country. A country's growth rate oscillates around four cycles normally expansion, peak, recession and trough with each cycle having some impacts on commercial banks credit losses. During periods of GDP expansion and peaks, commercial banks suffer minimal credit losses because with increased incomes and profits borrowers are able to meet their loan repayments when they fall due. On the contrary during periods of recessions and trough, commercial banks record increased credit losses across their loan portfolios.

The Central Bank of Kenya credit officer report of December 2015 noted that with poor GDP growth, inflation grows rapidly, there is minimal inflows of funds from the government to the private sectors leading to subdued business growth resulting in reduced business incomes and profits. A combination of these factors eventually leads to huge credit losses within the banking sector since many borrowers are no longer able to service their loan repayments on time. Various studies have been conducted on the effects of GDP growth rates on credit losses of commercial banks.

Credit Growth

Credit growth refers to the increase in the amount of funds that commercial banks lend to individuals, business enterprises, companies either in the form of retail loans, term loans, credit cards, asset financing, business overdrafts or any other form of credit. Many empirical studies have established that a rapid expansion of credit is a major cause of increasing credit losses among the commercial banks. Hess *et al* (2009) found that strong loan growth translates to significantly higher levels of credit losses with a lag of 2-3 years in Australian banking sector. Keeton (1999) noted that banking deregulation in America brought about competition giving incentives to CB's to shift to riskier credit policies and less capital requirements. As a result CB's lending standards loosened, banks started accepting riskier collaterals, lending to large corporates on unsecured terms begun. Banks also relaxed covenants around use of borrowed funds, loan to valuation and on interest coverage ratios. Caprio and Klingebiel (1997) established that credit losses are greatly influenced by growth of credit during periods of

economic booms. The study noted that rapid credit growth often leads to a decline in the credit standards on individual banks.

Credit Quality

Nonperforming loans measures the credit quality in the loans portfolios and the ability of such portfolios to earn interest income in the future. Nissim *et al* (2013) defines nonperforming loans as both nonaccrual and restructured loans. Nonaccruals are loans on which interest accruals have been discontinued due to borrower's financial difficulties. This occurs when the loan principal or interest or both becomes unpaid for over a period of 90 days. A loan is considered restructured when the bank grants a concession to the debtor that changes the terms of the loan to prevent it from being charged off as long as the debtor can fulfil the new terms of the restructure. A high level of NPL's is an indicator of a huge number of credit defaults that affects the bank's profitability and net worth due to the resultant losses.

Cucinelli (2015) study of the impact of nonperforming loans on banks' lending behaviour (2007 – 2013) for Italian Banks found that increase in NPL's leads to worsening of credit quality leading to CB's incurring excess credit losses from time to time. The study analysed sampled data of 488 Italian banks (cooperative and commercial banks respectively) with the OLS regression technique. Ahmed and Ariff (2007) multi country study of bank's credit risk determinants used cross section data of various banks' balance sheet and income statements of commercial banks of selected countries. Variables of the study included impaired loans as a measure of credit quality, total liabilities / total assets, earning assets / total assts. Results of the study also found NPL's to be positively correlated to credit losses signifying a deteriorating loan quality.

Lending Rates

Bank Weighted Average Lending Rate is the weighted average interest rate charged by reporting commercial banks on loans granted during a given period of time. The WALR is computed monthly based on interest rates of all outstanding loans of commercial banks and their maturity period. The use of WALR by CB's promotes transparency and openness in loans pricing across commercial banks. Monthly data is derived as the ratio of actual interest income of all commercial banks on their peso-denominated loans to the total outstanding level of these loans. Periods of low real interest rates could result to lower credit losses while steep rising real interest rates could accelerate credit losses. Interest rates charged on loans should incorporate a component for expected credit losses, thus providing for a measurable expected credit loss when a loan is made and at every future date until it is repaid

Naveed (2007) study of determinants of credit risks of Pakistan banking industry found that growth in interest rates have no impact on credit risks. The study used panel data for a period of seven years with growth in interest rates, GDP and loan loss provisions among the independent variables. However this had been contradicted by Sykes (1994) who established that increase in lending / interest rates slows business growth significantly leading to growth in debt. With higher interest rates many borrowers are unable to meet increased loan repayments and default on their debts exposes CB's to credit losses. Ahmad *et al* (2007) multi country study on credit risks determinants found that interest rates spread negatively affects credit risks on emerging economies like India, Korea, Malaysia, Mexico and Thailand. The current study was expected to find positive correlation between WALR and credit losses in commercial banks in Kenya.

