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EFFECT OF CREDIT RISK MANAGEMENT POLICIES ON FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN KENYA

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Abstract

Purpose: *The purpose of the study was to investigate the effect of credit risk management policies on the performance of commercial banks in Kenya. The specific objectives of the study were to find the effects of capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio on the performance of the banks.*

Objectives: *The independent variables of the study were capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio while dependent variable was the abnormal stock return.*

Significance: *The findings of the study will make a contribution to the emerging body of knowledge dedicated to bringing to the fore all the pertinent issues related to commercial bank credit management. This study will be useful to commercial banks credit officers and the various regulators like the Central bank of Kenya, Capital Markets Authority in Kenya.*

Design: *The population of the study was the forty four licensed commercial banks in Kenya as at December 2017. A purposive sample of ten banks was selected based on the criteria that they were listed and had complete data for the period under study.*

Findings: *Adopting a 5% non-directional test of hypothesis, the study found a statistically no significant relationship between capital adequacy ratio and bank stock performance in Kenya, a statistically no significant relationship between loss given default ratio and bank stock performance in Kenya, a statistically no significant relationship between loan loss provision ratio and bank stock performance in Kenya and a statistically significant negative relationship between non-performing loan ratio and bank stock performance in Kenya. The study concluded that, at 5% significance level, capital adequacy ratio, loss given default ratio and loan loss provision ratio had statistically no significant effect on bank stock performance while non-performing loans ratio had a negative and statistically effect on bank stock performance in Kenya for the period under study.*

Keywords: *Abnormal Stock Return, Credit Risk Management Policies, Commercial Banks, Financial Performance*

1. Background

Banks in Kenya have been lending funds to serial defaulters, this is as a result of banks having different credit information regarding the borrowers and these borrowers have exploited the information asymmetry to borrow several loans from the Kenyan banks and defaulting in the long run thus increasing the level of nonperforming assets (NPAs) in the banking sector in Kenya. Due to information asymmetry, the Central Bank of Kenya and Kenya Bankers Association came together to initial Credit Information Sharing in the Kenya to cap the loop hole exploited by the serial defaulters. Credit Information Sharing is a process where banks and other lenders submit information about their borrowers to a credit reference bureau so that it can be shared with other credit providers. According to bank supervision annual report CBK, 2009 it enables the banks to know how borrowers have been repaying their loans. Credit Information Sharing enables the banks get access a Credit Report. A Credit Report is a report generated by the Credit Reference Bureau (CRB), the Credit Report contains detailed information on a borrower's credit history, the borrower's identity, credit facilities, bankruptcy and late payments of previous obligations and latest checks made by other prospective lenders. It can be obtained by any prospective lender, when they have a valid reason to access the report as stipulated in Kenyan banking law, to determine the borrower's creditworthiness.

2. Credit Risk Management in Kenyan Banks

Despite the BCBS regulations the current global financial crisis indicates that risk management of the financial institutions is not adequate enough. This leads to the failure of the banks in highly challenging financial market. The Central Bank of Kenya report (2013) has indicated that the major issues facing the banking industry include new regulations especially with the passing of the new constitution where the CBK requires financial institutions to build up their minimum core capital requirement to Kenya shillings 1 Billion, the global crisis experienced worldwide affected banking industry in Kenya and more so the mobilization of deposits and trade reduction and the declining interest margins.

Kenyan banks must devise credit risk management strategies that will enable them to meet regulatory requirements by the BCBS and CBK and yet stay in profitability. Credit risk management strategies are designed and applied both internally as an operational tool by bank management and externally by bank regulatory authorities to manage the financial health of the banking sector. The focus of such policies are the needs for asset diversification; maintenance of balance between returns and risk, bank asset quality and ensuring safety of depositors funds. The failure of various regulatory frameworks designed by the supervisory authorities and inability of technological innovations to stem rising toxic assets in many banks constitute matters of grave concern for stakeholders in both developed and developing nations financial systems; Sinkey (1998), Saunders and Cornett (2008) and BCBS (2004) Management of bank credit risk relates to the minimization of the potential that a bank borrower or counter- party will fail to meet its obligations in accordance with agreed terms (BCBS, 2004).

