

Research Article



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## The impact of credit risk on financial performance: Evidence from rural and community banks in Ghana

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#### Abstract

The study examines the impact of credit risk on financial performance of rural and community banks in Ghana. The study adopts a survey study design. The target population consists of all rural and community banks in Ghana. The study utilized the purposive sampling method to select Ghana's rural and community banks. The research relied on annual reports from rural and community banks in Ghana for the period 2014-2018. The research used ten(10) rural and community banks whose financials are available throughout the time being studied. The secondary data for the analysis is from the rural and community banks' annual reports. Data analysis was performed using STATA version 13 software. The findings show negative relationships between the two credit risk indicators and the measures for financial performance. The study concludes that rural and community banks' financial performance is compromised by credit risk and that credit risk is steadily increasing and has the ability in the future to hinder rural and community banks' financial performance. The study's key recommendation is that management of rural and community banks should; work closely with credit reference offices in the country to scrutinize credit applicants, assess credit applicants efficiently by using credit manuals as a basis for screening poor clients from good ones and applying all credit policies to ensure that human interference is prevented in the criteria for credit applicants.

**Keywords:** Credit risk, financial performance, non-performing loans, rural and community banks, total liabilities to total assets



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### Public Interest Statement

The study's key recommendation is that management of rural and community banks should; work closely with credit reference offices in the country to scrutinize credit applicants, assess credit applicants efficiently by using credit manuals as a basis for screening poor clients from good ones and applying all credit policies to ensure that human interference is prevented in the criteria for credit applicants.

## 1.1 Introduction

Credit risk is one of the most significant threats a bank faces when providing financial services to customers (Caruso et al., 2021). The banking sector's primary source of income is the interest on loans issued by banks (Ramazan & Gulden, 2019). The risks faced by banks can be categorized into six (6), according to Koch and MacDonald (2014). Credit, liquidity, reputational, operational, market, liquidity and legal risks are listed in the categories of these risks that can affect the liabilities, market valuation, profitability and equity of banks. Credit risk refers to the tendency of total or partial loss of loans due to the inability to repay the loan on time (Buchory, 2021). Ghana's finance sector contributes significantly to the country's Gross Domestic Product (GDP) (Tawiah, 2018). The creation of credit is the banks' principal revenue-generating activity. Both the lender and the borrower run enormous risks in this operation (Ayertey, 2018). The Financial Intermediary Mechanism shall calculate the amount of credit risk latent above and below the limits of the credit application in order to decide whether to accept or refuse the proposal. The needed framework for such decisions to be made is an effective credit management system (Poli & Puri, 2013). The office of the Currency Comptroller (2011) defines the management of the loan portfolio as the method of controlling risks inherent in a credit process. It needs an assessment of the steps that management takes during the credit process to identify and track risk.

Ghana's finance market makes a significant contribution to the competitive economy of the world (Tawiah, 2018). The finance sector raises economic growth in Ghana by supplying loans to individuals and businesses (Ayertey, 2018).

Studies have shown that credit risk and bank performance are positively related, while others indicate a reverse. Study results suggest that findings are incoherent regarding how credit risk impact bank performance. The study finds that Ghana's rustic and consistent credit risk management (CRM) procedures are not in operation in Ghana. The high degree of non-performing bank loans reduces a bank's profitability hence affecting its performance. The only notable research which investigates rural banks' credit risk and financial performance are Boahene et al. (2012); Odonkor et al. (2011); Boahena et al., (2012); Akotey & Abor (2013). The studies find that Ghana's credit risk management policies require improvement. The only study in Ghana that examined the effect of Ghana's rural banks' credit risk and profitability is the study of Afriyie et al. (2012). Still, the gap is that the study did not consider other criteria for measuring credit risk aside from non-performing loans and capital adequacy. According to Tang and Jiang (2003), macroeconomic variables including inflation, interest rate and real GDP growth positively affect bank profitability. Reviews show that there is an inverse relationship between credit risk and banks efficiency inverse (Hosna et al., 2009; Odonkor et al., 2011; Poudel, 2012; Boahene et al., 2012; Kolapo et al., 2012; Onalapo, 2012; Dhakal, 2015). Other studies have shown that credit risk management and banking performance are positively associated (Marshal & Onyekachi, 2014; Ogboi & Unuafefe, 2013; Kargi, 2011; Afriyie et al. 2012; Akotey and Abor, 2013; Sakyi et al. 2014; Apanga et al., 2016; Shrestha, 2014;

Gestel & Baesens, 2008; Perera et al., 2014; Khalid & Amjab, 2012; Hussain & Al-Ajmi, 2012).

