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Impact of Credit Risk Management on Financial Performance: A Study of Selected Commercial Banks in Ghana

Henry Darmoe
Administrative Executive, Department of Administration, Strasol Global Ltd, Ghana

Abstract:
The introduction of Basel II has increased the importance of credit risk management. Financial crisis is also a reason for this. Credit grant is a major source of earning for banks and financial institution. How credit risk management has made effect on financial performance or profitability for some selected commercial banks in Ghana is the main objective. The time period is of seven years (2011-2017). Two model specifications have been adopted to assess this relationship. The dependent variables are: two major measures of profitability (ROE and ROA). The credit risk measures adopted in the study included capital adequacy ratio, non-performing loans to total loans, loan loss provisions ratio and loans to deposit ratio.

Keywords: *Credit Risk, financial performance, banks, return on asset, return on equity, capital adequacy ratio, significant*

1. Introduction and Overview

1.1. Background of Study

There is high competition in the banking industry as a result of demand for diverse financial products and services. The banking industry today is globally characterized by stiff and intense competition, which threatens the very survival of the banking institutions. The industry now is very competitive and therefore players in it need to apply the right methods to differentiate from each other to gain a competitive advantage by designing more modern and most needed financial products or services. As the stronger banks try to consolidate their hold on the industry the smaller ones develop strategies to compete. This leads to the creation of different banking products, varying from different types of accounts with varying attached benefits to different offers for loans, thus increasing the pressure on the banks to extend credit and maximize profit.

These activities come with risks, which must be considered appropriately in the credit granting. The basic objective of these banking functions is to meet financial expectations of customers and make enough profits, thus surviving in the banking industry. It is therefore important for banks to ascertain the right knowledge and implement effective and efficient marketing strategies (Armstrong &Kotler, 2004).

The banks' efforts in addressing financial needs and wants of customers have not gone without risk factors. In effect, the consideration of risk is inherent in any useful activity of banks, particularly in terms of providing credit facilities. Credit risk is among the most significant risks that banks deal with, considering the fact that granting credit to customers is a major source of income for commercial banks. Therefore, managing these risks associated with the credit granted has a bearing or impact on the financial performance or profitability of commercial banks (Li and Zou, 2014).

Casuet. al (2006) discovers many reasons behind failure of banks. The inability of a bank to efficiently and effectively control its credit risk has a significant adverse effect on the financial performance or profitability of the bank. In the last decade, some banks in Ghana have had their hard-earned reputation impaired whiles others who could not retrench the situation have collapsed. According to Tetteh, 2012, inefficient credit risk supervision procedures and poor credit quality remain principal reason of bank's failure and globe financial crises.

Recently, several researchers have focused on establishing the effect of credit risk on financial performance of banks and contradictory results have been found.

Positive association found between capital adequacy ratio and return on Equity (ROE) for US banks (Berger, 1995). A positive effect between performance and credit risk Management has been observed by Saeed MS and Zahid N. Whereas Opoku Asare (2015) got mixed result for their study on commercial banks. Mixed results were presented by study conducted for selected commercial banks in Ghana by Opoku Asare (2015). According to his research, non-performing loans is negatively related to profitability while loan loss provision ratio and loan and advances ratio are positively significant to bank's profitability.

On the other hand, Noman, Pervin and Chowdhury (2015) study about commercial banks in Bangladesh provided completely different results. Their results showed a negative and important relation between capital adequacy ratio (CAR) and return on equity (ROE).

Considering the importance of credits in the banking industry and its dire impact, it is highly necessary to ensure effective supervision of credit risk during the credit granting stage to the recovery stage.

1.1. Statement of Problem

The banking sector has become more complex in the last two decades due to the development of financial security market. As a result, banks are getting into transaction without fully realizing the risk level. The main and most significant one is the credit risk – since credit granting is identified to be the major source of earnings for banks.

Basel II considers different credit risk measurement techniques with the aim to improve the credit management quality without constraining banks competitiveness. Therefore, it is in need to be examined.

1.2. Objectives of the Study

How credit risk management is affecting performance or profitability of some commercial banks in Ghana is the main purpose of this study.

1.3. Research Questions

To fulfill research objective following are the research questions:

- What factors are affecting credit risk management?
- What factors are affecting the indicators of bank's financial performance or profitability?
- What is the association between indicators of credit risk management and the indicators of banks' financial performance?
- What measurements can be taken to improve the bank's financial performance using credit risk management?

1.4. Significance of Study

- The study tries to bridge the gap of evaluating performance of some commercial banks of Ghana.
- The study will also serve as a reference material for researchers along similar topics.

The risks associated with credit provision will be evaluated alongside with the credit risk management practices needed to mitigate them. The impact of these on the banks' performance will also be determined. It is the hope that results of the project will serve as a useful tool for policy makers in the banking industry. The researcher is optimistic that the findings and recommendations of the study would go a long way to bring about the elevation of credit risk management practices to the entire fabric and ethos of the Ghanaian banking industry.

1.5. Organization of Study

This research study is organized into five chapters

Chapter one gives an overview of the study. It includes the background of study, problem statement, research objectives and questions, the significance of the study and the organization of the work.

Chapter two entails a review of relevant literature from different writers related to credit risk management. Chapter three present the methodology used which entails the population, sampling techniques and sample size, data collection and processing for data analysis.

The chapter four captures the findings, analysis and discussions of results whiles the final chapter captures the conclusion, summary and recommendation.

