

**THE IMPACT OF CREDIT RISK ON PROFITABILITY OF SOME SELECTED
BANKS IN GHANA**

By

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A Thesis submitted to the Department of Accounting and Finance,
Kwame Nkrumah University of Science and Technology in partial fulfillment of the
requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION (FINANCE OPTION)

School of Business, KNUST
College of Humanities and Social Science

August, 2015

DECLARATION

I, hereby declare that this submission is my own work towards the degree of Master of Business Administration and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for an award for another degree of the University, except where due acknowledgement has been made in the text.

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DEDICATION

I dedicate this work to the heavenly father, Jesus Christ, who has granted me life and strength to all these and to my mum, Janet Ofori Boateng (Mrs), my siblings , Kwabena Ofori Boateng and Amoateng and Jennifer Opoku- Mensah for their prayers and support.



ABSTRACT

The study attempts to reveal the relationship between credit risk and profitability of some selected banks in Ghana. A balanced panel data from seven selected banks covering the nine-year (2005-2013) was analyzed within the fixed and random effects techniques. Two key measures of profitability (dependent variables) employed in the study comprised of Return on asset (ROA) as model-1 and Return on Equity (ROE) as model 2. The credit risk measures used in the study included nonperforming loans to total loans, loan loss provisions ratio and loans and advances ratio. In addition, some internal and external determinants of profitability age were captured in model.

The results showed that, nonperforming loans is negatively related to profitability while loan loss provision ratio and loan and advances ratio are positively significant to bank's profitability. Also the researcher discovered that both capital adequacy and age have a positive relationship with profitability while bank size has an inverse relationship. All the external factors were statistically insignificant. The study suggested the need for management of the banks to put in effective measures in improving the credit risk management strategies to enhance their profitability.

ACKNOWLEDGEMENT

I am most grateful to God Almighty for his grace and mercies that saw me through the completion of this work. Many thanks also go to my supervisor, Eric Oteng Abayie (PhD) for his assistance and contribution to this work. I also acknowledge the contribution my family, Kwame Ohene Gyan, Dave and all who in diverse ways have contributed to this work. I say a big thank you.



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CHAPTER ONE

INTRODUCTION

1.0 BACKGROUND TO THE STUDY

Risk is an inevitable phenomenon which has lived with mankind since time immemorial. In our domestic and especially in our business life, we find ourselves in situations where risk taking becomes the solution to our break through. Nevertheless, one should find a way to minimize or manage this risk in order not to affect the expected result from a given investment. In the financial sector, risk management is seen as one of the most essential internal itineraries upon which decisions are made by financial institutions. (Aureliju *et al*, 2014).

Carey (2001) disclosed that the most essential issue in the managing of an economy is the mitigation of risk. This is not different from what happens in the banking industry. In the aspect of banking, credit risk is given much attention due to the characteristics of their borrowers and the kind of businesses they invest into. The bank theory identifies six popular categories of risk which are related with credit guidelines of banks. They include credit risk (risk of repayment), interest risk, portfolio risk, operating risk, credit deficiency risk, and trade union risk (Muhammad, 2014). Analyses have shown that, credit risk is the main risk that causes the collapse of a bank. (Sinkey, 1992, p.279)

According to Fatemi *et al* (2006), credit risk occurs as a result of the refusal of one party to deliver his or her duties. The development of different kinds of counterparties, ranging from individuals to sovereign governments and the new forms of obligations has stressed on the reason why credit risk management is on top in terms of actions laid down for the benefits of managing risk in the banks. The management of risk has become the order of

the day because banks are financially incapacitated to take in more loan losses (Boffey and Robson, 1995). In a larger spectrum, the ability of a bank to engross losses is possible when loans yield profit, shareholders' funds and deposits from customers (Boffey and Robson, 1995).

Over the years, banks have encountered hitches from different sources. The chief causes of these challenges are the careless ways of scrutinizing borrowers and counterparties, improper management of portfolios, and ignoring the economic indicators of the country or other situations that can result to decline in the credit level of a bank's counterparties .

The inability of a bank or a financial institution to effectively control its credit risk has a substantial adverse result on the performance of its profitability both in the short and long term. In the last five years, some financial institutions in Ghana have had their hard earned reputation marred and others who could not curtail or curb the situation have collapsed because of weak measures in the controlling of credit risk categorized by massive of insider loans and the avoidance of diversified loan portfolio. Inefficient credit risk supervision methods and poor credit quality remain overriding reason of bank collapse and globe financial crises (Tetteh, 2012). Researches on the failure of banks in the world at large have revealed that low quality of loans is a predominant cause of bank distresses (Boahene, et al 2012). Therefore an effective supervision of credit risk should be implemented during the credit granting stage to the recovery stage. Financial Institutions have to stress credit worthiness of the customer because if default occurs, they will find themselves in a financial shortage linked with its adverse implications.

1.1 STATEMENT OF THE PROBLEM

The very nature of the banking business is so delicate because more than 85% of their liability is deposits from customers (Saunders and Cornett, 2005). Banks create loans from these deposits from customers and these loans are major income generating source for majority of the banks. However this action is associated with enormous risks to both the banks and the deficit units.

Banks are now working so hard to attract the massive number of people who are not working with them. This has led to an increase in banks' surplus units and deficit units. With the aim of increasing revenue and gaining a large portion of the market share, many banks have given out loans and advances which could not be recovered leading a massive growth in Non-Performing Loans (NPLs) in their accounts. This has become a worrisome situation for banks and other stakeholders.

The 2010 Ghana Banking Survey Report by PricewaterhouseCoopers revealed that there was an increase in the total revenue from GHC 793 million in 2007 to GHC 1.5 billion in 2009. Interestingly, the period witnessed a fast weakening of the industry's loan portfolio which had an inverse effect on profitability. There was a massive jump in Impairment charges for non-performing loans over period from GHC 60 million in 2007 to GHC 266 million in 2009. The Central Bank of Ghana also disclosed that the NPL ratio also deteriorated from 16.2% in December 2009 to 17.6% as at December 2010.

The rise in NPL ratio has resulted in the reduction of the market share of the some major banks in Ghana from 49.5% in 2009 to 45% in 2010 (Bank of Ghana report 2010).

With respect to the issues raised, it can be said that the impact credit risk has on a bank's financial strength cannot be undermined.

However, a study carried out by Boahene *et al* (2012) on the topic “Credit risk and profitability of some selected banks in Ghana” exposed that credit risk constituents do not reduce the profitability of a bank. This implies that, banks in Ghana experience high profit irrespective of the huge credit risk exposure, conflicting with views shared by other researchers; Njanike (2009), Al-Khouri (2011), Poudel (2012) that credit risk indicators are inversely related to profitability. The prime concern of this thesis is to determine whether credit risk has an impact on the profitability of Ghanaian banks using data from 2005 to 2013.

1.2 OBJECTIVES OF THE STUDY

In relation to the selected commercial banks, the specific objectives for the study include.

1. To determine the impact of nonperforming loans on the profitability of some selected banks in Ghana.
2. To ascertain the impact of loan loss provision on the profitability of some selected banks in Ghana.
3. To examine the effect of loans and advances on the profitability of some selected banks in Ghana.

1.3 RESEARCH QUESTIONS

In order to achieve the above study objectives, the research aims at addressing the following questions in relation to the selected banks.

1. What is the impact of non-performing loans on the profitability of commercial banks in Ghana?
2. What is the impact of loan loss provisions on the profitability of commercial banks in Ghana
3. Does loan and advances has any effect on the profitability of some selected banks in Ghana.

1.4 JUSTIFICATION FOR THE STUDY

Credit risk underpins the performance of banks and therefore proper credit risk management reduces the default rate of customers and assists banks to be on top in the loan generating market. Credit risk which is as a result of ineffective management is one of the foremost catalysts of banks letdown. Furthermore, the degree to which credit risk is controlled has a bearing on the progress and sustainability of that financial institution and the economy at large.

The purpose of this research is to discover impact of credit risks on the profitability of banks in Ghana. It would serve as an embodiment of knowledge to individuals, management and practitioners in the banking and non-bank financial industry. The findings of the research would also be of scholarly importance in the academic arena.

1.5 RESEARCH METHODOLOGY

The researcher employed a quantitative method to estimate the impact of credit risk on profitability. These approaches are deemed appropriate for studying credit risk and its impact on profitability as it gave the researcher more vivid space. A breakdown of this is seen in the third chapter of this research work.

1.6 LIMITATIONS OF THE RESEARCH

This study is limited to the influence Credit Risk has on the on the profitability performance of some selected banks in Ghana from 2005 to 2013 and therefore the findings, analyses and recommendations cannot be linked to the whole banking industry in the Ghana . Perhaps researching into other banks will yield dissimilar outcome. Cross border study can bring a different dimension as a result of difference in supervisory guidelines.

1.7 ORGANIZATION OF THE STUDY

The research is organized into five chapters. Chapter one contains the background of the study, problem statement, the objectives of the research, research questions, justification of the research, the methodology, as well as the limitations of the study. Chapter two gives the literature review i.e. examining the theoretical background of the research topic. Chapter three explains in detail, the methodology employed for the research. The data collection techniques and the model used for the study, data presentation and analysis of the research findings would as well be dealt with in chapter four. Lastly chapter five would comprise of summary, conclusion, and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter deliberates other research works conducted on credit risk and its impact on profitability. Additionally, it makes comparative analysis and tries to assess the credit risk management strategies in relation to banks in Ghana. This chapter reviews the concept of credit risk and profitability. It also brings to bear some internal and external determinants of banks' profitability.

2.1 THEORITICAL REVIEW

2.1.1 THE CONCEPT OF CREDIT

According to Kitua (1996), the idea of credit came in to the lime light after the second world when it was large embraced in Europe and advanced to Africa. Credit is the faith lender has in a borrower so that resources can be transferred to the borrower without immediate payment (Greuning *et al.*, 2003). This means the lender gives a borrower an asset with the intention of getting an equal asset in value on the day of payment in a later date. According to Onyeagocha (2001), the term credit is used precisely to refer the confidence lender have in a borrower by prolonging a loan which may take the form of money, goods or securities.

Onyeagocha (2001) sees credit more as the belief a creditor entrusts in a borrower that whatever given him will be paid. Essentially, when a loan is made, the lender is said to have given credit to the borrower and he automatically accepts the credit of the borrower. In the financial parlance, Credit also refers to the giving out of loans and the making of debt. Other researchers who look at commercial trade define credit as the approval for

deferred payment for goods acquired. The credit facility may take the form of a liquid asset (cash) or fixed asset.

In the banking arena for which this research is based, credit is the advancement of funds based on some financial expectations a borrower believes to gain and the assurance that the debt (principal and interest) will be paid in full.

According to Tetteh (2012), sound credit- giving is one of the most essential principles which strengthen financial institutions in their financial standing. This researcher stressed that, sound credit giving establishes credit limits as well as develop credit granting process for approving new credits. Credit plays a very vital part in the economic growth and development of a country. These roles credit plays can be categorized into two: it enables the transfer of funds to where it will be most effectively and efficiently used and secondly, credit economizes the use of currency or coin money as granting of credit has a multiplier effect on the volume of currency or coin in circulation (Aremu *et al*, 2010). The giving out of credit goes through a chain of processes known as the Lending cycle.

2.1.2 CREDIT EVALUATION

This is a very sensitive stage because it helps ensure loan quality. In simple terms, the giving of credit rests on the sureness the lender has in the borrower's ability to pay (credit worthiness). Credit worthiness is the ability and the readiness of a borrower to settle his or her debt. This is one of numerous issues which determine what should go into the credit policies of a lender. A lot of financial models come into play when assessing the credit worthiness of the deficit units. The most commonly used is the five financial analysis tools which include character, capital, capacity, condition and collateral. These tools are generally known as the 5c's of credit (Machiraju, 2004).

2.1.2.1 CHARACTER

According to Machiraju (2004), Character signifies the customer's preparedness and willpower to settle his or her debt. Character is usually known when the lender engages a one on one talk with the borrowers; scrutinize their debt history and also how they manage their finances and the operational aspect of their business. Character is considered as the most important of the five c's because refusal to do due diligence will lead to a clear case of moral hazard.

2.1.2.2 CAPACITY

Capacity is a quantitative financial analysis to decide whether the customers have the capacity to payback what they have taken. According to Owusu Tweneboa (2000), capacity is the ability of the borrower to generate cash from the overall operations to pay for the loans given. Capacity is very important to the lender because it serves as a form of assurance that the loan can be recovered.

2.1.2.3 CAPITAL

Capital is also referred to as the net worth which represents funds set aside to cater for unexpected losses. Thus it serves as a cushion for the business. The lender is much interested in the capital adequacy of the borrower. (Machiraju, 2004).

2.1.2.4 CONDITION

Conditions are the outward factors that can have an impact on the credit portfolio of a business. This can take the form of economic policies prevailing in the country and the

international market at large. Lenders will be in a safe position if they consider the effect of the economic conditions both the borrowers and themselves (Machiraju, 2004).

2.1.2.5 COLLATERAL

Machiraju (2004) defined collateral as the properties a lender in exchange for the loan given. It serves as insurance for the lender when the borrower could not settle his or her debt. Collateral is considered as insulation against default but it is not advisable for a lender to give out loans based on collateral.