In a bid to maximize profits and ensure safety of depositors funds, banks act as delegated monitors on behalf of lenders (depositors) using various innovations, technologies and procedures to enforce credit contracts. These measures notwithstanding, banking operations are still exposed to some inherent credit risks including borrowers‛ outright default; unwillingness or inability to meet credit commitment due to the vagaries of business activities or other environmental dynamics (Bidani, Mitra and Kumar, 2004). Credit management frameworks therefore become imperative tools in decision - making that relates to loan - pricing, delegating lending powers, mitigating or migrating as well as managing incidences of credit risk on the bank‛s overall portfolio.

Most studies on credit risk management posit that there is a positive relationship between effective credit risk management and banks�more profitability while some of these studies support the notion that there is a negative relationship between them (Alshatti, 2015). Some studies that found a positive relationship between credit risk management and bank performance include those of Hosna, Manzura and Juanjuan (2009) who found Non-performing loans indicator affects (ROE) more than capital adequacy ratio, Aruwa and Musa (2012) who found a strong positive relationship between risk components and the banks‘ financial performance, although the direction of the effect is not specified, and Boahene, Dasah and Agyei (2012) who also found a positive relationship between credit risk and bank profitability. On the other hand Musyoki and Kadubo (2012), assessing various parameters pertinent to credit risk management as it relates to banks‘ financial performance, found an inverse impact of the parameters under study on banks‘ financial performance. This result is dublicated by Kaaya and Pastory (2013) who showed that credit risk indicators negatively affected on the bank performance.

3. Problem Statement

Lending is the main business of financial institutions and loans is naturally the main asset and the major source of revenue for banks. Despite the huge income created from lending, available literature shows that huge shares of banks loans regularly go bad and therefore affect the financial performance of these institutions. The issue of bad loans can fuel banking crisis and result in the collapse of some of these institutions with their attendant repercussions on the economy as a whole. Kane and Rice (2001) stated that at the peak of the financial crisis in Benin, 80% of total bank loans portfolio which was about 17% of GDP was nonperforming in the late twentieth century. Certainly bad loans can lead to the collapse of banks which have huge balances of these nonperforming loans if measures are not taken to minimize the problem. Many borrowers that are potentially good credit risk fail to get funding because the lenders cannot objectively establish their credit history due to the underlying challenge of information asymmetry. Also, some bad loan borrowers, who know that banks operate in isolation, have exploited the information asymmetry to create multiple bad debts in the banking industry in Kenya. The operation nature of these loan serial defaulters have distorted the lending business in the credit market, adversely affecting bank performance, threatening banking sector stability and curtaining growth of the credit to the private sector due to the high interest charged on facilities to compensate on the credit risk. Therefore, this upsurge of nonperforming loans has caused a spiral effect on the interest charged to all borrowers across the market. In addition, the fear of lending to bad debtors has led to the tendency by banks to scramble for less risky lending in the form of government securities such as treasury bills and treasury bonds.

4. Objectives of the Study

The general objective of the study was to determine the effect of credit risk management on financial performance of commercial banks listed on the Nairobi Securities Exchange in Kenya. The specific objectives are;

i. Determine the effect of the Capital Adequacy Ratio on performance by commercial banks in Kenya.
ii. Establish the effect of Loss Given Default Ratio on performance by commercial banks in Kenya
iii. Determine the effect Loan Loss Provisions Ratio on performance by commercial banks in Kenya
iv. Establish the effect of Non-Performing Loans Ratio on performance by commercial banks in Kenya.

5. Hypothesis of the study

The following four null hypotheses were tested in this study;

H_{01}: Capital Adequacy Ratio does not have a significant effect on bank performance in

H_{02}: Loss Given Default Ratio management does not have a significant effect on bank performance in Kenya.

H_{03}: Loan Loss Provision Ratio does not have a significant effect on bank performance in Kenya. Kenya.

H_{04}: Non-Performing Loans Ratio does not have a significant effect on bank performance in Kenya.

6. Theoretical Reviewed

Credit risk management may be defined as the combination of coordinated tasks and activities for controlling and directing risks confronted by an organization through the incorporation of key risk management tactics and processes in relation to the organization‘s objectives (Nikolaidou & Vogiazas, 2014). The available literature provides many theoretical considerations to justify the adoption of risk management in banks including the following theories that the study explored: financial economics theory, new institutional economics theory, agency theory, stakeholder theory and Portfolio theory.

