IMPACT OF INTEREST MARGIN ON NON-PERFORMING LOANS:

(CASE OF RURAL BANKS)

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A LONG ESSAY SUBMITTED TO THE DEPARTMENT OF FINANCE,
UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT FOR THE AWARD
OF MSc. DEVELOPMENT FINANCE.

JULY 2019
DECLARATION

I, hereby declare that, this Long essay presented is my own original and any other work has been duly acknowledged. I also declare that this work has never been submitted partially or wholly to any institution for award of certificate.

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CERTIFICATION

I declare that this Long essay was supervised in accordance with the procedures and guidelines laid down by the University.

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31 July, 2019

DATE
DEDICATION

I dedicate this project work to my wife, Abigail Ansong for her encouragement and enormous support and love.
ACKNOWLEDGEMENT

I am extremely grateful to God for His guidance and divine protection during this academic exercise. I would like to express my sincere appreciation to my supervisor, Dr. Amin Karimu for his support, advice and wise guidance provided throughout this research. He was so swift with providing responses to my write-ups and provided timely comments to ensure this piece met all the academic requirements and standards. I genuinely acknowledge all who have been of great support. I would also appreciate the effort of friends and colleagues who supported me in various ways.

May the Good Lord richly bless you all
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ABSTRACT

The financial sector of Ghana witnessed what many described as “financial crisis” in the early part of 2017. Many financial institutions became insolvent stemming from high levels of non-performing loans in the financial sector. Ghana as a country is currently experiencing one of the worst financial crises the country has ever experienced since it became a Republic. So far, over seven (7) commercial, retail and investment banks in the country have been declared insolvent by the Bank of Ghana (BoG) leading to massive loss of jobs and financial investments which have so far cost the in the excesses of GH¢ 12.7 billion of taxpayers’ money which could have been invested in social programmes and infrastructural projects to alleviate poverty (GNA, 2017). The Rural and Community Banking institutions in the country has not been left out of this mess with most of them being declared insolvent which has led to majority of their customers losing their savings (GNA, 2017). It is against this back drop that this study critically and carefully examined how certain factors interact with interest rate margin to influence NPL among rural banks in Ghana by employing a panel data analysis. The study found that both bank-specific variables and certain economic factors influence loan performance among rural banks in Ghana. The main factors that were identified to influence non-performing loans among rural banks in Ghana include interest rate, GDP, inflation, real effective exchange rate and loan growth.
CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION

The first chapter of this study details the background of the study, the problem statement, and the objectives of the study, the research questions and the significance of the study are also considered in this chapter. The chapter further discusses scope, limitations and chapter organisation of the study.

1.1 BACKGROUND

Over the last decades, many countries have engaged in several reforms designed to deregulate and privatize industries where regulation and public possession have been the order of the day (Alexandersson, 2010). According to Alexandersson (2010), such reforms have, for example, affected many banking and financial industries across the globe. Beck (2008) asserts that the restrictive policies were expected to contribute to the industrialization of the economic system and even more importantly to the stability of the banking sector. Conversely, monetary repression had charges on the financial system's competitiveness and efficiency hence many developing countries’ governments have moved away from a device of restrictive financial and monetary control to a greater liberalized monetary sector (Marius & Bogdan, 2012). Fuerst, Goldberg and Gomis-Porqueras (2012) established that restrictions on financial sector activities, savings insurance, and lax entry necessities tend to limit financial institution overall performance and expand government ownership of the banking system. The restrictive financial policies are regarded to have contributed to the retardation of the economic development process in many
developing nations (Philips et al, 2014), as was once evidenced in Ghana for the duration of the 1970s and the 80s (Aryeetey, 1994).

In view of this, the financial sector of Ghana has undergone several reforms that are geared towards liberalizing the financial sector to enhance and ensure healthy competition both locally and globally. This led to a significant increase in the number of banks in Ghana. It is established that as of November 2018, the number of banks and savings and loans company duly licensed that operated in Ghana totaled 34 and 37 respectively. It is however worthy of notice that the number of banks in Ghana reduced from 34 to 23 as a result of the clean-up in the banking sector which culminated from an increase in the minimum capital of banks. The current number of banks and other Licensed Specialised Deposit-Taking Institutions (SDIs) can largely be attributed to liberalization of the financial sector under the Financial Sector Adjustment Programme (FINSAP) and Financial Sector Strategic Plan (FINSSIP) which brought about improved savings, enhanced deposit mobilization, financial deepening, and competition in the banking industry. It is noted that, for the past decade, financial institutions in Ghana have been engaging in healthy competitions. The healthy competition has, to a very large extent, led to technological innovations in the financial sector such as automated teller machines (ATMs), e-banking, telephone banking, SMS banking and many others.

