The effect of credit risk management on the financial performance of commercial banks: evidence from Tanzania

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Abstract

The vital role played by commercial banks in economic development calls for the stable and sustainable financial performance of banks for smooth financial intermediation. However, unhealthy credit has caused the collapse of many financial institutions all over the world. Therefore, this study examines how credit risk management practices affect the financial performance of commercial banks in Tanzania. While employing multiple linear regression techniques, the study analysed balanced panel data from 225 observations gathered from audited published annual reports of 15 commercial banks in Tanzania from 2006 to 2020. Credit risk approval and credit risk monitoring were used as proxies for credit risk management. The findings reveal that credit risk approval has a positive effect on banks' capital adequacy, efficient utilisation of equity, asset quality, and liquidity. However, credit monitoring negatively affects the financial performance of banks through their earning ability, asset quality, and liquidity. The study recommends that incorporating credit risk management practices as a core aspect of bank operations is crucial, as it has a beneficial impact on financial performance. Nevertheless, it is advised to exercise caution and achieve a harmonious balance in the integration and concentration of all examined variables since credit approval could not exhibit a positive effect on banks' earning ability. This has also been established on credit monitoring towards capital adequacy and efficient use of equity.

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1. Introduction

Based on their catalyst function for economic development, the sound financial performance of commercial banks cannot be overemphasised (Tegambwage & Kasoga, 2023). In fact, their financial performance (FP) should constantly be under surveillance (Ekinci & Poyraz, 2019). This performance is largely geared towards lending activities, which are the core business of commercial banks (Gabriel & Victor, 2019). However, lending activities pose a greater risk of commercial banks' failure as a result of losses generated by non-performing loans (Incekara & Çetinkaya, 2019). This is contributed by a failure to properly manage credit risk, which results in banks' inefficiency and troubled financial performance (Alwi et al., 2021; Kingu et al., 2018; Saleh et al., 2020; Yurttadur et al., 2019); hence, a need for effective credit risk management.

For over a decade, commercial banks in Tanzania have been experiencing fluctuating performance. For instance, the Bank of Tanzania (BoT) guidelines stipulate a minimum capital adequacy ratio of 12%, a maximum non-performing loan rate of 5%, and a minimum return on equity and return on assets of 5%, with rates above 20% being encouraged. Moreover, liquidity is expected to be maintained at a minimum of 20%, as per the Banking and Financial Institutions Liquidity Management Regulations, 2014. Nevertheless, the banking sector has consistently maintained rates below the recommended safety levels, signalling potential challenges for ensuring sustainable financial stability. This underperformance has been witnessed by a consistent fluctuation in the performance of banks, which is below the recommended safety thresholds, as depicted in Figure 1. This was evidenced in 2018 when BoT, through circular No. FA.178/461/01/02, voiced an alarm about the banks' performance, linking it to internal factors such as weak controls and supervision, shortcomings in credit risk assessment, and ineffective recovery processes (BoT, 2018).

It is worth recognising that global financial systems operate in a dynamic environment that exposes the banking sector to substantial risks. Due to this, the frequency of major bank failures has been steadily rising, impacting both developed and developing nations (Tegambwage & Kasoga, 2022a). Ineffective credit risk management (CRM) practices have resulted in the downfall or financial struggles of many commercial banks worldwide (Sanarya et al., 2023). Researchers such as Hallunovi and Berdo (2018) have identified several factors contributing to this trend; a significant factor mentioned is the deficiencies in CRM.

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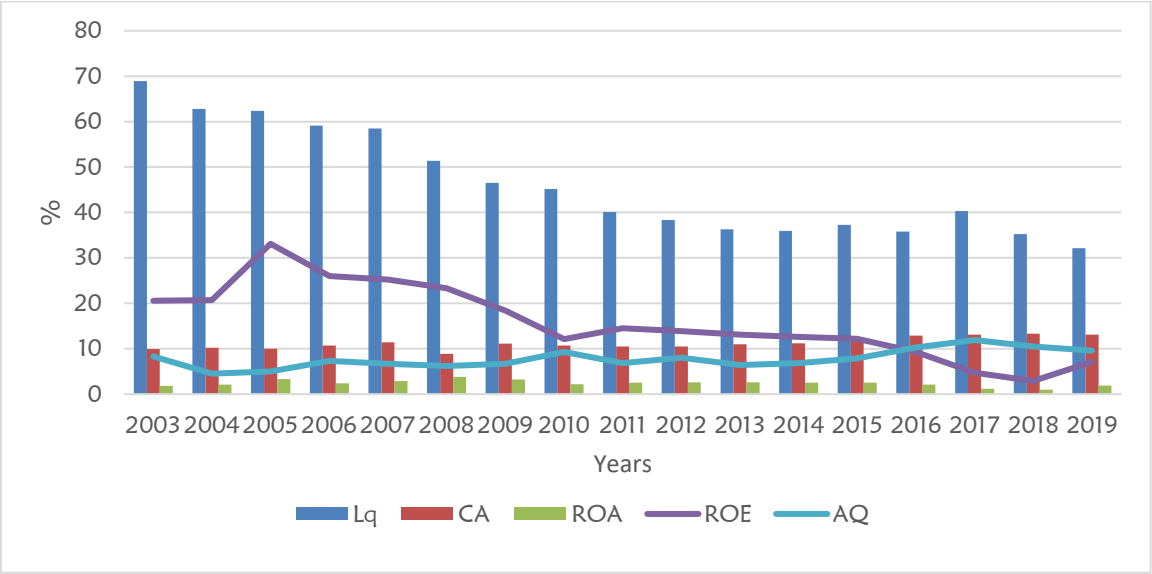

Figure 1. Trend of selected financial performance indicators
Source: Researcher's compilation from BoT 2003 – 2019 annual reports

The sustained success of any financial institution hinges on an effective approach to CRM, given that over 50% of total bank revenue is currently generated from interest and various fees associated with loans, making it the primary revenue stream for financial institutions (Banerjee et al., 2018; Chelangat et al., 2022; Temba et al., 2024; Temba et al., 2023). The said sustainable growth relies on the proficient handling of credit risk and enhanced financial performance, as indicated by Oke et al. (2012). These risk management practices are essential for banks to foster growth and maintain competitiveness within the banking sector.

Few studies have provided a linkage between CRM practices and banks' financial performance as measured by capital adequacy, efficient use of equity, earning ability, quality of assets, and liquidity (Al Zaidanin & Al Zaidanin, 2021; Folorunso & Rafiu, 2019; Kabir & Dey 2012; Nguye, 2023). For instance, Nguyen (2023), used return on assets (ROA), return on equity (ROE), and net interest margin in measuring financial performance. Al Zaidanin and Al Zaidanin (2021); Fadun and Silwimba (2023); Folorunso and Rafiu (2019); Khanaland and Sapkota (2023); and Von Tamakloe et al. (2023) adopted ROA in measuring financial performance. Olobo et al. (2021) adopted non-performing loans and provision for bad loans in measuring financial performance. In Tanzania, the literature provides a work by Majondo et al. (2023), who assessed the linkage between CRM and financial performance while adopting ROA and NPL for financial performance. However, none of the mentioned studies have adopted all five aforementioned measures while measuring financial performance.