Along with the fact that Afriyie et al. (2012) is the only study that has investigated yet is of a limited kind, reviews and the findings of the above-mentioned studies use microfinance and commercial banks as case studies. Their results suggest that findings are incoherent on the impact of credit risk on bank performance, which motivated a need for more analysis. The question is whether the findings of this inconsistency influence the credit risk viability of rural and community banks in Ghana? The research aims to study the impact of credit risk on Ghana's rural and community banks' financial performance. The specific objectives are to (1) determine the trend for non-performing loans of rural and community banks in Ghana, (2) examine the effect of credit risk on the financial performance of rural and community banks in Ghana.

## **2.0 Literature Review**

### **2.1.1 Credit risk**

The idea of credit risk is that banks cannot raise the funds they borrow from their customers (Han, 2015). Han (2015) asserts that credit risk consists of three main forms: risk of principal loss, the risk for loss of interest, and the risk of loss of benefit. Al-Khoury (2010) explains some of the key causes of credit risk, including inadequate institutional capability, inadequate credit guidelines, unpredictable interest rates, inefficient management, inadequate legislation, increasing numbers of banks, incompetence in credit valuation, ineffective methods of lending, government intervention, and insufficient central bank supervision. Naomi (2011) claims that the possible difference in net income from non-payment or delay in credit facility payment to customers reflects credit risk. Credit risk is most clearly described, according to the Basel Banking Supervision Committee, as the potential for bank counterparty failing to meet their responsibilities under agreed conditions (Ekinici and Poyraz, 2019).

### **2.1.2 Sources of Credit Risk**

A total of two primary sources are used to determine credit risk criteria. These risk factors could be classified as external or internal. The risk factors are addressed as follows, according to Afolabi, Obamuyi and Egbetunde (2020): In trying to investigate the financial conditions of the risk associated with credit, it is important to indicate that as a result of changes in market series, currency exchange rate, interest rate, credit availability and credit quality, changes in countries revenue and unemployment level would have an effect on credit risk. The willingness of the lending firm to perform its responsibility is a cash crunch or financial issue. Furthermore, the changes in legislation and regulations will lead to financial institutions altering their transaction processing, as well as their debt collection efficiency and capacity (Olson & Zoubi, 2017).

### **2.1.3 Credit Management Policy**

Credit management policy is the principles and structures developed by top administration that neglect the company's credit division and analyze execution against established procedures in increasing credit benefits (Jim-Franklin, 2010). It effectively places the system of rules to reduce credit-related costs while expanding its benefits (Saeed and Zahid, 2016). The arrangements for credit administration include credit, credit and credit policies. The policy is the benchmark for the actions and aspirations of all employees responsible for credit awards and also serves as a reference point for standards-built performance measures. Franklin (2010) instructs the endorsement and use of credit policies to achieve the great goals of the credit administration technique.

#### **2.1.4 Credit Risk Management**

Credit risk management's major goal is to mitigate the risks connected with public ownership (Brigham et al., 2016). Bank credit risk is usually mostly created from loans. Other forms of credit risk, such as those that appear on and off the balance sheet in the banks in the financial books, might emerge throughout bank activities. Commercial banks are now exposed to a significantly higher level of credit risk (Olson and Zoubi, 2017). These financial structures include foreign exchange trading, interbank transactions, shares, international financing, equities, swaps, and so on. Risks are many forms of individual, technological, organizational, environmental, and political factors, according to Brink (2017), Falkner (2017), and Harper et al. (2017). Risk management on the other hand, requires all means available to people, workers and organizations to mitigate or eliminate a possible threat (McIlwraith, 2011).

Management has a responsibility to create a credit monitoring team to make sure the credit is managed and handled properly. Gibson (2014) notes that a company must concentrate on risk management as one of its core functions. Risk management requires defining, assessing, aggregating, planning, handling and risk reporting. Procedures to calculate an overall credit risk exposure of a company and effective internal control mechanisms should be appropriate (Kalunda et al., 2012).

#### **2.1.5 Credit Risk Management Strategies**

Credit Risk management Strategies are approaches used by banks to minimize or reduce credit risk adverse effects. It is important to have a robust credit risk management structure, since it helps to maximize income and longevity. The core philosophies of credit risk management techniques take the following shape according to Falkner (2017). They include the establishment of a specific structure, power delegation, discipline and cooperation at all levels, and accountability for persons (McIlwraith, 2016). Some approaches to credit risk reduction include.