7. Research Methodology

The researcher adopted a positivist research philosophy in this study. According to Morris (2006) the positivist researcher maintains that it is possible to adopt a distant, detached, neutral and non-interactive position. This position enables the researcher to assume the role of an objective analyst, making detached interpretations about those data that have been collected in an apparently value-free manner. This study adopted a quantitative longitudinal research design. A longitudinal study follows the same sample over time and makes repeated observations (Forgues, Bernard and Vandangeon-Derumez, 2011). Longitudinal research designs describe patterns of change and help establish the direction and magnitude of causal relationships. The target population consists of all members of a real or hypothetical set of people, events or objectives from which a researcher wishes to make general results (Grove, 2003).

8. Operationalization and Measurement of Variables

The dependent variable

The dependent variable of the study was bank performance. According to Ahmed (2008) the performance of a commercial bank is often described with the help of efficiency analysis. Various methods are used to measure the performance of banks and some common methods include financial ratio analysis such as return on assets, return on investments and return on equity, CAMELS analysis, the parametric and the non-parametric analysis techniques. Few studies have looked at stock performance a measure of bank performance. Thus, as a deviation from, and in order to determine if bank risk management strategies have any impact on a bank‘s stock performance, this study measured bank performance by using an out of balance sheet measure, that is, abnormal stock returns. The annual abnormal stock returns were calculated using a modified formula suggested by Kaisoji (2013).

Independent variables

The independent variables were the credit risk management techniques of NPLR (Non-performing Loans/Total Loans, CAR ((Tier One Capital + Tier Two Capital)/Risk weighted Assets, LGDR (Total loan losses/Total exposure on default and LLPR (Loan Loss Provision/Non-performing loans).

NPL: A non – performing loan is any obligation or loan in which interest and the principal payments are more than 90 days, more than 90 days of worth of interest has been refinanced, capitalized or delayed by agreement or if payments are less than 90 days overdue but payments are no longer anticipated (IMF 2009).

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LGD: It is the percentage loss rate suffered by a lender on a credit exposure if the obligor defaults. In other words, even if the counterparty defaults (fails to repay the amount owed), the lender will usually succeed in recovering some percentage of the current amount owed in the process of workout or sale of the obligor's assets. This percentage is termed the recovery rate (RR), i.e. the following relation holds: RR = 1 – LGD.48 LGD can be estimated on the basis of historical data on realised losses.

CA: Capital adequacy refers to the amount of equity capital and other securities which a bank holds as reserves against risky assets as a hedge against the probability of bank failure. In a bid to ensure capital adequacy of banks that operate internationally, the Bank of International Settlements (BIS) established a framework necessary for measuring bank capital adequacy for banks in the Group of Ten industrialized countries at a meeting in the city of Basle in Switzerland. This has come to be referred to as the Basle Capital Accord, on Capital Adequacy Standards. The Basle accord provided for a minimum bank capital adequacy ratio of 8% of risk-weighted assets for banks that operate internationally. Under the accord, bank capital was divided into two categories – namely Tier I core capital, consisting of shareholders' equity, and retained earnings and Tier II supplemental capital, consisting of internationally recognized non-equity items such as preferred stock and subordinated bonds. Tier One Capital is deemed to have highest capacity to absorbing losses in order to allow banks continue to operate on ongoing basis.

Tier One capital is the sum fully paid common shareholder equity, disclosed Reserves and non-cumulative perpetual preferred stock. Tier Two Capital cannot exceed 100% of Tier One Capital and given by the sum of subordinated debt, undisclosed reserves, general loan loss reserves and hybrid debt equity capital instruments.

LLR –It is a percentage (%) that reflects accumulated provision expenses (minus write-offs) of current total loans. It is a rough indicator of the overall quality of the loan portfolio, and it represents the loan loss reserve amounts maintained by a commercial bank to offset the default risk in its total outstanding loan portfolio.

9. Research Findings and Interpretation

Diagnostic and Specification Tests

Descriptive Statistics

The descriptive statistics test was run by using eviews and the output is shown in Table 1

Table 1: Group Descriptive Statistics

	AR01	CAR	LGDR	NPLR	LLPR
Mean	2.036700	0.236895	0.051517	0.092462	0.563996
Median	1.971253	0.229417	0.040860	0.043778	0.520157
Maximum	7.724036	0.431683	0.574023	0.799207	2.534936
Minimum	1.000004	0.039092	0.000686	0.006861	0.038280
Std. Dev.	0.801417	0.085975	0.069667	0.154598	0.450348
Skewness	5.221283	0.450532	6.148979	3.372301	1.858796
Kurtosis	37.71602	2.418288	46.59351	14.16123	7.971673
Jarque-Bera	3833.227	3.355060	5983.932	496.0164	112.4026
Probability	0.000000	0.186835	0.000000	0.000000	0.000000
Sum	142.5690	16.58266	3.606186	6.472356	39.47971
Sum Sq. Dev.	44.31655	0.510022	0.334892	1.649131	13.99409
Observations	70	70	70	70	70