Therefore, this study filled the knowledge gap by assessing the influence of CRM through loan approval and loan monitoring on financial performance while adopting all five measurements of banks' financial performance, which are key indicators of commercial banks' performance as provided by BoT in selected commercial banks in Tanzania. Effective loan approvals processes ensure that loans are granted to creditworthy customers, minimise the risk of defaults, and ensure the financial stability of commercial banks (BoT, 2018). Loan monitoring helps commercial banks detect early signs of default among borrowers, intervene early, and take corrective actions, thereby contributing to the overall financial performance (Nguyen, 2023). The findings of this study will offer valuable guidance to banking industry practitioners, particularly senior executives within commercial banking institutions, as they provide pertinent insights of CRM, i.e., credit approval and monitoring to enhance financial performance of commercial banks. This study stands to contribute significantly to the mitigation of credit risk, consequently fostering enhancements in the financial performance of commercial banks in Tanzania.

The rest of the paper is organised as follows: The next section presents the literature review and hypothesis development. The methodology of the study follows it. Then, the findings and their discussion are presented. The final section provides a conclusion and recommendations.

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2. Literature review

This section covers a theoretical review that forms the conceptual groundwork for the study. Subsequently, it explores and presents the extant literature on the interrelationship between credit approval processes and loan monitoring practices, elucidating their respective impacts on the financial performance of commercial banks (CBs). Furthermore, this section outlines the formulation and evolution of hypotheses derived from the synthesised theoretical framework and empirical evidence

2.1 Risk management theory

Pyle (1997) posits that risk management theory serves to scrutinise the imperative of risk management and establish the conceptual underpinnings for contemporary bank risk management, emphasising credit risks as primary focal points. The theory contends that credit risks can wield both direct and indirect influences on the viability of banks (Eichhorn, 2004). Van Staveren (2009) further elaborates on this framework, asserting that organisations must systematically and purposefully monitor their risks, particularly those intertwined with their strategic objectives. This entails evaluating the magnitude and trajectory of such risks to ensure alignment with stakeholders' prescribed risk tolerance levels and congruence with organisational strategic goals. The absence of effective and efficient credit risk management, as anticipated by Ngugi (2001), is expected to have a direct impact on banks' profitability through the manifestation of credit risk indicators.

2.2 Empirical review and hypotheses development

2.2.1 Credit approval

This study adopts Mishkin et al. (2018) view of credit risk approval, whereby it represents the meticulous evaluation conducted by a lender to ascertain the creditworthiness of a prospective borrower, thereby establishing their eligibility for obtaining credit facilities. Integral to this process is the comprehensive scrutiny of various financial metrics, including income documentation, credit history, and the execution of a thorough credit analysis. This analysis encompasses the assessment of key indicators such as credit scores and the appraisal of available collateral. These procedural steps serve the fundamental purpose of ensuring the reliability and precision of the information utilized in the determination of the borrower's creditworthiness, thereby facilitating an informed decision regarding the extension of credit. Credit approval is recognized as a pivotal factor influencing loan growth and consequently impacting the overall performance of banking institutions (Dang, 2019). However, when not approached with due diligence, it can lead to adverse effects on performance. He explained that banks excessively expand their lending activities, often due to laxity in credit approval processes, experiencing an immediate decline in solvency and an uptick in the rate of loan loss provisions in the following 2 to 3 years. He further points out that, this growth flight is posited not to diminish banks' returns but rather to enhance profitability in the long term.

In two separate investigations, Mudanya et al. (2022) explored CRM practices and their effects on the FP of commercial banks in Kenya, while Bhatt et al. (2023) conducted a similar study in Nepal. Mudanya et al. utilized regression analysis on data spanning from 2016 to 2021 in Kenya, revealing that CRM practices, including loan default monitoring and credit scoring, exerted a significant positive influence on financial performance, specifically measured by the return on assets (ROA) of commercial banks. Conversely, Bhatt et al. (2023) uncovered noteworthy relationships, including a positive association between environmental risk and credit risk, the impact of credit appraisal measurements on credit risk, the influence of market risk analysis on CRM, and the mediating role of CRM in the relationship among these factors and the overall performance of commercial banks in Nepal.

Majani (2022) conducted a study on the correlation between CRM and the financial performance of commercial banks. The research revealed that the non-performing loans ratio and loan loss provisions ratios did not show a statistically significant relationship with return on equity. Conversely, the capital adequacy (CA) ratio negatively impacted ROE significantly, while a positive and statistically significant correlation was found between the loan-to-assets ratio and ROE. Majani (2022) findings however are short of reliance as the study made the use of capital adequacy as an independent variable and return on equity as a dependent variable whereas both of the variables are recommended for gauging financial performance. This particular study employed both CA and ROE as measurements of financial performance.

Similarly, Yimka et al. (2015) investigated the relationship between CRM and the financial performance of selected deposit money banks. Their findings indicated a significant positive influence of the ratio of non-performing loans to provisions for loans and advance losses on ROE. However, the ratio of non-performing loans and advances to total loans and advances did not exhibit a significant effect on ROE. Alaradi and Hilal (2020) provided that the result of every loan application, regardless of approval

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or rejection, has a significant impact on banks' financial performance. Nevertheless, notwithstanding its fundamental significance, the decision-making process entailed in loan approval is intricate and characterized by inherent uncertainties, thus impeding the straightforward attainment of a conclusive judgment.

The conducted review exposed that most of the prior studies concentrated on return on assets and return on equity to proxy banks' financial performance, with a limited concentration on the efficient use of equity, asset quality, and liquidity levels of commercial banks. This study fills that gap with a fifteen-year (15) study from 2006 to 2020 with a total of 255 observations while focusing on the credit risk approval process by estimating banks' financial performance through five measures, hence hypothesising the following;

H1a: Credit approval has a significant positive effect on banks' capital adequacy.

H1b: Credit approval has a significant positive effect on banks' earning ability.

H1c: Credit approval has a significant positive effect on banks' efficient use of equity.

H1d: Credit approval has a significant positive effect on banks' asset quality.

H1e: Credit approval has a significant positive effect on banks' liquidity.

2.2.2 Loan monitoring

According to Cornett et al. (2021), loan monitoring refers to a continuous procedural framework wherein the performance of a loan is systematically observed and evaluated across its entirety, spanning from inception to final repayment. This encompassing process entails the meticulous scrutiny of the borrower's financial status, compliance with stipulated loan agreements, and any pertinent alterations in circumstances that might influence their capacity to fulfil repayment obligations (Kasoga & Tegambwage, 2024). The efficacy of loan monitoring lies in its capacity to enable lenders to promptly discern potential risks, thereby facilitating the timely implementation of corrective measures as deemed necessary and thereby safeguarding the loan's favourable standing (Tegambwage & Kasoga, 2022b). This current study adopts Cornett's (2021) definition of loan monitoring.