Many scholars and financial experts have advanced this credit evaluation tools by developing another effective tool known as CAMPARI. CAMPARI is an acronym for character, ability. It also includes margin, purpose, amount, repayment and insurance. The procedure employed in the granting of loans determines the quality of a loan.

According to Boahene (2012), credit officers should not only consider these five (5) C"s but to gain better understanding on how to analyze the credit risk factors, some principal economic determinants that control the performance of a loan portfolio and the impact these economic factors have on one another must be determined. These factors include inflation, interest rate, GDP, market value of collaterals.

2.1.3 THE CONCEPT OF RISK

Financial institutions through their role as a financial intermediary help circulate funds deposited by the various surplus units to the deficit units. In the course of performing this role, they are confronted with risk which remains one of the topical issues of current financial studies that had attracted special attention from both scholars and professionals. One key factor that determines the success of any banking institution is risk management. According to Boahene *et al* (2012), the

business of banking is full of risk and hence a banks' ability to generate profit and maximize the wealth of their shareholders depends on their attitude toward risk and management of the risk.

Risk is the probability that the actual will be different from the expected value. Thus it is the possibility that the actual may be different from the expected return. In banking, "risk is defined as the sum of threats likely to occur until the money loaned and all other committed are settled by the borrower.

Financial institutions in the quest to make profit and maximize shareholders' wealth often engage in some activities which expose them to various types of risks. Lidgerwood (1993) identifies five diverse categories of risk allied with the operation of any financial institutions. These are credit risk, interest risk, foreign exchange risk, capital adequacy risk, fiduciary risk. Out of these, she pointed credit risk as the most influential among them.

In 2001, the Basel Committee divided bank risk into three major parts. Namely, credit risk, operational risk and market risk. According to this committee, credit risk is the failure of a borrower to honour his or her debt obligations.

2.1.4 CREDIT RISK

Lending involves a number of risks. Among these risks, credit risk plays the major role since by far the largest asset item for banks is loans, which generally account for half to almost three-quarters of the total value of all bank assets. Credit risk has long been an important and widely studied topic in bank lending decisions and profitability. According to Van Greuning and Bratan (2000), credit risk means, payment may be delayed or ultimately not paid at all which can in turn cause cash flow problems and affect a bank's liquidity. From these researchers' point of view, credit risk is the risk of loss that might occur if one party to an exchange fails to honour the terms under which the exchange was

to take place. Credit risk comes up from uncertainty in a given counterparty to meet up with the obligation of honoring the terms and conditions of the credit arrangement (Fatemi and Foolad, 2006). In essence, credit risk arises from uncertainty in counterparty's ability or willingness to meet his/her contractual obligations. In the same vein, Naomi (2011) argued that credit risk represents the potential variation in the net income from non-payment or delayed payment of credit facility granted to customers. According to Basel committee on Banking Supervision, credit risk is most simply defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms.

Han (2015) defines credit risk as the possible losses of banks coming from borrowers" failing to repay. According to him, credit risk is made of three main forms: principal loss risk, interest loss risk and profit loss risk. Al- khouri (2010) outlines some major causes of credit risk and they include; inadequate institutional capacity, unsuitable loan guidelines, unstable interest rates, inefficient management, unfitting regulations, increasing number in banks, negligence in credit valuation, ineffective lending methods, government interference and insufficient monitoring by the central bank.

From the above definitions and meanings given by these researchers, they bore down to the fact that, credit risk is a cancer which causes serious financial problems when it is not properly managed.

2.1.5 CREDIT RISK MANAGEMENT

Many researchers had come out with reasons backing bank failures and recognized numerous issues (Chijoriga, 1997, Santomera 1997, Brown Bridge and Harvey, 1998). Glitches associated with loan specifically, porous credit risk management policies, have been identified as the major explanations behind banking problems. According to Kitua

(1996), majority of bank's equity is made up of Loans. This means any decline in the quality of loans can bring serious problems in the banking business

One factor that exists between financial institutions and borrowers is information asymmetry. This phenomenon makes it difficult for banks to identify creditable borrowers from bad ones. Therefore banks must put systems in place in order to analyze and evaluate the creditworthiness of borrowers to avoid adverse selection and moral hazard (products of information asymmetry) which cause enormous accumulation of nonperforming loans in their records.

Emphatically, the attributes of borrowers gained two main models. They are the qualitative and the quantitative. The qualitative is known as credit scoring models (Hefferman, 1996). If this model is applied effectively, it signals variations in predictable level losses (Santomero, 1997). The quantitative model on the other hand, helps numerically to bring to bear the factors which contribute to credit risk, assess the strength of these factors.

According to Raghavan, CRM helps to detect measure and supervise the activities of a bank. This means, credit risk management aids banks in monitoring the number of activities so as to avoid credit risk. Most banks have chalked successes as a result of an effective CRM system used in their daily operations. In the same dimension, the author of Introduction to Banking, The Casu *et al* (2006), also described CRM as a weapon used by management to increase its returns by bringing credit risk to its lowest minimum.

Santomero (1997) bring to bear the importance of having an effective CRM in place. According to this researcher, the presence of CRM limits the probabilities of distinctive losses by erasing risks that does not bring any reasonable return. He pointed out that, CRM

has led to a uniform assessment across borrowers. According to Wenner *et al* (2007) CRM empowers financial institutions to become potent and achieve a stable growth.

According to Onaolapo (2012), the Basel Committee on banking supervision sees CRM as a way of reducing the likelihood that the deficit unit cannot meet the agreed payment and time of payment. Credit risk management is an essential element of a bank's financial standings. That is to say, the performance of bank is highly dependent on effective and efficient credit risk management (Prakash and Poudel, 2012). CRM is very important in the banking sector because, it forms a fundamental part of the credit process. However, there are disadvantages that will scare some banks from engaging in CRM. These bottlenecks in the initial stages affect the financial position of these financial institutions but in the long run yields offsetting benefits.

2.1.6 CREDIT RISK MANAGEMENT STRATEGIES

The credit risk management strategies are procedures banks adopted in the mitigation or reducing the negative effect credit risk. A comprehensive credit risk management structure is vital because as stated it helps increase the revenue and survival. According to Lindergren (1987), the main ideologies in credit risk management strategies take the following form. They include formation of a clear structure, delegation of powers, discipline, and communication at all level and holding people accountable. Some of approaches for preventing credit risk include the following.

2.1.6.1 SELECTION

According to Gestel *et al* (2009), a sound CRM begins with a proper choosing of borrowers and the products that suit them. For this to be possible, a competent loan officers

and Operative models of estimating risk should be in place. This is a very crucial stage because decisions are taken by the entire committee member. Here, borrowers that are likely to default are either denied or asked to secure the loan with more collateral to limit the effect of default. .

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2.1.6.2 LIMITATION

This method aids the bank by reducing the amount of loss suffered from a borrower. It prevents the event where the failure of counterparty to meet his or her obligation will heavily affect the financial performance of the bank. The number of riskier transactions is brought to the bearer minimal. (Gestle *et al*, 2009).

2.1.6.3 DIVERSIFICATION

Gestel *et al* (2009) stressed that banks should deal with different counterparties ranging from individuals, industries. This helps to spread the risk across various borrowers so that banks can reduce the impact of loss it is much workable for large and international banks.

2.1.6.4 CREDIT ENHANCEMENT

According to Gestel *et al* (2009) when a bank realizes it is exposed to too much risk when dealing with a particular kind of borrower, it solves this by acquiring an insurance policy to cover for the any future losses. Through this, the quality of the loan facility is improved. It is called credit risk mitigation.

2.1.6.5 COMPLIANCE TO BASEL ACCORD

Basel committee on Banking Supervision enlarges the procedures through which a bank can manage its exposure to credit risk. One of the principles is constantly changing and

reviewing their credit risk policies to suit the prevailing economic trend in the country. This can be done by the introduction of new products and services. Secondly, banks should investigate their borrowers properly. This will lead to a better understanding of the customer they are dealing with (Basel Committee on Banking Supervision, 1999). These strategies do not prevent credit risk totally; however they can reduce the level of credit risk the banks are exposure to. And this will increase the profitability performance of the banks.

2.1.7 CREDIT RISK MEASUREMENT

The successful management of credit risk is dependent on the ability to measure it. The main challenge of FIs is how to precisely measure credit risk exposure and portfolio level because as the level of credit risk rises, the realized rate of return on the a loan portfolio is reduced and the required level of capital increases (Cole *et al*, 2012).

Muhammad and Garba, (2014) identify two important tools that can be used in assessing or measuring credit risk. These include Default ratio (DR) and Cost per loan advanced.

2.1.7.1 DEFAULT RATIO (DR)

DR is a ratio that determines the amount of non-performing loans as against the total loans and advance over a period. It shows the percentage of loans and advances that were not paid over a period. It also shows the efficiency of management has performed in controlling their loan portfolio over a period. (Appa, 1996; Ahmed *et al.*, 1998; Kolapo *et al.*, 2012). DR ratio can be calculated as:

DR Ratio = Non performing Loans / Total Loan and advances

2.1.7.2 COST PER LOAN ADVANCE RATIO (CLA)

CLA is the average cost per loan advanced to customer in monetary terms. The function of this is to point out efficiency in distributing loans to customers (Appa, 1996; Ahmed *et al.*, 1998; Kolapo *et al.*, 2012). CLA ratio can be calculated as:

$$\text{CLA Ratio} = \text{Total Operating Cost} / \text{Total Amount of Loans}$$

2.1.8 PROFITABILITY

Banking Profitability may also show managers attitude toward risk. Banks that make huge profits are not scared when venturing into risky activities. In a similar fashion, banks that are not effective in their management encounter higher bad debt. Profitability measure is important to the investors. The level of profitability is very significant for shareholders of a bank because it shows how effective management has utilized their investments (Devinaga, 2010).

In determining the financial strength of a commercial bank, the level of profitability is predominant. According to Codjia (2010), profitability performance will concentrate on the income statement which shows how much is generated (revenue), how much is spent (expenses) net income. This may be prepared by the bank on a monthly, quarterly or annual basis (Codjia, 2010)

According to Rushdi and Tennant (2003), profitability can be measured in a number of ways. They include return on assets (ROA), return on equity (ROE). But over the year, most researchers prefer using return on asset (ROA). Godlewski (2004) used ROA in measuring profitability. It was disclosed that, the performance of a bank was negatively affected by the level of nonperforming ratio. In theory, ROA shows the capacity of a bank's management to make profits using the level of asset available. It may be unfair

because of the other events that take place outside the balance sheet (Athanasoglou *et al.*, 2005).

Moreover, the performance of a business is normally estimated using their profitability standings. These researchers used return on asset as a measure for profitability. In their defense, these researchers selected ROA over ROE because it is free of financial leverage and the risks associated with it (Flamini *et al*, 2009). Additionally, it is possible to compare companies in the same industry or diverse industry when ROA is employed as a proxy for profitability. This makes ROA a strong measure for profitability (Devinaga, 2010).

2.1.9 INTERNAL DETERMINANTS OF BANKS' PROFITABILITY

According to Devinaga (2010), researchers who paid more attention to the discovery of the determinants of a bank's performance and profitability classified them into two main factors. These are the internal and the external factors. According to Husni (2011), the internal determinants of profitability are made up of factors that can be controlled by the banks. Thus it is within the power of the banks to determine the level these factors should take. These determinants have effect on both the revenue and cost incurred by the banks. Some research papers have divided these determinants into two groups. They are the financial statement variables and non-financial variables. The financial statement variables have a direct effect on both the financial statement and the statement of financial position of the bank and the non- financial statement variables consist of factors like the number of branches of a particular bank, location (Haron, 2004). The following are the internal determinants of the profitability of banks;

2.1.9.1 LOAN QUALITY

Banks play different roles through which income is generated. One of these roles is the advancement of loans to borrowers. It has been established that loan and advances is one of the main avenue through which the bank make profit. This means the more the banks give out loans, the more they grow in terms of profit (Abreu and Mendes, 2003). However, banks have to tread cautiously because this exposes them to liquidity and default risks which affect the profit and survival of the banks (Devinaga, 2010). For instance, the global financial crisis that begun in the United State of America in 2008 had its roots from the sub-prime loans which the banks engaged in and when the housing market experienced a decline in prices, borrowers or customers who were granted these sub-prime loans could not pay back the loans and the interests attached to them and this led to the doom of some banks (Gaurav and Kelly 2011). During this period of financial recession, Ghanaian banks experienced profit in spite of the continuous increase in nonperforming loans. The stress test conducted the IMF revealed that, anytime the assets of the bank are not put into efficient and effective use and bad debt rises, the financial strength of the banks begins to decline and this can cause the banks to collapse if immediate steps are to taken. Therefore it is important to put measures in place to enhance the quality of loans in order to avoid large number of defaults.

Furthermore, the ratio of loan loss to total loans (LLTR) is also a significant determinant of banks' profit (Sufian *et al* (2008). The rise in LLTR represents a rise in the credit risk the banks are exposed to. Hence higher credit risk affects profitability of a bank adversely.