2. Review of Literature

2.1. Literature Review

Banks primarily generate their business by offering credit - which goes beyond loans - to customers in a business or to private individuals based on some factors. It is this lending that is their bread, because the only real major source of their earning comes from credit.

So, when a customer to whom a bank or a lending institution lends credit reneges on the payment; the lender is at a major risk, because their growth plans are based on the investments, they make out of the interest earned on this credit. This makes a credit risk management process central to a bank or a financial institution.

2.2. Theoretical Framework

2.2.1. Modern Portfolio Theory

Modern portfolio Theory (MPT) is part of the most crucial economics theories that deal with finance and investments (Markowitz, 1990). The Theory was developed by Harry Markowitz in 1952 and was published in the journal of finance with the name of "Portfolio Selection". The theory considers the maximization of returns investors could get from their investment with respect to the risk associated to such investment. MPT provides that an investor must consider the level of risk one investment has on the overall investment portfolio.

MPT gives a portfolio framework concerning the maximization of investment returns for a given level of risk to investors through diversification. MPT highlighted that return of a particular investment should not be the only concern for an investor but they should consider the weighted average of the expected returns of a portfolio's component securities. Selection of right mix of these assets is the main objective of MPT (Freeman, 2006).

As per Markowitz, an investor should follow the principle of diversification by selecting a portfolio of investments rather than focusing on only one. It has following basic assumptions:

- Same Investment Information Should Be Available To Each Investor
- Investors Should Exhibit Rational Mentality
- There Should Be A Normal Distribution Like Patterns For Expected Returns Of Investments.
- Investors Are Generally Exhibiting Risk Averse Mentality

Effective and efficient asset combinations are the primary focus. Grinold (1999), described the word efficient as the optimum and higher expected rate of return on a particular investment with a level of risks. A higher expected rate of return based portfolio need to be considered along with checking the risk level (Greg, 2009). Portfolio always provides lower risks and more returns because of combinations compared to single security (Butterworths, 1990). Many types of risks can be there like leaving of an important post etc. (Michaud, 1998). Markowitz (1991), mentioned that portfolio comes with unsystematic (unique) risk, but not for systematic (market) risk. As the price fluctuation of a security is special, it does not relate to price fluctuations of other securities, which helps investors to diversify, or remove, a portion of each security's risk (Michaud, 1998). There are many useful ways to evaluate securities with models like capital asset pricing etc. (Thygerson, 1995).

In the banking sector, credit constitute a major part of asset and therefore the theory can be used to explain the need for banks to select portfolios that cuts across various business sectors and industries (Greg 2009). However, there are a lot of gaps in the theory and some critics have argue that it doesn't deal with real world situations. Markowitz initial intent was to address the importance of investors spreading risk when making an investment decision and not credit portfolio management in the banking sector such as how commercial banks can form a portfolio of credit that maximizes returns and reduces risk, how to identify risk-free portfolios and the various risk banks faces when managing credit portfolios. Hence, the theory cannot completely be applied when managing credit risk in commercial banks.

2.2.1. Trade-off Theory

The trade-off theory refers to the idea of a company deciding on how much debt and equity financing to use by balancing the costs and benefits. The main aim of this theory is to discuss the fact that companies are usually financed by either debt or equity or both.

Standard Capital Market Theory states that there is a trade-off between risk and return (Markowitz, 1952 and Sharpe, 1964). The higher the risk an investor is willing to bear the higher the return to be expected. However, this trade-off only holds true for the unsystematic risk, not for the risk that can theoretically be avoided by diversification. Financial theory, therefore predicts that well diversified banks earn more expected rate of returns than banks with little diversification. However, financial theory based on the notion of perfect capital markets is not really applicable to banks. This argument leads to the theory of financial inter mediation, taking into account the role of asymmetric information which incorporates the relevance of monitoring. In the Diamond (1984) model- monitoring costs and monitoring quality are considered to be constant across all banks. Thus, the argument by Diamond that diversification reduces the banks monitoring costs and that therefore banks should be as diversified as possible.

To find the tradeoff between risk and profit analysis of the risk- return trade- off has been adopted (Thygerson, 1995). The theory of the trade-off between risk and return takes into consideration of many factors like the level of credit portfolio, determination of the optimal level of credit. It has a gap between the theory and credit risk management and financial performance in commercial banks.

2.3. Concept of Risk

Risk is the uncertainty or possibility of loss that prevail in any business transaction. According to Business Dictionary (2010), risk is the probability or threat of damage, injury, liability, loss or any other negative occurrence caused by internal or external vulnerabilities, and which may be neutralized through pre-mediated action. In finance, risk means the probability that an actual return on an investment will be less than the expected return.

Risk can be used to describe the uncertainty of an event and its outcomes, which either improving or inhibiting; operational performance, achievement of goals and objectives or meeting set targets or expectations of stakeholders (Charities and Risk Management, Charity commission for England and Wales).

Alternatively, risk is the likelihood that a project or an investment will not yield expected result and the investor will lose the funds invested in such project. Every business decisions and opportunities are based on this concept that future returns and performance are uncertain and are dependent on many uncontrollable factors.

2.3.1. Bank and Risk

The nature of a bank's activity means it is exposed to a wide variety of risks, especially since banks use a large amount of leverage. Managing these risks is however an inherent part of its business. Without proper monitoring and management of risks by a bank, it could easily become bankrupt or insolvent. These risks may arise from the occurrence of some expected or unexpected events in the economy or the financial markets. Risk can also arise from staff error or illegal intention, which causes erosion in the value of assets and, consequently, diminishes the bank's innate value.