Financial institutions in Ghana engage in numerous economic activities that generate revenues. However, loans and interest on loans remain the largest and the most important asset and source of revenue for banks in Ghana through significant interest income earnings. This is seen in the volume of loans that constitute financial institutions’ overall assets and the annual volume of credit granted to borrowers in the private and public sectors of the economy. Caprio and Klingebiel (1996) suggest that a key challenge to the banking sector in the world over in the last few years
however, is the rising levels of Non-Performing Loans (NPLs) as a result of deteriorating economic conditions. In Ghana, the high level of NPLs is mostly caused by some key economic factors. Typically, the high level of non-performing loans in the country which resulted in the collapse of two seemingly healthy banks (UT Bank and Capital Bank) can be attributed to the high level of interest charged on loans making it impossible to pay fully the loan and the principal as observed in the research of Ahmad and Bashir (2013) in Pakistan. Again, the 2015 Ghana Banking Survey carried out by PricewaterhouseCoopers revealed that, the rise in NPLs in the financial sector of Ghana can largely be attributed to the “legacy debt” which resulted from unpaid subsidies on energy prices and foreign exchange under recoveries in relation to state organizations in the energy sector preventing these institutions from repaying their bank loans on schedule”.

In recent times, there has been a rise in NPLs in Ghana. This has rendered a good number of banks insolvent. It is recorded that the stock of NPLs as at December 2012 stood at GH¢ 1.9 billion and by the end of December 2016, it had grown to GH¢ 6.2 billion. In the same period, the NPL ratio (the ratio of nonperforming loans to gross loans) for the banking industry also increased from 13.2 percent in December 2012 to 17.3 percent in December 2016. The Commerce and finance, the Services and the Electricity, Gas and water sectors accounted for the largest proportions of banking sector NPLs (BOG Banking Sector Report, January 2017). The share of Commerce and Finance NPLs in the total NPLs of the banking sector was 39.1 percent, while NPLs of the Services and the Electricity, Gas and Water sectors were 15.1 percent and 12.0 percent shares respectively as at end-December 2016. Together, the NPLs of the three sectors represented 66.2 percent of the total NPLs of the financial sector as at end December 2016. (BOG Banking Sector Report, January 2017).
The high level of non-performing loans in the financial sector has informed financial institutions’ decision to be cautious in lending due to the negative repercussions that NPLs have on financial institutions' performance and existence as well as the economic implications for loan recoveries. The Bank of Ghana in December, 2016 reported that the annual growth in gross loans and advances moderated, in real terms, from 6.1 percent as at end-December 2015 to 1.9 percent as at end-December 2016. It also attributed the deceleration in growth to the general slowdown in credit extension on the back of deteriorating asset quality.

It is therefore clear that NPLs induce uncertainty and impact the financial institutions', specifically rural banks' willingness and ability to keep lending, therefore affecting aggregate demand and investments. Furthermore, unresolved NPLs suppress economic activity of currently overextended borrowers and trap resources in unproductive uses. This study finds it very expedient and crucial to critically examine the impact of interest rates, a major determent of loan performance; on non-performing loans taking into consideration some selected rural banks in Ghana.

1.2 STATEMENT OF THE PROBLEM

The financial sector of every economy is deemed as a pivot around which the other sectors may revolve (Chibba, 2009). Ghana’s economy, just like any other economy, comprises three major sectors which include the Service sector, manufacturing sector and Agricultural sector. One of the main players in the service sector is the financial market. The service sector was once the major contributor to GDP of the Ghanaian economy. The sector recorded the highest growth of 4.7% to GDP in 2016 (2017 annual budget).

The service sector of Ghana’s economy is largely dominated by banks and other Licensed Specialised Deposit-Taking Institutions. Scholars have established that the financial sector of
every economy is fundamental to sustainable economic growth as customers’ confidence in the system is enhanced (Schwab, 2009; Sanusi & Governor, 2011). This implies that, in essence, a negative shock in the financial sector of the economy will subsequently have a negative repercussion on financial institutions’ ability to undertake their basic function of intermediation and this will lead to a deteriorating effect on the financial system.