The Jarque-Bera test tests the null hypothesis of normality against the alternate of non-normality. From Table 1 the p-values for AR, LGDR, NPLR and LLPR are all zero indicating that the Jarque- Bera values are significant at all levels of significance and therefore we reject the null and conclude that AR, LGDR, NPLR and LLPR are not normally distributed. The skewness values for that AR, LGDR, NPLR and LLPR indicate that the variables have a positive skewness. The p-value for the variable CAR was greater than 0.05 indicating the Jarque-Bera value was insignificant and we therefore fail to reject the null and conclude that the CAR is normally distributed.

The Hausman Test Results

To decide whether to use fixed or random effects model the researcher ran the Hausman test with the null hypothesis that the preferred model for the data was random effect versus the alternative of a fixed effects model. According to Green (cited in Torres-Reynia, 2007).

The Hausman tests on whether the fixed or random effects model is suitable for the panel.

Table 2: Hausman Test Results

Correlated Random Effects - Hausman Test			
Test cross-section and period random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.525642	4	0.4740
Period random	0.074999	4	0.9993
Cross-section and period random	3.384497	4	0.4957

Source: Research data

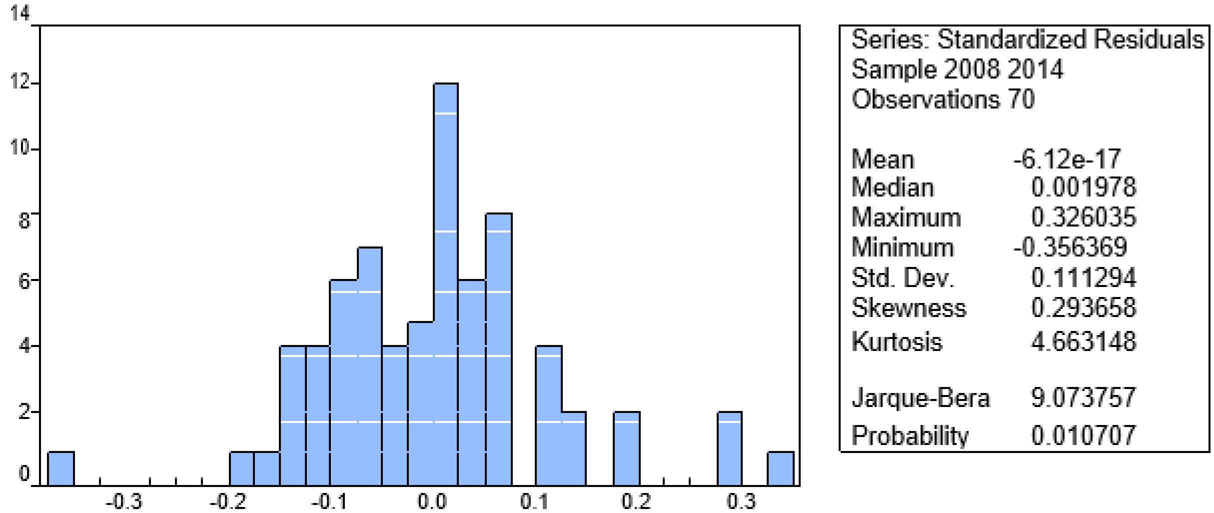
From Table 2, all the p (Chi-Square statistics) of 0.4740, 0.9993 and 0.4957 for the chi-square statistics 3.525642, 0.074999 and 3.384497 respectively are greater than 0.05 (at 5% significance level) and therefore insignificant. This means that we fail to reject the null and therefore use the random effects model in this data.

The Normality Test Results

The least-squares fit is based on the conditional mean. The mean is not a good measure of centre for either a highly skewed distribution or a multi-modal distribution. Non-Normality does not produce bias in the coefficient estimates, but it does have two important consequences: it poses problems for efficiency—that is, the OLS standard errors are no longer the smallest, standard errors can be biased—i.e., confidence intervals and significance test may lead to wrong conclusions (Andersen, 2012). The test for normality was done using the Jaque-Bera test statistic which tests the null hypothesis that the data is normality distributed against the alternate that the data is not normally distributed. Data that was not normal was transformed by using the power transformation method.