The money lent to a customer may not be repaid due to the failure of a business. Also, money may not be repaid because the market value of bonds or equities may decline due to an adverse change in interest rates. Another cause for no refund is that a derivative contract to buy foreign currency may be defaulted by a counter party on the due date. These types of risks are intrinsic in the banking business (Saul Perez, 2014).

There are a lot of risks that banks face and according to Management Study Guide, the major risks banks face is:

2.3.1.1. Credit risk

The Basel Committee on Banking Supervision defines credit risk as the potential that a bank borrower, or counterparty, will fail to meet its payment obligations regarding the terms agreed with the bank. It involves both uncertainty in repayment of the bank's dues, and repayment of dues on time. It may occur as a result of the following reasons: Inadequate income of borrowers Insufficient underwriting frameworks Business failure of the borrowers; the unwillingness of the borrowers to repay.

2.3.1.2. Market Risk

According to The Basel Committee on Banking Supervision, market risk can be defined as the risk of losses in on- or off-balance sheet positions that arise from movement in market prices. The four components of market risk are:

- Interest risk: potential losses due to a change in interest rates. Requires Banking Asset/Liability management.
- Equity risk: potential loss as a result of unfavorable change in stock prices. Banks can accept equity as collateral for loans or credit and buy ownership stakes in other firms as investment from their investible cash. Any adverse change in stock prices either leads to a loss or reduction in investment value.
- Commodity risk: potential loss as a result of adverse change in commodity (agricultural, industrial, energy) prices. Huge fluctuations occur in these prices due to constant variations in demand and supply. Any bank holding these as part of their investments is exposed to commodity risk.
- Foreign Exchange risk: potential loss as a result of change in the value of the bank's assets or liabilities resulting from exchange rate variations as banks transact with their customers or other stakeholders in multiple currencies.

2.3.1.3. Operational Risk

Operational risk is defined by "Basel Committee on Banking Supervision" as the risk of loss resulting from insufficient or failed internal procedures, people, and systems or external events and policies. This risk occurs in all day-to-day activities every bank. Examples operational risk include incorrectly cleared check or a wrong order punched into a trading terminal. This risk arises in almost every department (credit, investment, treasury and IT) within the bank sector. There are three major causes of operational risk:

- Human invention and error
- Failure of IT or internal software and system
- Failure of internal processes to transmit data correctly.

2.3.1.4. Liquidity risk

Liquidity means a bank has the ability to meet payment obligations basically from its depositors and has enough money to give as loans or credit. So, liquidity risk is the risk of a bank not being able to carry out its day-to-day operations due to inadequate cash. It is defined as the risk stemming from the lack of marketability of an investment that cannot be bought or sold quickly enough to prevent or minimize a loss. As the name implies, liquidity risk disables a bank from carrying out day-to-day cash transactions. Look at this risk like person A going to a bank to withdraw money and the bank saying that it doesn't have cash at that moment! That is the risk a bank has to save itself from.

Provision for adequate liquidity in a bank is critical because a liquidity shortfall in meeting commitments to other banks and financial institutions can have serious effect on the bank's reputation and its bond prices in the money market.

2.3.1.5. Business Risk

In general, business risk can be defined as the probability that an entity or firm will have lower than expected returns or profits, or that it will experience a net loss instead of a profit at the end of a financial period. In the context of a bank, business risk is the risk related to the failure of a bank's long-term strategy, estimated revenue and other profitability related issues. To be avoided, business risk requires pliability and adaptability to market conditions. Long-term strategies are important for every bank but such strategies should be subject to change.

2.3.16. Reputational Risk

The Financial Times Lexicon defines reputation risk as the possible loss of the organization's reputational capital. Just like any other entity or brand, a bank faces reputational risk which may be precipitated by bank's activities, rumors about the bank, willing or unconscious non-compliance with regulations, data manipulation, poor customer service, bad customer experience within bank branches and decisions taken by banks during crucial situations.

2.3.1.7. Systemic Risk

This risk includes a possibility of bringing down the entire financial system to a standstill, what was possibly seen during the dot-com bubble in 1995, or the housing market crash of 2008. This arises due to a domino effect where the failure of a bank could cause related failure of its counterparties and other stakeholders, which could, in turn, threaten the entire financial services industry.

2.3.1.8. Moral Hazard

Moral hazard is a situation in which one party gets involved in a risky event knowing that it is protected against the risk and another party will bear the cost. It arises when both the parties have incomplete data about each other.

2.3.2. Credit Risk

The existence of financial institutions and commercial banks are not to receive deposits from customers only but to also offer loan facilities and credit to these customers, therefore being inevitably exposed to risk related to credit granting. Fluctuations of in the value of debt instruments and derivatives have been highlighted by Chen and Pan (2012). An increase in credit risk will raise the marginal cost of debt and equity, which leads to an increase in the cost of funds for the bank (Basel Committee, 1999). The ability of banks to manage credit risk has become most important in the banking industry due to the many unfavorable effects it has on the firm's survival and profitability. According to Coen (1999), credit risk exposure is still a threat and has become a major problem in banks globally. It is therefore important that banks take ardent cognizance of the need to have suitable credit administration involving identification, measuring, monitoring and controlling credit risk instituted and also to determine that sufficient capital is maintained against credit risks and that they are appropriately indemnified for every risk suffered. Generally, credit risk is the greatest source of risk in the banking industry, Huang and Oosterlee (2012). Credit risk has serious damage to many projects. According to Flyvbjerg et al (2003), credit risk has been shown to be particularly huge and damaging for very major investment projects or megaprojects. These projects have come to a halt; ending up in what has been called the debt trap - a state where due to cost overruns, schedule delays – the costs of financing debt become more than the revenues available to pay interest on and bring down the debt (Flyvbjerg et al, 2003). A raise in the credit risk of banks gradually leads to liquidity and causes solvency problems. Credit risk management provides basic structure for understanding the impact of credit risk management on banks' financial performance (Kargi, 2011).

