WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Non-Performing Loans Management and Financial Performance of Commercial Banks in Rwanda - Case of Bank of Kigali (2007-2022)

Shallom Confiance Tuyizere

Univesity of Kigali, Kigali, Rwanda

ABSTRACT

The financial sector is believed to be one of the important backbones of an economy. The sector works as a facilitator for achieving sustained economic growth through providing efficient monetary intermediation. In the contemporary banking business, increasing non-performing loans (NPLs) is a very critical but frequent issue in bank fund management. The general objective of this study is to assess the relationship between non-performing loans management and the financial performance of Bank of Kigali. The study was conducted in Bank of Kigali (BK) headquarters currently operating in Kigali city, Nyarugenge district. Quantitative methods are used in this study, examining the impact of non-performing loans on the financial performance of the bank. The analysis is divided into sections that include descriptive statistics, correlation, and regression analysis. The study's findings provide professionals and academics with important information about managing non-performing loans and how it affects financial performance. The NPLs had a value ranging from 6,730,569,000 Frw to 20,710,717,000 Frw, with a median value of 954,510,000 Frw. The NIM data also revealed an average value of 76.87944, which represents the Bank of Kigali's profitability from its primary loan and deposit activities. An R-squared value of 0.225, suggesting that the model could account for 22.5% of the variability in NIM. There were no significant relationships between delayed loan repayment, interest rate, or loan deposit ratio and NIM, according to the data. The model could only account for 22.5% of the variation in NIM, indicating the presence of other undiscovered components.

Keywords: *Non-performing loans, loans management, Bank of Kigali, Financial performance, commercial banks*

1. INTRODUCTION

The financial sector is believed to be one of the important backbones of an economy. The sectors work as a facilitator for achieving sustained economic growth through providing efficient monetary intermediation (Paudel, 2018). It is their function to mobilize funds savers by issuing to their own securities. These institutions, like every other business organization, have some risk to manage before they can successfully achieve their aims and objectives, which are always 98% profit oriented. In the contemporary banking business, increasing of non-performing loans (NPLs) is a very critical but frequent issue in bank fund management (Adhikary, 2006).

Non-performing loans seriously affect profitability of the Bank (Barth et al., 2004). It was found that if the competent manager is in his lending practices, bad debt will arise, or the repayment of a loan and advance became doubtful from time to time will eventually affect profitability (Littlefield & Rosenberg, 2004). Several measures have been agreed on and implemented to minimize the risk of non-performing loans. The increasing level of non-performance loan rates in banks books, poor loan processing, undue interference in the loan granting process; inadequate or absence of loan collaterals among other things, are linked with poor and ineffective credit risk management that negatively impact on the bank's performance. According to Gibson (2006), management should maintain a written loan annually by the board of director's description of the overall credit grading process and establish responsibility for the various loan review function. The sources and causes of problem loans can arise from both mistakes made by the borrower and weaknesses in the bank's loan practices. The most sources of income for financial institution are income from portfolio, thus the greater the loan portfolio, the greater the profits and the quicker the developments, (world bank training guidelines 2013).

Notably in 2006 in Rwanda some savings and credit cooperatives (SACCO) commonly known as COOPEC (cooperative d'epargne et de credit) have collapsed, the major cause of insolvency being a poor credit management. In Rwanda by March 2023 the National Bank of Rwanda (BNR) has raised concerns about nonperforming loan where, the outstanding Non-Performing Loans (NPLs) in banking sector dropped to FRW 127 billion in December 2022 from FRW 158 billion in December 2021, largely due to write offs of overdue loans (FRW 37.9 billion in 2022) and recoveries from non-performing loans. As result, the NPL ratio declined to 3.1 percent in December 2022, from 4.6 percent in December 2021.