RESEARCH METHODOLOGY

The current study adopted a longitudinal design whereby secondary panel data was collected and analysed using a random effect regression model in order to determine the casual relationship of the dependent and independent variables. The study considered data for all the 43 commercial banks in Kenya between 2008-2016. Data was analysed using STATA statistical software. The study first conducted Hausman test to choose the best model between fixed effect and random effect models of which a random effect model was suitable for this study. Unlike the fixed effects model, the variation across entities in Random effect model is assumed to be random and uncorrelated with the predictor or independent variables included in the model. Prior to running the regression model, pre estimation tests were conducted to check for the presence of Multicollinearity and stationarity of the data. Post estimation tests of autocorrelation and Heteroskedasticity were also conducted. Since the data was collected on nine year duration, unit root pre-tests was conducted prior to running the regression model to prevent spurious results. Multicollinearity was conducted using Variance Inflation Factor method while stationarity of the data was tested by using Im-Pesaran-Shin (IPS) test. The study used Wooldridge Test of Autocorrelation and Likelihood Ratio Test of Heteroskedasticity. The following general equation was used to link the independent variables to the dependent variable.

$Y_{it} = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X4_t + \mu_{it} + e_{it}$

$Y_{it} = \beta_0 + \sum_{i=1}^{4} \beta 1 Xit + \mu_{it} + e_{it}$

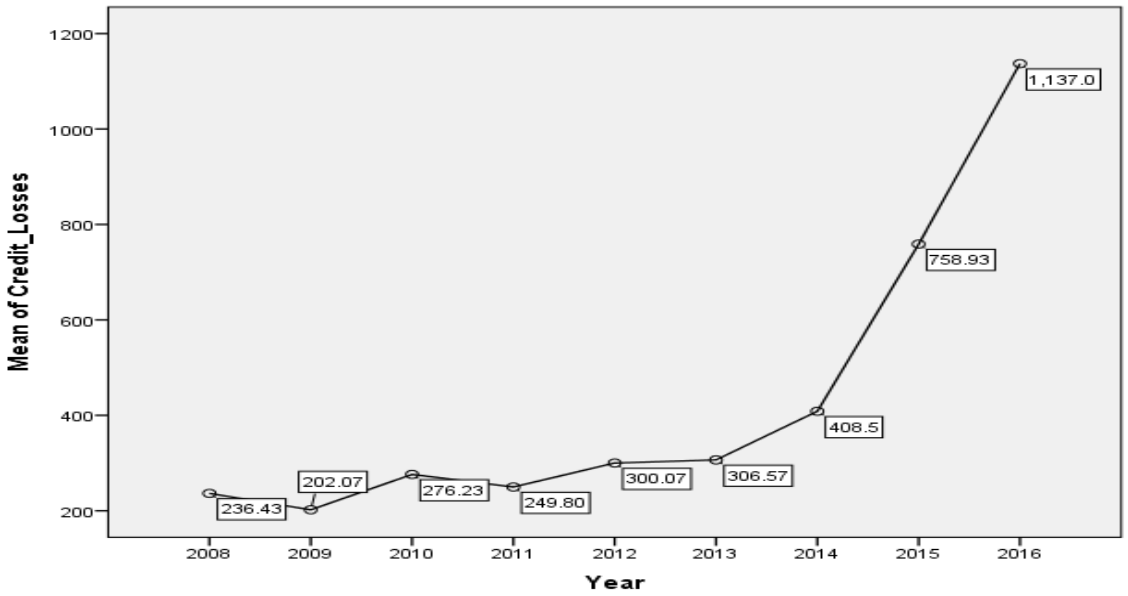
Where: Y = Credit Losses, β_0= Constant, β_1, β_2,β_3 and β_4 = Regression Coefficients, X_1 = Credit Growth, X_2 = Credit Quality, X_3= GDP, X_4= Lending Rates, U_{it}=Between-entity error and e_{it}=Within-entity error.

RESULTS

Trend Analysis of Credit Losses

The findings in Figure 1 indicate time related effects in credit losses due to changes in the variable over the years. The results reveal increasing unsteady trends in credit losses over the study period. The trends are however predictable which indicates non stationarity in the variables. From the findings in Figure 1 the increase in credit losses was slow between the year 2008 and 2013 before a steady increase between the year 2013 and 2016. This has led to regulators increased surveillance and enhanced reporting standards of the nonperforming loans accounts. This has in return increased loan loss provisions by commercial banks in Kenya.