### **2.2 The Credit Risk Theory**

Robert Merton presented the credit risk theory in 1974 in his default theory, the central credit risk theory. Credit risk refers to the possibility of money being lost as a result of a decrease in the creditworthiness of the other party in a financial transaction (Liu, Mirzaei & Vndoros, 2014). Default risks are at the heart of the credit risk equation. Failure to comply with contractual obligations constitutes a risk of default for the party concerned. The lender bears the majority of the risk, which includes the loss of capital and interest. Default risk can be whole or partial, and it can occur in special situations, such as when a bank becomes insolvent and is unable to refund the money to a depositor (as a result of poor financial performance). When a firm's equities is treated as an asset call option, Robert (1974) proposes that this model be used to quantify the credit risk of the company. He was instrumental in the development of two main credit risk methods, the systemic approach and the intensity approach (also known as reduced form approach). Taking advantage of the Merton model, Clifford V. Rossi derived three essential methods of credit risk assessment. The definition of loan expansions and management of credit portfolios and the distribution of losses created through the simulation of Monte Carlo. The creditor may check the future borrower, require the borrower to take the proper insurance, like insurance for mortgages or seek protection or third-party guarantee to reduce the credit rates to reduce the risk of the lender.

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Generally speaking, the greater the credit risk, the higher the interest rate to be paid by the debtors. A negative relationship between credit risk and financial performance is predicted by the theory of credit risk. This indicates that when credit risk is higher, it lowers the profitability of a bank and vice versa, which suggests an inversion of credit risk and financial efficiency (Owojori, Akintoye & Adidu, 2011).

### 2.3 Empirical Literature

The impact of credit risk on the financial performance of Nigerian microfinance institutions is analyzed in Afolabi, Obamuyi and Egbetunde (2020). This research uses microfinance panel data from 2012 to 2018 and a reversal model to assess the influence of credit risk on microfinance institutions' financial performance. The findings reveal that the return on assets and the number of non-performing loans are both adversely and strongly correlated. It also demonstrates that the relationship between total loans and development and return on assets is significant and positive, as the study demonstrates.

By examining the effects of loan risk on the financial performance of deposit-taking banks in Turkey, Ekinci and Poyraz (2019) provide a comprehensive analysis. The study includes the findings of 26 commercial banks from 2005 to 2017. Credit risk and financial performance indicators have been shown to have a negative relationship, as has been previously stated.

The effect of credit risk on the profitability of five UK business banks is assessed by Saeed and Zahid (2016). The research explores two dependent ROA and ROE variables for profitability estimation. For the duration of financial research, the multiple statistical analysis uses bank data from 2007 to 2015. The study found that measures of credit risk have a positive correlation to bank profitability. The findings show further that banking sizes, leverage and growth have been intertwined positively. Since the financial crisis, the banks are profitable and have learned how to handle credit risk over the years.

The influence of loan risk on the financial performance of Kenya's commercial banks has been examined by Muriithi, Waweru and Muturi (2016). The data period for the analysis is 2005 to 2014 and covers 43 registered commercial banks within Kenya by 2014. The study found that the risk of credit is substantially adverse to the profitability of the bank.

The impact of credit risk on Bangladesh's profitability banking sector has been examined by Noman et al. (2015). The research hires uneven panel data from 2003 to 2013 and 18 private sector banks with 172 observations. The study shows a significant negative relationship between measures of credit risk and financial results.

The effect of credit risk indicators on rural and community banks' profitability in the Brong Ahafo region of Ghana was reviewed by Afriyie et al. (2012). There is a clear positive correlation between non-performing loans and the profitability of rural banks, suggesting that there are higher lending losses but that banks are still profiting. The result also reveals that rural banks do not have sound and efficient procedures for credit risk management. The gap in this research is that its study does not consider other risk factors that influence the bank's profitability.

Kithinji (2010) analyzed the effects of loan and advance measurements on total assets and the ratio of non-performing loans to total loans and advances in Kenya's overall assets from 2004 to 2008. The study shows that commercial banks' earnings do not have an effect on the volume of credit and unsuccessful loans.

In comparison to Kithinji, Aremu et al. (2010) indicate that the biggest danger to the viability of banks in Nigeria is non-performing loans here. The results suggest that the provisions on loan losses increased from 64,5 billion in 1999 to 223,4 billion in 2004.

The effect of credit risk on the profitability of banks in Ethiopia was examined by Gizaw et al. (2013). The study collected data from annual reports of eight (8) commercial banks over 12 years period. The result of the survey is that credit risk factors, inability to execute loans, credit losses, and capital sufficiency greatly impact commercial banks' profitability in Ethiopia.