Loans or credit that is in default or close to being default become Non-Performing Loans (NPLs). The terms of the default rate in loans are defined by every bank

2.4. Empirical Review

There are several researches works on the relationship between credit risk management and financial performance (profitability), and how effective credit risk management help in reducing the probability of failure and restricting the uncertainty of achieving the expected financial performance. Financial performance of banks has been measured using either Return on Equity (ROE) or Return on Asset (ROA) or both. Majority of these research studies used regression model of analysis to analyze the data.

Most of these works support the notion that there is a positive relationship between effective credit risk management and banks' financial performance. Others are of the view that there is a negative relationship between the two.

HosnaManzura and Juanjuan (2009) researched on the credit risk management and financial performance in commercial banks in Sweden where they examined four commercial banks. They discovered that Non-performing loans indicator impacted on financial performance more than Capital adequacy ratio and the impact of credit risk management on performance was not the same for all the banks captured in their study.

Similarly, Li and Zou (2014) conducted a study on how credit risk management impact or affect profitability of banks in Europe. Gizaw, Kebede, and Selvaraj (2015) examined the impact of credit risk on financial performance of commercial banks in Ethiopia. The study showed that NPL/TL and CAR were significant and negatively related to ROE and ROA.

Angeela (2010) showed no relationship between the NPL and net profit for banks in Kenya within the financial statements. The low net profits of banks were even discovered within the period when the credit facilities of the firms were also low. On the other hand, Aduda and Gitonga (2011) through their study, using regression model of analysis, discovered a reasonable level of relationship between the credit risk management and financial performance of Kenyan banks.

Boahene, Dasah, and Agyei (2012) studied the relationship between credit risk and financial performance (profitability) of some selected banks in Ghana. They discovered a positive relationship between credit risk and profitability. This implies that Ghanaians banks experience high profitability regardless of the huge credit risk exposures.
Naceur and Omran (2008) used unbalanced panel regression in their study on the impact bank regulations, financial and institutional development have on profitability in the Middle East and northern part of Africa from 1989 to 2005 shown that there is a positive relationship between credit risk and profitability of banks.

Alalade et al (2014) carried out a study on the impact of managing credit risk and profitability of banks in Nigeria (Lagos state). The results showed that credit risk reduce profit and hence management of credit risk should be vital to management of banks in Lagos.

The various set of findings discussed in the literature by past researchers across different geographical frontiers, the significance of the relationship between credit risk management and financial performance becomes evident for the banking industry in Ghana in this present research study.

2.5. Conceptual Framework

The conceptual framework for this study can be illustrated in the research model below:

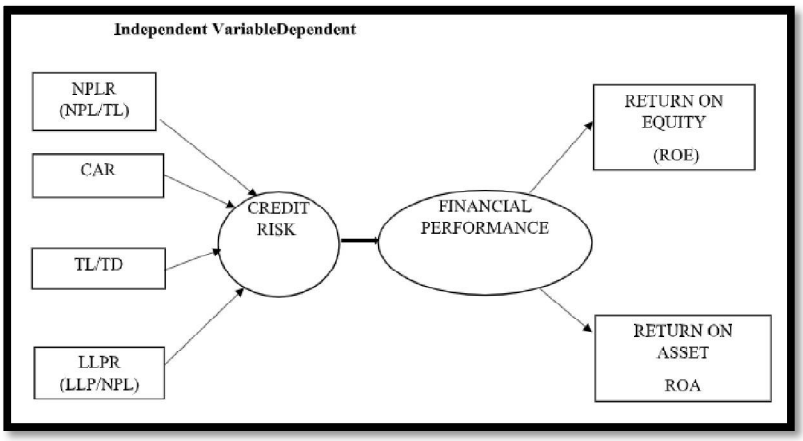

Figure 1: Research Model
Source: Developed for the Study 2019

ROA: Return on Asset, ROE: Return on Equity, CAR: Capital Adequacy Ratio, TL/TD: Total Loans to Total Deposit ratio, NPL/TL: Non-Performing Loans to Total Loans, LLP/NPL: Loan Loss Provisions to Non-Performing Loans.

2.6. Hypothesis

The hypothesis below were tested;

- I: The relationship between NPL/TL, CAR, TL/TD, LLP/NPL and ROE of commercial banks in Ghana
- II: The relationship between NPL/TL, CAR, TL/TD, LLP/NPL and ROA of commercial banks in Ghana

3. Research Methodology

3.1. Methodology

This section presents the research methodology used in the study. The chapter covers the research design, sampling, data collection, data analyzing instruments and the description of applied regression model.

3.2. Research Design

This part describes the nature of the pattern the study intends to follow. This is the overall strategy for carrying out the study. The primary objective of the study is to examine the impact of credit risk management on financial performance of commercial banks in Ghana. The study is conducted using deductive approach because it uses some of the hypothesized relationships between the selected credit risk management indicators and the financial performance indicators.

The method of the study is *quantitative* and *regression model* of analysis is use to analyze data collected from the annual reports of the selected banks. The regression output is then use to conduct the analyses and answer the research questions and the analyses are presented by using *descriptive approach*.