Maintaining favourable financial performance measures, such as return on assets, earnings per share, return on equity, dividend per share, and market to book value ratio, requires effective loan management. NPLs have significantly decreased between December 2021 and December 2022, which highlights the urgent need to address this problem, according to the National Bank of Rwanda's most current NPL worries. Therefore, in order to improve the stability and prosperity of commercial banks and the general economy, it is essential to look into the reasons, sources, and methods of mitigating NPLs.

This study mainly aims at establishing the relationship between non-performing loans management and the financial performance of BK PLC, through the assessment of the contribution of delayed repayment on financial performance. The discussions are guided with this null hypothesis:

H_0: There is no significant correlation between delayed repayment and financial performance.

2. LITERATURE REVIEW

This section presents reviewed literature relating to nonperforming loans management and financial performance. Also, it presents the conceptual framework and the research gap.

2.1 Research Gap

There are research gaps related to non-performing loan (NPL) management and financial performance. There is a lack of understanding of the bank-specific factors that contribute to NPLs and impact financial performance. Exploring loan portfolio composition, risk management practices, credit underwriting standards, and internal control systems specific to Rwandan commercial banks can inform targeted strategies for NPL management and financial performance improvement. Additionally, there is inadequate assessment of the effectiveness of regulatory frameworks and policies specific to the Rwandan banking sector.

Evaluating the impact of regulations on NPL management and financial performance can provide valuable insights. There is a need to investigate the long-term effects of NPLs on financial stability and sustainability of Rwandan commercial banks. Understanding the persistence of NPLs and their impact on capitalization, profitability, liquidity, and market reputation over time is crucial. Addressing these research gaps can provide insights for policymakers, regulators, and commercial banks to develop effective strategies, policies, and risk management frameworks for NPL management and financial performance improvement.

2.2 Conceptual framework

A conceptual framework is a diagrammatical research tool intended to assist the researcher to develop awareness and understanding of the situation under scrutiny and to communicate this (Kandampully, 2008). A conceptual framework is used in research to outline possible courses of action or to present a preferred approach to an idea or thought. It can be defined as a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation.

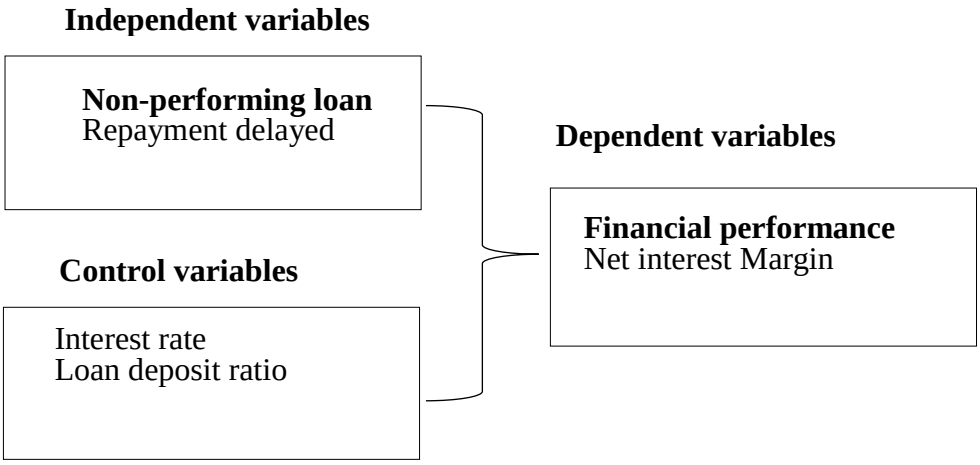

Figure 1 - Conceptual framework

A dependent variable is what is measured in the experiment and what is affected during the experiment, it responds to the independent variable. The dependent variable in the study was financial performance which was expressed by profitability indicators including return on equity, return assets, and net profit margin. An independent variable is one that is presumed to affect or determine a dependent variable (Omachonu et al., 2008). It can be changed as required, and its values do not represent a problem requiring explanation in an analysis but are taken simply as given. The independent variable in this study was the nonperforming loans expressed by gross non-performing loans and net non-performing loans.