Instefjord and Nakata (2014) demonstrated the implementation of dynamic loan monitoring, wherein the bank continuously scans for real-time events that could impact loan quality, leading to improved financial performance. However, they noted that this approach may elevate the motivation for risky loans. They further point out that, in some cases, managers are termed to go for low operating costs by intentionally minimizing devoted costs on loan management, deliberately raising profits, but trading the practice with future problems on loan performance. Le (2018) explored the existing interrelations among bank efficiency, capital, and risks while adopting the three-stage least squares framework in a concurrent equations framework for analysing the unbalanced panel data of the study. According to the study, neglecting loan monitoring tends to lead to bank cost inefficiency, hence affecting the financial position of the firm. The study findings evidenced that banks do allocate a small portion of their costs on credit monitoring deliberately to minimize costs over short-term profits. Additionally, Le (2018) claims that this practice is subjected to financial deterioration as it weakens the loan quality (asset quality) of concerned banks.

Contrary to Le's findings, Ghosh (2018) established that a low proportion of loan monitoring costs over the total loan portfolio do not jeopardize the performance of the banks under study. Whereas Karugu and Ntoiti (2015) found that credit monitoring also had a significant positive effect on profitability. Further, Gauri and Heman (2020) undertake an empirical investigation into the correlation between bank capitalization and banks' efforts on loan monitoring. The study employs four distinct proxies to gauge the monitoring activities of banks. Specifically, two proxies are grounded in loan quality, representing the post-hoc outcomes of monitoring exertions, while the remaining two proxies derive from salary expenditure, designed as ex-ante measures aimed at capturing the quality and magnitude of labour input dedicated to monitoring efforts. While employing a methodology incorporating time-fixed effects estimations, findings reveal a positive correlation between bank capitalization and each of the metrics employed to assess monitoring exertions. Moreover, the study observes that this correlation exhibits heightened significance among smaller banks and those actively involved in relationship lending.

Despite the contradicting results from previous studies, this current study believes that inadequate credit monitoring has a negative effect on financial performance. Furthermore, the reviewed literature

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revealed that most of the previous studies did not employ the five measures of financial performance. Most of the studies employed return on assets and return on equity to proxy banks' financial performance. This study fills that gap with a fifteen-year (15) study from 2006 to 2020 with a total of 255 observations while focusing on the CRM process by estimating banks' financial performance through five measures. Hence the study hypothesised that:

H2a: Credit monitoring has a significant positive effect on banks' capital adequacy.

H2b: Credit monitoring has a significant positive effect on banks' earning ability.

H2c: Credit monitoring has a significant positive effect on banks' efficient use of equity.

H2d: Credit monitoring has a significant positive effect on banks' asset quality.

H2e: Credit monitoring has a significant positive effect on banks' liquidity.

3. Research methodology

The study adopted an explanatory research design due to its capability to examine relationships between a set of two or more study variables (Bhattacherjee, 2012). The study analyses the effect of CRM proxies by credit approval and credit monitoring on the financial performance of selected Tanzanian commercial banks proxies by capital adequacy, earning ability, efficient use of equity, asset quality, and liquidity (see Table 1).

To maintain consistency of information collected from units of inquiry and analysis, the study collected balanced panel data from fifteen picked commercial banks licensed by BoT. With balanced panel data, information was collected from only those commercial banks that have been in full operation during the entire period covered by the study, i.e., seventeen years from 2006 to 2020, making a total of 255 observations. According to Hair et al. (2010), a rule of thumb for an adequate sample or number of observations for social science research is to recommend at least 15 observations per one variable, hence making 255 observations sufficient for this study.

Data were collected from the sampled commercial banks that were audited and published annual reports. Variable measurements for the independent and dependent variables adopted by the study are presented in Table 1. Further, due to the likelihood of bank size and age influencing the banks' performance (Mori & Towo, 2017), these two aspects were controlled during data analysis. For data analysis, the study adopted a multiple linear regression model as follows:

$Yit = \alpha i+\beta o+\beta 1X1it+\beta 2X2it + \beta 3X3it + \beta 4X4it+ \varepsilon it$

Where βo = intercept of the regression model; $\beta 1$ and $\beta 2$ = the coefficients of the CRM constructs; $\beta 3$ and $\beta 5$ = the coefficients of control variables; it represents the variables for the ith bank in period t; and εit = the error /disturbance term.

Table 1. Variables' operationalisations

N	Variables	Abbr	Type	Measurement	Adopted From
1	Capital Adequacy	CA	Dependent	Equity Capital to Total Assets	Alwi et al. (2021)
2	Earning Ability	EA	Dependent	Net income to total assets	Kingu et al. (2018)
3	Efficient Use of Equity	EE	Dependent	Net income to total equity	Alwi et al. (2021)
4	Asset Quality	AQ	Dependent	Non-performing Loans to Gross Loans	Yurttadur et al. (2019)
5	Liquidity	Lq	Dependent	Liquidity Assets to Short- term obligations	Saleh et al. (2020)
6	Credit Approval	RAP	Independent	Gross performing loans to the total increase in doubtful loans (doubtful from performing loans)	Piatti and Cincinelli (2018)
7	Credit Monitoring	CM	Independent	The ratio of loan monitoring operating expenses to total loans.	Dwike & Maria, (2017)
8	Size of Bank	SB	Independent	Log of total assets	Matanda (2016)
9	Age of Bank	AB	Independent	Number of years of the bank	Mori and Towo (2017)

Source: Table by authors

4. Results

4.1 Preliminary results

4.1.1 Descriptive statistics

Before undergoing inferential analysis, the data were initially characterized in terms of their mean, standard deviation, maximum, and minimum values. The findings presented in Table 2 reveal that the average capital adequacy level is 0.13 (13%), with a range spanning from -1.8 to 0.84 and a standard

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deviation of approximately 0.144. In accordance with the BoT's guidelines (2019), a minimum capital adequacy ratio of 12% is advised. Consequently, the computed value of 13% surpasses the BoT's recommended ratio by 1%. This indicates that the banks under consideration in the analysis possess adequate capital for conducting their business activities.

The average value of earning ability was 0.03 (3%), ranging from a minimum of -0.53 to a maximum of 0.25 and exhibiting a standard deviation of 0.52. According to BoT regulations, a minimum ratio of 5% is stipulated, while banks are encouraged to maintain a ratio of 20% for secure and prudent operations, as outlined in the Banking Sector Supervision Reports of 2019. The mean value of 3% reflects the suboptimal utilisation of available assets by banks, as noted by Oyetade et al. (2021). The effective utilization of equity, as indicated by the return on equity (ROE), is crucial in illustrating the management's capacity to generate income from the firm's existing equity. The average value of ROE was 0.17 (17%), suggesting a reasonable use of available equity. This aligns with the recommended ratio falling within the range of 15% to 20%, as specified by Moussu & Petit-Romec (2017).