Figure 1 Trend Analysis for Credit Losses (2008 to 2016)

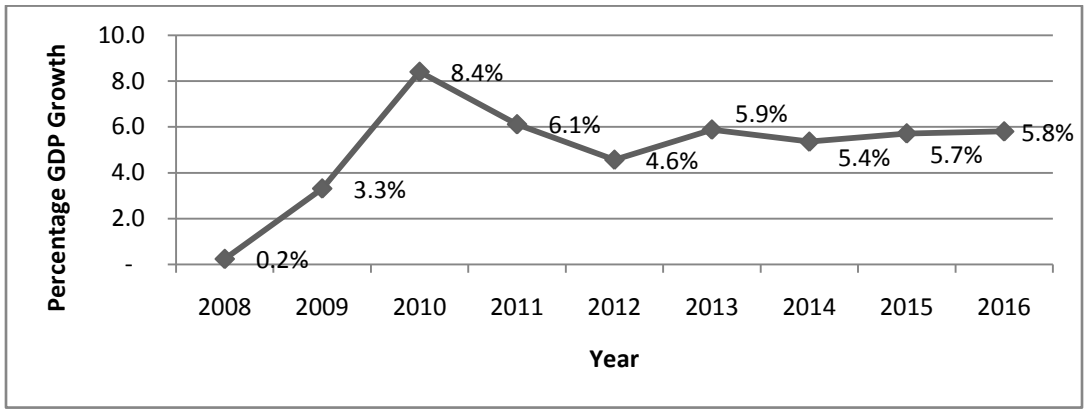


Source: Commercial Banks Annual Reports (2008 – 2016)

Trend Analysis of GDP Growth

The changes in growth of GDP as portrayed in the Figure 2 reveal unsteady increasing and decreasing trends over the study period. It is extremely difficult to predict GDP growth and this is an indicator of stationarity.GDP trends in Kenya have been more influenced by prevailing political environment more than any other factor over the study period. During periods of political stability the economy has been recording impressive growth rates as noted in the years from 2014 to 2016 as well as 2010 where the highest growth rate was recorded in 2010 at 8.4%. On the contrary during periods of political uncertainties, such as 2008 and 2013, the economy has grown marginally with the lowest growth rate recorded in 2008 at 0.2%.

Figure 2 Trend Analysis of GDP Growth (2008 to 2016)

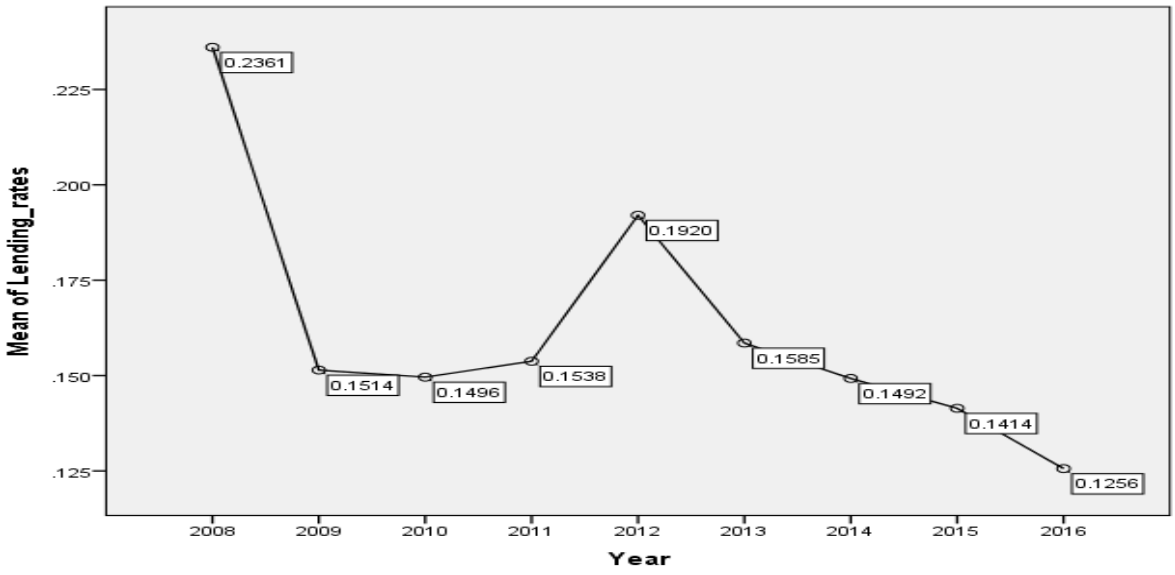


Source: Kenya National Bureau of Statistics (2008 -2016)