A study carried out by Vong *et al* in 2009 revealed that, loan loss provisions is inversely related to the performance of banks in Macao. Another measure for a loan quality is the ratio of loan to total asset (LOLA). Again, the work of Vong *et al* (2009) disclosed that

LOLA had a negative relationship with profitability instead of increasing it and according to these authors, this result was in confirmation with the initial finding of Vong (2005). To summarize on this point, the quality of a loan can be measured using non-performance loans, loan loss provisions and loans and advances ratio as suggested by Rasiah (2010) and Vong *et al* (2009) respectively.

2.1.9.2 INCOME

According to Devinaga (2010), the income of a bank can be broken down into two, namely, interest and non-interest income. Interest income is made up of Interest charge on loans, overdraft and trade finance which are made available to customers by the bank. Non – interest income on the other hand consists of fees, commissions, brokerage charges and returns on investments in subsidiaries and securities. From these two incomes generated by the banks, interest income is the major source of revenue (Vong *et al*, 2009) because it contributes about 80% of the earning of the banks.

2.1.9.3 DEPOSITS

Banks are said to be deeply reliant on the monies largely given by the customers in the form of deposits to generate the credit being offered to borrowers. It has been established that deposits are inexpensive source of financing for banks and therefore positively affected the profitability of banks when request for loan facility is on the rise. This implies that banks make more profit when the level of deposits rises and loans are given out to customers (Devinaga 2010). However, the caveat here is that, if the demand for loan is low, having more deposits could rather reduce the profit because of the interest the banks pay on these deposits (Devinaga 2010). A study carried out by Husni (2011) on the determinants commercial banks performance in Jordan unveiled that ROA and Total Liability to Total Assets are positively related.

2.1.9.4 CAPITAL RATIO

Capital ratio was identified as a variable in the studies done by both Devinaga (2010) and Vong *et al* (2009) on the topic “Determinants of banks profitability and performance”.

They both share the view that shareholders’ funds, reserves and retained profit which make up the capital structure has an influence on the profitability of banks because of its consequence on leverage and risk. According to these researchers, the assets of banks can be raised through capital (equity) and debt. Among the two, debt financing can be more risky when it comes to credit and liquidity risk. For instance, banks which are financed through debt will be scare to move into risky investments because when losses are made they are still obliged to settle the debt. On the other hand, a bank financed by capital can invest in more risky projects and also absorb problems which rise as a result of liquidity and credits risks.

Sufian *et al* (2008) also stressed on the importance of a strong capital structure for banks in developing countries because it offers them ability to endure financial crunches and protect depositors in times of bankruptcy and distress macroeconomic conditions.

Molyneux *et al* (1992) argued that lower cost of capital can be achieved when a bank is financed predominantly by equity and this can boost the profitability of that bank. In addition, Both Basel II and III accord concedes that majority of bank bankruptcies are as a result credit losses and for this reason it is important for banks to have a strong capital base which will serve as a cushion against loss (Basel Committee’s response to the Financial Crises 2010).

Berger (1995) also stated that banks with weak capital base stands on risky grounds. This will have a negative impact on profitability. This is the brain behind Bank of Ghana’s

persistent increase in the capital requirement in the banking industry. The Ghanaian banks' Capital to risk weighted assets is said to have increased from 9.1 % in 2003 to 19.1% in 2010 whereas, the Tier I capital to risk-weighted assets has also increased from 16.2% in 2005 to 18.6% in 2010 (IMF Country Report 2011). This shows that the minimum capital standing in Ghanaian Banking Sector is higher than the requirement set by Basel II at 8% (Basel Committee's response to the Financial Crises 2010).

This might account for persistent rise profitability by the Ghanaian banks during these years of global financial crisis. A research carried out by Karkrah and Ameyaw (2010) on the topic profitability determinants of commercial banks in Ghana disclosed that the equity ratio which is the measure of the capital strength of the banks is positively related to the ROA.

2.1.9.5 LIQUIDITY RATIO

According to Devinaga (2010), regulators of the banking industry requires banks to hold enough liquid assets (cash) to deal with the day to day activities like meeting the withdrawal needs of the customers. He explained that this is possible if the banks are able to amass enough cash and the quickest way to raise funds from other sources. This means that, the ability for a bank to survive also dependent greatly on the level of liquidity. However, Devinaga (2010) stated that the lesser earnings on liquid assets and funds which are not utilized have a negative impact on the profitability of a bank. And because of this, liquidity management serves as an important factor of profitability.

The IMF Country Report 2011 has shown that irrespective of the financial distress that hit the world, Ghanaian banks are strong in terms of liquidity. The report revealed that in 2010 Ghanaian banks had 25.3% in the area of Liquid asset to total assets and 33% for

Liquid asset to short- term liabilities. Based on these ratios it was concluded that Ghanaian banks had generated profit because of their strong liquidity. Devinaga (2010) used the ratio of loan and advances to deposits as a measure for liquidity. The researcher used this ratio because information on loans and deposits are easily accessible.

2.1.10 EXTERNAL DETERMINANTS OF PROFITABILITY OF BANK

The ambiances in which banks operate have a significant influence on the financial performance and their strategies employed. These external determinants are the outside factors that affect the positioning of a bank. These factors are above the controlled of the banks; however, banks which are proactive can position themselves very well to make the best out of the anticipated changes. According to Karkra and Ameyaw (2010), these external factors are the macroeconomics variables and can affect the profitability of a bank. In this research, Gross Domestic Product, interest rate and exchange rate are adopted as the external determinants.

2.1.10.1 GDP

According to Vong *et al* (2009), the real GDP growth rate is used as a measure for economic growth of a country and has a positive impact on the profitability of a bank. These authors stressed that, when there is a favourable economic growth, the probability of borrowers defaulting is very low and vice versa. However, some studies have revealed a diverse relationship between the profitability of a bank and GDP.

As some research works support the idea of positive relationship between these variables, others reveal otherwise. a study conducted by Sufian *et al* (2008) on

Philippian banks revealed a positive relationship between banks' profitability and GDP. This is in line with the work done by Athanasoglou *et al.*, (2008) which showed a positive correlation between the variables. On the other hand, a study by Husni (2011) on the banks in Jordan indicated a significant and an inverse relationship between ROA and GDP. Interestingly, the finding of Vong *et al* (2009) showed an insignificant relationship between the two variables.

2.1.10.2 INTEREST RATE

Interest rate have been used in many studies as a determinant of bank's profitability since net income interest which is the difference between interest income and interest expenses has massive influence on the profitability of a bank (Devinaga, 2010). This researcher described interest rate as an external factor since it is determined by the economic policies of the government and the invisible hand of demand and supply. Additionally, he stressed that, the effect of change on profitability depends on the extent and speed at which interest rate differs in both short and long run period in the bank.

According to Devinaga (2010), banks frequently change their rate of return on their assets to cancel any differences as a result of variations in economic policies. The assets of the banks especially short term loans have short maturity and these loans are usually flexible in terms of rate. This makes it easy for the banks to amend their rate to suit the fluctuations with the interest rate.

A study by Uhomoibhi (2008), into the impact of interest rate on profitability of commercial banks revealed that interest rate is not only significant but also has a positive impact on the profitability. The finding was in line with that of Karkra and Ameyaw and Husni (2011). Furthermore, a research conducted by Pasiouras and Kosmidou (2007) on

the factors influencing the profitability of domestic and foreign commercial banks in the European Union” indicated a positive relationship.

2.1.10.3 EXCHANGE RATE

Over the years, many researchers have conducted studies to discover the impact of exchange rate on the profitability of banks. A study by Atindehou and Gueyie (2001) on the topic “Canadian Banks and their exposure to foreign exchange rate risk” indicated that the profitability of Canadian Banks depended on the foreign currency variation over a period. Other research by Elyasiani and Mansur (2005) showed that data on exchange rate had a strong impact on the financial performance of a bank. This is contrary to findings of Chamberlain *et al* (1997). According to Bracker *et al* (2009), variations the U.S. Dollar is one of the major source of bank risk. The study revealed that exchange rate has a significant impact on profitability. However, the results of the study were not consistent, while some time period indicated a positive relationship; the other generated an inverse relationship.

2.2 EMPIRICAL REVIEW

2.2.1 CREDIT RISK AND PROFITABILITY.

Proper management of credit risk is a significant element of an all-inclusive method to risk management as a whole and vital to the future progress of any financial institution. Banks play a major role in the credit market because they assemble deposits from the various surplus units and make them available to the deficit unit for development activities. This implies that banks give out loan to borrowers from deposits made by the public with the objective of increasing their profitability. Now, since banks make huge profit through their

role as financial intermediaries, it beholds on them to find pragmatic ways of managing credit risk and thereby guarding and enhancing their profitability (Muhammad *et al*, 2014).

According to Hempel and Simomson (1999), non-performing loans is a major credit risk indicator and therefore a bank can lower its credit risk exposure by reducing it. Over the years, many researchers have tried to scrutinize the influence of credit risk on banks' profitability and if really nonperforming loans play in major role in depleting profitability.

Ahmed *et al* (1998) used multi-variant regression and discovered that, loan loss, which is the last aspect of non- performing loans has a strong impact on profitability because, a rise in loan loss suggests an elevation in credit risk and therefore affecting the bank's financial standings negatively. Another study conducted by Ahmad and Ariff (2007), revealed that a dominant element of credit risk in commercial banks is loan loss provision so that any jump in the level of loan loss has a direct relationship with credit risk. They again stressed on the fact that, credit risk in developing countries supersedes that of developed economies.

Naceur and Omran (2008) employed the unbalanced panel regression in studying the impact bank regulations, financial and institutional development have on profitability in the Middle East and North Africa from 1989 to 2005 shown that there is a positive relationship between credit risk bank capitalization and banks' profitability. Achou *et al* (2008) carried out a project which looked at the impact of CRM and profitability. This study displayed that there is a substantial correlation between bank performance (in the field of profitability) and credit risk management (in terms of loan performance). Effective credit risk management results in better banking performance. This implies that it is of

vital significance that banks practice prudent credit risk management in order to protect banks' assets and the investments of shareholders.

Njanike (2009) shared similar idea after a research was carried out in Zimbabwe between 2003 and 2004. He assessed the level at which a bank fails if CRM is neglected. It was established that higher rate of bank crisis is linked with failure to handle credit risk. Njanike (2009) suggested that banks should implement credit scoring and review their credit policies and put in place a prudent corporate governance practices.

Kithinji (2010) came out with an interesting result after he conducted a research which sought to assess the outcome of CRM on banks' profitability in Kenya. The research took the total loans, level of nonperforming loans and profit accumulated for a five year period. Surprisingly, it came out that, neither of these independent variables had influence on profitability. That is the findings disclosed that nonperforming loans and credit giving has no bearing on the profitability of commercial banks than other variables. Therefore it will be prudent for Commercial banks to pay keen attention to other issues other than concentrating more on the level of loan and nonperforming loans. Aremu *et al* (2010) also came out with a paper contrary to that of Kithinji. This paper finds non-performing loans as the main danger to the profitability of banks in Nigeria. It is stressed that bankers should consider the new idea of credit rating and scoring recently pronounced by the Central Bank of Nigeria in order to improve their credit administration and management which will help raise their profitability. According to the finding, loan loss provisions rose from 64.5 billion in 1999 to 223.4 billion in the year 2004. This is bad because it depletes the profit figures of the banks every year. These researchers believe that if banks implement the recommendations made by the central bank they will lead to improvement in the profitability and a decrease in the level of nonperforming loans in Nigeria.

Kargi (2011) estimated the effect of credit risk on the profitability of Nigerian banks. Data on credit risk and profitability ratios were collected from 2004 to 2008. The analysis of this data involved descriptive, correlation and regression techniques. The result was that CRM has a substantial influence on the profitability of Nigerian banks. Other findings on the study showed that a rise in nonperforming loans negatively affect profitability and liquidity. Epure and Lafuente (2012) studied the impact of risk on the performance of banks in Costa-Rican banking industry during 1998-2007. The results showed that performance has an inverse relationship with nonperforming loans and capital adequacy related positively with performance.

A study by Boahene *et al.* (2012) use regression analysis (both fixed and random effect models) in bringing to bear the linkage between credit risk and profitability of some selected banks in Ghana. It came out that, the credit risk constituents rather have a positive relationship with bank profitability. This implies that, banks in Ghana experience high profitability irrespective of the huge credit risk exposure. This is similar to the research made by Kithinji in 2010 and contrary to other studies which projected that credit risk indicators have negative effect on profitability. In a diverse dimension, Kolapo *et al* (2012) used panel data analysis in studying the effect of credit risk on banks' performance using ROA as a measure for performance. The result was that an increase in nonperforming loans or loan losses provision diminishes profitability (ROA), while an increase in total loan and advances enhance profitability.

Gizaw *et al* in 2013 examined the impact of credit risk on the profitability of commercial banks in Ethiopia. Secondary data was retrieved from 8 sample commercial banks for a period of 12 years from annual reports of these banks. In analyzing the data, a STATA software version 11 was used to compute the descriptive statics and panel data regression model and the outcome was that credit risk determinants; nonperforming loans, loan loss

provisions and capital adequacy have a significant impact on the profitability of commercial banks in Ethiopia. Therefore the researchers stressed on the need to strengthen the credit risk management policies to gain better financial standing for commercial banks in commercial in Ethiopia.