The normality test of the residues from a regression model was run on eviews and the variables AR, LGDR, LLPR and NPLR were found to have p-values of zero and therefore failed the normality test at all levels of significance. To treat the non-normality problem and using power transformation with a searching algorithm, a lambda (□) value of -0.76 gave a distribution of the residual terms that was approximately normal (see figure 4.1). Consequently, all the original data was transformed through the power transformation method to obtain a new, approximately, normally distributed data.

Figure 1: Normality Test Results



Source: Research data

Figure 1 shows the transformed data was normally distributed at 1% significance level. After this transformation the data was fit to be used in regression analysis since it didn‘t violate the normality condition.

Stationarity Test Results

Stationarity is a property of an underlying stochastic process and not the observed data such the joint distribution of a set of n consecutive random variables, in a series, is the same, regardless of where in the series it is chosen (Kendall and Stuart, 1983). A stationary series is one with a mean value which will not vary with the sampling period. In contrast, non-stationarity can simply be defined as processes that are not stationary and that have statistical properties that are deterministic functions of time (Kendall and Stuart, 1983).

Tests for stationarity were conducted by the using the Levin, Lin & Chu t* in eviews software.

Table 3: Abnormal Returns Unit Root Test Results

Panel unit root test: Summary
Series: AR1

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-12.1564	0.0000	10	50

From Table 3 the Levin, Lin & Chu t* of -12.1564 has a p-value of 0. This means that this Levin, Lin & Chu t* value is significantly less than zero ($p<0.01$) and therefore we reject the null hypothesis of a unit root in AR1 panel in favour of the alternative that the panel is stationary at level.

Table 4: Capital Adequacy Ratio Unit Root Test Results

Panel unit root test: Summary
Series: CAR1

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.77671	0.0218	10	50

Source: Research data

Table 4 shows a Levin, Lin & Chu t* value of -0.77671 has a p-value of 0.0218.This means that the Levin, Lin & Chu t* valueis significantly less than zero ($p<0.05$) and therefore we reject the null hypothesis of a unit root in CAR1 panel in favour of the alternative that the panel is stationary at level.

Table 5: Loss Given Default Ratio Unit Root Test Results

Panel unit root test: Summary
Series: LGDR1

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-15.4553	0.0000	10	50

Source: Research data

From Table 5, the Levin, Lin & Chu t* value of -15.4553 has a p-value of 0. This means the Levin, Lin & Chu t* value is significantly less than zero ($p<0.01$) and therefore we reject the null hypothesis of a unit root in LGDR panel in favour of the alternative that the panel is stationary at level.**Table 6: Loan Loss Provision Ratio Unit Root Test Results**

Panel unit root test: Summary
Series: LLPR1

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.1156	0.0000	10	50

Source: Research data

The Levin, Lin & Chu t* of -11.1156 (see Table 6) has a p-value of 0. This means the Levin, Lin & Chu t* value is significantly less than zero ($p<0.01$) and therefore we reject the null hypothesis of a unit root in LLPR1 panel in favour of the alternative that the panel is stationary at level.

Table 7: Non-Performing Loan Ratio Unit Test Results

Panel unit root test: Summary
Series: NPLR1

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.54404	0.0000	10	50

Source: Research data

The Levin, Lin & Chu t* of -9.54404 (see Table 7) has a p-value of 0. This means that the Levin, Lin & Chu t* value is significantly less than zero ($p<0.01$) and therefore we reject the null hypothesis of a unit root in LLPR1 panel in favour of the alternative that the panel is stationary at level.

From the unit root tests (Table 3 to Table 7) all the panels were found to be stationary at level. This means that in specifying the model, no adjustments due to non-stationarity problems would be made to the model.

Table 8: Panel Cointegration Test Results

Cointegration is a statistical property possessed by some time series data that is defined by the concepts of stationarity and the order of integration of the series. A vector time series is cointegrated if each of the series taken individually is non-stationary, with a unit root, while the linear combination of the non-stationary series in stationary.