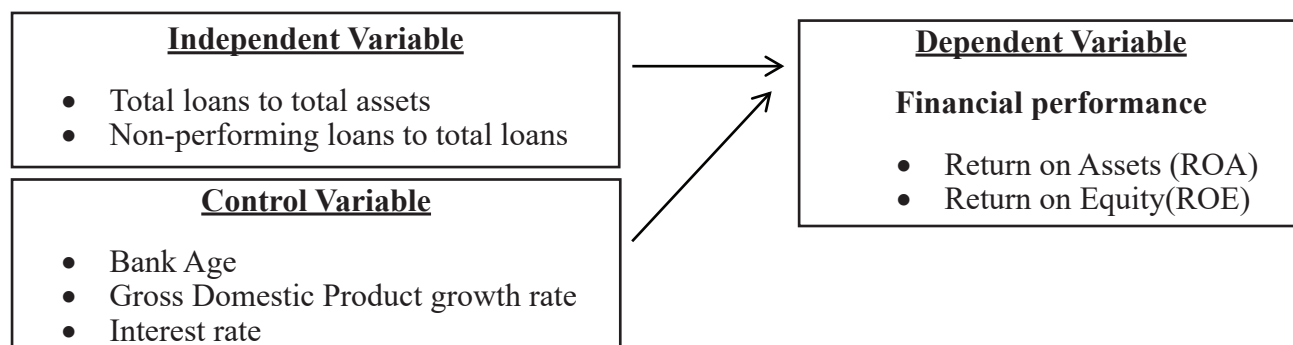
The impact of credit risk on banking performance by banks in Costa Rican during 1998-2007 is examined in Epure and Lafuente (2012). The results show that performance is associated positively with performance with non-performing loans and capital adequacy.

In order to create the relation between credit risk and profitable behaviour of some banks, Boahene et al. (2012) utilized fixed and random effect regression analyses models. Findings show that the credit risk constituents have a positive connection to the profitability of the bank.

Similar to Kithinji's study in 2010 and contrary to other reports, credit risk measures are expected to affect profitability adversely. Kolapo et al. (2012) use the empirical data of the panel to evaluate the impact of credit risk on bank performance with the aid of ROA as the performance measure. This results in a decline in profitability (ROA) in the amount of unsatisfactory loans or debt losses, while a rise in the overall loan and development increases profitability.

## 2.4 Conceptual Framework

The study's independent variable is the ratio of total loans to total assets and non-performing loans to total loans. The study explores unique industry actors, including bank size and bank age. The study also considered interest rate and Gross Domestic Product, and macro-economic variables. The definition structure shows how these variables impact the dependent variable.



Source: Adapted from Afolabi, Obamuyi and Egbetunde (2020).

### **3.0 Methodology**

#### **3.1 Research Design**

The study adopts a quantitative research approach. The quantitative approach enables the researcher to measure the relationship between credit risk and financial performance. The study adopts the panel data longitudinal time for the study. The study uses the audited annual reports of a recent period of 2014 to 2018 in order to present results that are more representative. The research survey design is adopted in selecting rural and community banks in Ghana.

#### **3.2 Population of the Study**

The target population for the study is rural and community banks in Ghana. The review is based on publicly available 2014-2018 financial reports. The study targeted rural and community banks in Ghana are 137.

#### **3.3 Sampling size and Sampling procedure**

Ten rural banks and community banks are being sampled in Ghana because they were the only rural and community banks with their financial statements readily available throughout 2014 - 2018. The population specification and sampling were carried out on the assumption above. The purposive sampling technology allows the rural and community banks of Ghana to pick a size.

#### **3.4 Variable Measurement**

##### *Dependent Variable*

##### **Financial Performance**

The profitability measures will be adopted to assess financial performance for the study since they are the commonly used measures. The study considers return on assets and returns on equity as profitability measures in assessing financial performance. Return on assets is measured as net profit /total assets. Return on equity measures using net profits/equity.

##### *Independent Variables*

The independent variables for the study is total loans to total assets and non-performing loans to total loans.

##### **Non-Performing Loan Ratio**

The non-performing loan ratio will be measured by Nonperforming loan to Gross/Total loans ratio

##### **Total Loans to total Assets**

Total loans are calculated by a total asset ratio, divided into total assets by total loans

##### *Control Variables*

##### **Bank Size**

The bank size was measured by applying the natural logarithm on the total assets.

##### **Bank Age**

Bank age is the period since its inception

### Interest Rate

The annual percentage rate (APR) paid on credit given by the banks is to be calculated by interest rate.

### Gross Domestic Product

The value of a country's entire economic operation is determined by Gross Domestic Product.

### The Dependent Variable

The financial performance is assessed using return on assets and returns on equity.

### Return on Equity

Return On Equity (ROE) is computed as net income divided by equity.

### Return on Assets

Return On Assets (ROA) is computed as net income divided by total assets.