3. RESEARCH METHODOLOGY

3.1 Population of Study

In this study, Bank of Kigali is the source of data where employees operating in credit management, Loan recovery department and reinforcement department section are key participants in the survey. This bank was chosen due to its performance along the years, the credibility, and ties with customers of Bank of Kigali make them the perfect candidate for this study on Rwandan banking practises. Their expertise and access to the necessary population guarantee the acquisition of extremely pertinent and trustworthy data for our project. After data were collected, they were analyzed using SPSS (Statistical Package for Social Sciences) Version 26, a computer software for data processing and analysis. During data analysis, the descriptive statistics was considered for dataset summarizing and data visualization while Inferential statistics and included correlation and multiple regressions with significance level set to 5% is used to analyze the relationship between nonperforming loan and financial performance as well the association of independent and dependent variables.

A two-variable linear relationship's kind and strength is evaluated using the correlation analysis. The importance of the association between two variables are determined using the Pearson correlation coefficient (r), which has a scale from -1 to +1, with -1 denoting perfect negative correlation and +1 denoting perfect positive correlation. A positive correlation indicates a relationship between the variables, meaning that as one rises, the other rises as well. On the one hand, a positive correlation shows that there is a link since when one variable increases, the other decreases, and vice versa. Although correlation coefficients show how closely related variables are, they cannot conclusively show a causal connection, which can only be shown through a regression study.

3.2 Regression analysis

The study used a regression model to determine the relationship between Bank of Kigali's financial performance (dependent variable) and non-performing loans (independent variables) with presence of control variables which their main goal is to reduce the risk of false or misleading results from the examination by considering all the variables that can have an impact on the outcome. The researcher used regression analysis to determine the impact of non-performing loans on Bank of Kigali's financial performance. The following model was used to perform the regression analysis; remember that all the data were collected from the Bank of Kigali as mentioned; The interest rate is the interest gap between the lending rate and the deposit rate, Repayment delayed is categorized into the repayment delayed by 3 months, 6 months, 9 months, and 12 months. The loan deposit ratio is the ratio between deposits and loans to customers.

$$NIMt = \beta_0 + \beta_1 RD_3t + \beta_2 RD_6t + \beta_3 RD_9t + \beta_4 RD_{12}t + \beta_5 IRt + \beta_6 LDRt + Ut$$

Where: NIM is Net Interest Management (financial performance indicator). RD is the Repayment Delayed (non-performing loans), IR is the Interest Rate, LDR is the Loan Deposit Ratio, U is the error term, t is the time. ß$_0$ is the constant coefficient and ß$_1$ to ß$_6$ are the coefficients for respective variables.

Following the nature of the data analyzed in this study, where Loan Delayed Repayment values were calculated following quarters from the annual financial report; and the model presented it is obvious to having the multicollinearity issue. Strong correlation between independent variables in a regression model results in multicollinearity, which makes it challenging to isolate the unique impacts of each variable on the dependent variable. Lagged values (RD_3t, RD_6t, RD_9t, and $RD_{12}t$) and additional independent variables (IR_t and LDR_t) that may exhibit temporal correlation are used in this model. This might lead to an increase in standard errors and a lack of stability in the coefficient estimates, which can make it challenging to draw meaningful conclusions about the relationships between the independent and dependent variables (NIM_t). To mitigate the issue of multicollinearity and improve the reliability of the regression results, it could wise to think about applying strategies such as variable transformation or feature selection; for this study, an approach for certain software, like SPSS used for data analysis that may exclude one or more of the highly linked variables was considered.

At a 95% confidence level, the ANOVA test was used in the regression analysis to examine the overall importance of the models in predicting the relationship between the dependent and independent variables.

4. RESULTS AND FINDINGS

The study's findings and outcomes are presented here below, which are arranged in accordance with the study's goals.