Kao Residual Cointegration Test
Series: AR1 CAR1 LGDR1 LLPR1 NPLR1
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend

	t-Statistic	Prob.
ADF	-4.627838	0.0000

From Table 8, the t-value of -4.627838 is significantly less than zero ($p<0.05$) and we reject the null of no cointegration and no deterministic trend assumption in favour of cointegration and a deterministic trend in the panels.

Multicollinearity Test Results

Multicollinearity is a statistical phenomenon in which there exists a perfect or exact relationship between the predictor variables. When there is a perfect or exact relationship between the predictor variables, it is difficult to come up with reliable estimates of their individual coefficients. It will result in incorrect conclusions about the relationship between outcome variable and predictor variables‖ (Joshi, 2012). The Variance Inflation Factor (VIF) quantifies the severity of multicollinearity in an ordinary least-squares regression analysis.

Multicollinearity was tested by using the variance inflation factor (VIF) method shown in equation 3.5. To find the R-Squared a regression analysis of each independent variable was done using the particular independent variable as a dependent variable and regressing it on all the other independent variables.

Table 9: Multicollinearity Test Results

—Dependent‖ Variable	Independent Variable				VIF (Critical value = 4)	Inference
	LGDR1, LLPR1, NPLR1	CAR1, LLPR1, NPLR1	CAR1, LGDR1, NPLR1	CAR1, LGDR1, LLPR1		
CAR1	0.039223*				1.04	No collinearity
LGDR1		0.307161*			1.44	No collinearity
LLPR1			-0.017547*		0.98	No collinearity
NPLR1				0.302555*	1.43	No collinearity

Where (*) indicate the adjusted R-Squared values of the —Dependent Variables

Source: Research data

From Table 9 it is evident that no variable suffered from excessive multicollinearity and therefore there wasn't any treatment for multicollinearity of the data in this study.

Heteroscedasticity Test Results

When the variance of the error terms is not constant then there is heteroscedasticity. In the presence of heteroscedasticity the unbiased estimators obtained by the OLS do not provide the estimate with the smallest variance which leads to bias in test statistics and confidence intervals, particularly if the heteroscedasticity is severe rather than ―marked‖. Depending on the nature of the heteroskedasticity, significance tests can be too high or too low (Williams, 2015). In this study heteroscedasticity was tested by using the Breusch – Pagan Test for heteroskedasticity (using Eviews software). In this study there was no problem of heteroscedasticity and therefore there was no treatment for problems of heteroscedasticity.

The White Heteroscedasticity test in eviews was used to test for heteroscedasticity. It tests the null of homoscedasticity and if we fail to reject the null then there is heteroscedasticity.

Table 10: White Heteroscedasticity Test Results

Heteroskedasticity Test: White

F-statistic	0.446482	Prob. F(14,54)	0.9506
Obs*R-squared	7.158444	Prob. Chi-Square(14)	0.9284
Scaled explained SS	14.01636	Prob. Chi-Square(14)	0.4485

Source: Research data

From Table 10, the F-statistic p-value of 0.9506 is higher than the 5% (p>0.05) significance level and we therefore fail to reject the null and conclude that there is no heteroscedasticity in the data. Thus no treatment was required for heteroscedasticity for the data in this study.

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Cross-section Dependence Test

A key assumption underlying the linear regression model (LRM) typically used in applied econometric studies are that of no autocorrelation (McGuirk & Spanos, 2002). Existence of positive autocorrelations, for example, leads to the OLS estimates of the standard errors being smaller than the true standard errors which would lead to the conclusion that the parameter estimates are more precise than they really are and therefore there would be a tendency to reject the null hypothesis when it should not be rejected. According to Granger and Newbold (1974) the three major consequences of auto- correlated errors in regression analysis are that: estimates of the regression coefficients are inefficient, forecasts based on the regression equations are sub-optimal and usual significance tests on the coefficients are invalid.

The Cross-dependence in panel data is the equivalent of autocorrelation in time series data. The Pesaran test of cross-section dependence was used this test. If the test statistic for cross-sectional dependency is significant, this suggests the presence of cross-sectional dependency, which is a source of bias in the estimated standard errors and/or parameter estimates (DeHoyos and Sarafidis, 2006). The data was found to suffer from the problem of cross-section dependence. This was corrected by using a lag of 1 on the dependent variable.

Panel serial correlation was tested by using the Pesaran CD test in eviews. The Pesaran CD test tests the null of no panel serial correlation and if we reject the null then we conclude there is serial correlation in the panel data.