Ogboi and Unuafé (2013), in their study stress that Nigerian banks in their quest to maximize profit are channeling chunk of their scare financial resources in provision for loan loss. Time series and cross sectional data were obtained from the annual report and accounts of selected banks from 2004-2009. The researchers used Panel data analysis to estimate the linkage among loan loss provisions (LLP), loans and advances (LA), nonperforming loans (NPL), capital adequacy (CA) and return on asset (ROA). It came out that comprehensive credit risk management and capital adequacy had a positive effect on profitability whilst loans and advances rather had an inverse relationship with financial performance in the period under study.

Alalade *et al* (2014) examines the impact of managing credit risk and profitability of banks in Lagos state. The research hypothesis was tested and analyzed in relation to credit risk and its significant effect on banks' profitability. It was also the aim of this research to evaluate how effective it is for a bank to manage its credit risk effectively to enhance profitability. Data for the study was an obtained through the administering structured questionnaires which were answered by respondents. Correlation coefficient was used to decide whether or not credit risk management has an impact on profitability. The results revealed that credit risk reduces the profit and therefore management of credit risk should be of great importance to management of bank in Lagos state.

2.3 REVIEW OF THE COMMERCIAL BANKING SECTOR IN GHANA

Banking has been one of the most essential activities that help boost the strength of both developed and underdeveloped economies. The focus of banking can be divided based on the needs it addresses and its methods of operation. In a wider scope, banks can be classified into commercial banks and central bank. Commercial banks are the ones with the sole aim of making profit by providing financial services while the central bank is described as “the parent” of the commercial banks, this is because, it controls and monitors the operations of these banks and other economic activities.

The Banking Companies Act of India defines Bank as “a financial institution which accepts money from the public for the purpose of lending or investment repayable on demand or otherwise withdrawal by cheques, drafts or order or otherwise.” From this definition, it can be said that the traditional activities of a bank is to buy money (deposit from customers), sell money (granting of loan facility) and to make money (from interest charged on loan).

In Ghana, the banking industry has seen a tremendous development from the past decade. This is due to the of the re-capitalization and re- structuring that have been implemented to curb the uncertainties in the global financial systems and catch up with the economic growth of Ghana. This new regulations recommended by the Financial Sector Assessment Program (FSAP) in 2003 have enabled the banks to stand tall against any financial tension .In addition, regulators have developed an efficient ways of managing liquidity and have also put in place institutions to fight for the rights of creditors (IMF Country Report). This wind of change was motivated by the development in information technology, the deregulation that had taken place in the national and regional levels of the financial sector and the effects of the globalization process. Some of the significant developments in the industry are as follow;

The year 2003, saw an increment in the minimum stated capital of the banks from GH¢20,000 to GH¢7 million. The same year, banks with GH¢7 million in capital were given universal banking licenses. This gave each bank the authority to provide several services like commercial, merchant and development banks. Now, almost all banks in Ghana offer the same banking services because of this license.

In 2004, the Banking Law 1989 (PNDC Law 225) was substituted with The Banking Act 2004 (Act 673). Two years after (2006), there were massive development in the industry where the Secondary deposit reserves requirement (15%) was eradicated. Again, Foreign Exchange Act 2006 (Act 723) (the “Foreign Exchange Act”) was implemented the same year.

The approval of Credit Reporting Act (Act 726) and Banking (Amendment) Act 2007 (Act 738), the abolishment of the National Reconstruction Levy and the Redenomination of the cedi were seen in 2007. In 2008, the biometric smart card E-zwich was introduced to eradicate the risk of carrying cash around. The Borrowers and Lenders Act, 2008 (Act 773) and the Anti- money Laundering Act, 2008 (Act 749) came into force. Another significant reform that took place in 2014 was the restrictions placed on foreign exchange transactions.

Today, commercial banking in Ghana is made up of many players (local banks and foreign banks) and this has intensified the quality of corporate governance. In times past, the commercial banking sector was dominated by Barclays and Standard Chartered banks. These banks exploited Ghanaians because of their dominance in the market. They did this by asking customers to pay huge fees for little service done. For instance, in 2003, the least deposit required by these banks when opening a current account for a customer was 100 Ghana Cedis and this in the Ghanaian context was too much considering the level of

income. Currently, the saturation of the commercial banking sector has caused these banks to change their policies so they can gain a huge share of market.

According to Ghana Banking Survey (2014), Ecobank Ghana stands tall with market share of 13%. This is as result of the synergy achieved after it merged with The Trust Bank. The market share of Ghana Commercial Bank has fallen from 11% in 2012 to 9.4% in 2013 despite being the bank with widest branch network. This has widen the gap between EBG and GCB further and the experts have associated the drop in GCB's market share to the strong competition in the industry as various banks continuously expand their capacity and chase for customers from the same market.

Surprisingly, the high market share enjoyed the EBG did not make it the most profitable bank in the industry rather; Baroda has increased its PBT from 85% in 2012 to 88.3% in 2013. Even though Baroda is known to have relaxed its methods towards risk and it continue to give out credit facilities to customer but a very conservative way. Baroda has invested more than half of its working assets in government securities which are default free. This is aiding the bank in generating the highest profit in the banking sector. The profit recorded by Baroda represents less than a percent of the entire PBT in the industry. Nevertheless, it will persistently generate remarkable operating results as far as it continue to invest in government instruments. The critical developments seen in the structures of commercial banking sector in Ghana have and continue to play a significant role by providing rooms for investment activities and also help grow the economy to the country.

2.4 CREDIT RISK AND COMMERCIAL BANKING IN GHANA

A commercial bank is one mainly involved in deposit and lending activities to private and corporate clients in wholesale and retail banking. As a financial intermediary, credit risk is one factor that is pinning the financial strength of the commercial banks.

According to the Ghana Banking Survey (2014), the industry has attained extraordinary progress in making sure that the quality of loans is improved. The loan loss provision as a percentage of gross loans and advances continued to be constant at 6.3% in 2013. The industry became less proactive in the evaluation of credit facilities from 2006 to 2009 and recorded a higher credit default a year after banks cleared their books by being effective and efficient in the credit granting process.

The wind of change that has occurred in the regulations of the Bank of Ghana concerning credit administration has introduced three major reforms. They include credit reference bureaux, collateral registry and the Borrowers and Lenders Act for effective credit administration. These variations enhanced the quality of loans in the accounts of the banks and have enhanced the betterment of loans in the accounts of the banks.

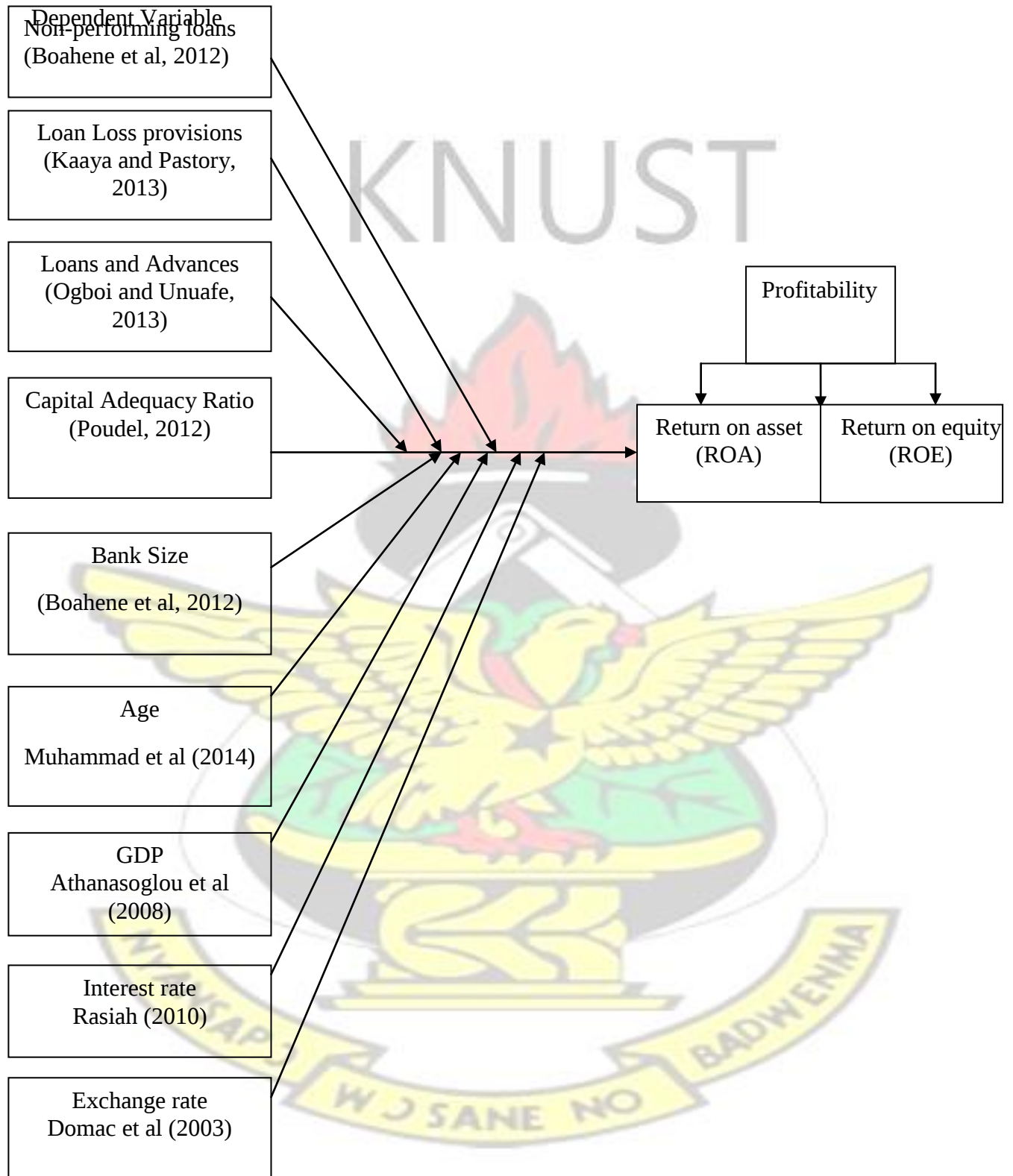
Badu (2012) in her research “an assessment on the effectiveness of credit risk management tools utilized by financial institutions in Ghana, a case of UT Bank” concluded that credit risk management aided the bank in reducing helps nonperforming Loans and enhanced the profitability performance. Therefore to avoid credit risk, effective CRM must be implemented. However, significant enhancement in the quality of loan in the book of the commercial banks as a result of the credit administration reforms had a disadvantage. The growth in the credit of the industry is now increasing at a decreasing rate in the year 2013. There have been an increased in Gross loans and advances by 41% in 2012 but dropped to 32% in 2013.

2.5 CONCEPTUAL FRAMEWORK

A conceptual framework is a scheme of concepts or variables which the researcher will operationalize in order to achieve set objectives (Oso and Onen, 2007). It is a pictorial demonstration of the theory portrayed as a model where researcher shows the link between variables and renders the reveal the relationship between the independent, extraneous and dependent variables (Oso and Onen, 2007).

Poudel (2012) studied the factors affecting commercial banks performance in Nepal for the period of 2001-2012 and used a linear regression analysis technique. The study revealed a significant inverse relationship between commercial bank performance measured by ROA and credit risk measured by default rate and capital adequacy ratio. In this study, the a priori assumption is that credit risk (non-performing loans, loan loss provisions, loans and advances) has a negative impact on profitability. Additionally, there are other internal variables such as capital adequacy, bank size and age that could affect the profitability (ROA and ROE) of a bank.

**FIGURE 2.1 CONCEPTUAL FRAME WORK INDEPENDENT VARIABLES
DEPENDENT VARIABLES**



Source: developed for the study (2015)

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

This section of the research explains the tools employed in answering the research questions of this study. In other words this aspect of the work brings to bear the methodology of the study. The research design, the sources of data used in the study, sample for the study are captured at the section. Additionally, it also focuses on the credit risk measures and some other internal and external determinants of profitability. Finally, it presents the model adopted in analyzing and discussing the results of the study.

3.1 RESEARCH DESIGN

This aspect describes the nature of the pattern the research intends to follow. This is the overall plan or strategy for conducting the research. The primary purpose of the study was to explore the relationship between credit risk and the profitability of some selected banks in Ghana. The research was conducted through a Historical Research Design. Historical research design is where the researcher explores, explains and understands past phenomenon from already existing data. This helped the researcher to arrive at conclusions about the impact of credit risk on the profitability in order to explain the present and predict and control the future. The study adopted quantitative research approach. The quantitative research approach answered the “How many?” questions in the study, thus allowed the measurement of relationships between variables in a systematic and statistical way.

3.2 DATA

There are numerous sources through which one can obtain data for a research work. According to Yin (1994), data can be sourced through documentation, archival records, interviews, direct observation, participant observation and fiscal artifacts. The researcher of this study employed document analysis in accessing data for the research. Document analysis is a “critical investigation of public or private recorded information related to the issue under investigation”. This helped the researcher to gain unobtrusive information at the pleasure of the researcher and without interrupting the researched. The researcher used this technique to obtain data from the annual reports and audited financial accounts of 7 out of the 27 Universal banks from 2005 to 2013. These selected banks include Ghana Commercial Bank, Cal Bank, Ecobank, HFC Bank, Standard Chartered Bank, UT Bank and SG-SSB. These banks were selected because they are listed on the Ghana Stock Exchange (GSE) and again, they are a blend of old and young generation banks. This helped the researcher to gain correct result and leverage.