The Rural Banks’ roles in providing financial services to majority of Ghanaian, mostly those in the lower income bracket cannot be overemphasized. In spite of their numerous roles in making financial services available in communities where most banks do not find those places attractive to set up branches, the rural banks are worse hit by the high level of NPLs in Ghana. The impact of NPLs on the general solvency of financial institutions in Ghana prompted the BOG with the help of the International Monetary Fund (IMF), to carry out a diagnostic review of the loans as well as advances and investments held by financial institutions especially commercial banks in 2015. This was to ensure that adequate impairment allowances are made for NPLs and to provide the Regulator with an informed view on the capital adequacy of financial institutions to inform appropriate intervention, if required. Subsequently the transitional process for the implementation of Basel II began, aimed at enhancing risk management and financial stability.

However, the effort by the state to reduce non-performing loans in the financial sector has not achieved the needed success. In the case of rural banks, scholars argue that the seemingly spiraling rise in NPLs stems from the fact that rural banks target low income earners whose income flows cannot be predicted with certainty (Steel & Andah, 2008). This class of people is often regarded as risky borrowers (Mensah, 2004). As a result, rural banks, in their quest to reduce the risk associated with loan default, charge relatively higher interest rates as compared to how much banks charge their clients. High interest rate is deemed to have a positive and a significant correlation
with loan default (Angbazo, 1997). In July 2018, the governor of Bank of Ghana indicated that the rural banks in Ghana are highly under-capitalised and hence only 94 out of the 141 registered rural banks representing 66% had meet the Bank of Ghana minimum capital requirement of Ghc1 million. The bone of contention in this case is that rural banks charge higher interest rates and higher interest is deemed to have a significant and positive relationship with NPLs. Against this backdrop, it is of greater importance to analyse if the high level of NPLs in the rural banks can be attributed to the relatively higher interest rate or it is as a result of certain economic and bank specific factors.

1.3 RESEARCH OBJECTIVES

Specifically, this study seeks to:

1. Examine the impact of interest margin on Non-Performing Loans in some selected rural banks in Ghana.
2. Examine how other economic variables may affect NPLs among rural banks in Ghana from 2013 to 2018.

1.4 RESEARCH QUESTIONS

Broadly, this study seeks to find the relationship that exists between interest margin and NPLs among some selected rural banks in Ghana. Underpinned by the above specific objectives, this study finds answers to the following central questions:

1. What is the impact of interest margin on NPLs among rural banks?
2. What are the other economic factors that have the tendency of increasing NPLs in Ghana?
1.5 SCOPE AND LIMITATION OF THE STUDY

The study uses panel data of 46 rural banks currently operating in Ghana. The data was sourced from BoG annual report on banks from 2013 to 2017. Data from these years are used because of the need to ensure relevance of the study to current economic trends.

The 46 rural banks under consideration were chosen because of the availability of adequate data within the period under study as well as the volume of data to be compiled especially using the panel model.

A key constraint of this study is the limited resources in terms of data, funds and time available to undertake a thorough and comprehensive research. Similarly, enough data on the rest of the rural banks operating in Ghana are not adequate and, in some instances unavailable.

1.6 Organization of the Study

This study is partitioned in six distinct chapters in order to enhance clarity of presentation, facilitate reading and ensure understanding.

Chapter One

The chapter one of the study introduced the study by looking at the background to the study, statement of the problem, the research objectives, the research questions, significance of the study, the scope of the study, the various limitations of the study and finally, the organization of the study.

Chapter two

The second chapter examines the historical reforms in respect to regulation within the financial sector in Ghana over the years and its impact on the sector.
**Chapter Three**

The third chapter of this research work consists of review of related literature from books, articles, related research work and internet resources which helped the researcher in extracting relevant literature on Non-Performing Loans in financial sector both in Ghana and the world at large.

**Chapter four**

The four chapter of the study focuses on the outline and the details of the research methodology.

**Chapter Five**

The chapter five presents the analyzed data together with its interpretations and finally presents the research findings and thorough discusses them.

**Chapter Six**

The chapter six, which happens to be the final chapter of this study, featured recommendations based on the findings, summarizes the study and draws useful conclusion.
CHAPTER 2
OVERVIEW OF THE FINANCIAL SECTOR

2.0 Introduction
This chapter two present reforms in the financial section Ghana. It also looks at regulation underpinning the revolutionary changes over the years.