Table 11: Cross-section Dependence Test

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals

Test	Statistic	Prob.
Pesaran CD	2.478809	0.0132

Source: Research data

From Table 11, the p-value of 0.0132 less than 0.05 (5% significant level) and therefore the t-statistic of 2.278809 is significantly different from zero. The null hypothesis of no correlation is rejected and the conclusion is that the data suffered from panel serial correlation. To correct for cross-section dependence, the dependent variable was lagged with a lag of 1 and the test repeated. The result showed that the effect of cross-dependence was eliminated (see Table 11).

Table 12: Cross-Section Dependence Test With Lag

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals

Test	Statistic	Prob.
Pesaran CD	-0.829060	0.4071

Source: Research data

From Table 12, the p-value of 0.4071 is more than 0.05 (5% significant level) and therefore the t-statistic of -0.829060 is not significant and we therefore fail to reject the null and conclude that the data suffers no cross-section dependence.

Serial Correlation

Serial correlation is often observed in time series and in panel data. The causes of serial correlation include intrinsic serial correlation and model misspecification. In the presence of serial correlation the OLS estimates are no longer BLUE and the OLS standard errors and test statistics are no longer valid (Wooldridge, 2015). Serial correlation tests apply to macro panels with long time series. Not a problem in micro panels (with very few years), (Torres-Reyna, 2010). Due to the small number of years (seven years) for this study, which considered small, serial correlation was considered not to be a problem and thus this test was not done.

After the diagnostic and specifications tests and the subsequent adjustments and transformations in the data and model, the following output was obtained by using eveiws software.

Table 13: Panel Regression Output

Dependent Variable: AR1(-1)
Method: Panel EGLS (Cross-section random effects)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.701784	0.069665	10.07376	0.0000
CAR1	0.008900	0.026731	0.332943	0.7406
LGDR1	0.000480	0.000588	0.816087	0.4183
LLPR1	-0.004532	0.007256	-0.624541	0.5351
NPLR1	-0.007758	0.003012	-2.575570	0.0130

Weighted Statistics

R-squared	0.276130	Mean dependent var	0.624548
Adjusted R-squared	0.145834	S.D. dependent var	0.125029
S.E. of regression	0.115554	Sum squared resid	0.667632
F-statistic	2.119245	Durbin-Watson stat	2.535297
Prob(F-statistic)	0.045111		

Source: Research data

In this study, the hypothesis testing is non-directional and therefore a two tail test of hypothesis is done. The study adopted 0.05 significance level in interpreting the results. From the results (Table 13) the constant (C) was significant ($p<0.05$) 5% significance level. The rest of the coefficients are explained below according to the study objectives.

Effect of the Capital Adequacy Ratio on performance by commercial banks in Kenya

The first objective sought to determine the effect of capital adequacy ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of 0.0089 for CAR had a probability (p) value of 0.7406 (> 0.05) and therefore not significant at 5% significance level. Thus the study found a positive non-significant relationship between CAR and bank stock performance in Kenya. This result deviates from that of Odongo (2013) who found that stock performance reacted negatively to CAR announcements. The difference in these results may be attributed to the differences in the actual variables used in the studies.

Effect of Loss Given Default Ratio on performance by commercial banks in Kenya

The second objective sought to determine the effect of loss given default ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of 0.00048 for LGDR is insignificant at 5% ($p>0.05$) significant level. Thus the study found a positive insignificant relationship between LGDR and bank stock performance in Kenya. Studies on the effect of LGDR on bank stock performance were limited. The result from this differ from that of Djan *et al*., (2015) who found an inverse relationship between default rate and banks' performance.

Effect Loan Loss Provisions Ratio on performance by commercial banks in Kenya

The third objective sought to determine the effect of loan loss provision ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of - 0.004532 for LLPR is insignificant at 5% ($p>0.05$) significant level. Thus the study found a negative and insignificant relationship between LLPR and bank stock performance in Kenya. There are few studies on loan loss provision ratio and bank stock performance. One of the studied by Bushman and Williams (2011) only mention that Loan loss provisioning is a key accounting choice that directly influences the volatility and cyclicality of bank earnings, as well as the information properties of banks‵ financial reports with respect to reflecting changes in the risk attributes of loan portfolio but they don‵t show how LLPR exactly affects stock performance.