## 3.5 Model Formation

Two regression models are built in this study. Model 1 has a dependency variable as Asset Return (ROA) and Model 2 has its reliable variable as equity return (ROE). The independent variables are the NPL and Total credits for total asset ratios The independent variables (TLTA). The variable controls include bank size (BS) and bank age (BA), the GDP and interest rate (IR). The independent variable indicates an overall multiplicative Cobb functional relationship, Douglas as seen in Models 1 and 2.

$$ROA=f(TLTA, NPL,BS,BA, GDP, IR ) \tag{1}$$

$$ROE=f(TLTA, NPL,BS,BA, GDP, IR) \tag{2}$$

The regression model illustrates the relationship between dependent and independent variables

$$ROA_{it} = \alpha_0 + \alpha_1 TLTA_{i,t} + \alpha_2 NPL_{i,t} + \alpha_3 BS_{i,t} + \alpha_4 BA_{i,t} + \alpha_5 GDP_{i,t} + \alpha_6 IR_{i,t} + \varepsilon_{i,t} \tag{3}$$

$$ROE_{it} = \beta_0 + \beta_1 TLTA_{i,t} + \beta_2 NPL_{i,t} + \beta_3 BS_{i,t} + \beta_4 BA_{i,t} + \beta_5 GDP_{i,t} + \beta_6 IR_{i,t} + \varepsilon_{i,t} \tag{4}$$

Where  $ROA_{i,t}$  and  $ROE_{i,t}$  represent performance of rural and community Bank (i) at time t,  $\alpha_0$  and  $\beta_0$  stands for the model constant or intercept,  $\alpha_i$  and  $\beta_i$  stands for the coefficients of the independent variables and  $\varepsilon_{i,t}$  is the idiosyncratic error term which is assumed to have a normal distribution.

## 3.6 Data Collection and Analysis

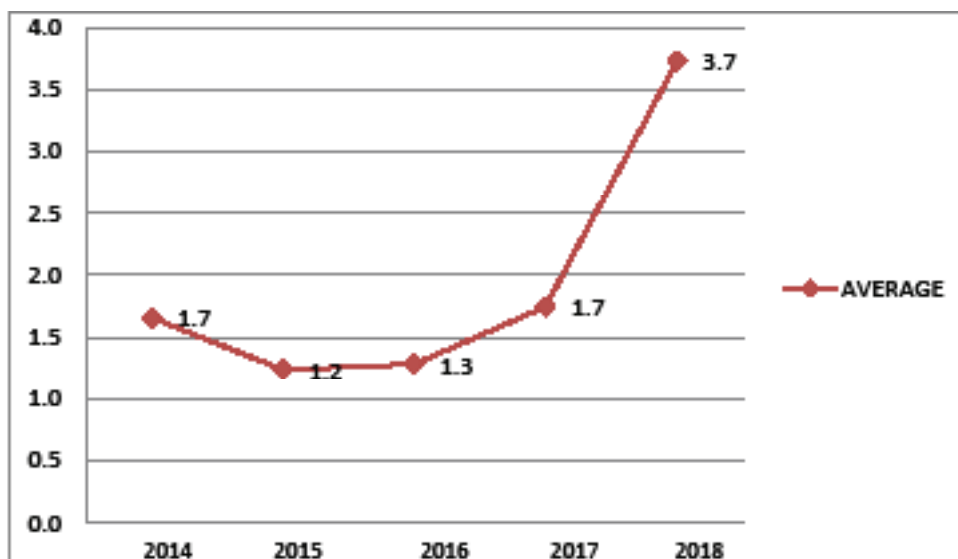
The study aims to use secondary data. The data for that study was collected from the audited financial statements of rural and community banks in Ghana. Related data will be entered in Microsoft's Annual Financial Statements for estimation ratios and eventually exported to the STATA for interpretation. In the analysis, the report employs descriptive data. Correlation and regression analysis is also conducted to investigate the effect of credit risk on the financial performance of rural and community banks in Ghana. Until regression analysis, a correlation procedure for Pearson's product-moment will be conducted.

## 4.0 Results and Discussion

The trend analysis component of the study is provided in this section to estimate the trend in rural and community banks' non-performing lending in Ghana, descriptive statistics, matrix and panel regression for asset returns, equity returns, non-performing lending and the total lending of total assets, bank size, banking era, interest rates and gross domestic product.