2.1 Overview of the Financial Sector in Ghana
Banking activities began in Ghana in 1896 when the British Bank of West Africa, now Standard Chartered Bank(Ghana) Limited, opened an office in Accra and offered basic banking services of borrowing and lending money to customers (Kapstein et al, 201; Gockel, 1995). As of April 2018, the Ghanaian financial sector comprised 105 rural banks, 34 banks of which 17 are foreign controlled banks and the other 17 are locally controlled banks (Ghana Banking Report, 2018). The rural banks in Ghana focus on providing loans and taking deposits from their clients. They are usually limited on what to do and what not to do. Unlike the savings and loans institutions, Ghana’s banking system is operated based on the concept of universal banking where banks render all forms of banking services. Although there had been some specialized banks in the past, they have all in one way or the other metamorphosed into universal banks (Annin 2000).

The financial sector in Ghana have undergone numerous transformations as a result of the periodic reforms that is geared toward making the financial institutions healthier in terms of competition and become stronger (Owusu-Antwi, 2009; Brownbridge & Gockel, 1996). In the early stages and prior to the reforms, there was an extensive post-independence government intervention. Public ownership dominated the banking systems. Financial institutions, especially those that were
established between 1950 to the late 1980 were either wholly or majority-controlled by the public sector. Interest rates were being fixed by the Monetary Authority (Bank of Ghana) and there were limitations on sectorial credit allocation. Brownbridge and Gockel (1996) as well as Annin (2000) have testified of the severe financial suppressions, steeply negative interest rates with the financial sector policies. In their findings they made mention of the fact that most credit were channeled to the public sector. This condition generated a series of reforms which comprised the liberalization of allocate controls on banks, restructuring of insolvent banks and reforms to prudential regulation and supervision. So as part of a comprehensive macroeconomic adjustment programme, financial sector liberalization in Ghana was introduced in the early 1990s, under the Financial Sector Adjustment Programme (FINSAP).

2.2 EVOLUTION OF SOME FINANCIAL SECTOR REGULATIONS

In the 1980s, most public sector financial institutions were declared insolvent with about 41% non-performing loans attributable to the private sector (Kapur et al., 1991). This period also witnessed numerous prudential banking reforms in Ghana and many developing economies which was spearheaded by World Bank. Specifically, in Ghana, such reforms included the passing of the Banking Law, 1989 (P.N.D.C.L. 225), Bank of Ghana Act, 2002, Act 612, the Banking Act, 2004 a, b (Act 673), and the Banking Amendment Act 2007 (Act 783).

The Banking Law (P.N.D.C.L225) was revised in 1989 under the Financial Sector Adjustment Programme (FINSAP I). Some of the new provisions in the Act included placing limits on risks exposure; capital adequacy ratio of 6%; setting uniform accounting standards and expansion of auditing scope and strengthening both on-site and off-site supervision of banks by the Bank of
Ghana. The supervisory powers of the Bank of Ghana were enhanced with the revision of the Bank of Ghana Law (P.N.D.C.L 291) in 1992. In 2002, the Bank of Ghana Act 612 led to the establishment of the Banking Supervision Department responsible for the supervision and examination of all banking institutions in the country to strengthen the regulatory capacity of the Bank of Ghana. The supervision of the banking and credit system was to ensure adherence to prudential banking reforms by Ghanaian banks. The Banking Law, 1989 (P.N.D.C.L. 225), was replaced by Banking Act, 2004 (Act 673) to promote an effective banking system. The regulations in the Act covered the licensing of banks, capital requirements, liquidity, ownership and control, restrictions on lending, supervision and control and accounts and auditing. A notable reform in the Act was the increase in the minimum capital adequacy ratio from 6% to 10%. The Banking Amendment Act (2007), Act 738, replaced the Banking Act (2004) with an additional function of ensuring the soundness and stability of the financial system in Ghana and also the establishment of offshore banking and other offshore financial services such as insurance and leasing with a focus of positioning Ghana as the regional hub for financial activities in Africa and to attract diaspora investments. As evidenced from the aforementioned reforms, most of the regulations have sought to ensure adherence to best practices in the financial sector of Ghana.

The introduction of the Banking Act (Act 673) in 2004 also led to the elimination of secondary reserves and adjustments in the minimum capital requirement. The minimum capital requirement was initially increased to Ghs60 million in 2007 and then in 2013, it was increase to Ghs120 million and finally pegged at Ghs400 million in 2018. Act 673 also saw the introduction of the universal banking license, which allows banks to provide various forms of banking services. These regulatory reforms arguably led into attractiveness of the banking industry, which later saw a number of new entrant through merger and acquisition. Notable among them is the Ecobank
acquisition of TTB in 2012, Access bank acquiring Intercontinental bank, and Republic Bank of Trinidad and Tobago acquiring HFC bank.