Trend Analysis of Lending Rates

The findings of the trends for lending rates reveal that there has been a decreasing unsteady trend in the variable. However, the trends are predictable and that is a signal of non-stationarity in the variable. Prior to the year 2016, interest rates charged by commercial banks in Kenya were market driven but strongly guided by the monetary policies adopted by the government. The highest rates were recorded in the year 2008 and the lowest was recorded in the year 2016 after interest rate capping was effected.

Figure 3 Trend Analysis of Lending Rates (2008 to 2016)

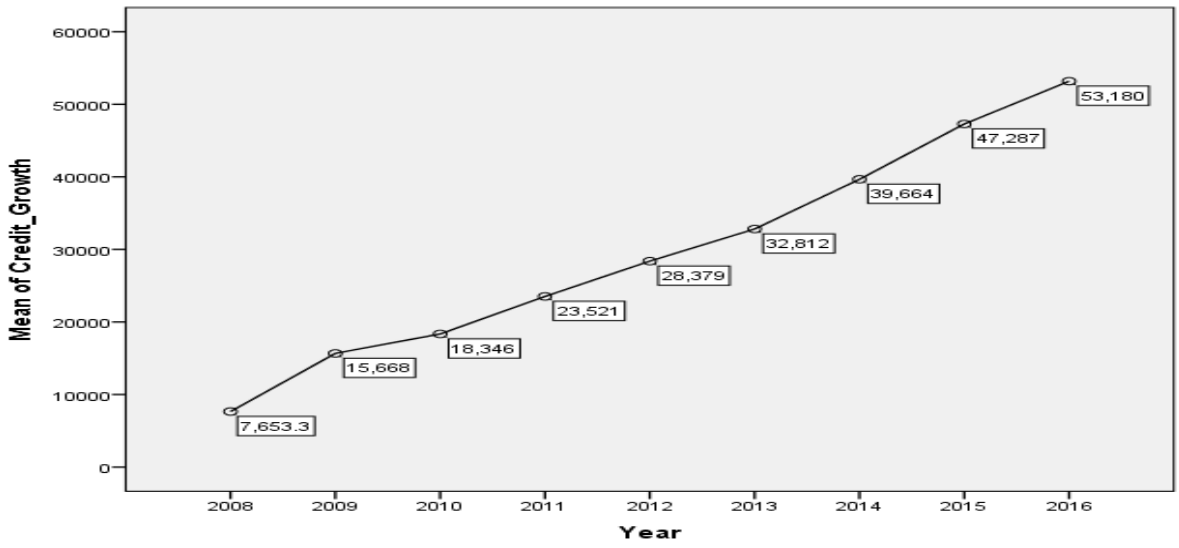


Source: CBK Annual Reports (2008 – 2016)

Trend Analysis of Credit Growth

The findings show that credit growth has been increasing steadily in the study period. This shows high predictability in the variable hence an indication of non-stationarity. From the above trend there was mild growth in credit in terms of Millions by commercial banks in Kenya in the study period. This increase can be attributed to government's efforts to reduce on domestic market borrowings thereby freeing credit for banks to lend to other sectors of the economy. There has also been liberalisation in the banking industry whereby banks have been taking more risks even from unsecured loan products.