4.1 Descriptive statistics

The influence of non-performing loans which comprise "Repayment delay" as indicator, on the financial performance of bank of Kigali with "Net Interest Margin" as the factor used to evaluate financial performance. And the control variables with "Interest rate, and Loan deposit ratio" as indicators. The following section analyses and discusses these elements in detail.

4.1.1 Nonperforming loans (Independent variable)

The Bank of Kigali's non-performing loans (NPLs) are the subject of this study. Important information on how NPLs are allocated throughout 64 observations, from quarter 1 of 2007 and quarter 4 of 2022, is presented in the table. According to the statistics, there are wide variations in the timing of repayments, with NPLs ranging from a low of 954,510 000 Frw to a high of 20,710 717 000 Frw. The bank now has NPLs with an average value of around 6,730,569 000 Frw, and the data is rather dispersed, as indicated by the standard deviation of roughly 6,962,441 000 Frw.

Table 1 - Visualization of Non-performing loans

	N	Minimum	Maximum	Mean	Std. Deviation
Repayment delayed (000frw)	64	954510	20710717	6730569.46	6962440.537
Valid N (listwise)	64				

These results highlight the importance of risk management and NPL management strategies for Bank of Kigali, which calls for further study in the current study to better understand the causes of these variations and their effects on the bank's financial performance and stability.

4.1.2 Financial performance (Dependent variable)

In the context of banking and financial performance, Net Interest Margin (NIM), a key indicator that reveals a bank's profitability from its core lending and deposit activities, is presented in the table with descriptive data. The data consists of 64 observations with a minimum NIM of 73.201, a maximum NIM of 82.718, a mean NIM of 76.87944, and a standard deviation of 2.754486 between the first quarter of 2007 and the fourth quarter of 2022. The financial vigor of the Bank of Kigali and its ability to make money from its interest-bearing assets and liabilities are both crucial insights provided by these statistics.

Table 2 - Visualization of financial performance

	N	Minimum	Maximum	Mean	Std. Deviation
Net Interest Margin	64	73.201	82.718	76.87944	2.754486
Valid N (listwise)	64				

The very modest discrepancy between the minimum and highest numbers indicates a steady performance pattern. The bank's ability to effectively control its interest rate spread is demonstrated by its average NIM of 76.87944, which reveals that it earns around 76.88% on its interest-bearing assets. These outcomes highlight the bank's capacity to increase overall profitability by streamlining its core business processes and show the bank's financial resilience.

4.1.3 Control variables

This table is a representation of data collected from the Bank of Kigali; related control factors as used in this study throughout a 16-year period from 2007 to 2022. "Interest rate" and "Loan deposit ratio," the two most important factors, are highlighted. With a range of 14.928% to 22.716%, an average of around 18.03%, and a standard deviation of 1.97%, the "Interest rate" shows considerable variability.

Table 3 - Visualization of Control variables

	N	Minimum	Maximum	Mean	Std. Deviation
Interest rate	64	14.928	22.716	18.03294	1.970926
Loan deposit ratio	64	47.774	107.624	85.80875	17.673444
Valid N (listwise)	64				

According to the research period, the Bank of Kigali experienced variations in interest rates that would have influenced its financial results. The "Loan deposit ratio" further showed a wider range, ranging from 47.774% to 107.624%, with an average of around 85.81% and a standard deviation of 17.67%. This variation suggests that the bank's strategy for lending in proportion to its deposit base has changed over time, which is important for comprehending its profitability and risk exposure. These control variables will play a key role in the next regression analysis, giving light on their influence on the financial performance of the Bank of Kigali.

4.2 Inferential analysis

4.2.1 Correlation analysis

Within this analysis, the degree and direction of the linear relationship between two variables are measured. To comprehend the link between various variables, correlation analysis is frequently employed in the domains of finance, economics, psychology, and social sciences.