The reforms also project the banking sector in Ghana to be attractive sector and that led to influx of foreign bank especially from Nigeria. This brought about intense competition among banks in Ghana, with regards to market share of various bank and deposit size. The competition also change the traditional approach of banking in Ghana, with respect to account opening, introduction of relationship management, and bank dealing with SMEs.

The competition has also led to technological innovation with the introduction of Automated Teller Machines (ATMs), e-banking, mobile banking and various electronic banking services. This technological innovation have contributed enormously in deepening banking services and promoting financial inclusion drive in Ghana.
CHAPTER 3
LITERATURE REVIEW

3.0 INTRODUCTION

The chapter three of this study presents a review of scholarly articles and publications on Non-Performing Loans (NPLs) and how its impact the other sectors of the Ghanaian economies and the global economy at large. This chapter critically and thoroughly delves into the theoretical underpinnings of NPLs and empirical reviews. Though the study on NPLs has been comprehensive, it is not exhaustible. This study will aim at exploring the extent NPLs affect the survival of 8 rural banks in Ghana.

3.1 Financial Sector Risks and Risk Assessment

Risk in the financial sector can be very detrimental to the prospects of every economy if not identified and the needed actions taken to mitigate its impact. This research focuses on NPLs which a product of risk in the financial sector and hence there is the need to explore all the categories of risk in the financial sector. Das (2005) provided a general overview of the practice of risk management, mostly from the perspective of derivatives contracts. Embrechts, Frey, and McNeil (2005) emphasized the application of quantitative methods to risk management. Crouhy, Galai, and Mark (2001, 2006) are two solid risk management references for practitioners working at international banks with special attention given to the regulatory framework. Jorion (2007) gave an overview of the practice of risk management through information on banking regulations, a careful analysis of financial disasters, and an analysis of risk management pitfalls. He also made a strong case for the use of value-at-risk-based risk measurement and illustrated several applications and refinements of the value-at-risk methodology. Finally, Bernstein (1998) is another key
reference. This masterpiece gives a vibrant account of the history of the concept of risk from antiquity to modern days.

3.1.1 Categories of Financial Sector Risks

Risk in the financial sector can broadly be categorized under market risk, credit risk, operational risk, liquidity risk, and legal and regulatory risk. This classic view has provided a backbone for the phenomenal development of the science of risk management in the past 15 years. In many financial institutions, these categories are reflected in the organization of the risk management function.

According to Embrechts, Furrer and Kaufman (2008), there are several risks that confront the financial sector across the world. They particularly mention tumbling equity markets, falling real interest rates, unprecedented increase in longevity, inappropriate reserving, and wrong management decisions as being among the driving forces that have put the financial stability of many financial institutions at risk over the recent past. Senior management, risk managers, actuaries, accounting conventions, regulatory authorities have all been part.

3.2.1. Market Risk

Market risk is generally defined as the risk of a decline in asset prices as a result of unexpected changes in broad market factors related to equity, interest rates, currencies, or commodities. Market risk is probably the best understood type of risk and the type for which large amounts of good quality data are most readily available. A variety of measures, such as value at risk, is readily available to evaluate market risk.
3.2.1.2 Credit Risk
Credit risk measures the possibility of a decline in an asset price resulting from a change in the credit quality of a counterparty or issuer (e.g., counterparty in an OTC transaction, issuer of a bond, reference entity of a credit default swap). Credit risk increases when the counterparty’s perceived probability of default or rating downgrade increases.

3.2.1.3 Operational Risk
Operational risk is defined by the Basel Committee as “the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events”. Thus, operational risk can result from such diverse causes as fraud, inadequate management and reporting structures, inaccurate operational procedures, trade settlement errors, faulty information systems, or natural disaster.

3.2.1.4. Liquidity Risk
Liquidity risk is the risk of being unable to either raise the necessary cash to meet short-term liabilities (i.e., funding liquidity risk), or buy or sell a given asset at the prevailing market price because of market disruptions (i.e., trading-related liquidity risk). The two dimensions are interlinked because to raise cash to repay a liability (funding liquidity risk), an institution might need to sell some of its assets (and incur trading-related liquidity risk).

3.2.1.5 Legal and Regulatory Risk
Legal and regulatory risk is the risk of a financial loss that is the result of an erroneous application of current laws and regulations or of a change in the applicable law (such as tax law).