Figure 4 Trend Analysis of Credit Growth

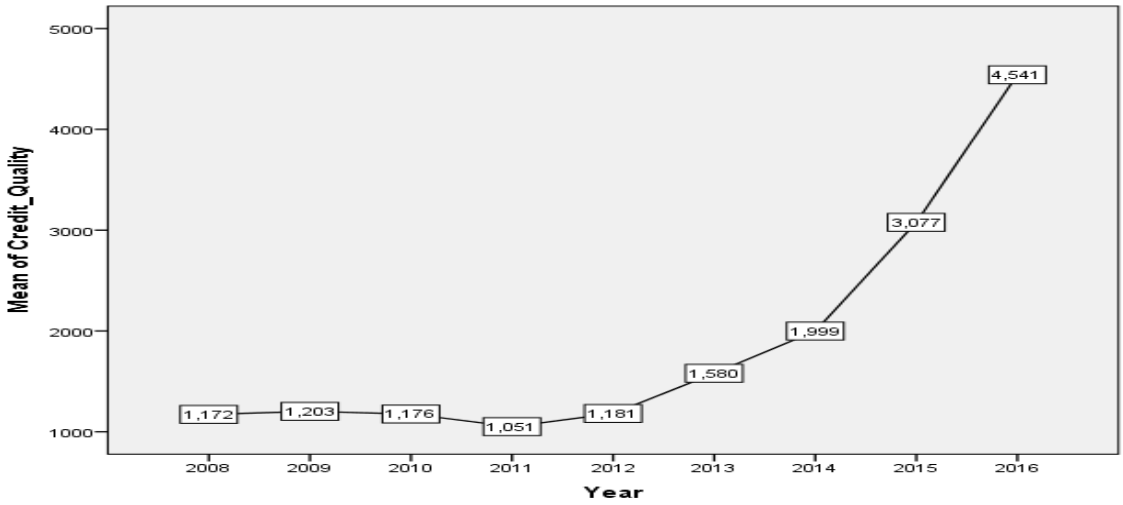


Source: Commercial Banks Annual Reports (2008 – 2016)

Trend Analysis of Credit Quality

The trends in credit quality has been unsteady with indication of increasing and decreasing values before the year 2011 after which it started increasing steadily up to the year 2016. The implementation of the Basel 11 accord on risk management saw a drastic reduction in the nonperforming loans in the country. The Basel accord provided robust programmes of risk identification, risk mitigation and risk prevention. The adoption and implementation of the Basel 11 principals by the Central Bank of Kenya through the prudential guidelines has been credited with the reduction of nonperforming loans during the period 1999 to 2011. This has stabilised the credit quality.

Figure 5 Trend Analysis of Credit Quality



Source: Commercial Banks Annual Reports (2008 – 2016)

Descriptive Analysis

The study conducted descriptive analysis to establish the mean, standard deviation as well as the normality of the variables. The results indicate the average credit losses in Millions of all the commercial banks for the study period was 421 million with a standard deviation of 767 million which indicated a high variation in the credit losses over the study period. Credit growth had a mean of 29698 Million with a standard deviation of 46582 million that also showed a high variation in credit growth over the study period. Credit quality had a mean value of 1858 million with a high standard deviation of 3132 Million which also revealed a high variation in credit quality among the commercial banks in the study period. On the other hand, the mean GDP growth rate was 5% with a standard deviation 0f 2% which reveals a small variation in the GDP growth over the study period. The average lending rate was 16.72% over the study period with a standard deviation of 6.1% which revealed a small variation in the lending rates among the commercial banks over the study period.

Table 1 Descriptive Analysis

	Credit losses	Credit growth	Credit quality	GDP	Lending Rates
Mean	421.8207	29698.07	1858.462	5.040144	0.167149
Median	112	9260	698	5.713383	0.149665
Maximum	5011	332990	26769	8.402277	0.551859
Minimum	-100	92	10	0.232283	0.041475
Std. Dev.	767.979	46582.4	3132.066	2.127518	0.060655

Diagnostic Tests

MultiCollinearity Test

The study conducted a multicollinearity test to establish whether the independent variables are highly correlated. A variance inflation factor method was used. A VIF factor value less than 10 indicates no presence of multicollinearity. Since all the independent variables had a VIF value less than 10, there was no multicollinearity problem in the study variables.

Table 2 MultiCollinearity Test

Variable	**VIF**	**1/VIF**
Credit Growth	2.33	0.428495
Credit Quality	2.26	0.441856
Lending Rates	1.34	0.748037
GDP	1.31	0.766032
Mean VIF	**1.81**	

Unit Root tests

The presence of a unit root was tested by using Im-Pesaran-Shin (IPS) test. IPS test is based on a null hypothesis of presence of unit root (Data is non-stationary). If the value is less than 0.05, then the null hypothesis is rejected implying that the data is stationary. The results presented in Table 3 indicate that all the variables were stationary since the null hypothesis of the presence of a unit root was rejected (Probability value was less than 0.05). No differencing was hence required on those variables.