3.3. Data Collection and Sampling

There are many sources through which one can get access to data for a research work. Data can be sourced from documentation, archival records, interviews, direct observation, participant observation and fiscal artifacts (Yin, 1994). The researcher adopted document analysis in obtaining data for the research. This technique was used in accessing data from the annual reports of fifteen (15) commercial banks from 2011 to 2017. These selected banks are Agricultural Development Bank (ADB), Ecobank Ghana, Cal Bank, Ghana Commercial Bank (GCB), HFC Bank, Access Bank Ghana, Standard Charted Bank, Barclay Bank Ghana, SG-SSB, Fidelity Bank, National Investment Bank (NIB), Prudential Bank, Zenith Bank Ghana, Stanbic Bank Ghana and GT Bank.

Hence, there are total of one hundred and five (105) observations in the regression analysis. Theoretically, the number of observations should be 10-20 observations per an independent variable in the regression analysis. With this study, there are one hundred and five (105) observations and four (4) independent variables which are satisfactory in relation to standard.

3.4. Data Analyzing Instrument

The study use panel data regression analysis is used to determine the impact of credit risk management on financial performance. The regression output is derived by using STATA software.

3.5. Variable Measurement Procedures

3.5.1 Independent Variables

Four independent variables namely CAR, NPLR (NPL/TL), TL/TD and LLP/NPL are selected because they are the major indicators of credit risk management that affect profitability of banks. Also, these four variables are selected because they are more comprehensive and easier to interpret.

3.5.1.1. Capital Adequacy Ratio CAR

Capital adequacy ratio measures a bank's capital to it risk-weighted asset. It is calculated as follows:

CAR = (Tier 1 capital + Tier 2 capital)/Risk-weighted asset (RWA).

The higher a bank's CAR, the higher the level of unexpected losses the bank can absorb before being insolvent (Reserve Bank of New Zealand, 2007, p.9). It is believed that a bank with strong capital base would be able to absorb losses that may arise from non-performing loans (Adegbaju&Olokoyo, 2008). Minimum capital adequate ratio aims to protect customers and promote stability and efficiency of the financial system (Reserve Bank of New Zealand).

3.5.1.2. Non-Performing Loan Ratio NPLR (NPL/TL)

Basically, NPLR is defined as Non-performing loans divided by total loans. It is a major determinate of credit risk in commercial banks. It shows the quality of a bank's loan portfolio. Higher NPLR implies that management were not efficient when evaluating the loan applications. After the adoption of International Financial Reporting standard (IFRS) in 2005, financial institutions provide accurate categorization of NPLs. NPLs amount is found in the Notes to financial statements under Loans part and TL amount is derived by adding two types of loans; loans to entities and institutions and loans to the public.

3.5.1.3. Loan Loss Provision Ratio LLPR (LLP/NPL)

Loan loss provision is an expense to banks which serves as an internal insurance fund. It is the amount saved for default loans. Thus, the money set aside to take care of the inability and unwillingness of customers to repay loans or credit. The LLPR is the ratio of total loan loss provision (LLP) to total non-performing loans (NPL). The basic premise behind LLPR is that managers of banks reflect their notion toward the bank's asset quality (Gizew et al, 2013). An increase in a bank's LLPR implies a reduction in the quality of its assets.

3.5.1.4. Loan to Deposit Ratio LDR (TL/TD)

Loan to deposit ratio of a bank indicates the credit risk appetite of the firm that exposes it to likely losses. It is expressed as a ratio of total loans (TL) to the total amount of deposits (TD) and it is usually used to evaluate the liquidity of a bank. If the ratio is high, then the bank is required to be efficient in order to avoid insolvency.

3.5.2 Dependent Variables

For this study, the researcher decided to use ROE and ROA as dependent variables and measure of profitability.

3.5.1.5. Return on Equity (ROE)

Return on Equity measures how much owners have gained in their return on investment in a bank. It shows the efficiency of management in the usage of funds shareholders have invested into the firm.

3.5.1.6. Return on Asset (ROA)

Return on Asset reveals the efficiency and effectiveness of management in the performance of a bank in terms of profit generation. It is the ratio of net income and total assets. A bank with higher ROA means management is efficient and capable of converting assets into net income and hence translates into greater profit.

3.6. Regression Analysis

The regression analysis is carried out to find out;

- The impact of credit risk management on financial performance (profitability) in the selected banks (15 banks) within 7-year period (2011-2017) giving a total of 105 observations.

Measuring profitability of banks using both ROE and ROA while being the function of NPLR, CAR, LLPR and TL/TD, the regression model equation becomes:

$X_1 = \alpha+\beta_1Y_1+\beta_2Y_2+\beta_3Y_3+\beta_4Y_4+\varepsilon$ (1)

$X_2 = \alpha+\beta_1Y_1+\beta_2Y_2+\beta_3Y_3+\beta_4Y_4+\varepsilon$ (2)

Where X_1, X_2 represent the profitability of the selected commercial banks measured by ROE and ROA respectively; Y_1: capital adequacy ratio (CAR), Y_2: non-performing loan ratio (NPLR), Y_3: loan loss provision ratio (LLPR), Y_4: loan to deposit ratio (TL/TD); β_1, β_2, β_3, β_4: represent the coefficient values of the four independent variables respectively; α: represent the value of the vertical section. It is equal to the value of the dependent variables when the values of the independent variable's coefficients equal to zero.