The publication of numerous articles, working papers, and books has marked the unparalleled advances in risk management. As a general reference, the following are a few of the sources that offer thorough treatments of risk management.
3.3 Risk Measures in the Financial Sectors

According to Lleo (2009), the measurement of risk falls at the confluence of the theory of economics, the statistics of actuarial sciences, and the mathematics of modern probability theory. Szegö (2002) presented an excellent overview of risk measures and their development from a probabilistic perspective as well as a critique of the value-at-risk methodology. Albrecht (2004) on the other hand, provided a concise overview of risk measures from an actuarial perspective and with a particular emphasis on relative risk measures whereas, Föllmer and Schied (2004) offered mathematical insights into risk measures and their link to modern finance and pricing theories.

In addition to the classical metrics inherited from investment theory, such as standard deviation of return, new families of measures, such as value at risk or expected shortfall, have recently emerged from risk management literature. Finally, the practitioner community, mostly in hedge funds, has also contributed to this remarkable story by proposing new “Street” measures, such as the Omega, which is designed to quantify dimensions of risk that other metrics fail to capture.

3.4 NON-PERFORMING LOANS

In the broader context, NPLs can be considered as loans that are outstanding in both interest and principal for a period of time contrary to the terms and conditions spelt out in the loan agreement. The concept of Non-performing loans differs from one country to another. A loan may be considered non-performing in one country and might not be considered as such in another country. There is, however, some common opinion on this issue. Accordingly, the IMF’s Compilation Guide on Financial Soundness Indicators, defines NPLs as follows:

“A loan is nonperforming when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed
by agreement, or payments are less than 90 days overdue, but there are other good reasons such as a debtor filing for bankruptcy to doubt that payments will be made in full “(IMF, 2005).”

Similarly, the 2014 annual report of Standard Chartered Bank Ghana Ltd, recognised non-performing loans, in accordance with GAAP and BOG regulations, as; any loan that is more than 90 days past due or is otherwise individually impaired (which represents those loans against which individual impairment provisions have been raised) and excludes:

- Loans renegotiated before 90 days past due and on which no default in interest payments or loss of principal is expected.
- Loans renegotiated at or after 90 days past due, but on which there has been no default in interest or principal payments for more than 180 days since renegotiation, and against which no loss of principal is expected.

3.5 Determinants of Non-Performing Loans

Non-Performing Loans are caused by numerous factors. For simplicity and for the purpose of this study, research groups them under financial institutions factors and economic factor ie factors that are remote to the day-to-day operations of financial institutions in Ghana (Louzis, Vouldis & Metaxas, 2012). These factors are presented below.

3.5.1 Financial Institution-Specific Factors

Financial institution-specific variables refer to the factors which characterized individual financial institutions. The financial institution-specific variables are factors that can be influenced by managerial decisions and usually associated with the specific policy choices of a particular
financial institution with regard to its efforts to maximize efficiency and improve its risk management. In theory, bank specific variables that are usually regarded as determinants of NPLs include loan growth, financial performance, bank size, ownership structure, the quality of the loan portfolio and operational efficiency.

3.5.2 Loan growth

The credit policy of the bank plays an essential role in determining the subsequent levels of NPLs. Loan growth has a direct (positive) association with the volume of NPLs reported by commercial banks (Sinkey and Greenwalt (1991), Keeton (1999), Salas and Saurina (2002), Jimenez and Saurina (2006) and Metaxas et al (2010)). To maximize the short run benefits, managers seek to rapidly expand credit activities and may hence take inadequate credit exposure measures. In this regard, Keeton (1999) suggests that rapid growth of loans can be triggered by return maximization strategies. Particularly, during periods of economic growth, the financial institutions engage in market share conquest campaigns discarding the necessary assessment of credit quality of borrowers (Fernandez De Lis et al., 2000). The search for rapid growth of loans is achieved by either reducing interest rate charged to borrowers or by lending to lower credit quality borrowers. This will lead, through adverse selection, in which banks lend to lower credit quality borrowers and ultimately increase the probability of NPLs.