A STATA software version 12 was used to calculate a descriptive statistics (mean, standard deviation, minimum and maximum) of the study variables, correlation matrix for the purpose of multicollinearity and a panel data regression analysis was also used in determining the impact of credit risk on profitability performance.

3.3 MODEL SPECIFICATION

Panel data analysis model was used to determine the relationship between credit risk and profitability of some selected banks in Ghana. The Panel Data Model is longitudinal or cross sectional time –series data in which the behavior of entities are observed across time

(Reyna 2007). This model allows researchers to control for variables that cannot be measured like cultural factors or difference in business practices across companies or variables that change overtime but not across entities (national policies, federal regulations and international agreements). It helps to account for individual heterogeneity. It also provides more informative data, more variability, less co-linearity among the variables, more degree of freedom and efficiency (Gujarati and Sangeetha, 2007).

3.3.1 PANEL DATA ESTIMATION TECHNIQUES

Panel data uses two main techniques in its analysis and they include; Fixed and Random Effect Model.

The Fixed Effect Model explores the relationship between predictor and outcome variables within an entity (bank, company person). Each entity has its own peculiar features that may or may not have an impact on the predictor variable (Reyna 2007). For instance, the policies of a particular country could have some impact on interest rate. This model assumes that the unique element with an individual may impact or bias the predictor or outcome variables and therefore there is the need to control for this. This is the motive behind the assumption of the correlation between entity's error term and predictor variables (Reyna 2007).

This model removes the effect of time-variant characteristics so that the net result of predictors on the outcome variable can be ascertained.

Another assumption this model is that those time-invariant features are distinctive to the individual and should not be correlated with the other individual features. Each entity is different therefore the entity's error term and the constant which involves individual

features should not be correlated with the others (Reyna 2007). This means FE is not suitable when the error terms are correlated because the implications may not be accurate. The equation used in the FE model is given as:

$$Y_{it} = \beta X_{it} + \alpha_i + U_{it}$$

Where α_i ($i = 1 \dots n$) is the unknown intercept for each entity, Y_{it} is the dependent variable (DV), i represents entity and t is time, X_{it} is the independent variable (IV), β_1 represents the coefficient for the IV and U_{it} is the error term.

The Random effect model on the other hand is a special case of the fixed effects model. It is employed in analysis of hierarchical or panel data when one assumes no fixed effect. Thus it allows for individual effects. The brain behind this model is that the variance across entities is assumed to be random and uncorrelated with the predictor or independent variables.

Random effect model assumes that the entity's error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables. Therefore individual characteristics which may or may not have impact on the predictor variables must be specified. The down side is that, some variables may not be available therefore bias can occur in the model (Reyna 2007). According to Williams (2015), Random Effect models can be estimated through Generalized Least Squares (GLS).

The random effect model is:

$$Y_{it} = \beta X_{it} + \alpha + U_{it} + \varepsilon_{it}$$

“...the main difference between fixed and random effects is whether unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not” (Greene, 2008).

According to Greene (2008), the decision to choose either of these models can be done by running the Hausman test. It basically tests whether the unique errors (U_i) are correlated with the regressors.

In the absence of individual effect, thus when u_i is 0, ordinary least square (OLS) is employed to produce efficient and consistent estimation of parameters. This is the pooled OLS. The pooled OLS is preferred when the null hypothesis is not rejected in either fixed or random effects.

According to Greene (2008), it is based on five main assumptions which include linearity, where the dependent variable is formulated as a linear function of a set of independent variable and the error (disturbance) term. Exogeneity assumed that the expected value of disturbances is zero or are not correlated with any regressors. The third assumption states that, disturbances have the same variances and are related with one another. Again, the observations on the independent variables are not stochastic but fixed in repeated samples without measurement errors.

Lastly, there is the full rank assumption which specified that there is no exact linear relationship among the independent variables. This means there is no trace of multicollinearity. The equation for pooled OLS is written as:

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} (U_i = 0)$$

3.4 EMPIRICAL MODEL

This research adapted a Balanced Panel Data model which was used by Boahene *et al* (2012) in their research on “Credit Risk and Profitability of Selected Banks in Ghana”. These researchers employed both Fixed and Random effect model in the study and the result was consistent for all the variables with the exception of the growth variable. The

Hausman Specification Test was run by these researchers and revealed that the fixed effects model was much more preferred to the random effects and therefore the fixed effects model was used for the analysis.

The result showed that credit risk, size of bank, bank growth rate are keys factors which influence the profitability of sampled banks in Ghana. Surprisingly, the entire variables used in the research had a positive impact on firm profitability. The basic model used in this study was written as

$$ROE = \beta_0 + \beta_{NCOTL_{it}} + \beta_{NPLR_{it}} + \beta_{PPPNTLA_{it}} + \beta_{SIZE_{it}} + \beta_{GRO_{it}} + \beta_{TDA_{it}} + \varepsilon_{it}$$

Kolapo *et al* also conducted a study on the topic “Credit Risk and Commercial Banks” Performance in Nigeria”. In their study, they used the fixed effect model. This is due to the fact that although the intercept may differ across individuals (the five banks) each individual’s intercept does not vary over time. Thus it is time variant. The result was that the coefficients of Non-performing loans, Loan Loss Provision and Loans and Advances were highly significant as the probability values of the estimated “t” coefficients were extremely small. The study revealed that a 100% increase in non-performing loan reduces profitability (ROA) by about 6.2%; a 100% increase in loan loss provision also reduces profitability by about 0.65% while a 100% increase in loans and advances increase profitability by 9.6%. The model for the study was given as;

$$ROA = \beta_0 + \beta_1 NPL + \beta_2 LLP + \beta_3 LA + \mu$$

Kolade *et al* (2012) used ROA as the dependent variable in their model but the researcher employed both ROA and ROE, the most common indicators of profitability in two different models. Additionally the researcher has developed the right hand side of the model used by Kolade *et al* by adding Capital adequacy ratio (CAR) and other variables like, bank size (total assets) and age. These variables have been added to the main

independent variable, credit risk which was measured by the ratio of nonperforming loans to total loans (NPLR), total loans and advances ratio (LAR) and loan loss provision ratio. The empirical model for the study of the impact of credit risk on profitability is given as;

MODEL – 1

$$ROA = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 LAR_{it} + \beta_4 CAR_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \varepsilon_{it} \dots \dots (1)$$

$$ROA = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 LAR_{it} + \beta_4 CAR_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_1 GDP_t + \beta_2 INT_t + \beta_3 EXC_t + \varepsilon_{it} \dots \dots (2)$$

MODEL – 2

$$ROE = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 LAR_{it} + \beta_4 CAR_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \varepsilon_{it} \dots \dots (1)$$

$$ROE = \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 LAR_{it} + \beta_4 CAR_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_1 GDP_t + \beta_2 INT_t + \beta_3 EXC_t + \varepsilon_{it} \dots \dots (2)$$

This econometric method allowed to control the heterogeneity of the observations in their individual measurements, either by taking into account a specific stationary effect (Fixed effect) or by considering a non-observable specific effect (Random effect). The Hausman test assisted the researcher in selecting the specific effect needed for this study. The test determines whether the estimates of the coefficients taken as a group are significantly different in the two effects. The preferred model for null hypothesis in the Hausman test is random effect contrary to the alternative hypothesis which goes for the fixed effect. Thus when the test statistic (prob>chi2) is less than 0.05 it leads to the rejection of the null hypothesis and acceptance of the alternative.

The results from the Hausman tests conducted for the two equations in model- 1 indicated that, the fixed effect model was appropriate and preferred in analyzing this study. The case was different in model 2. Here, the Hausman test conducted for the first equation showed that fixed effect was appropriate however the second equation for the model -2 proved

otherwise. The Hausman test indicated the random effect as appropriate. The analysis of the study is in two folds. The first one used credit risk measure and other internal determinants of profitability in its analysis whilst the second had some macroeconomic factors attached to the models.

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3.5 DEFINITION OF VARIABLES

The decision to examine the influence credit risk has on the profitability of banks will be conducted using eleven variables and they include:

3.5.1 DEPENDENT VARIABLES

RETURN ON ASSETS (ROA)

ROA is the ratio of net income and total assets of a company. This determines how efficiency and effectiveness in the performance of a bank's management in terms of profit generation from the limited source. The higher the ROA means management is efficient and the capable of converting the assets into net income and this translates into higher bank's profit.

RETURN ON EQUITY

The researcher also used return on equity (ROE) as dependent variable and measures of profitability. It measures how much shareholders have gained in their return on investment in the bank. ROE was used as the measure of the profitability in this study because ROE along with ROA has been widely used in earlier research (Ara al el, 2009).

It reveals the efficiency of management in the usage of the monies shareholders have invested into the company.

3.5.2 INDEPENDENT VARIABLES

NONPERFORMING LOAN RATIO (NPLR)

This is the major determinant of credit risk in commercial banks. It is the ratio of nonperforming loans to total loans. It reveals the quality of a bank's loan portfolio. That is the percentage of the total loans and advances that is on the verge of going bad. The higher the ratio sends a signal that that management was not too efficient when evaluating loan applications. Again it shows that there is a higher probability the most of the loans might not be recovered.

LOANS AND ADVANCES RATIO (LAR)

This ratio is commonly used to evaluate the liquidity of a bank by dividing total loans by its total deposits. It determines the ability of a bank to meet loan demands and the withdrawal needs of its customers. A higher ratio means that the bank is less required and must be efficient to avoid insolvency and vice versa.

LOAN LOSS PROVISION RATIO (LLPR)

A loan loss provision is an expense that is saved for defaulted loans or credits. This serves as an internal insurance fund. This is the money set aside to cater for the inability for a borrower to make payments. That is either the principal or interest or even both. This protects depositors from a loss in the funds deposited in the banks. According to Gizaw *et al* (2013), the basic assumption behind LLPR is that banks managers reflect their belief toward the bank's asset quality. An increase in LLPR means a decrease in the quality of the assets.

CAPITAL ADEQUACY RATIO

Capital adequacy ratios measure of the amount of a bank's capital expressed as a percentage of its risk weighted credit exposures. This is also a control variable and is selected because regulators have identified it as the main measure of a bank's financial performance. A strong Capital Adequacy Ratio increases the profitability of a bank. It also helps in the stability and efficacy of the financial system. The Basel Accord II requires banks to hold capital adequacy at least 8 % of their risky asset.

SIZE

In this research, size of a bank was measured by the logarithm the total asset year by year. It is also an essential determinant of financial performance. The relationship between bank size and profitability is uncertain because most researchers argue that larger banks enjoy economies of scale while other scholars think otherwise.

AGE

Age is a measure of the experience of the bank, i.e. the number of years since its formation. Here it has been assumed that the older the bank, the more experience it has gain in fighting credit risk and therefore a positive impact on its profitability. Thus a positive sign indicates that experience counts in the banking sector; whereas, a negative sign shows that younger banks are more efficient than the older ones.

GROSS DOMESTIC PRODUCT (GDP)

Gross Domestic Product (GDP) is one of the macroeconomic indicators employed in measuring the financial performance of a bank. This is because it is used to estimate the

entire economic activities of a country. Based on the results of the study conducted by Bikker (2002), a positive relationship is expected.

INTEREST RATE

Interest rate is generally expected to have a positive impact on bank's profitability. This means as interest rate increases, banks receive more on their loans granted. Thus an increase in interest rate raises the lending rates more than the deposit rates. This same increase also escalates the burden of borrowers which may lead to lower quality in terms of asset. This compels banks to charge higher interest to offset their exposure to credit risk (P.I. Vong *et al*, 2009).

EXCHANGE RATE

This variable is also used to measure the effect of environmental situations in the banking industry. The finding may differ depending on the exchange rate adopted by the country (fixed or floating exchange rate). According to Domac and Martinez- Peria (2003) the profitability of the bank is likely to rise if the country employs the fixed exchange regime. However, Artete and Eichengreen (2002) see it differently. These researchers believe irrespective of the exchange rate regime adopted by a country, banks can increase or reduce their profitability.

TABLE 3.1 VARIABLES AND EXPECTED RELATIONSHIP

DEPENDENT VARIABLES	INDEPENDENT VARIABLES	RELATIONSHIP
Return on Asset (ROA)	Nonperforming loan (NPLR)	Positive/ Negative
	Loan loss provision (LLPR)	Positive/ Negative

Return on Equity (ROE)	Loan and advances	Positive/ Negative
	Capital adequacy ratio (CAR)	positive
	Bank size	Positive/ Negative
	Age	positive
	GPD	Positive/ negative
	Interest rate	Positive/negative
	Exchange rate	Positive /negative

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF THE EMPIRICAL RESULT

4.0 INTRODUCTION

The chapter reveals the empirical evidence on the impact of credit risk on profitability of some selected banks in Ghana using a balance panel data of banks over the period 2005-2013. This chapter presents the descriptive statistics of the selected variables, the correlation matrix and the result of the regression analysis. Econometric specifications for ROA and ROE have been determined by employing both fixed and random techniques. The Hausman Test was used by the researcher to determine the appropriate technique for each model.