Concerning asset quality, the BoT prescribes an asset quality ratio of 5%, determined by the non-performing loans (NPLs) ratio. In contrast, the mean value among the examined banks was 13.1%, ranging from a minimum of 0% to a maximum of 99%. This suggests a notable 8% fluctuation in non-performing loans (NPLs) within the commercial banking sector. The recommended liquidity ratio for commercial banks (CBs) is set at 20%, as indicated in the Banking Sector Supervision Reports of 2012. However, the evaluated banks exhibited a range in liquidity ratios from 1.4% to 20%, with an average of 11%. This ratio signifies the banks' capacity to utilise liquid assets to fulfil short-term obligations. Therefore, a liquidity ratio of 11% should not be deemed satisfactory, as it represents only 11% of the short-term obligations that can be settled using the available liquid assets, as highlighted by Durrah et al. (2016).

The number of doubtful loans piling up from performing loans was adopted to measure the carefulness of credit/loan approval procedures. On average, 0.09 (9%) of approved loans turn into doubtful loans (loans aged more than 90 days), with a minimum of 0.01 (1%) and a maximum of 0.16 (16%). This ratio, according to Piatti & Cincinelli (2018), when on the higher side, indicates a weak evaluation of loan granting processing. The minimum value of 0.01 with an average of 0.16 implies that existing approval processes are good in comparison to previous studies (ibid.). The trend of existing credit monitoring is thought to pose potential challenges to the future state of the loan portfolio and have an impact on financial performance, especially in relation to asset quality, as indicated by Wood and Skinner (2018). The study's data analysis reveals that, out of 255 observations from fifteen commercial banks spanning seventeen years, the maximum recorded ratio is 1.4, with a mean of 0.04 and a minimum of 0.00. On average, loan monitoring costs account for only 3.8% of the total operating costs incurred by commercial banks.

Regarding the control variables in this study, the average monetary value of the banks examined stands at Tanzania Shillings 316,227,766,016.8, calculated as the logarithm (base 11.5) of their total assets. Additionally, the average operational lifespan of these banks is documented at 14 years, ranging from a minimum of 1 year to a maximum of 31 years.

Table 2. Study variables' description

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Capital Adequacy	255	0.13	0.14	-1.81	0.84
Earning Ability	255	0.03	0.05	-0.53	0.25
Efficient Use of Equity	255	0.17	0.20	-0.29	2.28
Asset Quality	255	0.13	0.19	0.00	0.99
Liquidity	255	1.11	0.42	0.01	2.04
Credit Approval	255	0.09	0.30	0.01	0.16
Credit Monitoring	255	0.038	0.127	0.0	1.38
Size of Bank	255	11.51	0.61	9.40	12.81
Age of Bank	255	13.67	6.15	1.00	31.00

Source: Table by authors

4.1.2 Variables' correlations

The Spearman's test was adopted to describe how variables respond to each other and how they behave in response to any change in another variable, and the results are presented in Table 3. Moderate + and – association has been observed, and no single indicator of CRM showed a one-sided direction, i.e., either positive or negative association with FP. Quantified by the gross doubtful loan ratio, credit approval demonstrates a negligible correlation in both positive and negative directions with all financial performance indicators except for asset quality. Specifically, there is a positive correlation of 0.22

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observed with asset quality, signifying that proficient risk approval enhances asset quality. Credit monitoring exhibits a robust positive correlation of 37% with asset quality, indicating that as the proportion of allocated monitoring costs to overall operating expenses increases so does the quality of assets. Additionally, a positive correlation has been noted with capital adequacy, efficient use of equity, and liquidity. Conversely, there is a negative association with earning ability.

Regarding control variables, there is a positive correlation between bank size and capital adequacy (CA), earning ability (EA), and liquidity (Lq) at 0.12 for each. Conversely, bank size exhibits a negative correlation with efficient use of equity (EE) at 0.02 and asset quality (AQ) at 0.00. This suggests that larger banks tend to have improved capital adequacy, earning ability, and liquidity while experiencing lower efficiency use of equity and asset quality, and vice versa.

The relationship between bank age and efficient use of equity, earning ability, and asset quality is inversely proportional, indicated by correlations of -0.03, -0.01, and 0.00, respectively. This implies that as the age of the bank increases, its efficient use of equity, earning ability, and asset quality decrease—a pattern contrary to the findings of Mori and Towo (2017). The only positive correlation observed with bank age is recorded in relation to capital adequacy (0.27) and liquidity (0.32). These correlation outcomes affirm the absence of multicollinearity among the variables, as no high correlation (>0.8) has been detected, as per the criteria outlined by Field (2013).

Table 3. Variables' correlations

Variable	CA	EA	EE	AQ	Lq	RAP	CM	SB	AB
CA	1.00								
EA	0.16	1.00							
EE	0.04	0.20	1.00						
AQ	-0.03	-0.09	0.00	1.00					
Lq	-0.01	0.31	-0.16	-0.21	1.00				
RAP	0.01	-0.08	-0.05	0.22	-0.04	1.00			
CM	0.04	0.03	0.15	0.09	-0.08	0.32	1.00		
SB	0.12	0.12	0.02	0.00	0.40	0.02	-0.03	1.00	
AB	0.27	-0.01	-0.03	-0.02	0.32	0.24	0.03	0.51	1.0
Obsr.	255	255	255	255	255	255	255	255	255

Source: Table by authors

4.1.3 Diagnostic tests

Nature of study necessitated for normality, multicollinearity, heteroscedasticity, independence, and unit root of panel data tests where the Shapiro-Wilk test, Mean VIF, Breusch-Pagan test, Durbin Watson's test, and Im-Pesaran-Shin methods were adopted for the tests respectively (Yao & Li, 2014) whose results are presented in Table 4.

Table 4. Data diagnostic test results

Variable/Test	CA and CRM	EE and CRM	EA and CRM	Lq and CRM	AQ and CRM
Shapiro-Wilk	0.1	0.1	0.5	0.5	0.1
Mean VIF	2.0	2.0	2.1	2.0	1.9
Breusch-Pagan	0.4	0.1	0.4	0.2	0.1
Durbin Watson	0.4	0.7	0.5	0.6	0.7
Im-Pesaran-Shin	0.0	0.0	0.0	0.0	0.1

Source: Table by authors

Panel data are validated to exhibit a normal distribution, as indicated by the Shapiro-Wilk test result with a p-value greater than 0.05. The variance and inflation factor values are both below ten, affirming the absence of multicollinearity issues (Daoud, 2018). Moreover, the Breusch-Pagan test yields p-values exceeding 0.05, confirming the absence of heteroskedasticity and thus indicating homoscedastic conditions, consistent with Bananuka et al. (2023); Kasoga (2020) and Daoud (2018) findings.

The outcome of the Durbin-Watson d-statistic values indicated no serial dependence between variables, but they were not sufficiently close to the ideal value of two. Therefore, the Newey command in Stata was utilized to address potential issues of heteroskedasticity and serial correlation. The Newey estimator, as per Newey and West (1987), is designed to control for these issues and is implemented through the Newey-West Standard Error Model procedure. This procedure, particularly useful in panel datasets, allows for the estimation of correlations between lagged residuals within the same cluster, offering an alternative approach for handling correlated errors across observations (Bertrand et al., 2004; Casson & Farmer, 2014). The Im-Pesaran-Shin (IPS) test, as proposed by Pesaran (2011), was utilized to

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examine data stationarity. The obtained significance p-value ($p < 0.05$) affirms stationarity, indicating the absence of a unit root in the data (Table 6).