Effect of Non-Performing Loans Ratio on performance by commercial banks in Kenya

The fourth and last objective sought to determine the effect of non-performing loans ratio on performance by commercial banks in Kenya. From the findings the t-test statistic of - 0.007758 for NPLR is significant at 5% ($p<0.05$) significant level. Thus the study found a negative significant relationship between NPLR and bank stock performance in Kenya. This result agrees with that of Beck, Jakubik and Piloi (2013), Macharia (2012) and Muasya (2000), who a significant negative relationship between the non-performing loans and bank performance.

The Overall Model

The model had R^2 off 14.58%. The interpretation of the low adjusted R-squared value is that the model had low predictive power in using the independent variables to explain the dependent variable under this study. This implies that more or different predictor variables need to be used in the study. The F-statistic for the model was 2.119245 and the (F-statistic) of 0.045111 (less than 0.05) shows that the F-statistic was significant and therefore the model as a whole was significant in predicting bank performance.

10. Summary

The main objective this study was to find the effect of credit risk management on the performance of commercial banks listed at the Nairobi Securities exchange in Kenya. The specific objectives were to find the effects of capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio on the performance of the banks. The independent variables of the study were capital adequacy ratio, loss given default ratio, loan loss provision ratio and non-performing loans ratio while dependent variable was the abnormal stock return. Relevant theoretical and empirical literature was reviewed and gaps identified to inform the study. The population of the study was the forty four licensed commercial banks in Kenya as at December 2014, as per the latest data available by the time the study was being conducted. A purposive sample of ten banks was selected based on the criteria that they were listed and had complete data for the period under study. Secondary data for the construction of the variables under study was collected from the financial statements and the Nairobi security exchange was collected the sample period. Data was diagnosed for and treated, where necessary, of the problems of panel regression. Using a longitudinal study design and a random effects model specification a panel Estimate Generalized Least Squares regression was done on the data using eviews software. Adopting a 5% non-directional test of hypothesis, the study found a statistically no significant relationship between capital adequacy ratio and bank stock performance in Kenya, a statistically no significant relationship between loss given default ratio and bank stock performance in Kenya, a statistically no significant relationship between loan loss provision ratio and bank stock performance in Kenya and a statistically significant negative relationship between non-performing loan ratio and bank stock performance in Kenya.

11. Conclusions

Concerning the first objective of the study which was to determine the effect of capital adequacy ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, capital adequacy ratio has statistically no significant effect on bank stock performance in Kenya. On the second objective which was to establish the effect of loss given default ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, loss given default ratio has statistically no significant effect on bank stock performance in Kenya. For the third objective which was to determine the effect of loan loss provision ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, loan loss provision ratio has statistically no significant effect on bank stock performance in Kenya. On the last objective which sought to determine the effect of non-performing loans ratio on performance by commercial banks in Kenya, the study concluded that, at 5% significance level, non-performing loans ratio has a negative and statistically effect on bank stock performance in Kenya.

12. Recommendations and Policy Implications

From the findings, capital adequacy ratio, loss given default ratio and loan loss provision ratio did not affect bank stock performance in Kenya while non-performing loan ratio had a negative effect bank stock performance in Kenya for the period under study. Thus this study makes the following recommendations: Given the current supervisory and regulatory policy frameworks for banks, credit risk managers should be less concerned with adjustments in the ratios of capital adequacy ratio, loss given default ratio and loan loss provision ratio as the values of these ratios have no significant effects on performance but should instead be more prudent on the management of the non-performing loans ratio as it has a significant effect on performance; From a regulatory point of view and according to the study findings, it is recommended that the current regulatory policy requirements on capital adequacy ratios, loss given default ratios and loan loss provisions ratios should be maintained as their results are uniform across the sample while the regulatory non-performing loans ratios should be adjusted in order to mitigate the negative effects; For researchers and academicians and in relation to the study findings, it is recommended that future studies in this area be carried out for longer study periods in order to bring out the true picture of the effect of the independent variables on the dependent variables of the study. It is also recommended that more independent variables be considered for study.

13. Areas for Further Research

There was a limitation on the number of independent variables used in this study as only four were considered. Future research in the area would focus on more independent variables to the regression model in order to develop concrete literature in this study area. The study was also limited on the number of years under study due to unavailable of data for a longer period. Future research should consider longer study periods for generalising the results. The researcher suggests the following areas for further research as they are closely related to the outcome of the current study: The size effect of banks on loan portfolio performance in Kenya; Micro-prudential regulation and performance of commercial in Kenya.

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