4.1 DESCRIPTIVE STATISTICS

The researcher provided a comprehensible image of profitability performance and credit risk indicators by employing the descriptive statistics. The main statistics are mean,

standard deviation, maximum and minimum values of the variables over the selected number of years. This study considered both return on asset (ROA) and (ROE) as a measure of profitability performance and the result on the table showed that on the average the banks used in the study earned a 3.26% return on asset with 1.39% standard deviation.

A study by Flamini *et al* (2009) on banks in the Sub-Saharan African countries revealed that there was a 2% return on asset which was seen as higher than that of the ROA of banks in other parts of the world. On this basis it can be said that these banks under study have been proficient in using their assets. Flamini *et al* (2009) further emphasized that high profitability enjoyed by banks in Sub-Saharan Africa can be linked to the size of the bank, diversified portfolio and private ownership.

In the case of Ghana, total assets increased by 33% from GHS27, 100 million in 2012 to GHS36, 100 million in 2013, but the tremendous increase in net profits by 64% from GHS940 million in 2012 to GHS1,530 million in 2013 also played a role in generating greater returns (Ghana Banking Survey, 2014).

In the case of ROE, the table displayed that equity shareholders earned an average of 25.42% with 12.09% of standard deviation. This is above the industry average return of 23.8%. Even though this can be considered as good, some banks performed poorly with a minimum value as low as 1%.

With regard to credit risk measures, the average NPLR among the selected banks for the study in the period of nine years was 9.4% with a standard deviation of 6.35%. The difference between the minimum value of 1% and the maximum of 32% and the standard deviations showed there was a high variability in terms of NPLR.

According to Willem (2013) there is no internationally accepted limit for loan loss provision ratio, nevertheless some countries have provided benchmarks or parameters to guide the activities of banks in these countries. This is one of the measures of credit risk and it shows the level of default risk the bank is ready to absorb. As per the result, the banks under study had an average of 6.14% loan loss provision with a standard deviation of 4.74%. The minimum and maximum values are 1% and 23% respectively.

The ratio of loan and advance to deposit is used as a measure of credit risk. It shows the extent to which funds deposited in the banks are used in generating loans which is capitalized by default risk. On the descriptive table, the LAR of the banks under study had an average of 75.94% with a standard deviation of 27.44%. The maximum and minimum values were 166% and 23.1 respectively, suggesting that the banks pay more attention to the granting of loan facilities which is more risky. The maximum value depicted how banks give out loans facilities in excess of the total deposits.

Capital adequacy ratio is the ratio of adjusted equity base to adjusted asset base. This is used by the central banks to secure the monies of depositors from default risks and other short falls of the banks. The accepted minimum requirement set by the Basel is 8%, however, the bank of Ghana has increased its minimum CAR to 10 % (Ghana Banking Survey, 2013). This is to ensure that depositors are highly protected. From the table, the CAR had a mean value of 16.11% with a standard deviation of 4.72%. The minimum and maximum values stood at 8.62% and 31.36% respectively. It can be said that the banks have the capacity to bear loss from loan granting and other failures. The bank size (log of total asset) was 20.35 with a standard deviation of 1%. It recorded a maximum of 21.96% and a minimum of 18.07%.

GDP growth has declined from 15% in 2011 to 7.1% in 2013. From the table, GDP had a mean of 7.24% with standard deviation of 2.51%. The period under study recorded a minimum and maximum value of 4.2 and 13.6 respectively. Interest rate had a mean of 14.72% (1.82), a minimum value of 12.5 and a maximum of 18%. The mean value of exchange rate for the period was 1.3533 with a standard deviation of .4014.

TABLE 4.1 DESCRIPTION OF THE VARIABLES

VAR	OBS.	MEAN	STD.DEV.	MIN	MAX
ROA	63	3.2571	1.3923	.73	6.96
ROE	63	25.4171	12.0929	1.98	53.3
NPLR	63	9.3997	6.3522	1	32
LLPR	63	6.1384	4.7416	1	23
LAR	63	75.94	27.4414	23.1	166
CAR	63	16.1110	4.7233	8.62	31.36
SIZE	63	20.3457	.9694	18.0705	21.9553
AGE	63	38.7143	33.5032	10	117
GDP	63	7.2444	2.5060	4.2	13.6
INT.	63	14.7222	1.8267	12.5	18
EXC.	63	1.3533	0.4014	0.9073	2.0641

4.2 CORRELATION MATRIX

The table 4.2 shows the correlation matrix for the entire variables employed in both Model -1 and 2. The coefficient of the correlation shows an index of the direction and the extent of the connection between two set of scores without implying causality. The sign of the coefficient is a signal of the direction of the relationship while the absolute value of the coefficient indicates the magnitude.

Correlation matrix is important because it shows the existence of multicollinearity among the variables. Multicollinearity is the condition where some or all of the explanatory variables are extremely connected so that it is problematic when determining which of them is affecting the dependent variable. Schindler and Cooper (2009) state that any correlation above 0.8 between the independent variables is assign of multicollinearity. Thus the variables are highly correlated. From the table 4.2, there is no trace of multicollinearity



TABLE 4.2 CORRELATION MATRIX

	roa	roe	nplr	llpr	lar	car	size	age	gdp	int	exc
roa	1.0000										
roe	0.7862	1.0000									
nplr	0.0404	-0.0527	1.0000								
llpr	0.1573	0.1422	0.7857	1.0000							
lar	-0.4243	-0.4739	-0.1338	-0.2389	1.0000						
car	0.1606	-0.0678	-0.2381	-0.2978	0.0801	1.0000					
size	0.3561	0.2768	-0.0485	-0.1364	-0.4592	0.0296	1.0000				
age	0.4128	0.4268	0.0165	-0.0125	-0.4614	0.0597	0.4661	1.0000			
gdp	-0.0629	-0.1159	0.1550	0.0414	-0.2436	0.0427	0.3230	0.0351	1.0000		
int	0.0204	0.0033	-0.0492	-0.0297	0.2259	-0.0026	-0.0082	-0.0013	-0.5929	1.0000	
exc	0.2492	-0.0204	0.1373	-0.0502	-0.0688	0.2331	0.6539	0.0705	0.3664	0.0861	1.0000

4.3 REGRESSION RESULTS FOR MODEL – 1

4.3.1 REGRESSION RESULT FOR MODEL -1 (EQUATION-1)

The researcher estimated the panel regression analysis for the models using both fixed and random techniques. Hausman Test was conducted to ascertain the right technique to adopt, where the null hypothesis stands, random effect is preferred and the reverse is true for fixed effect. The result of the Hausman Test for Model – 1 indicated a p-value of 0.0292 which is small enough to reject the H_0 , therefore fixed was used.

As observed from the table of the Model- 1, the R^2 is 0.1594 which means that credit risk pointers and the other variables in the model explained about 16% of the variance in profitability performance of the some selected banks in Ghana measured by ROA.

The result indicated that all independent variables used in the model are statistically significant to the dependent variable (ROA). The coefficient of nonperforming loan (NPLR) is negative which implies that it NPLR is inversely related to Profitability (ROA) at the .05 significance level. Thus 100% increase in NPLR will reduce profitability by 9% Ceteris Paribus. Again, the result indicated that loan loss provisions ratio has a positive relationship with profitability at the .01 significance level. This means holding all other variables constant, a 100% increase in LLPR, will result in a 15% increase in profitability. The loan and advances ratio also had a positive relationship with profitability at the .05 level.

In term of percentages, a 100% increase in LAR will in turn increase profitability by 2% ceteris paribus. For capital adequacy ratio (CAR), an increment of 100% will also increase profitability by 11% at the .01 significance level. Bank size on the other hand had a negative coefficient which was contrary to the expected relationship at the .01 level. Age is positively related to profitability at the .01 significance level.

TABLE 4.3 FIXED AND RANDOM EFFECTS FOR MODEL -1 (EQUATION -1)

FIXED EFFECT				RANDOM EFFECT		
Var	Coef.	t-test	prob	Coef.	z-test	prob
NPLR	-0.9033	-2.21	0.031	-0.0519	-1.31	0.189
LLPR	0.1586	3.16	0.003	0.1161	2	0.041
LAR	0.021	2.22	0.031	-0.009	-1.28	0.201
CAR	0.1125	2.8	0.007	0.0638	1.88	0.06
SIZE	-1.6533	-2.8	0.007	0.2897	1.48	0.138
AGE	0.5955	3.45	0.001	0.0097	1.77	0.076
CONS.	10.307	1.69	0.098	-3.5734	-0.84	0.403
		R-sq:		R-sq:		
		overall	0.1594			overall
		F(6,50)	5.77			waldchi2(6)
		Prob>F	0.0001			prob>chi2
		N	63			N

TABLE 4.4 HAUSMAN TEST FOR MODEL – 1 (EQ-1)

COEFFICIENTS				
	(b)	(B)	(b-B)	sqrt (diag (V_b-V_B)
	fixed	random	Difference	S.E.
NPLR	-.0903277	-.051855	-.0384727	.0102727
LLPR	.1586072	.1160515	.0425556	.
LAR	.0210067	-.0090913	.0300981	.0062494
CAR	.1124968	.0637973	.0486995	.0216455
SIZE	-1.653299	.2897326	-1.943031	.5582885

AGE	.5955271	.009642	.585885	.1726229
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b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg Test:

Ho: difference in coefficients not systematic

$$\begin{aligned}\text{chi2}(6) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 14.04\end{aligned}$$

$$\text{Prob}>\chi^2 = 0.0292$$

(V_b-V_B is not positive definite)

4.3.2 REGRESSION RESULT FOR MODEL -1 (EQUATION -2)

The researcher extended the first model (ROA) by adding three macroeconomic variables which include GDP, interest rate and exchange rate. After conducting the Hausman test, it indicated a p-value of 0.0000. This is small enough to reject the null hypothesis and therefore, fixed effect was used in analyzing this second equation under the model – 1. There was R- square of 0.1623 which suggest that 16% of the variance in profitability (ROE) can be linked to this model.

The results were not different in terms of signs (positive or negative) but the magnitude of impact was altered. Nonperforming loan still maintained its negative relationship at .05 significance level but this time, 100% increase will reduce profitability by 8.23% Ceteris Paribus. LLPR still had a positive impact on profitability at .01significance level. Thus holding all other factors constant, 100% increase in LLPR, profit is expected to increase by 16%. LAR also maintained its positive relationship with profitability; however, it was statistically insignificant.

CAR indicated a positive impact on profitability at .05 significance level. This implies that holding all other variables constant, 100% increase in CAR, is expected to boost profit by 9.83%. Bank size (total asset) still had an inverse relationship with profitability at .05 significance level. Thus all other factors being constant, a percentage increase will reduce profit by 16%. Age on the other hand, revealed that it is one factor that increases profitability at .05 significance level.

Surprisingly, all the external or macroeconomic variables employed in this model were statistically insignificant.

TABLE 4.5 FIXED AND RANDOM EFFECTS FOR MODEL –1 (EQUATION -2)

FIXED EFFECT				RANDOM EFFECT			
Var	Coef.	t-test	prob	Coef.	z-test	prob	
NPLR	-.0823	-2.02	0.049	-.0580	-1.44	0.151	
LLPR	.1589	3.10	0.003	.1098	1.99	0.046	
LAR	.0209	1.88	0.067	-.0142	-1.93	0.054	
CAR	.0983	2.39	0.021	.0422	1.19	0.234	
SIZE	-1.5555	-2.61	0.012	.0103	0.04	0.972	
AGE	.5319	2.07	0.044	.0111	1.97	0.049	
GDP	-.1376	-1.73	0.090	-.1967	-2.28	0.023	
INT.	-.1752	-1.86	0.069	-.1214	-1.10	0.271	
EXC	.6749	0.65	0.522	1.2886	2.00	0.046	
CONS.	13.60338	1.89	0.065	4.3576	0.72	0.469	
		R-sq:				R-sq:	
		Overall	0.1623			overall	0.4142
		F(9,47)	5.77			waldchi2(6)	37.47
		Prob>F	0.0003			prob>chi2	0.0000

N 63

N 63

TABLE 4.6 HAUSMAN TEST FOR MODEL -1 (EQ -2)

Coefficients				
	(b)	(B)	(b-B)	$\sqrt{\text{diag}(V_b - V_B)}$
	fixed	random	Difference	S.E.
NPLR	-.0823	-.0580	-.0243	.0054
LLPR	.1589	.1098	.0491	.
LAR	.0209	-.0142	.0351	.0084
CAR	.0983	.0422	.0561	.0208
SIZE	-1.5556	.0103	-1.5659	.5202
AGE	.5319	.0111	.5208	.2569
GDP	-.1376	-.1967	.0591	.
INT	-.1752	-.1214	-.0538	.
EXC	.6749	1.2886	-.6136	.8227

b = consistent under H_0 and H_a ; obtained from xtregB = inconsistent under H_a , efficient under H_0 ; obtained from xtregTest: H_0 : difference in coefficients not systematic $\chi^2(9) = (b -$ $B)'[(V_b - V_B)^{-1}](b - B)$ $= 392.16$ Prob> $\chi^2 = 0.0000$

(V_b-V_B is not positive definite)

4.4 REGRESSION RESULTS FOR MODEL – 2

4.4.1 REGRESSION RESULT FOR MODEL - 2 (EQUATION 1)

A similar test was performed for Model - 2 where Roe was the dependent variable. The Hausman Test showed a p-value of 0.017. This p-value is small enough to reject H_0 , therefore reject the H_0 . By virtue of the fact that the H_0 was rejected, fixed effect was used in analyzing this model.