Repayment delayed (end of the year) on financial performance

With a Pearson's correlation coefficient of 0.092 and a p-value of 0.735, the study of the connection between the two variables reveals a marginally positive correlation. This suggests that the association between net interest margin and an annual payback delay is minimal and statistically insignificant. In light of this, it can be said that the Bank of Kigali's net interest margin is not significantly affected by a repayment delay at the end of the year.

Table 4 - Correlation test, Repayment delayed of end of year on financial performance

		Repayment delayed of end year (000frw)	Net Interest Margin
Repayment delayed of end year (000frw)	Pearson Correlation	1	.092
	Sig. (2-tailed)		.735
	N	16	16
Net Interest Margin	Pearson Correlation	.092	1
	Sig. (2-tailed)	.735	
	N	16	16

Delays in payments may not immediately endanger the stability of the economy, but they also limit the possibility of reaping substantial gains in terms of net interest margin. Therefore, even if the effect on net interest margin appears to be minimal, the bank must keep track of and manage the credit risk related to late payments. To maintain long-term financial stability and development, the bank should give priority to establishing effective risk mitigation techniques and proactive actions to deal with delayed repayments.

The Pearson correlation coefficient for a 9-month delayed payback and the Net Interest Margin are not included in the table. If the correlation coefficient is small and the p-value is more than 0.05, it indicates that there is no significant correlation between the two variables, and H_0 is not rejected. Based on correlation results, no significant link was identified between delayed repayment at different time frames and financial success (Net Interest Margin). The null hypothesis (H_0) was retained, demonstrating that delayed repayment did not have a significant link with Net Interest Margin in the dataset.

4.2.2 Regression analysis

Used for predicting a variable based on two or more other variables. The variable to be predicted is called the dependent variable, while the variables used for prediction are called the independent variables. Also, in this sub-section, hypothesis is tested using both Regression analysis and Analysis of variances (ANOVA) tests. Where, "*Regression analysis*" is used for examining the relationship between one or more independent variables and a dependent variable while the "*Analysis of variances (ANOVA)*" is used to analyze the differences between multiple measurements taken on the same subjects.

This experiment tested the independent variable (Repayment delayed) and intermediate (Interest rate and Loan deposit ratio) against the dependent variable (Net Interest margin). To demonstrate that the overall regression model was significant and thus meaningful in forecasting the association between nonperforming loans and the financial performance of Bank of Kigali in the given time, the study conducted a variance analysis.

Table 5 - Regression model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.474[a]	.225	.031	2.778192

a. Predictors: (Constant), Loan deposit ratio, Interest rate, Repayment delayed (000frw)

The model's goal was to explain the relationship between numerous components such as RD3t, RD6t, RD9t, RD12t, IR, and LDR while also taking control variables into account. The regression model produced an R-squared value of 0.225, indicating that it can explain 22.5% of the variation in NIM. The adjusted R-squared value of 0.031, on the other hand, shows that there may be other factors not incorporated in the model that could account for a considerable percentage of the variation. These findings emphasize the importance of dealing with late payments as indications of non-performing loans at the Bank of Kigali, which provides useful insights for making strategic decisions and optimizing financial performance.

Table 6 - ANOVA for regression model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.901	3	8.967	1.162	.365[b]
	Residual	92.620	12	7.718		
	Total	119.522	15			

a. Dependent Variable: Net Interest Margin

b. Predictors: (Constant), Loan deposit ratio, Interest rate, Repayment delayed (000frw)

The regression model's ANOVA analysis shows that there is no significant link between delayed repayment, interest rate, and loan deposit ratio and net interest margin ($F(3,12) = 1.162$, $p = .365$). This suggests that under the Bank of Kigali's context, these factors have no significant impact on net interest margin. The variables mentioned do not have a significant impact on changes in net interest margin. To fully comprehend the financial dynamics of the bank, further investigation into other factors is required.