#### 4.1 Average Non-Performing Loans for Rural and Community Banks



**Figure 4.1 Average Non-Performing Loans for Rural and Community Banks**

Source: Fieldwork, (2021)

The trend analysis component of the study is provided in this section to estimate the trend in rural and community banks' non-performing lending in Ghana, descriptive statistics, correlation matrix and panel regression for asset returns, equity returns, non-performing lending and figure 4.1 shows a trend study of the average non-performing loans of rural and community banks in Ghana. The average non-performing loan for the ten (10) banks was 1.7 in 2014. It declined to 1.2 in 2015 and further increased to 1.3 in 2016. The average number of non-performing loans increased to 1.7 in 2017, representing an increase from the previous year. This increased significantly from 1.7 in 2017 to 3.7 in 2018. It appears that there has been a consistent growth in the non-performing loans of rural and community banks between 2015 and 2018. This is supported by the results of the average non-performing loans. As a result of the significant increase in the average non-performing loans from 2017 to 2018, the rural and community banks in Ghana are exposed to greater credit risk. As a result, effective credit risk management should be developed and implemented to control the level of non-performance of rural and community banks in Ghana. The continuous increase in the rate of non-performing loans in Ghana confirms the World Bank data (2020) that the Ghanaian banking sector from 2008 to 2018 shows a persistent increase in NPL from 7.68% to 21.89%, respectively for total loan to total assets, bank size, bank age, interest rates and gross domestic product.

#### 4.2 Descriptive Statistics

Tables 4.1 and 4.2 provide a quick summary of the descriptive statistics for ROA and ROE models, respectively. Mean, standard error, minimum and maximum are all included in the descriptive analysis. The descriptive statistics for the ROA model are presented in Table 4.1 below. All of the study variables for ROA have a positive mean, which is encouraging. The return on assets (ROA) for RCBs in Ghana is 0.035038 on average. This indicates that a one-cedi investment in the assets of rural and community banks in Ghana will provide a return on the investment of 3.5 percent on the investment. Some rural and community banks earn up to 8 pesewas every transaction, while others suffer a loss on investment to the tune of the

money spent on the acquisition of assets. The findings are in line with the findings of Antwi (2015) and Appiah (2015), who found that rural and community banks in Ghana have a low return on assets (ROA). In line with the findings of Antwi (2015) and Appiah (2015), who found that rural and community banks in Ghana have a low return on assets (ROA).

The ratio of net liabilities to total assets is on average of 0.826694. This means that total assets of the rural and community banks (RCBs) account for 82.6694 percent of their total liabilities. This also implies that the RCBs are heavily financed by debt. Excess debt servicing would have a negative impact on the survival of rural and community banks, which are compelled to satisfy their financial obligations when they are due to do so.

It is estimated that rural and community banks in Ghana have a mean of 20.4604 non-performing loans. This means that, on average, 20.4604 percent of the loans made to consumers are not providing the returns expected by the lender. Substantial credit risk is demonstrated, and rural and community banks in Ghana must take steps to mitigate this risk. This finding corroborates the study of Alhasan (2019) and Antwi (2015), the non-performing loans of rural and community banks are increasing at an alarming rate hence requires stringent actions to protect the credit portfolios of the rural and community banks.

Table 4.1 Descriptive Statistics				
	Mean	Std. Err.	Minimum	Maximum
ROA	0.035038	0.003078	-.0051	.0818
ROE	0.201741	0.017514	-0.022	0.429
Bank size	7.750965	0.052954	7.646	7.857
Bank age	34.7	1.225661	10.00	41.00
GDP	166.0232	2.781197	146.59	246.60
Interest rate	21.9	0.487392	17.00	26.00
Total liabilities to assets	0.826694	0.008485	0.483	1.000
Non-performing loans	20.4604	2.444219	2.500	6.500

Source: Fieldwork, (2021)

#### 4.2 Correlation Matrix for ROA and ROE

The results of the study's relationship between the dependent and independent variables are presented in this section of the study. The existence or absence of multicollinearity between the independent variables is indicated by the correlation matrix. When all correlation matrix scores are between -0.8 and -1 or 0.8 and 1, respectively, the existence of multicollinearity is present (Greene, 2008). There is no multicollinearity among the independent variables, as evidenced by the fact that all correlation matrix results are less than 0.8. Total liabilities to total assets ratio and return on assets (ROA) are both found to have a weak negative association. The study shows the total liabilities to total assets ratio and returns on equity (ROE). The

relationship between ROA and ROE was demonstrated by correlation coefficients of -0.1137 and -0.2710, respectively, for the two variables. Several researches have confirmed that there is a weak negative association between the total liabilities to total assets ratio and the return on assets and return on equity, respectively (Ekinici and Poyraz, 2019; Kargi,2011; Kolapo et al., 2012; Kithinji, 2010; Ogboi and Unuafe,2013).

Non-performing loans have a weak negative association with ROA reflected by a correlation coefficient of -0.1866 and a weak negative correlation with ROE as shown by -0.2974. Non-performing loans have a negative relationship with both return on assets (ROA) and return on equity (ROE), according to research conducted by Obamuyi and Egbetunde (2020); Afolabi and Zahid (2020); Saeed and Zahid (2016); Muriithi et al. (2016). Non-performing loans negatively affect return on assets (ROA) and return on equity (ROE).