- The model 1 measures the relationship between credit risk management indicators and financial performance of the selected commercial banks in Ghana by ROE
- The model 2 measures the relationship between credit risk management indicators and financial performance of the selected commercial banks in Ghana by ROA.

Abbreviations	Description	Measurement
ROE	Return on Equity	Profit after interest and tax (Net profit)/ Total Equity
ROA	Return on Asset	Profit before tax/ Total Asset
CAR	Capital Adequacy Ratio	Tier 1 + Tier 2 capital / RWA
NPLR	Non-Performing Loan Ratio	Non-performing loan/Gross Loan and Advances
LLPR	Loan Loss Provision Ratio	Loan Loss Provision/Non-Performing Loans
LDR	Loan to Deposit Ratio	Total Loans/Total Deposit

Table 1: Variables Definitions and Measurement

4. Findings, Analysis and Discussion

4.1. Introduction

This chapter discusses the analysis of data and reveals the empirical evidence on the relationship between credit risk management and profitability of commercial banks in Ghana. This section presents the descriptive statistics of the variables selected, the correlation matrix and the regression analysis results.

4.2. Descriptive Statistics

The study provides a digestible image of financial performance and credit risk indicators by adopting descriptive statistics. The major statistics employed are the mean, standard deviation, minimum and maximum values of variables over the number of years selected. The research study reckoned both Return on equity (ROE) and Return on asset (ROA) as performance measure and the result from the table depicts that averagely, the equity shareholders of the selected banks used in this study earn a 23.729% return on equity with 12.7% a standard deviation. This is higher and above 17.3% which is the industry average ROE as at April 2018 (Bank of Ghana banking sector report 2018). Even though some banks perform badly with a negative minimum value.

With ROA, the table shows that the banks earn a 4.39% return on asset with 2.45% standard deviation. According to Bank of Ghana banking sector report 2018, the industry average for ROA is 3.6% as at April 2018. Hence, it can be said that the selected banks for this study have been effective and competent with regards to the usage of their assets. However, the minimum value of -0.036 depicts that some banks perform poorly.

With the credit risk indicators, the average NPLR among the selected banks for the research study for the period of seven (7) years is 14.85% with 9.39% standard deviation.

Willem (2013) indicated that there is no internationally accepted limit for loan loss provision ratio (LLPR) however, other countries have instituted a guiding principles or measures to direct and control the activities of banks within the countries. As a measure of credit risk, loan loss provision ratio reveals the level of default risk a bank is willing and ready to absorb. From the table, the banks under study have an average of 9.69% LLPR with 6.56% standard deviation.

Capital adequacy ratio (CAR) as the main solvency indicator which is expressed as a ratio of adjusted capital to risk-weighted asset is used by the central bank to safeguard customer's deposits from default risk. Under Basel III, the accepted minimum capital adequacy ratio that banks ought to maintain is 8% however, the bank of Ghana's statutory requirement for capital adequacy ratio (CAR) is 10%. This is instituted to ensure that customer's deposits are protected and safe. From the table, the average CAR for the selected banks is 18.65% with a standard deviation of 6.5%. It is clear that the banks have the ability to bear loss arising from loan granting with a minimum and maximum values of 6.5% and 52% respectively.

The loan to deposit ratio LDR (TL/TD) reveals the extent to which monies deposited by customers are being used by the banks in granting loans. From the table, the average loan to deposit ratio for the selected banks is 58.29% with 19.67% standard deviation. This shows that the banks give out about 60% of customer's deposits as loans and credit. The minimum and maximum values are 27% and 117% respectively, showing that the selected banks pay more attention to loan granting which comes with some level of risk. The maximum value of 117% indicates that the banks give out loans in excess of total deposit from customers.

. summarize ROA ROE CAR NPLR LLPR LDR

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	105	.0439971	.0245315	-.036	.0924
ROE	105	.2371886	.1276537	-.2334	.492
CAR	105	.1865419	.0651843	.0652	.52
NPLR	105	.148501	.0939256	.01	.45
LLPR	105	.0969638	.0656959	.02	.3541
LDR	105	.5829238	.1967374	.23	1.17

Table 2: Descriptive Analysis Results

4.3. Correlation Analysis/Matrix

The correlation matrix is a tabular representation showing the correlation coefficients of the variables employed. The coefficient of the correlation shows the association between the variables used without implying causation. The correlation analysis is carried out to correlate the profitability (ROE & ROA) indicators with credit risk indicators (CAR, NPLR, LLPR, LDR) used in this study. The sign of the coefficient is a signal of the direction of the relationship while the absolute value of the coefficient shows the magnitude (OpokuAsare, 2015).

Correlation matrix is critical as it also reveals the existence of multicollinearity among the variables. Multicollinearity arises when two or more variables are highly correlated. According to Schindler and Cooper (2009), any correlation above 0.8 between the independent variables is a sign of multicollinearity. From Table 3, there is no existence of multicollinearity between the independent variables.

	ROE	ROA	CAR	NPLR	LLPR	LDR
ROE	1.0000					
ROA	0.8404	1.0000				
CAR	0.1201	0.3384	1.0000			
NPLR	-0.3799	-0.2300	-0.0352	1.0000		
LLPR	-0.3821	-0.3011	-0.0335	0.7255	1.0000	
LDR	-0.1444	-0.1662	-0.2641	-0.2523	-0.2581	1.0000

Table 3: Correlation Matrix

The table depicts that, all the independent variables except CAR are negatively correlated to the dependent variables (ROE and ROA). CAR is positively correlated to ROE and ROA.