3.5.1.2 Operational efficiency:

Theoretically, the relationship between operational efficiency of a bank and bank’s NPLs might appear to be largely unrelated, because operations personnel typically do not participate in screening and monitoring loan customers, and because loan officers typically do not participate in overseeing operations costs. However, issues of NPLs and cost of efficiency are in fact related in several important ways. Hence, the impact of operational efficiency on NPLs can be positive or
negative. In one hand, a number of researchers have found that failing banks tend to be located far from the best-practice frontier (Berger and Humphrey 1992, Barr and Siems 1994, DeYoung and Whalen 1994, Wheelock and Wilson 1994). A number of other studies have found a positive relationship between low cost of efficiency and NPLs even among banks that do not fail (Hughes and Moon 1995, Resti 1995). According to Berger and DeYoung (1997), the positive association among low cost efficiency and NPLs is hypothesized as ‘bad management’. The basic argument here is that, low cost efficiency considers as signal of poor managerial performance (bad management), which can greatly affects loan granting behavior of a bank. As bad managers, they may have poor skills in credit scoring and therefore choose a relatively high proportion of loans with low or negative net present values or be less than fully competent in appraising the value of collateral pledged against the loans. Also, they may have difficulty monitoring and controlling the borrowers after loans are issued to assure that agreements are heeded. Hence, under the “bad management” hypothesis, there is a positive association between low cost efficiency and NPLs. On the other hand, low cost efficiency may have a negative impact on NPLs. According to Berger and DeYoung (1997) this relationship is hypothesized as “Skimping”. According to this view, there exists a trade-off between allocating resources for underwriting and monitoring loans and measured cost efficiency. In other words, banks which devote less effort to ensure higher loan quality will seem to be more cost-efficient; however, there will be a growing number of NPLs in the long run. Hence, banks which have adequate budget to screening loan customers, appraising collateral, and monitoring and controlling borrowers after loans are issued seem to be cost inefficient in the short run. However, the volume of NPLs tends to be lower as compared to banks which do not have adequate budget to ensure higher loan quality. Thus, under the skimping hypothesis, the association between measured cost efficiency and NPLs is negative.
3.5.1.3 Financial performance
The financial performance of a bank is usually related to the risk taking behaviour of managers (Hu et al. (2004), Jimenez and Saurina (2006), Jellouli et al (2009), Metaxas et al (2010) and Vogiazas and Nikolaidou (2011)). As noted in Hu et al. (2004), profitable banks are less engaged in risky activities as they have less pressure to create revenues. Profitable banks have an opportunity to choose a loan applicant who has strong financial performance and lower risk. Hence, as the profitability of banks increases, the probability that managers engaged in risky investment will reduce and ultimately the probability that loans become a non-performing loan will also reduce with the same manner. To the contrary, unprofitable (inefficient) banks might engage in risky lending activity in particularly when managers have short term incentives. As banks engage in risky activities, the likelihood that loans become default is high and ultimately resulting with sizeable volume of NPLs.

3.5.1.4 Income diversification
The traditional argument based on Diamond (1984) suggests the wisdom of not putting all eggs in one basket. Recently however, there is no general consensus on the benefit of income diversification. On one side, there are supporter of the concept of portfolio theory which states that banks can reduce firm-specific risk by diversifying their portfolios as it makes possible the compensation for losses in some products by gains in others (Winton 1999, Templeton and Severiens 1992 and Gallo et al. 1996). Hence, the potential losses on the loan activity might be overcome by looking for non interest sources of revenues (financial revenues and capital gains). On the other side, scholars like, Maksimovic and Philips (2002), DeYoung and Roland (2004) and Stiroh (2006) argued that, diversification of revenue does not guarantee low level of NPLs. Because, too many operating items make the banks lose their focus on specialized field and reduce their monitoring effectiveness that may increase the probability of failure. Hence, banks should
focus on a single line of business so as to take greatest advantage of management’s expertise which ultimately reduced the probability of NPLs.

3.5.1.4 Ownership structure
According to the Coase Theorem, cited in Hu (2006), the assignment of property rights (ownership) will not affect economic efficiency as long as the transaction cost is zero. However, the real world is imperfect and the transaction cost can be sufficiently high. In an imperfect world with high transaction costs, ownership does matter to economic efficiency and making different ownership types is associated with different transaction costs (Cooter and Ulen 2000). In this regard, most existing literature suggested that state-owned banks are usually associated with high NPLs than privately owned banks. Salas and Saurina (2002) argue that to enhance the economic development of the country, state-owned banks have more incentives to fund riskier projects and to allocate more favorable credits for small and medium firms. Private institutions clearly have an incentive to solve adverse selection and moral hazard problems and lend to borrowers who have productive investment opportunities. Governments have less incentive to do so because they are not driven by the profit motive. The absence of a profit motive also means that state-owned banks are less likely to manage risk properly and be efficient (Hu 2004). This inadequate risk taking behavior (compared to the return profile) will lead to a higher level of NPLs.