**Table 4.2 Correlation matrix for ROA and ROE**

							Total liabilities Non- to total assets performing
	ROA	ROE	bank size	bank age	GDP	interest rate	Loans
ROA	1.0000						
ROE	0.8212	1.0000					
Bank size	0.0775	0.0941	1.0000				
Bank age	0.013	0.1671	0.4854	1.0000			
GDP	-0.3625	-0.2677	0.2833	0.0516	1.0000		
Interest rate	0.5303	0.4488	-0.0975	0.0000	-0.6373	1.0000	
Total liabilities to total assets	-0.1137	-0.2710	0.5048	0.3805	0.2478	-0.1836	1.0000
Non-performing loans	-0.1866	-0.2974	0.0026	-0.0890	-0.0833	0.1111	-0.4607 1.0000

Source: Fieldwork, (2021)

### 4.3 Panel Regression Results

This section presents the findings of multiple regression for the return on assets (ROA) and return on equity (ROE) models, which were conducted using the panel Least of Squares method to investigate the impact of credit risk on the financial performance of rural and community banks in Ghana. Tables 4.3 and 4.4 show the findings of the panel regression analysis, respectively.

## 4.3.1 Fixed - Effect Regression for ROA Model

Table 4.3 Fixed - Effect Regression for ROA Model

ROA	Coef.	Std. Err.	t	P>t
Bank size	0.00469	0.003428	-1.37	0.178
Bank age	0.00014	0.000129	-1.05	0.301
GDP	-3.00E-07	6.62E-05	0.00	0.996
Interest rate	4.0s1E-05	0.000404	0.1	0.921
Total liabilities to				
Total assets	-0.04639	0.022767	-2.04	0.048
Non-performing loans	-0.000526	6.76E-05	7.78	0.000
_cons	0.067617	0.02592	2.61	0.013
<b>Chi sq. Statistics</b>				
<b>chi sq. d.f.</b>				<b>Prob</b>
<b>Hausman Test</b>	76.08	0.0000	7	0.0000
R-squared =0.9191    F( 7, 42) =68.2    Prob > F =0.0000				

Source: Fieldwork, (2021)

The results shown in Table 4.3 summarise the results of the fixed effect regression for ROA. The Hausman test is significant at the 0.0000 level of significance, which is less than the 5% level of significance. As a result, the fixed model is considered appropriate for the ROA model in this study.

The R-squared value is 0.9191, indicating that independent variables (non-performing loans and the ratio of total liabilities to total assets) and control variables (interest rates) account for 91.91 percent of the variation in the ROA (bank size, bank age, interest rate and GDP).

The size of the bank has a positive and statistically insignificant effect at the 5% level of significance, as demonstrated by the coefficient of 0.00469. This suggests that the size of a bank has no substantial impact on its profitability and vice versa. As demonstrated by the coefficient of 0.00014, bank age is both positively and statistically insignificant at the 5 percent level of significance. Because of this, the age of the bank has a positive and significant impact on the return on assets of rural and community banks throughout Ghana. Return on assets will increase by 0.00014 for every unit that the bank's age grows by one unit. As a result, the older the banks are, the more experienced and efficient they will be due to the economies of

scale they will enjoy. According to Onaolapo (2012), the longer a bank has been in operation, the greater its prospects of boosting returns on assets increase.

A unit rise in GDP will result in a -3.00 percent loss in return on assets. As evidenced by the p-value of 0.996, the GDP has a negligible impact on the return on assets of rural and community banks when considered at the 5 percent level of significance.

Regarding interest rates, the p-value for interest rates is 0.921, which indicates that there is a positive and statistically insignificant association between interest rates and return on assets of rural and community banks when the level of significance is set at 5. Return on assets will grow by 4.01 percentage points for every unit increase in the interest rate.

A negative and statistically significant association exists between total liabilities to total assets ratio and return on assets (ROA) at the 5% level of significance, as indicated by a regression coefficient of -0.04639. This indicates that a unit rise in the ratio of total liabilities to total assets will result in a 0.04639 percent loss in return on assets. This finding is consistent with the findings of Alhasan (2019) and Ogboi and Unuafé (2013). They found that the total liabilities to total assets ratio significantly negatively affected return on assets. Alhasan and Unuafé (2013) found that the total liabilities to total assets ratio significantly negatively affect the return on assets.

In accordance with the findings, non-performing loans have a negative and statistically significant impact on returns on assets at the 5% level of statistical significance. In the end, the data suggest that a unit rise in non-performing loans will result in a -0.000526 decline in return on assets. The findings of this study support the findings of Afolabi et al. (2020) and Obamuyi and Egbetunde (2020), which found a negative and statistically significant association between non-performing loans and returns on assets of rural banks in the country.