Table 3 Im Pesaran Shin Unit Root Test

Variable	Method	Statistic	Prob.**	Decision
Credit Losses	Im, Pesaran and Shin W-stat	-7.48277	0.000	Stationary
GDP Growth	Im, Pesaran and Shin W-stat	-5.18087	0.000	Stationary
Lending Rates	Im, Pesaran and Shin W-stat	-4.72103	0.000	Stationary
Credit Growth	Im, Pesaran and Shin W-stat	-2.97426	0.001	Stationary
Credit Quality	Im, Pesaran and Shin W-stat	-3.56824	0.000	Stationary

HeteroskedasticityTest

The study tested against violation of the assumption of homoscedasticity. There was a need to ensure that the residuals of the regression model are constant across time and hence the study used likelihood ratio test to run the test. It is tested against the null hypothesis of homoscedasticity. The results in Table 4 indicate that the null hypothesis of panel

homoscedastic error terms is rejected as supported by a Prob > chi2 which is less than the critical p value (0.05). This indicates that robust standard errors were applied when running the final regression so as to control for the problem (Field, 2008).

Table 4 Likelihood Ratio Test of Heteroskedasticity

Likelihood Ratio Test	
LR Chi2 (3)	-2626.516
Prob>Chi2	0.0000

Autocorrelation test

Autocorrelation test was conducted to make sure that the error terms were not correlated with time since data for a period of 9 years was collected. The study used Wooldridge Test of Autocorrelation where the null hypothesis states that there is no first order serial autocorrelation in the panel data. From the results in Table 5, the null hypothesis of no first order correlation is not rejected given that the p-value is greater than 0.05 (p-value = 0.5252). This reveals that the panel regression model was suitable to be used in the study since it did not suffer from any problem of serial autocorrelation.

Table 5: Wooldridge Test of Autocorrelation

Wooldridge Test for autocorrelation in panel data H_0 : No first order Autocorrelation	
F (1,40)	0.411
Prob >F	0.5252

Correlation Analysis

The study assessed the correlations among the predictor variables using the pair-wise correlation matrix. The correlation analysis helped in determining the association between the study variables. It helped established the direction of change in credit losses given the change in any of the study variables (credit growth, credit quality, lending rates and GDP growth). Further, it helped to show whether multicollinearity problem existed in the data before a regression model was run. This was a compliment of the VIF method. A correlation value above 0.8 among the predictor variables indicates the presence of multicollinearity. The result in Table 4.6 reveal absence of multicollinearity as had previously been confirmed under the VIF method since no correlation among the predictor variables was above 0.8. The study findings showed that credit growth, credit quality and lending rates can significantly be associated with credit

losses among commercial banks in Kenya over the study period. The macroeconomic variable that is GDP growth does not affect credit losses significantly.

Credit growth is positively and significantly associated with credit losses among commercial banks in Kenya (r = 0.788, Sig = <0.05). This shows that an increase in credit growth leads to an increase in credit losses. The relationship is strong since the correlation value is close to 1. Furthermore, Credit quality is positively and significantly associated with credit losses among commercial banks in Kenya (r = 0.757, Sig = <0.05). This shows that an increase in credit quality leads to an increase in credit losses. The relationship is strong since the correlation value is close to 1. Lending rates is positively and insignificantly associated with credit losses among commercial banks in Kenya (r = 0.127, Sig = <0.05). This reveals that higher lending rates are associated with higher credit losses among commercial banks in Kenya though the degree of association is relatively low. The effect of GDP growth on credit losses (r = -0.097, Sig = >0.05) is small (not important / insignificant).It is however negative as shown by a positive Pearson correlation value although the strength is weak. This implies that as the economy improves credit losses decrease.

Table 6 Correlation Analysis

		Credit Growth	Credit Quality	GDP	Lending rates	Credit Losses
Credit Growth	Pearson Correlation	1	.747**	.136**	-.170**	.788**
Credit Quality	Pearson Correlation	.747**	1	.075	-.118*	.757**
GDP	Pearson Correlation	.136**	.075	1	-.360**	-.097
Lending rates	Pearson Correlation	-.170**	-.118*	-.360**	1	.127*
Credit Losses	Pearson Correlation	.788**	.757**	-.097	.127*	1
	Sig. (2-tailed)	0.000	0.000	0.062	0.015	

Correlation is significant at the 0.01**, 0.05* 2-tailed.

Hausman specification test

Hausman specification test was used by the study to select the best regression model between a random effect and a fixed effect regression model. The null hypothesis for Hausman test states that the difference between the coefficients is not consistent meaning that a random effect model is the best while the alternative hypothesis states that the differences are consistent implying that a fixed effect model is the best. A Prob>chi^{2}value greater than 0.05 implies that a random effect model is suitable (null hypothesis is not rejected) while a Prob>chi^2 value less than 0.05 implies that a fixed effect model is suitable (null hypothesis is rejected rejected). Results in Table 7 indicates a Prob>chi^{2}value of 0.7424 which is more than critical P

value at 5% level of significance which implies that the null hypothesis that a random effect model is the best was not rejected. The study hence used a random effect regression model to establish the determinants of credit losses among commercial banks in Kenya.