4.3. Regression Model Analysis

The regression model employed two financial performance measure; ROE and ROA with four independent credit risk indicators; CAR, NPLR, LLPR, TL/TD. Table 3 shows credit risk indicators used as independent variables entered in both equations of the regression models.

$X_1 = \alpha+\beta_1Y_1+\beta_2Y_2+\beta_3Y_3+\beta_4Y_4+\varepsilon$ (1)

$X_2 = \alpha+\beta_1Y_1+\beta_2Y_2+\beta_3Y_3+\beta_4Y_4+\varepsilon$ (2)

The two models are revealed in Table 4.3, indicating the percentage of variability of the independent variables. The “R square” expresses the link between the dependent variables and the independent variables whiles the “R” constitute the square root of “R square”. The R value shows how the independent variables are related to the dependent variables. Also, the “Adjusted R square” mentions the affinity of independent variables with dependent variables in order to ensure the validation of decisions based on the regression model. In calculating for the adjusted R square, if the number of observations is small, the difference between “R square” and “Adjusted R square” is greater than one (Hosna et al, 2009).

4.3.1. Results from Model 1

The researcher used pooled regression analysis to examine the impact of the credit risk indicators on return on equity. The results in Table 4reveals that the regression analysis employed 105 observations. In the case of model 1 from the table, the R square value is 0.24 which signifies a satisfactory level of relation between the variables. It demonstrates that the credit risk indicators in the model explained 24% of the variance in financial performance of the selected banks as measured by return on equity (ROE).

The result shows that three out of the four credit risk indicators (independent variable) used in the model are statistically significant to the dependent variable (ROE). The relationship between NPLR and ROE is statistically significant with NPLR having a negative coefficient; implying that non-performing loan ratio is inversely related to financial performance (ROE) at a significant level of 0.05. Therefore, all things being equal, a percentage increase in NPLR will result in a 3% reduction in financial performance (ROE).

The capital adequacy ratio (CAR) has a positive relationship with ROE but it is statistically insignificant. However, both LLPR and LDR (TL/TD) are statistically significant with a negative coefficient. Thus, all things being equal, an increase in both ratios will lead a reduction in the financial performance (ROE) of the selected banks.