Scatter plots were generated to assess the linearity of financial performance, board of directors, and CRM indicators. The results from the tests, depicted in Figure 2, suggest linearity in the model, as the scattered points exhibit vertical movement alongside zero. Additionally, the residual plot does not indicate a non-linear relationship between the fitted values and the residuals, aligning with the observations of Casson and Farmer (2014).

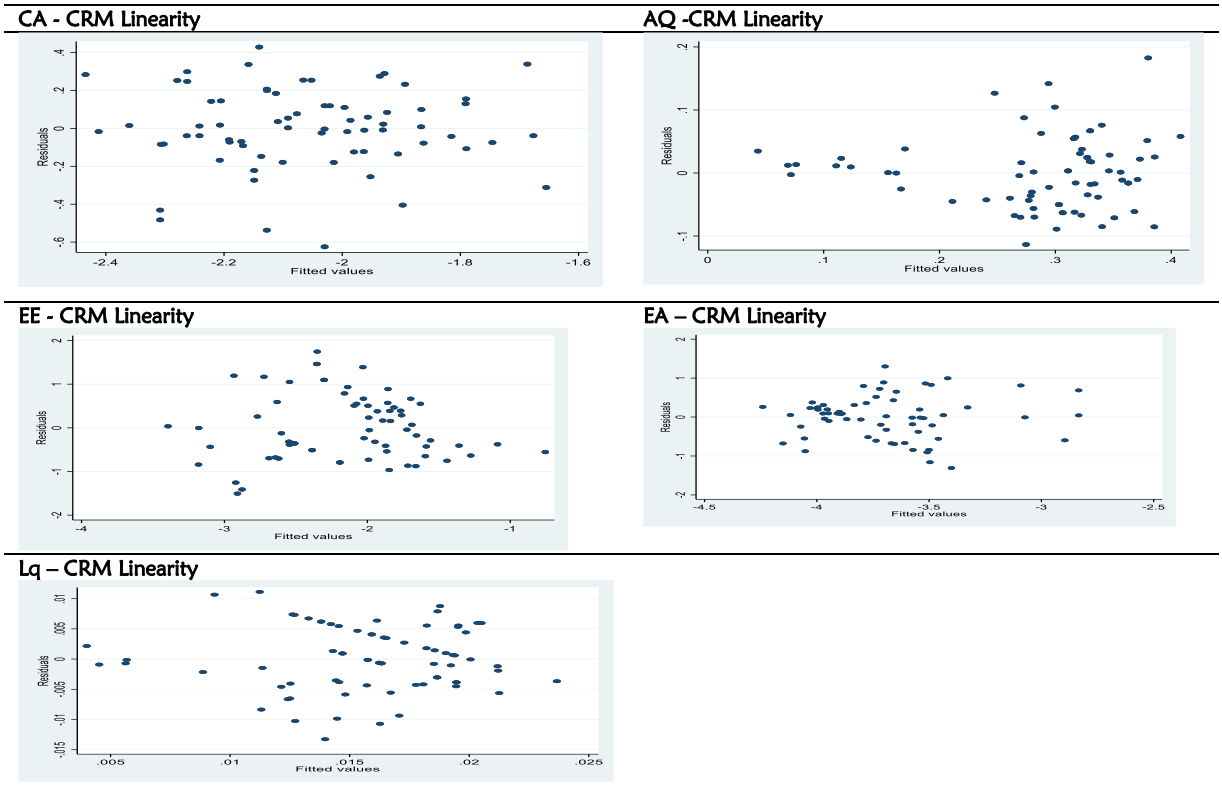

Figure 2. Scatter plots for study variables
Source: Figure by authors

4.1.4 Model fitness test

To determine the most appropriate model among common, random, and fixed effects, three tests were executed. The results, as presented in Table 5, encompass a stepwise evaluation from the Chow test (used for selecting between common and fixed effects) to the Hausman test (employed for choosing between fixed and random effects). Ultimately, the Breusch and Lagrange multiplier test was conducted. The outcomes favour the adoption of the common effect model, as evidenced by p-values exceeding 0.05.

Table 5. Model fitness test results

Variable/Test	CA and CRM	EE and CRM	EA and CRM	Lq and CRM	AQ and CRM
Chow	0.0	0.0	0.0	0.0	0.0
Hausman	0.2	0.7	0.0	0.2	0.2
Breusch & Lagrange Multiplier	0.2	1.0	0.1	0.1	1.0

Source: Table by authors

4.2 Main results and discussion

This section provides a comprehensive overview of the outcomes derived from the study's models, explaining the overarching relationship between banks' financial performance and CRM practices. The findings encapsulated within Table 6 depict the results of five distinct study models aimed at delineating the nexus between financial performance (FP) and CRM while simultaneously controlling for variables such as bank size and age.

The research findings indicate that credit monitoring practices do not exert a statistically significant influence on banks' capital adequacy. Equally, there exists a significant ($p < 0.01$) and positive association

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between banks' credit approval processes and banks' capital adequacy. This type of association suggests that thoroughness in the evaluation and approval of credit/loan applications enhances and fortifies the capital adequacy of commercial banks (CBs). These results are in line with Piatti and Cincinelli (2018) on the sense that effective CRM fosters a bank's performance. However, comparing the two studies, this current study has expanded the attributes of financial performance into five measures, and its results oppose Piatti and Cincinelli, 2018. The major contradiction is that the positive and significant effect does not hold on banks' capital adequacy as one of the measures of financial performance.

Moreover, the analysis reveals that bank age and bank size are positively affecting commercial banks' capital adequacy. This type of effect implies that older banks tend to exhibit superior capital adequacy levels, and larger-sized banks, in terms of assets, maintain robust capital positions.

Further, study findings portrayed negative associations between loan monitoring and banks' efficient use of equity, the association denotes that, the extent to which banks allocate their expenditures for their loan monitoring activities has a reverse impact on the efficient utilization of equity at a significant level of 0.01. In other words, increased allocation of funds towards loan monitoring tends to diminish banks' efficient utilization of their equity. Instefjord and Nakata (2014), however, stressed that banks' management adequately allocates enough monitoring costs for loan loss minimization, from the current study on average total operating costs consist of only 3.8% of credit monitoring costs. This outcome may stem from a reduction in other operational activities, which could otherwise contribute positively to equity utilization efficiency.

Notably, the study fails to establish a significant association between banks' loan/ credit approval and efficient utilization of equity at any level of significance. These results contradicted results from previous studies, for instance, Dang (2019) emphasized that loan approval can negatively and significantly affect financial performance if not approached with caution and due diligence.

Furthermore, the analysis reveals a positive and highly significant correlation ($p < 0.01$) between the size of banks as measured by asset volumes and banks' efficient utilization of equity. This implies that larger banks exhibit more efficient utilization of equity. This finding underscores the potential advantages conferred by economies of scale and operational efficiencies inherent in larger banking institutions, facilitating enhanced equity utilization efficiency.