The result from Model- 2 where Roe was the dependent variable indicated R^2 of 0.1757 which implies that 18% of the variance in profitability (ROE) can be linked to this model.

From the result, nonperforming loans is negatively related with profitability measured by ROE at .05 significance level. Thus a percentage increase in nonperforming loan will reduce profitability by 8%, all other things being equal. For loan loss provision (LLPR), the coefficient shows a positive relation on ROE at .01 significance level. This implies that holding all other variables constant, a percentage increase in LLP increased profitability by 12%. Loan and advances had a positive relation with profitability where 100% increase enhanced profitability by 11% but it was statistically insignificant. Bank size had a negative relationship with profitability at .01 significance level while age had a positive impact on profitability at .01 significance level. However the result from the Model - 2 revealed that CAR is statistically insignificant even though it had a positive relationship on ROE.

TABLE 4.7 FIXED AND RANDOM EFFECTS FOR MODEL – 2(EQUATION-1)

FIXED EFFECT				RANDOM EFFECT		
Var	Coef.	t-test	prob	Coef.	z-test	prob
NPLR	-0.8234	-2.57	0.013	-0.7998	-2.37	0.018
LLPR	1.181	3	0.004	1.0333	2.13	0.033

LAR	0.1107	1.49	0.142	-0.1194	-1.96	0.05
CAR	0.1349	0.4	0.671	-0.1139	-0.39	0.694
SIZE	-12.349	-2.66	0.01	0.6551	0.39	0.695
AGE	3.6849	2.72	0.009	0.1054	2.26	0.024
CONS.	123.921	2.58	0.013	20.0822	0.55	0.583
		R-sq:		R-sq:		
		Overall	0.1751	overall		0.3503
		F(6,50)	3.5	waldchi2(6)		30.2
		Prob>F	0.0058	prob>chi2		0.0000
		N	63	N		63

TABLE 4.8 HAUSMAN TEST FOR MODEL – 2 (EQ- 1)

COEFFICIENTS				
	(b)	(B)	(b-B)	sqrt (diag (V_b-V_B))
	fixed	random	Difference	S.E.
NPLR	-.8234	-.7998	-.0236	.
LLPR	1.1810	1.0333	.1477	.
LAR	.1107	-.1194	.2300	.0426
CAR	.1349	-.1139	.2487	.1243
SIZE	-12.3490	.6551	-13.0040	4.3296
AGE	3.6849	.1054	3.5794	1.3543

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic chi2(6)

= (b-B)'[(V_b-V_B)^(-1)](b-B)

= 21.12

Prob>chi2 = 0.0017

(V_b-V_B is not positive definite)

4.4.2 REGRESSION RESULTS FOR MODEL -2 (EQUATION- 2)

Unlike the earlier analyses where fixed effect was employed, this one proved otherwise. The Hausman test indicated a p- value of 0.0669 which supported the null hypothesis and therefore the random effect was used in the analysis. The results revealed a lot of variances or better still some variables had different impact on profitability.

The result projected R-squared of 0.3870 which implies that 39% of the variance in profitability (ROE) can be linked to this model. NPLR still had an inverse relationship with profitability (ROE) at .05 significance level. Holding all other factors constant, a percentage increase in NPLR is expected to reduce ROE by 7.05%. LLPR on the other hand had a positive impact on profitability (ROE), however it was statistically insignificant. LAR, another measure of credit risk indicated a negative relationship at .05 significance level.

CAR recorded an inverse relationship while bank size (total asset) had a positive relationship this time round. Additionally, age maintained its positive impact but all these variables were statistically insignificant. All the three macroeconomic variables included in this equation were not significant though still maintained their impact as seen earlier.

TABLE 4.9 FIXED AND RANDOM EFFECTS FOR MODEL –2 (EQUATION -2)

FIXED EFFECT				RANDOM EFFECT			
Var	Coef.	t-test	prob	Coef.	t-test	prob	
NPLR	-.7615	-2.34	0.023	-.7055	-1.97	0.049	
LLPR	1.1415	2.79	0.008	.9549	1.95	0.051	
LAR	.1001	1.12	0.267	-.1354	-2.07	0.039	
CAR	.0551	0.17	0.867	-.1092	-0.35	0.729	
SIZE	-12.3285	-2.59	0.013	1.1266	0.43	0.664	
AGE	4.2864	2.09	0.042	.0943	1.88	0.060	
GDP	-.9468	-1.49	0.142	-1.2946	-1.69	0.091	
INT.	-1.0582	-1.41	0.166	-.6510	-0.66	0.506	
EXC	-1.1489	-0.14	0.891	2.0279	0.35	0.724	
CONS.	125.9595	2.19	0.033	27.8797	0.52	0.602	
		R-sq:				R-sq:	
		Overall	0.1785			overall	0.3870
		F(9,47)	2.64			waldchi2(6)	33.46
		Prob>F	0.0142			prob>chi2	0.0001
		N	63			N	63

TABLE 4.10 HAUSMAN TEST FOR MODEL -2 (EQUATION-2)

COEFFICIENTS				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	random	Difference	S.E.
NPLR	-.7615	-.7055	-.0561	.
LLPR	1.1414	.9549	.1866	.
LAR	.1001	-.1354	.2355	.0603

CAR	.0550	-.1092	.1643	.0908
SIZE	-12.3285	1.1266	-13.4551	3.9909
AGE	4.2864	.0942	4.1922	2.0496
GDP	-.9468	-1.2945	.3477	.
INT	-1.0582	-.6510	-.4072	.
EXC	-1.1489	2.0278	-3.1767	6.0615

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic chi2(9)

$$= \frac{(b-B)'[(V_b-V_B)^{-1}](b-B)}{16.00}$$

Prob>chi2 = 0.0669

(V_b-V_B is not positive definite)

4.5 DISCUSSION ON REGRESSION RESULTS

4.5.1 THE IMPACT OF NONPERFORMING LOANS ON PROFITABILITY

The quality of a loan portfolio can be estimated by the level of credit default risk and this is measured by the rate of nonperforming loans to total loan and advances .A study conducted by Kithinji (2010) on the topic “The effects of CRM on banks” profitability in Kenya” revealed that ROA which is a measure of profitability is not influenced by the credit quality and nonperforming loans. This is contrary to the findings of this research. The results from regression analysis revealed that NPLR is inversely related with banks” profitability in Ghana measured by ROA. This is consistent with finding of Achou and Enguh (2008); Poudel (2012); Kolapo *et al* (2012); Kargi (2014); Muhammed (2014).

With respect to ROE, Boahene *et al* (2012) came out that, nonperforming loans has a positive relationship with profitability. Thus banks in Ghana make experience increase in profitability irrespective of their level of nonperforming loans. Once again, the outcome of this research revealed the opposite. This is in line with the study carried out by Kutsienyo (2011) on the topic “the determinants of profitability of banks in Ghana”. In this research by Kutsienyo nonperforming loans are negatively significant to the profitability of banks in Ghana.

4.5.2 THE IMPACT OF LOAN LOSS PROVISIONS RATIO ON PROFITABILITY

Interestingly, loan loss provisions ratio which is an indicator of credit risk showed a significant positive relationship with profitability measured by both ROA and ROE. This may be as a result of management’s ability to erase the shock of losses through the funds set aside for this purpose. This positive relationship between profitability and LLPR shows the presence of earning management. Muhammad *et al* (2012) defined earning management as “a distortion to real reflections of economic events that take place in an organization through the use of management judgment”. This is done by management to maintain steady earnings growth or to prevent reporting red ink.

4.5.3 THE IMPACT OF LOANS AND ADVANCES RATIO (LAR)

Ogboi *et al* (2013) in the study on the impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria came out that loan and advances had a negative impact on profitability. This research produced the reverse of Ogboi *et al* (2013). The results indicated a positive relationship with both ROA and ROE

and it is linked with the findings of Kolapo *et al* (2012). This may be as a result of the interest earning on these loan facilities made available to deficit units.

4.5.4 CAPITAL ADEQUACY AND PROFITABILITY

Over the years, many researchers such as Hosna *et al* (2009), Kintinji (2010), Kargi (2011), Poudel (2012) have described capital adequacy as a good enhancer of banks' profitability. The results of this work support the finding of these researchers that positive relationship with the profitability of the banks under study. This is as a result of the Bank of Ghana persistent increase in the capital requirement of the banking industry. This means there is enough capital to withstand any losses from loan default and other banking failures.

4.5.5 BANK SIZE (TOTAL ASSETS) AND PROFITABILITY.

Boyd *et al* (1993) and Boahene *et al* (2012) used the natural logarithm of total asset as proxy for bank size in their respective regression models. The findings of these researchers revealed a positive relationship between bank size and profitability. Thus larger banks enjoy economies of scale and a well-diversified portfolio.

However the reverse is true for this study. The result was rather an inverse relationship between bank size and profitability. Apparently, the expenses and the cost involve in running larger are high. Again, the introduction of new banks put pressure on the already existing ones to open more branches and put in measures to maintain their market share. These activities can be costly and erode their profit.

4.5.6 AGE AND PROFITABILITY

Muhammad *et al* (2014) in the study found out that age is negatively related with banks' profitability. This implies that the older the bank, the lower its profit. The results of the

study proved otherwise. Age is not only positive but also has a significant relationship with banks' financial performance. This means the older the bank, the more experience it has in the industry and therefore knows the trend and makes provisions for that.

4.5.7 GPD AND PROFITABILITY

A study by P.I.Vong *et al* (2009) revealed that, GPD has an insignificant impact on profitability. This is consistent with the work of Bennacaur and Goaid (2008). The findings of this particular research support the work these researchers. The researcher talked on the GPD'S negative impact as seen in the result. According to IMF report, persistent increase in GDP has led to an increase in loans between the periods from 2003-2010 and this increase in loans resulted in a rise in nonperforming loans. According to Joel (2002), an increase in nonperforming loans reduces profitability greatly.

4.5.8 THE IMPACT OF INTEREST RATE ON PROFITABILITY.

The stress test conducted by the IMF team in 2010 revealed that banks in Ghana are capable of withstanding the frequent variations in interest rate because most of their lending rate varies. The report added that an increase in interest rate can negatively affect the revenue borrowers and their ability to service debt and this leads to higher nonperforming loans. The result from the study revealed that interest rate has a negative impact on profitability, however it was statistically insignificant.

4.5.9 THE IMPACT OF EXCHANGE RATE ON PROFITABILITY.

A research conducted by Osuagwu (2014) indicated that exchange rate is not significant in explaining the changes in ROA. This is not different from the findings of the research work. Though exchange rate showed a positive relationship, it was statistically insignificant in determining changes in both ROA and ROE.

4.6 THE PREDICTIVE POWER OF THE MODELS

In econometric sense, when the overall probability (p) value (Prob>F) less than 0.05 then the model is strong and has high predictive power and that significant results will be achieved when used in other studies (Reyna 2007). The first aspect of the work which examined the impact of credit risk on profitability using credit risk measures and some internal determinants of profitability had probability values of 0.0001 and 0.0058 for model 1 and 2 respectively. The other aspect which included some macroeconomics factors had p- values of 0.0003 and 0.0001. This means the models used for the research have a high predictive power.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter presents the summary of the findings, conclusions and recommendations and based on the results. The summary gives a picture of the research, describing the various results of the research. The interpretation based on the empirical study is seen in the conclusion while the recommendations are proposals from the findings.

5.1 FINDINGS

The roles of banks in the economic development and growth of a country cannot be undermined. They engage in financial intermediation where funds are taken from the surplus units and made available to the deficit units. This role exposes them to various types of risks and the most popular and well-spoken of is credit risk. This is an assumed

risk that a borrower will not pay back the lender as agreed. It is therefore essential to identify the extent to which this risk influences the profitability of banks in Ghana

The purpose of this research work is to identify the prevailing relationship between Credit risk and Profitability of some selected banks in Ghana. The two key measures of profitability which include Return on asset (ROA) and Return on equity (ROE) were used as the dependent variables for this study. The explanatory variables employed in the two models were the measures for credit risk. This included nonperforming loans to total loans and advances, loan loss provision ratio and loans and advances ratio. Capital adequacy, bank size (total asset) and age were used as control variables. The researcher used a descriptive statics and Balanced Panel data regression in analysis data accessed from the annual reports and audited financial statements of 7 banks for a period of 9 years (2005-2013).

5.1.1 IMPACT OF CREDIT RISK

The first model which used ROA as a measure for profitability revealed that all variables employed as a measure of credit risk were found to be significant on profitability of banks.

The results indicated that, even though other credit risk measures like loan loss provisions and loan and advance have positive impact on profitability, nonperforming loans which is also measure of credit risk has an inverse relationship with profitability. This means as the deterioration in the quality of asset rises, the profitability of banks also decreases.

Using ROE as a measure of profitability, the effects of the credit risk measures were not different from the results of the model with ROA (Model -1).

The inclusion of the three external factors did not change the signs the credit risk measures had on profitability but rather the extent of impact.