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. reg ROE CAR NPLR LLPR LDR
```

Source	SS	df	MS	Number of obs	=	105
				F(4, 100)	=	7.92
Model	.517582279	4	.12939557	Prob > F	=	0.0000
Residual	1.63292771	100	.016329277	R-squared	=	0.2407
				Adj R-squared	=	0.2103
Total	2.15050999	104	.020677981	Root MSE	=	.12779

ROE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
CAR	.0682368	.1987369	0.34	0.732	-.3260516	.4625252
NPLR	-.387263	.194985	-1.99	0.050	-.7741077	-.0004183
LLPR	-.5843104	.2792095	-2.09	0.039	-1.138254	-.0303667
LDR	-.1926205	.0677518	-2.84	0.005	-.3270382	-.0582028
_cons	.4421576	.0714215	6.19	0.000	.3004593	.5838559

Table 4: Model 1

4.3.2. Results from Model 2

The model presents the impact of the credit risk indicators on return on asset. In the case of model 2, the R square value is 0.22 which signifies a satisfactory level of relation between the variables. It demonstrates that the credit risk indicators in the model explained 22% of the variance in financial performance of the selected banks as measured by return on asset (ROA). The two models are similar in relation to R and R square but standard error of estimate of model 1 indicates a high value as compared to the model 2. The result in model 2 also shows that three out of the four credit risk indicators (independent variable) used in the model are statistically significant to the dependent variable (ROA).

The relationship between CAR and ROA is statistically significant with CAR having a positive coefficient. Thus, an increase in the capital adequacy ratio of the selected banks will result in an increase in the financial performance (ROA), "all things being equal". The non-performing loan ratio is negatively related to return on asset but it is statistically insignificant. However, both LLPR and LDR are statistically significant with a negative coefficient. Thus, both ratios are negatively related to financial performance (ROA) of the selected banks. An increase in both ratios will lead to a reduction in the financial performance (ROA).

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. reg ROA CAR NPLR LLPR LDR
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Source	SS	df	MS	Number of obs	=	105
				F(4, 100)	=	7.35
Model	.016062076	4	.004015519	Prob > F	=	0.0000
Residual	.054637085	100	.000546371	R-squared	=	0.2272
				Adj R-squared	=	0.1963
Total	.070699161	104	.0006798	Root MSE	=	.02337

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
CAR	.1101911	.0363529	3.03	0.003	.038068	.1823142
NPLR	-.0119649	.0356666	-0.34	0.738	-.0827264	.0587966
LLPR	-.1221479	.0510729	-2.39	0.019	-.2234751	-.0208207
LDR	-.023779	.0123931	-1.92	0.058	-.0483667	.0008086
_cons	.0493323	.0130644	3.78	0.000	.0234129	.0752517

Table 5: Model 2

4.4. Discussion of Regression Results

4.4.1. Impact of Capital Adequacy Ratio on Financial Performance (Profitability)

The study of this research has revealed that CAR has a positive but insignificant impact on ROE yet has a positively significant impact on ROA. Various researchers such as Hosna *et al* (2009), Kinthinji (2010), Kargi (2011), Poudel (2012) and OpokuAsare (2015) over the years have recounted capital adequacy as an important enhancer of financial performance of banks. This implies that as capital adequacy ratio is increased, the banks become more profitability because there will availability of money to be lend to customers and also huge loan/credit facilitates can be granted to big creditworthy customers, hence more profit.

Also, it implies that there is sufficient capital available to withstand default loan losses and any other banking failures.

4.4.2. Impact of Non-Performing loan ratio on Financial Performance (Profitability)

This study has revealed from the observation that NPLR has a negatively significant impact on ROE which is accordant with result shown by the research study conducted by Hosna et al (2009). However, a study conducted by Boahene et al (2012) on the topic, "Credit risk and profitability of selected banks in Ghana" revealed that NPL is positively related to financial performance as measured by ROE. Thus, the banks in Ghana experience an increment in profit regardless of their NPLs. This is contradictory to the finding of this study.

In the case of ROA, the study also showed a negative impact of NPLR on financial performance. However, the impact is insignificant.

4.4.3. Impact of Loan Loss Provision ratio on Financial Performance (Profitability)

The study showed a significant negative relationship between loan loss provision ratio and financial performance as measured by both ROE and ROA. This result is consistent with the findings of Kolapo et al (2012). The result implies that an increase in provision for bad and doubtful debt will directly affect the profitability of the banks.

4.4.4. Impact of Loan-Deposit Ratio on Financial Performance (Profitability)

The result of this study showed a negative significant relationship between loan to deposit ratio (TL/TD) and financial performance for both profitability indicators (ROE and ROA). The result of this study supports the findings of the study conducted by Ogboi et al (2013) on the topic, "the impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria".

5. Summary, Conclusion and Recommendations

5.1. Introduction

This section presents a summary of the key findings, conclusions, recommendations and suggestions for further research study.

5.2. Findings

With the help of published audited financial statements for a period of seven years (2011– 2017) for fifteen selected commercial banks, the main objective of this study was to check the effect of credit risk management on financial performance of the above-mentioned banks in Ghana.

ROE and ROA were the two key profitability indicators used in measuring profitability (dependent variables) whiles credit risk management was measured using CAR, NPLR, LLPR and LDR (independent variables).

A descriptive statistics and pooled panel regression analysis techniques were employed to analyze the data gathered from the annual report of the selected commercial banks.

The result from model 1 which used ROE as profitability measurement depicted that there is a significantly negative relationship between NPLR, LLPR, LDR and financial performance. It means that the three credit risk variables adopted has an inverse relation with ROE. Thus, an increase in any of these variables will lead a reduction in financial performance of the banks.

However, the result in the same model indicated that the CAR as a control variable has a positive but an insignificant relationship with ROE.

The result from model 2 which used ROA as profitability measurement depicted that there is a positive significant impact of CAR on financial performance. This means that a high capital adequacy ratio leads to high profit. Also, LLPR and LDR have a negative significant impact on financial performance. Thus, any increase in these two ratios reduce the profitability of the banks. The same result indicated that NPLR has a negative but insignificant impact on financial performance of the banks.

5.3. Conclusion

The main objective of this study was to demonstrate the impact of credit risk management on financial performance of some selected commercial banks in Ghana. From the findings of the study, three out of the four independent variables showed a strong impact on the two dependent variables. In the case of ROE, NPLR, LLPR and LDR were statistically significant to financial performance. Only CAR was insignificant even though it had a positive impact on ROE.

In the case of ROA, CAR, LLPR and LDR were statistically significant to financial performance. Only NPLR was insignificant even though it had a negative impact on ROA. Therefore, it can be concluded that credit risk management has significant impact on financial performance of commercial banks in Ghana. Hence, a better credit risk management practice will enhance profitability of the commercial banks.

Thus, the findings from the study indicate that, if the NPLR, LLPR and LDR are maintained at the lowest level, the banks will experience much better performance financially. Meaning if these ratios are under control, there will be no or little loses to negate revenue that are earned from other sources. However, if the credit portfolio is not managed well, many loans will go bad and will require provisions or write-offs which will reduce earned profits. On the other hand, CAR has to be maintained at a higher level as possible in order to have a positive impact on financial performance. Currently, the minimum CAR in Ghana is 10%. So, there is a double benefit that comes with having high CAR; meeting the regulatory requirement and impacting positively on financial performance of the bank.

5.4. Recommendations

In order for banks to have an effective credit risk management system, the management need to put in place a satisfactory credit risk environment. It is recommended that when granting credit, managers must do due diligence by conducting sound credit evaluation and must cling to all the necessary guiding principles before granting the credit to the customer.

Banks must institute and operate under a sound credit granting process, keeping a suitable credit administration which involves measuring, monitoring and processing of credit together with efficacious controls over credit risk.

It clear from the results of this study that LLPR has a negative significant impact on financial performance. This implies that when loans granted to customers are being recovered when they are due to the extent that no provisions are made for them, the banks would experience higher profit. It is therefore recommended that management of banks should act efficiently and effectively in recovering loans. This will reduce the money set aside to provide for the losses arising from such loans.

Also, management must keep an eye on capital adequacy ratio to ensure that the banks have high CAR in order to avoid breach of regulatory requirement as well as enjoying the positive impact it has on financial performance.

Furthermore, LDR which is total loans to total deposit has a negative impact on financial performance. The banks must therefore check their mobilization of deposits in relations to the amount of credit granted to customers within the period. It is recommended that the banks must keep a healthy balance between total deposits and total loans and advances granted to customers within a period.

5.5. Suggestions for Future Research Study

In future study, more independent variable such as liquidity ratio, size of bank, interest rate and others should be included in the regression model in order to enhance the findings. The study could further increase the number selected banks and extend the number of financial years to cover a longer period.

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