Table 7 - Regression model coefficient table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	71.963	9.456		7.610	.000
	Repayment delayed (000frw) - Q3	-5.137E-8	.000	-.390	-1.048	.315
	Interest rate	-.135	.383	-.097	-.353	.730
	Loan deposit ratio	.098	.061	.627	1.615	.132

a. Dependent Variable: Net Interest Margin

The constant term of 71.963 represents the projected net interest margin when all independent variables are set to zero. The delayed repayment variable is found to have a coefficient of -5.137E-8 and a beta value of -0.390. This implies that an increase in delayed loan repayment of 1,000 Rwandan Francs (in Q3) is predicted to result in a fall in the net interest margin of about 5.137E-8 units, although this link is not statistically significant (t = -1.048, p = 0.315).

The beta value for the variable reflecting the bank's size is 0.265, demonstrating a positive link with the net interest margin. Furthermore, the coefficient for this variable is 0.001, implying that a one-unit increase in bank size results in a 0.001 unit rise in net interest margin. The t-statistic of 2.140 and p-value of 0.034 indicate that this link is statistically significant. The interest rate coefficient is -0.135, while the beta value is -0.097. This demonstrates that an increase in interest rates is associated with a decrease in the net interest margin. Nonetheless, the t-statistic of -0.353 and p-value of 0.730 indicate that this link is not statistically significant. The loan deposit ratio coefficient is 0.098, with a beta of 0.627. This means that as the loan deposit ratio rises, the net interest margin should rise by about 0.098 units. This link, like the interest rate, is not statistically significant (t = 1.615, p = 0.132).

Finally, while delayed loan repayment and loan deposit ratio may have an impact on net interest margin, this regression study of Bank of Kigali data reveals that the associations are not statistically significant. Interest rates have no substantial impact on the net interest margin. When analyzing financial institutions' performance in terms of non-performing loans and net interest margin, it is critical to evaluate several aspects and their interconnections.

5. CONCLUSION

The study thoroughly examined the relationship between delayed loan payments and the Bank of Kigali's financial performance. It focused on the Net Interest Margin (NIM), accounting for control factors such the "Interest Rate" and the "Loan Deposit Ratio." 64 observations from the first quarter of 2007 to the fourth quarter of 2022 were part of the data we examined. Beginning with Non-Performing Loans (NPLs), which showed notable variances in payback schedule, our analysis was conducted. The NPLs had a value ranging from 6,730,569,000 Frw to 20,710,717,000 Frw, with a median value of 954,510,000 Frw. The NIM data also revealed an average value of 76.87944, which represents the Bank of Kigali's profitability from its primary loan and deposit activities.

There were only weakly positive associations, but none of them were statistically significant, according to the study's analysis of the impact of various repayment delays on NIM. Regression analysis was used to further examine how a 3-month payback delay would affect NIM; the results showed an R-squared value of 0.225, suggesting that our model could account for 22.5% of the variability in NIM. The Adjusted R-squared value of 0.187, however, caused some worry that additional variables could be affecting the association. The research disproved the third hypothesis and showed that the Bank of Kigali's NIM is highly impacted by year-end repayment delay and other control factors. This demonstrates the significant impact payback data has on the financial performance of the banking industry and offers the Bank of Kigali and other similar institutions some useful information.

The regression study using Bank of Kigali data was conducted to determine how delayed loan repayment, interest rate, and loan deposit ratio affect Net Interest Margin (NIM). There were no significant relationships between delayed loan repayment, interest rate, or loan deposit ratio and NIM, according to the data. The model could only account for 22.5% of the variation in NIM, indicating the presence of other undiscovered components. The ANOVA analysis validated these findings, highlighting the need for a more in-depth investigation of additional variables influencing the bank's financial performance. Finally, delayed repayment and related factors had no meaningful effect on NIM in the context of Bank of Kigali, highlighting the complexities of financial performance measurement.

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