Table 7: Hausman Specification Test

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
credit_gro~h	.006563	.0081853	-.0016223	.0009181
credit_qua~y	.1251191	.0948866	.0302325	.0086788
gdp	.5517248	-3.502668	4.054393	7.312911
lending_ra~s	273.1564	149.3968	123.7596	483.8134

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(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.60
Prob>chi2 = 0.7424

Random Effect Regression Model

A random effect regression model was used to establish the determinants of credit losses among commercial banks in Kenya. This model enabled the study to achieve the study objectives. The regression results in Table 8 indicate an overall coefficient of determination (R squared) of 0.6831 which implies that 68.31% of the changes in credit losses among commercial banks is explained cumulatively by credit quality, credit growth, lending rates and GDP growth rate. This indicates that other factors other than the four explain the remaining 31.69% of the variation in credit losses.

The results also shows that within the commercial banks, credit quality, credit growth, lending rates and GDP growth rate explain 44.54% of the variation in credit losses which implies that of the controllable variables such as lending rates, credit quality and credit growth, commercial banks have put in place different mechanisms to control them. The model had a significant fitness (Prob> Chi ^{2} = 0.000) which implies that the overall random effect model used fit well. It indicates that the four predictor variables can be used to predict credit losses among commercial banks.

Table 8 Random Effect Regression Model Results

```
. xtreg credit_losses credit_growth credit_quality gdp lending_rates,re

Random-effects GLS regression                   Number of obs      =       350
Group variable: bank                            Number of groups   =        43

R-sq:  within  = 0.4454                         Obs per group: min =         1
       between = 0.9210                                        avg =       8.1
       overall = 0.6831                                        max =         9

                                                Wald chi2(4)       =    743.73
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

credit_losses	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
credit_growth	.0081853	.000753	10.87	0.000	.0067094	.0096612
credit_quality	.0948866	.0112774	8.41	0.000	.0727832	.1169899
gdp	-3.502668	12.7844	-0.27	0.784	-28.55964	21.5543
lending_rates	149.3968	450.5361	0.33	0.740	-733.6378	1032.431
_cons	-3.733921	124.9736	-0.03	0.976	-248.6776	241.2098
sigma_u	0					
sigma_e	437.35615					
rho	0	(fraction of variance due to u_i)				

From the above model coefficients the model below was generated.

Credit Losses = - 3.734 + 0.008 (Credit Growth) + 0.095 (Credit Quality) – 3.503 GDP Growth + 149.40 Lending Rates

Which is further reduced to;

CL = - 3.734 + 0.008 (CG) + 0.095 (CQ) – 3.503 GDP + 149.40 LR

While the optimal regression model representing the significant study variables is as below.

Optimal Regression Model

Credit Losses = - 3.734 + 0.008 (Credit Growth) + 0.095 (Credit Quality)

Simplified as below

CL = - 3.734 + 0.008 (CG) + 0.095 (CQ)

Test of the Hypothesis

The study findings for the random effect regression model showed that credit growth significantly affects credit losses among commercial banks in Kenya. Credit growth is positively and significantly related to credit losses among commercial banks in Kenya (Beta = 0.008, Sig = <0.05). The null hypothesis is hence rejected. This shows that an increase in credit growth leads to an increase in credit losses. The findings are consistent with Hess *et al* (2009) who found that strong loan growth translates to significantly higher levels of credit losses in

Australian banking industry with a 2-3 years lag. The study findings are also consistent with Saurina *et al* (2000) whose study on loan characteristics and credit risks in Spanish commercial banks established that credit growth has a significant and positive impact on credit losses in the loan run because with credit expansion CB's lower minimum credit standards for loan applicants thereby increasing chances the some borrowers will default on loan repayments in the long run. Similar results were recorded in a study by Caprio and Klingebiel (1997) study of bank insolvency in Italy. Keeton (1999) study based on a survey of senior loans officers in American banks also finds that faster credit growth leads to higher loan losses because of decreased standards of the loans portfolios.

The random effect regression model findings also established that credit quality is positively and significantly related to credit losses among commercial banks in Kenya (Beta = 0.095, Sig = <0.05). The null hypothesis is hence rejected. This shows that an increase in credit quality leads to an increase in credit losses. This indicates that low recovery rates for defaulted loans in the country leads to an increase in credit losses. This may be attributed to legal challenges surrounding discharging of securities held as collateral by commercial banks and the fact that a majority of the defaulted loans were unsecured and any recoveries done depends on the customer's goodwill to repay the defaulted loan. The findings are consistent with Cucinelli (2015) whose study on Italian banks' lending behaviour established that non-performing loans leads to worsening of credit quality leading to CB's incurring excess credit losses from time to time. The study found that commercial banks which had high nonperforming loans also has a high loss ratio as compared to banks with quality loan portfolios. The findings of Ahmed *et al* (1999) on multi country study of banks credit risk determinants also found that credit quality as measured by nonperforming loans or impaired loans is positively and significantly correlated to credit losses in the countries under the study namely Malaysia, Korea, Mexico, France among others.