The research findings reveal that credit risk approval processes implemented by banks exert a statistically significant positive effect ($p < 0.05$) on a bank's capacity to leverage assets for revenue generation (banks' earning ability). This finding suggests that a robust approval process is associated with enhanced asset utilization for revenue generation, the situation which is likely influenced by the sound quality of assets, characterized by lower levels of non-performing loans (NPLs). This is in support with Dang (2019) as he put it that, Lax credit approval processes lead to an immediate decline in solvency and an increase in loan loss provisions over the next 2 to 3 years. Moreover, the study demonstrates that the degree to which commercial banks prioritize the monitoring of their loan portfolios positively and significantly affects ($p < 0.01$) their earnings generation capabilities. These results are in line with the study conducted by Instefjord and Nakata (2014) who found a significant positive association between loan monitoring and financial performance. The current study's results highlight the notion that lending activities constitute a primary source of earnings for banks, necessitating heightened vigilance in loan monitoring efforts for better revenue earnings.

Furthermore, the analysis reveals that both, the bank's size and age exhibit a significant positive relationship with the earning ability of banks at 0.1 and 0.05 levels of significance respectively. This indicates that as banks mature over time, accompanied by an expansion in their asset base, their abilities for revenue generation from assets tend to increase. These findings are consistent with those of Ayadi and Boujelbene (2012), who similarly observed a positive relationship between bank size and return on average assets. However, they diverge from the findings of Alfadhli and Musaed (2021), who reported an inverse relationship between bank size and profitability (ROA).

The study uncovers a robust positive association between credit risk approval processes and the asset quality (AQ) of banks, reaching statistical significance at the 0.01 level. This finding emphasizes the notion that accurately assessed and approved loans tend to translate into performing assets, thereby generating greater interest revenues and bolstering the overall quality of banks' asset portfolios. Moreover, the allocation of operating funds towards loan monitoring, as indicated by credit monitoring practices, demonstrates a positive association with asset quality at a significance level of 0.01. This suggests that heightened vigilance in credit monitoring activities corresponds to an improvement in asset quality, indicative of a reduction in non-performing loans (NPLs) when efficient monitoring practices are implemented. Conversely, neglecting credit monitoring costs is posited to diminish the quality of banks' assets, potentially leading to elevated rates of NPLs. These findings align with previous research

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conducted by Wood and Skinner (2018) and Ghosh (2018) who also expanded the pivotal role of effective credit monitoring in bolstering asset quality within banking institutions. The study findings could not establish any association between the two aspects of control variables (bank size and bank age) with banks' asset quality at any level of significance.

The examination of banks' liquidity constitutes a crucial aspect of financial performance assessment. As per the study's findings, banks' credit approval processes exhibit a positive association with banks' liquidity at a 0.05 level of significance. These results align with prior research conducted by Zhang et al. (2016) and Novellyni and Ulpah (2017) but stand in contrast with the findings of Umar and Sun (2016).

Furthermore, the study reveals a positive relationship between credit monitoring practices and banks' liquidity at a statistical significance level of 0.01. This observation suggests that sustained caution in credit monitoring activities by management contributes to an augmentation of the bank's liquidity levels. These findings underscore the critical role of effective credit management strategies in enhancing liquidity positions within banking institutions, thereby ensuring their operational resilience and solvency. The age of the bank also is associated with banks' liquidity levels at a significance level of 0.1, while the study's findings failed to establish any association between bank size and banks' liquidity at any level of significance.

Viewed holistically, the financial performance of commercial banks, as represented by capital adequacy (CA), efficient equity utilization (EE), earnings ability (EA), asset quality (AQ), and liquidity (Lq), is explained to a significant extent by banks' CRM practices through credit risk approval processes and credit monitoring practices. Specifically, when controlling for the age and size of banks, these two variables (credit approval and loan monitoring practices) collectively determine banks' capital adequacy, efficient equity utilization, earnings ability, asset quality, and liquidity levels by 42%, 33%, 12%, 82%, and 23% respectively as evidenced in Table 6. The substantial explanatory power on asset quality (82%) underscores the foundational role of lending activities as the cornerstone of commercial banks' sustainability.

Table 6. Regression results

Variables	Model 1: CA		Model 2:EE		Model 3: EA		Model4: AQ		Model 5: Lq	
	β	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Constant	1.88	0.01	19.47	0.00	-4.93	0.10	1.00	0.00	-1.22	0.77
RAP	0.03	0.01***	0.01	0.96	0.01	0.05**	0.48	0.01***	0.02	0.05**
CM	-0.004	0.22	-0.002	0.01***	0.01	0.02***	0.57	0.01***	0.01	0.02***
SB	1.74	0.01***	-8.69	0.00***	2.15	0.10*	-0.22	0.25	0.89	0.92
AB	0.32	0.00***	0.25	0.44	-0.17	0.06**	-0.01	0.54	0.01	0.1*
R^2	0.42		0.33		0.12		0.82		0.23	
Adj.R^2	0.33		0.23		0.88		0.79		0.04	
F-Value	0.00		0.00		0.61		0.00		0.00	
Obser.	255		255		255		255		255	

Note(s): *** p<0.01, ** p<0.05, * p<0.1, Panel data (fixed and common effect estimates)
Source: Table by authors

4.2.1 Decision on hypotheses

The study examined the relationship between CRM practices and the financial performance of banks by testing fifteen hypotheses as previously outlined. The regression results, as indicated by p-values, supported seven hypotheses while rejecting three, as detailed in Table 7.

Table 7. Hypotheses Results

Hypotheses	Decision
H_{1a}: Credit approval has a significant positive effect on banks' capital adequacy	Accepted
H_{1b}: Credit approval has a significant positive effect on banks' earning ability	Rejected
H_{1c}: Credit approval has a significant positive effect on banks' efficient use of equity	Accepted
H_{1d}: Credit approval has a significant positive effect on banks' asset quality	Accepted
H_{1e}: Credit risk approval significantly affects banks' liquidity	Accepted
H_{2a}: Credit monitoring has a significant positive effect on banks' capital adequacy	Rejected
H_{2b}: Credit monitoring has a significant positive effect on banks' earning ability	Accepted
H_{2c}: Credit monitoring has a significant positive effect on banks' efficient use of equity	Rejected
H_{2d}: Credit monitoring has a significant positive effect on banks' asset quality	Accepted
H_{2e}: Credit monitoring has a significant positive effect on banks' liquidity	Accepted

Source: Table by authors

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4.2.2 Robustness of findings

The examination of factors influencing financial performance has the potential of endogeneity, as highlighted by Aljughaiman (2019). To address this concern, the current study ensured the robustness of variables through the application of the generalized method of moments (GMM) regression, specifically utilizing a one-step GMM system as outlined by Roodman in 2009. The joint exogeneity of instruments was assessed using the Hansen (1982) and Sargan (1958) J-tests for over-identifying restrictions, and the results affirmed the appropriateness of employing GMM, as presented in Table 8.