#### 4.3.2 Fixed - Effect Regression for ROE Model

The summary of the fixed-effect regression model for return on equity (ROE) is presented in Table 4.4 below. Consequently, the fixed-effect model for the null hypothesis has been rejected because the Hausman test indicates that it is significant at 0.0000, which is less than the 5 percent threshold of significance. As a result, the fixed model is considered to be appropriate for the ROE model in this study. The R-squared value is 0.9277, indicating that independent variables (non-performing loans and the ratio of total liabilities to total assets) and control variables (interest rates, bank size, bank age, interest rate and GDP) explain 92.77 percent of the variation in the return on equity.

The regression coefficients for each variable examined in the ROE model are presented in the above table, which is 4.4. The regression coefficient for bank size is 0.024061, which suggests that a unit increase in bank size will result in a 0.024061 increase in return on equity. The p-value for the size of the bank is 0.200. This value is bigger than the significance level of significance of 0.05, indicating that the bank size has an insignificant effect on return on equity.

The correlation between bank age and return on equity is 0.000776. This means that there will be a 0.000776 increase in return on equity for every unit increase in bank age. Because the p-value for bank size is 0.271, the age of the bank is insignificant in terms of determining return on equity, with a significance level of 0.05. A unit rise in GDP will result in a -2.3 percent loss in return on equity. The probability of GDP occurring is 0.948. Because of this, the impact on GDP is insignificant at the significance level of 0.05.

The correlation coefficient between interest rate is 0.001879. This suggests that a one-unit rise in the interest rate will result in a 0.001879 increase in the return on equity. Using a

significance level of 0.05, the interest rate has a p-value of 0.388, which indicates that it has no statistical significance in impacting return on equity.

-0.290871 is the regression coefficient for the relationship between total liabilities and total assets. This indicates that a unit increase in the ratio of total liabilities to total assets will result in a 0.290871 decline in return on assets. The ratio of total liabilities to total assets is 0.020, which is the p-value. The p-value for the total liabilities to total assets ratio is less than 0.05, indicating that the total liabilities to total assets ratio significantly impact the return on assets of rural and community banking institutions.

The results demonstrate that a unit increase in non-performing loans will result in a 0.00287 reduction in return on equity. In the case of non-performing loans, the p-value is equal to 0.000. This indicates that non-performing loans have a statistically significant impact on the return on assets of rural and community banks, which is a very high degree of statistical significance.

**Table 4. 4 Fixed – Effect Regression for ROE Model**

ROE	Coef.	Std. Err.	t	P>t
Bank size	0.024061	0.018486	1.3	0.200
Bank age	0.000776	0.000695	1.12	0.271
GDP	-2.3E-05	0.000356	-0.07	0.948
Interest rate	0.001879	0.002153	0.87	0.388
Total liabilities to assets	-0.290871	-0.120345	2.42	0.020
Non-performing loans	-0.00287	-0.000358	-8.01	0.000
_cons	-0.40806	0.136557	-2.99	0.005
<b>chi sq. statistics    chi sq. d.f.    Prob</b>				
<b>Hausman Test</b>	79.11	7	0.0000	
R-squared =0.9277    F( 7, 42) =76.94    Prob > F =0.000				

Source: Fieldwork, (2020)

### 5.1 Summary of Findings

Total liabilities to total assets ratio and return on assets (ROA) are both found to have a weak negative association. The study shows the total liabilities to total assets ratio and return on equity (ROE). There is a weak negative association between non-performing loans and return on assets (ROA). In Ghana, the size of a bank does not substantially impact the profitability of rural and community banks. Ghana’s rural and community banks have a positive but negligible impact on their return on assets as a result of the age of the bank. According to the findings, there is a negative and statistically significant association between total liabilities and total assets ratio and return on assets. The findings reveal that non-performing loans have a negative and statistically significant impact on the returns on assets of the company.

## 5.2 Conclusion and Recommendation

In general, the findings indicate that there are negative relationships between the two measures of credit risk and the indicators of financial performance in the banking sector. It is concluded that credit risk has a negative impact on the financial performance of rural and community banks in Ghana. Credit risk is increasing steadily and can potentially negatively impact the financial performance of rural and community banks in Ghana in the future, according to the study's findings. As a result of the rising levels of non-performing loans among rural and community banks in Ghana, the study recommends that management of rural and community banks effectively evaluate loan applicants by using credit manuals as a basis for separating bad customers from good customers, collaborate closely with credit reference bureaus in the country to scrutinize loan applicants and apply all loan policies and procedures. Rural and community banks should consider alternative sources of financing, given the high level of the total loan compared to total assets and the negative impact on profitability. By doing so, they will be able to reduce the liability component of their capital structure and, as a result, the amount of burden they will be required to pay as interest on their loans regularly.

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