The findings also indicated that the effect of GDP growth on credit losses is small (not important / insignificant). The effect is also negative (Beta = -3.503, Sig = >0.05). The null hypothesis is hence not rejected. This implies that when the economy is performing well, credit losses decrease. Although the effect is very small. The findings are consistent with Castro (2013) whose study on macroeconomic determinants of credit risks in commercial banks of Greece, Ireland, Portugal, Spain and Italy found that in periods of GDP expansion and peaks, commercial banks suffer minimal credit losses because with increased incomes and profits borrowers are able to meet their loan repayments when they fall due. The findings of Rodgers (2013) on credit losses in Australian commercial banks for a period of thirty three years (1980 - 2013) established that GDP growth is negatively correlated to greater credit losses among the

Commercial banks. Kearns (2004) and Hess K *et al* (2007) also found GDP growth to have a negative correlation effect with credit losses.

Even though GDP growth also has a negative correlation with credit losses in commercial banks in Kenya the significant is very small. This may be as a result of the fact the growth in certain sectors of the economy may not be credit driven. This study therefore concludes that GDP growth does not affect how much credit losses commercial banks incur in the course of lending business.

The findings finally indicated that the effect of lending rates on credit losses is small (not important / insignificant). The effect is also positive (Beta = 149.40, Sig = >0.05). The null hypothesis is hence not rejected. This implies that when the lending rates increases, credit losses also increases, although the effect is very small. The findings are consistent with the findings of Naveed (2007), Sykes (1994) and Ahmed et al (2007) all who found credit losses to be positively correlated to lending rates. This studies had observed loan distress during periods of high interest rates since loan repayments were higher than normal in most cases. Commercial banks in Kenya have in the course of their operations increased loan repayments for existing loan portfolios in response to shifts in lending rates.

CONCLUSION AND RECOMMENDATIONS

The study findings led to the conclusion that that credit growth and credit quality were the major determinants of credit losses among commercial banks in Kenya. The study concludes that credit growth is positively and significantly related to credit losses among commercial banks in Kenya indicating that an increase in credit growth leads to an increase in credit losses. The study also concludes that credit quality is positively and significantly related to credit losses among commercial banks in Kenya indicating that an increase in credit quality leads to an increase in credit losses. Furthermore, the effect of GDP growth as well as lending rates on credit losses is not significant. The study recommends that since credit growth significantly affects credit losses, commercial banks need to put up measures that can significantly control the amount of loans they give out. This can range from having thorough process of scrutinizing the applicants before awarding them the loans. There is also need for credit diversification to sectors of the economy where default rates are minimal. Commercial banks in Kenya are also encouraged to develop loan products which have minimum risks and whose maturity is shorter periods. The study lastly recommends a review of the lending framework of commercial banks to align the same to international best practises where credit is advanced based on as customer's credit score as opposed to his ability to pay.

The study also recommends that since nonperforming loans significantly affects credit losses, the regulator of the banking sector that is the Central Bank of Kenya should come up with measures to manage the defaults of the commercial banks' lending. This may be achieved through increased provisioning and also in developing robust credit monitoring tools which are able to detect loans which may fall in default early enough. The high correlation between nonperforming loans and credit losses is also a pointer to low recovery rates of defaulted loans by commercial banks in Kenya. In this regard the study encourages commercial banks to integrate more advanced methods of default loan recoveries in their operations. This may involve the enhanced use of credit reference bureaus, auctioneers, debt recovery agencies and internal teams for debt recovery.

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