The Arellano–Bond tests, introduced by Arellano and Bond (1991) and Arellano and Boverb (1995), were employed to examine first-order serial correlation (AR1) and second-order correlation (AR2) for the assessment of autocorrelation. The findings, presented in Table 8, validate that the initial error term is devoid of serial correlation, and the moment conditions are accurately specified.

The GMM results, as presented in Table 8, confirmed a strongly positive correlation between financial performance and the lagged financial performance from the previous year, specifically concerning the earning capacity of banks. In other words, the data suggests that the financial performance in the previous year is likely to contribute to positive performance in the current year by at least 51%, with a significance level of 1%. Additionally, the efficient utilization of equity exhibited a negative relationship with a past-year performance at a 1% significance level, and asset quality showed a negative association at a 10% significance level. Conversely, liquidity demonstrated a positive association between the previous year and the current year's performance at a 10% significance level.

The robustness GMM test confirmed positive associations (significantly) between CRM and FP; these are RAP with CA and Lq at 0.05 and 0.01 levels of significance, respectively. Also, at 0.01 levels of significance, it has been confirmed that there is a negative correlation between CM and EA. These findings suggest that, while certain financial performance metrics may be influenced by previous performance, the specified elements of CRM indeed exert a significant impact on financial performance.

Table 8. Robustness of empirical study findings

Variables	CA		EA		EE		AQ		Lq	
	MLRA	Robustness	MLRA	Robustness	MLRA	Robustness	MLRA	Robustness	MLRA	Robustness
L.CA		0.10 (0.07)								
L.EA				0.52*** (0.14)						
L.EE						-0.30* (0.17)				
L.AQ1								-0.29*** (0.07)		
L.Lq										0.20* (0.12)
RAP	0.03** (0.03)	0.01*** (0.00)	0.05** (0.01)	-0.00 (0.00)	0.01 (0.96)	0.01*** (0.02)	0.01*** (0.01)	-0.03*** (0.00)	0.05** (0.02)	0.01*** (0.02)
CM	-0.004 (0.00)	-0.02*** (0.00)	-0.002* (0.00)	-0.01*** (0.00)	0.01 (0.01)	0.00 (0.01)	0.00 (0.00)	-0.00 (0.00)	0.005 (0.01)	0.02* (0.01)
SB	-0.34** (0.17)	-1.15*** (0.20)	2.15* (1.27)	0.23 (0.17)	-0.08 (0.40)	-1.52*** (0.50)	-0.33 (0.30)	-0.07 (0.18)	3.87*** (0.82)	5.04*** (1.35)
AB	0.08*** (0.01)	0.15*** (0.02)	-0.17* (0.09)	0.00 (0.01)	-0.05 (0.03)	0.17*** (0.06)	0.09** (0.04)	0.08*** (0.02)	-0.01** (0.07)	-0.40*** (0.11)
Constant	1.80	2.48 (0.47)	-4.93 (2.91)	-0.57 (0.39)	0.32 (18.40)	4.04 (1.70)	0.33 (0.69)	-0.76 (0.49)	-8.15 (1.85)	-14.12 (3.01)
AR(1)		0.02		0.03		0.19		0.03		0.05
AR(2)		0.28		0.20		0.18		0.82		0.61
Sargan test		0.02		0.02		0.00		0.01		0.00
Hansen test		0.88		0.30		0.74		0.43		0.16
Obser		42		42		42		42		42
Number of id Prob > chi2 =0.000		8		8		8		8		8

Note(s): Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
Source: Table by authors

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5. Conclusion, implications and recommendations

5.1 Conclusion

Drawing from empirical evidence obtained through statistical analysis, discussions, and hypothesis tests, this study's results provide the diverse effect of CRM practices on the financial performance of commercial banks. It discerns that these influences vary depending on the specific features under assessment. In particular, the research unveils that credit risk approval processes contribute positively to the financial performance of banks across several key dimensions. Notably, they boost capital adequacy levels, facilitate the efficient utilization of equity resources, enhance asset quality metrics, and bolster overall liquidity positions. These findings underscore the pivotal role played by cautious credit risk approval mechanisms in fortifying the financial health and operational resilience of commercial banking institutions.

The study further discerns that the implementation of effective credit monitoring mechanisms yields beneficial outcomes for banks' financial performance across multiple dimensions. Specifically, it is elucidated that proficient credit monitoring practices positively impact earning potential, bolster asset quality parameters, and enhance liquidity positions within banking institutions. These findings underscore the significance of adept credit monitoring strategies in fortifying the overall financial health and operational resilience of banks, emphasizing their pivotal role in mitigating risks and optimizing performance metrics.

However, an overly stringent approach to loan monitoring detrimentally affects banks' capital adequacy and the efficient utilization of equity. These findings highlight the delicate balance required in CRM practices, where excessive stringency in monitoring can lead to unintended consequences on critical financial indicators, while overly lax approval processes can compromise earning capacity. Thus, achieving an optimal equilibrium in CRM is imperative for sustaining banks' operational vitality and long-term viability.

5.2 Study's implications and recommendations

The research findings emphasise the significance of discriminatory lending decisions at levels, the approval and monitoring levels, and their consequential effects on banks' performance. Consequently, it is advocated that senior management, alongside the boards of directors of banks and regulatory bodies, in this case, the BoT, adopt a proactive stance in consistently monitoring and regulating the lending activities conducted by banks' lending officers or teams. This oversight mechanism should be particularly attuned to two primary considerations: firstly, the prevailing economic conditions of the country, and secondly, instances where banks exceed the prescribed threshold rates for non-performing loans. By vigilantly scrutinizing lending practices within this framework, banks can effectively mitigate risks associated with discriminatory lending decisions and promote greater stability and resilience within the banking sector.

5.3 Implications for future researchers

Subsequent research endeavours could investigate deeper into examining such relationships by expanding the scope of independent variables through the inclusion of other variables such as mediating the relationship with digitalization effect and operational efficiency. Alternatively, refinement could be achieved by considering the exclusion of certain indicators that did not exhibit statistical significance within the framework of this specific study, this includes, credit monitoring to capital adequacy. By adopting such methodological enhancements, future investigations can offer a more nuanced understanding of the interrelationships under scrutiny, thereby enriching the scholarly discourse and advancing knowledge within the field.

References

Al Zaidanin, J. S., & Al Zaidanin, O. J. (2021). The impact of credit risk management on the financial performance of United Arab Emirates commercial banks. *International Journal of Research in Business and Social Science (2147- 4478)*, *10*(3), 303–319. https://doi.org/10.20525/ijrbs.v10i3.1102

Alwi, H. H., Parmitasari, N. A., & Pamungkas, I. D. (2021). The role of non-performing asset, capital, adequacy and insolvency risk on bank performance: a case study in Indonesia. *Journal of Asian Finance, Economics and Business*, *8*(3), 319–329. https://doi.org/10.13106/jafeb.2021.vol8.no3.0319

BoT (2018). *Notice to the Public*. Bank of Tanzania.