5.1.2 IMPACT OF CONTROL VARIABLES

The study revealed that capital adequacy has a positive relationship with profitability therefore banks with higher capital adequacy ratio are in a safe and sound position to give out more loans and absorb losses from credit default. However its effect on ROE was not statistically significant as compared to ROA. Age played a positive role in financial performance and the size of bank measured by total asset reduced profitability of the banks. Apart GDP which had a negative and a significant impact on ROA, all the other macroeconomics factors were statistically insignificant.

5.2 CONCLUSION

The primary aim of this research was to bring to light the impact of credit risk measures on the profitability of some selected banks in Ghana. From the finding, loan loss provision had a positive influence on profitability because it served as a financial backup for the banks to absorb losses. This means the presence of LLPR acts as a shield that protects the banks' profit from any unexpected credit default. Loan and advances also had a positive impact on profitability measured by ROA because of the higher interest rate charged on the loan facilities. This meant that banks can give out more loans without fear because they know that income earned on loans were paid would be enough to cancel that which went bad. In the case of ROE, LAR was statistically insignificant even though it had a positive effect on ROE.

However, nonperforming loans which is also a determinant of credit risk indicated a negative impact on profitability. Banks generate loans from the deposits received from customers therefore the banks' inability to recover these loans will mean that the little profit made will be used to serve the withdrawal needs of their customers.

The size of a bank measured by total assets had a negative impact on both profitability measures. This may be as a result of investing in assets which do not yield immediate income or income at all. Age on the other hand had a positive impact on the profitability measured by ROA and ROE. This suggests that older banks have the ability to increase their profit because these banks have a lot of experience in cutting costs and also built capacity in the area of credit recovery.

5.3 RECOMMENDATION

The following recommendations were made based on the finding of the study.

The management of banks especially credit officers must do due diligence by adhering to prudential guidelines when given out credit facilities. Banks must put in place sound credit-granting process, strictly hold fast to know your customer (KYC) system, applying effective measures in measuring and monitoring of credit (on-side and off-side monitoring) and ensure effective controls over credit risk. In addition to these measures, sound management practices and corporate governance should be adopted to reduce credit risk.

From the findings, it could be seen that LLPR or provision for bad debt is high and significant on profitability. This suggests that in a situation where loans are recovered to the extent that provisions are not made for them, profitability would increase. This raises a question of effectiveness of bank management to manage credit risk as well as the risk appetite of the banking institutions. The researcher therefore recommends that bank management should be proactive in recovering loans in order to reduce the funds set aside to provide for such loan losses. This may require tighter loan recovery strategies to ensure that the main measure of credit risk (i.e. NPLR) is reduced over time thereby increasing overall profitability

Again, LAR was found to have a marginal effect on profitability, it raises a concern as to how banks mobilize deposits vis a vis the amount of loan created over the same period. To reduce the risk created by excessive loan creation relative to amount of deposits mobilized, the researcher suggests that banks become proactive in mobilizing savings and deposits relative to the amount of loans created. It also requires that bank maintain a healthy balance between deposits and loans created within a reasonable period. The researcher suggests that banks reduce their risk appetite to rather healthy level that is sustainable.

Bank size plays a significant role in the profitability of banks. The size allows the bank to enjoy economies of scale and a diversified portfolio. However, banks should tread cautiously when it comes to investment. Investment in fixed assets like purchasing of vehicles and buildings which do not yield immediate results means that, funds will be tied up and since volatile fund in the form of deposits are used in these investments, liquidity. Since total asset was used as a proxy for bank size, it could be inferred that the size of bank assets in relation to liabilities is smaller. Again, the income earned on total assets may not be enough to cover payments on liabilities therefore the banks have to do proper asset-liability management.

Bank capitalization should be promoted so that banks performance can be improved. The habit of retaining earnings should be encouraged to increase the capital base rather than paying exorbitant bonuses. As a parent bank, the Bank of Ghana should intensify the monthly BSD 5R – Capital Adequacy Return taken from the banks and apply the appropriate sanctions to banks that fail to meet the minimum requirement.

In future research, it might be useful to study the impact of credit risk on the profitability of the individual banks. This will help reveal the performance of the individual banks toward the reduction of credit risk and how much it has affected their profitability.

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APPENDICES

APPENDIX I: FIXED EFFECT FOR MODEL – 1 (EQ- 1)

```

Xtreg      roa      nplr      llpr      lar      car      logsize      age,      fe
Fixed-effects (within) regression              Number of obs      =      63
Group variable: id                          Number of groups      =      7
R-sq: within = 0.4091                      Obs per group: min      =      9
between = 0.4388                          avg                      =      9.0
overall = 0.1594                          max                      =      9
                                           F(6,50)                  =      5.77
corr(u_i, Xb) = -0.9987                   Prob > F                  =      0.0001
  
```

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
roa						
nplr	-.0903277	.040796	-2.21	0.031	-.1722688	-.0083866
llpr	.1586072	.0502282	3.16	0.003	.0577209	.2594935
lar	.0210067	.0094633	2.22	0.031	.0019992	.0400143
car	.1124968	.0401867	2.80	0.007	.0317795	.193214
size	-1.653299	.5914334	-2.80	0.007	-2.841228	-.4653698
age	.5955271	.1727086	3.45	0.001	.2486316	.9424225
_cons	10.30699	6.110314	1.69	0.098	-1.965936	22.57992

sigma_u | 19.829075 sigma_e

| .97700881

rho | .9975782 (fraction of variance due to u_i)

F test that all u_i=0: F(6, 50) = 5.71 Prob > F = 0.0001

APPENDIX II: RANDOM EFFECT FOR MODEL – 1(EQ -1)

```

xtreg      roa      nplr      llpr      lar      car      logsize      age ,      re
Random-effects GLS regression              Number of obs      =      63
  
```


llpr	.1588609	.0512839	3.10	0.003	.055691	.2620308
lar	.0209312	.0111613	1.88	0.067	-.0015225	.0433849
car	.0982824	.0410935	2.39	0.021	.0156129	.1809518
size	-1.55558	.5967091	-2.61	0.012	-2.756004	-.3551564
age	.5318764	.256921	2.07	0.044	.0150181	1.048735
gdp	-.1375516	.0794846	-1.73	0.090	-.2974539	.0223508
intrate	-.1751915	.0943064	-1.86	0.069	-.3649114	.0145284
excrate	.6749759	1.045683	0.65	0.522	-1.428667	2.778619
_cons	13.60338	7.202067	1.89	0.065	-.8853065	28.09207

sigma_u | 17.594149 sigma_e

| .96234454

rho | .99701718 (fraction of variance due to u_i)

F test that all u_i=0: F(6, 47) = 4.84 Prob > F = 0.0006

APPENDIX IV RANDOM EFFECT FOR MODEL- 2 (EQ-2)

Xtreg roa nplr llpr lar car logsize age gdp intrate excrate, re						
Random-effects GLS regression	Number of obs	=	63			
Group variable: id	Number of groups	=	7			
R-sq: within = 0.2815	Obs per group: min	=	9			
between = 0.6923	avg	=	9.0			
overall = 0.4142	max	=	9			
	Wald chi2(9)	=	37.47			
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0000			
roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
nplr	-.0580432	.0403954	-1.44	0.151	-.1372167	.0211303
llpr	.1098084	.0550735	1.99	0.046	.0018664	.2177505
lar	-.0142149	.0073781	-1.93	0.054	-.0286757	.0002459
car	.0422268	.0354653	1.19	0.234	-.027284	.1117376
size	.0103043	.2923317	0.04	0.972	-.5626552	.5832638
age	.0110822	.005624	1.97	0.049	.0000594	.022105
gdp	-.1966537	.0863177	-2.28	0.023	-.3658333	-.0274742

intrate	-.1214302	.1102223	-1.10	0.271	-.3374619	.0946015
excrate	1.28856	.6454645	2.00	0.046	.0234729	2.553647
_cons	4.357676	6.017915	0.72	0.469	-7.437221	16.15257
sigma_u	0	sigma_e				
	.96234454					
rho	0	(f	variance due to	u_i		

APPENDIX V: FIXED EFFECT FOR MODEL -2 (EQ – 1)

Xtreg roe nplr llpr lar car logsize age, fe		
Fixed-effects (within) regression	Number of obs	= 63
Group variable: id	Number of groups	= 7
R-sq: within = 0.2955	Obs per group: min	= 9
between = 0.3034	avg	= 9.0
overall = 0.1751	max	= 9
	F(6,50)	= 3.50
corr(u_i, Xb) = -0.9971	Prob > F	= 0.0058

roe	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
nplr	-.8233847	.3201146	-2.57	0.013	-1.466354	-.1804157
llpr	1.181048	.3941266	3.00	0.004	.389421	1.972674
lar	.1106506	.0742557	1.49	0.142	-.0384963	.2597975
car	.1348985	.3153334	0.43	0.671	-.4984673	.7682644
size	-12.34898	4.640812	-2.66	0.010	-21.67033	-3.027637
age	3.68491	1.355196	2.72	0.009	.9629189	6.406902
_cons	123.9207	47.94593	2.58	0.013	27.61844	220.2229

sigma_u	120.32451	sigma_e	
	7.6663146		
rho	.	99595698	(fraction of variance due to u_i)

F test that all $u_i=0$: $F(6, 50) = 8.37$ Prob > F = 0.0000

APPENDIX VI: RANDOM EFFECT FOR MODEL -2 (EQ- 1)

Xtreg roe nplr llpr lar car logsize age, re
 Random-effects GLS regression Number of obs = 63
 Group variable: id Number of groups = 7
 R-sq: within = 0.0995 Obs per group: min = 9
 between = 0.5851 avg = 9.0
 overall = 0.3503 max = 9
 Wald chi2(6) = 30.20
 corr(u_i , X) = 0 (assumed) prob > chi2 = 0.0000

roe	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]		nplr
	-.7998128	.3379154	-2.37	0.018	-1.462115	-.1375108	llpr
1.03332	.4856877	.13	0.033	.0813899	1.985251	lar	-
.1193694	.0608212	-1.96	0.050	-.2385768	-.000162	car	-
.1138688	.2897948	-0.39	0.694	-.6818562	.4541187	size	.
6550991	1.670781	0.39	0.695	-2.619572	3.92977	age	.1054153
.0465715	2.26	0.024	.0141369	.1966936	_cons	20.08221	
36.579	0.55	0.583	-51.61131	91.77573			
sigma_u	0	sigma_e	7.6663146	rho			
	0	(fraction of variance due to u_i)					

APPENDIX VII FIXED EFFECT FOR MODEL -2 (EQ-2)

Xtreg roe nplr llpr lar car logsize age gdp intrate excrate, fe
 Fixed-effects (within) regression Number of obs = 63
 Group variable: id Number of groups = 7 R-sq:
 within = 0.3355 Obs per group: min = 9

between = 0.3101	avg	=	9.0
overall = 0.1785	max	=	9
	F(9,47)	=	2.64
corr(u_i, Xb) = -0.9978	Prob > F	=	0.0147

roes	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
nplr	-.7615289	.3251746	-2.34	0.023	-1.415696	-.1073619
llpr	1.141466	.4092405	2.79	0.008	.3181805	1.964752
lar	.1000975	.0890663	1.12	0.267	-.0790808	.2792758
car	.0550515	.327922	0.17	0.867	-.6046424	.7147454
size	-12.32849	4.761681	-2.59	0.013	-21.90775	-2.749221
age	4.286399	2.050204	2.09	0.042	.1619196	8.410878
gdp	-.9467548	.6342792	-1.49	0.142	-2.22276	.3292503
intrate	-1.058208	.7525556	-1.41	0.166	-2.572155	.4557382
excrate	-1.148883	8.344449	-0.14	0.891	-17.93575	15.63798
_cons	125.9595	57.4718	2.19	0.033	10.34119	241.5779
sigma_u 141.84146 sigma_e						
7.6794158						
rho .99707734 (fraction of variance due to u_i)						
F test that all u_i=0: F(6, 47) = 7.87 Prob > F = 0.0000						

APPENDIX VIII RANDOM EFFECT FOR MODEL – 2 (EQ – 2)

Xtreg	roes	nplr	llpr	lar	car	logsize	age	gdp	intrate	excrate,	re
Random-effects GLS regression									Number of obs	=	63
Group variable: id									Number of groups	=	7
R-sq: within = 0.1518									Obs per group: min	=	9
between = 0.5987									avg	=	9.0
overall = 0.3870									max	=	9
									Wald chi2(9)	=	33.46
corr(u_i, X) = 0 (assumed)									Prob > chi2	=	0.0001

roe	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	nplr
	-.7054691	.3589013	-1.97	0.049	-1.408903	-.0020354 llpr
.9548964	.4893119	1.95	0.051	-.0041373	1.91393	lar
.1354011	.0655522	-2.07	0.039	-.2638811	-.0069212	car
.1092459	.3150991	-0.35	0.729	-.7268289	.508337	size
1.126649	2.597281	0.43	0.664	- 3.963929	6.217226	age
.0941607	.0499674	1.88	0.060	-.0037735	.192095	gdp
1.294476	.7669073	-1.69	0.091	- 2.797587	.2086349	intrate
.6510298	.9792926	-0.66	0.506	- 2.570408	1.268348	excrate
2.027782	5.734763	0.35	0.724	- 9.212147	13.26771	_cons
27.87959	53.46742	0.52	0.602	-76.91462	132.6738	

sigma_u | 0 sigma_e | 7.6794158 rho |
0 (fraction of variance due to u_i)