Bananuka, J (RIP), Kasoga, P.S. & Tumwebaze, Z. (2023). Corporate governance and greenhouse gas disclosures: evidence from the United States. Tauringana, V. and Moses, O. (Ed.) Greenhouse gas emissions reporting and management in global top emitting countries and companies. *Advances in*

 https://doi.org/10.58548/2024abmj21.3144

Environmental Accounting & Management, 11, 51-79. https://doi.org/10.1108/S1479-359820230000011004

Catherine, N. (2020). Credit Risk Management and Financial Performance: A case of bank of Africa (U) Limited. *Open Journal of Business and Management*, *08*(01), 30–38. https://doi.org/10.4236/ojbm.2020.81002

Ekinci, R., & Poyraz, G. (2019). The effect of credit risk on financial performance of deposit banks in Turkey. *Procedia Computer Science*, *158*, 979–987. https://doi.org/10.1016/j.procs.2019.09.139

Fadun, O. S., & Silwimba, P. (2023). Does credit risk management impact the financial performance of commercial banks? *International Journal of Business Ecosystem & Strategy (2687-2293)*, *5*(2), 55–66. https://doi.org/10.36096/ijbes.v5i2.415

Folorunso, I. A., & Rafiu, O. S. (2019). Risk management and financial performance of listed deposit money banks in Nigeria. *The International Journal of Business and Management*, *7*(11), 151–161. https://doi.org/10.24940/theijbm/2019/v7/i11/November

Gabriel, O., & Victor, I. E. (2019). Effect of non-performing loans on the financial performance of commercial banks in Nigeria. *American International Journal of Business and Management Studies*, *1*(2). www.acseusa.org/journal/index.php/aijbms

İncekara, A., & Çetinkaya, H. (2019). Credit risk management: a panel data analysis on the Islamic banks in Turkey. *Procedia Computer Science*, *158*, 947–954. https://doi.org/10.1016/j.procs.2019.09.135

Instefjord, N., & Nakata, H. (2014). *Loan monitoring and bank risk*. http://ssrn.com/abstract=2426149at:https://ssrn.com/abstract=2426149Electroniccopyavailableat: http://ssrn.com/abstract=2426149

Kabir, A., & Dey, S. (2012). Performance analysis through CAMEL rating: a comparative study of selected private commercial banks in Bangladesh. *Journal of Politics & Governance*, *1*(2/3), 14–25.

Kasoga, P.S. (2020). Does investing in intellectual capital improve financial performance? panel evidence from firms listed in Tanzania DSE. *Cogent Economics and Finance,* 8(1), 1-26. https://doi.org/10.1080/23322039.2020.1802815

Kasoga, P.S. & Tegambwage, A.G. (2024). The effect of attitudes towards money on over-indebtedness among microfinance institutions' customers in Tanzania. *Applied Research in Quality of Life*. https://doi.org/10.1007/s11482-024-10294-0

Khanal, P., & Sapkota, P. (2023). *Credit risk management and its impact on performance of commercial banks: With reference to Nepal*. www.commercejournals.com

Kingu, P. S., Macha, S., & Gwahula, R. (2018). Impact of non-performing loans on bank's profitability: empirical evidence from commercial banks in Tanzania. *International Journal of Scientific Research and Management*, *6*(01), 71–78. https://doi.org/10.18535/ijsrm/v6i1.em11

Majondo, S., Mataba, L., & Mmari, G. (2023). Credit risk management strategies reviews and performance of commercial banks in Tanzania. *AJASSS*, *5*(1), 122. https://doi.org/10.4314/ajasss.v5i1.6

Mishkin, F. S., Eakins, S. G., York, N., Francisco, S., & Kong, H. (2018). *Financial markets and institutions*, 9. www.myfinancelab.com

Mori, N., & Towo, G. (2017). Effects of boards on performance of local and foreign-owned banks in Tanzania. *African Journal of Economic and Management Studies*, *8*(2), 160–171. https://doi.org/10.1108/AJEMS-06-2016-0090

Nguyen, H. (2023). Credit risk and financial performance of commercial banks: evidence from Vietnam. *ArXiv.Org*.

Olobo, M., Karyeija, G., Sande, P., & Khoch, S. (2021). Credit risk management practices and performance of commercial banks in South Sudan. *Journal of Financial Risk Management*, *10*(03), 306–316. https://doi.org/10.4236/jfrm.2021.103018

Saleh, A., Hassan, M., Mustafa, A., Thomran, M., & Elsayed, F. (2020). Assessing the non-performing loans and their effect on banks profitability: empirical evidence from the Saudi Arabia Banking Sector. *International Journal of Innovation, Creativity and Change. Www.Ijicc.Net*, *11*(8), 69–90. www.ijicc.net

Sanarya, A. A., Hawkar, A. H., Hamin, K. I., Bayar, G., Pshdar, A. H., Rizhin, N. O., Khowanas, S. Q., & Karzan, Q. H. (2023). The role of credit risk management in performance of commercial banks: analysis of commercial banks' performance in Erbil. *Qalaai Zanist Scientific Journal*, *8*(2). https://doi.org/10.25212/lfu.qzj.8.2.46

Tegambwage, A. G. & Kasoga, P. S. (2022a). Antecedents of customer loyalty in Islamic banking: evidence from Tanzania. *Journal of Islamic Accounting and Business Research*, 13(4), 701-713 https://doi.org/10.1108/JIABR-10-2021-0288

 https://doi.org/10.58548/2024abmj21.3144

Tegambwage, A.G. & Kasoga, P.S. (2022b). Loan repayment among group borrowers in Tanzania: The role of relationship quality. *Future Business Journal*, 8(37), 1-11. https://doi.org/10.1186/s43093-022-00151-7

Tegambwage, A.G. & Kasoga, P.S. (2023). Determinants of customer loyalty in Islamic banking: the role of religiosity. *Journal of Islamic Marketing*, 14(12), 3150-3167. https://doi.org/10.1108/JIMA-12-2021-0396

Temba, G. I., Kasoga, P. S., & Keregero, C. M. (2023). Corporate governance and financial performance: Evidence from commercial banks in Tanzania. *Cogent Economics and Finance*, *11*(2). https://doi.org/10.1080/23322039.2023.2247162

Temba, G.I., Kasoga, P.S. & Keregero, C.M. (2024). Impact of the quality of credit risk management practices on financial performance of commercial banks in Tanzania. SN Business & Economics, 4, 38 https://doi.org/10.1007/s43546-024-00636-3.

Von Tamakloe, B., Boateng, A., Mensah, E. T., & Maposa, D. (2023). Impact of risk management on the performance of commercial banks in Ghana: a panel regression approach. *Journal of Risk and Financial Management*, *16*(7). https://doi.org/10.3390/jrfm16070322

Yao, W., & Li, L. (2014). A new regression model: modal linear regression. *Scandinavian Journal of Statistics*, *41*(3), 656–671. https://doi.org/10.1111/sjos.12054

Yurttadur, M., Celiktas, E., & Celiktas, E. (2019). The place of non-performing loans in the Turkish banking sector. *Procedia Computer Science*, *158*, 766–771. https://doi.org/10.1016/j.procs.2019.09.113

 https://doi.org/10.58548/2024abmj21.3144