3.5.1.5 The Size of the Financial Institution
Scholarly literature provides evidence that suggests a negative association between size of a financial institution and NPLs (Salas and Saurina (2002), Hu et al. (2004), Cole et al. (2004), Micco et al. (2004), Garcia and Robles (2007) and Swamy (2012)). As noted in Hu et al. (2004), large banks have more resources and are more experimented for efficient information gathering, processing and analyzing to tackle moral hazard and adverse selection and ultimately better deal
with bad borrowers. Small banks, on the contrary, may be exposed to the adverse selection problem because of the lack of sufficient competencies and experience to effectively assess the credit quality of borrowers. In addition, Cole et al. (2004) suggested that, smaller banks adopt small business loan underwriting practices. Hence, the extents that the failure rates of small businesses are higher than those of larger and established firms.

3.5.2 Macroeconomic Factors

(Louzis, Vouldis and Metaxas (2012) provide evidence that suggests a strong association between NPLs and macroeconomic factors. Klein (2013) established that the macroeconomic factors that are highly likely to influence NPLs are: real GDP growth, inflation rate, effective exchange rate, real interest rate, unemployment rate, broad money supply (M2) and GDP per capital (Salas and Suarina 2002, Fofack 2005 and Jimenez and Saurina 2005). This study only considers the growth in real GDP, annual inflation rate, real interest rate.

3.5.2.1 Real GDP Growth

There is an inverse relationship between GDP growth and the level of NPLs reported by financial institutions (Salas & Suarina, 2002; Jajan & Dhal, 2003; Fofack, 2005; Hou, 2006). Jajan and Dhal (2003) postulate that change in business cycle impact the credit worthiness of borrowers in terms of their potential to make repayment of the loan and interest in full. Hence, strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of borrower which in turn contributes to lower NPLs. Conversely, when there is a slowdown in the economy (low or negative GDP growth), the economic activities in general are decreasing and the volume of cash held for either businesses or households are decreasing. These conditions contribute in deteriorating the ability of borrowers to repay the loans, which lead to increase the likelihood of delays their financial obligations and thus banks’ exposure to credit risk increase. In
this regard, Hou (2006) noted that, each NPL in the financial sector is viewed as an obverse mirror image of an ailing unprofitable enterprise.

3.5.2.2 Real Interest rate
Asymmetric information and the resulting adverse selection problem can lead to “credit rationing,” in which some borrowers are denied loans even when they are willing to pay a higher interest rate (Stiglitz and Weiss 1981). This occurs because as interest rates rise, prudent borrowers are more likely to decide that it would be unwise to borrow, whereas borrowers with the riskiest investment projects are often those who are willing to pay the highest interest rates. In this general setting, a higher interest rate leads to even greater adverse selection; that is, the higher interest rate increases the likelihood that the lender is lending to a bad credit risk and ultimately increases NPLs (Sinkey and Greenwalt (1991), Jimenez and Saurina (2006), Pasha and Khemraj (2009), Ahmad et al (2009) and Metaxas et al (2010)).

3.5.2.3 Inflation
Inflation affects borrowers’ debt servicing capacity through different channels and its impact on NPL can be positive or negative (Fofack 2005, Pasha and Khemraj (2009) and Nkusu 2011). The explanation provided by the literature for this relationship is that, higher inflation can make debt servicing easier by reducing the real value of outstanding loans particularly when the loan rates are fixed (banks do not adjust rates in accordance to the inflation change to maintain their real returns). However, it can also weaken some borrowers’ ability to service debt by reducing real income. Moreover, when loan rates are variable, inflation is likely to reduce borrower loan servicing capacity as lenders adjust rates to maintain their real returns or simply to pass on increases in policy rates resulting from monetary policy actions to combat inflation. Against this background, the relationship between NPL and inflation can be positive or negative.
3.5.2.4 Real effective Exchange rate
like inflation a change in effective exchange rate can also affects borrowers” debt servicing capacity through different channels and its impact on NPL can be positive or negative (Nkusu 2011). As noted in Pasha and Khemraj (2009), depreciation of the exchange rate can have mixed implications on borrowers” debt servicing capacity. On the one hand, it can improve the competitiveness of export-oriented firms. As long as the value of domestic currency depreciated (lower), export-oriented firms can dominate the international market at lower price (since their production cost is covered in domestic currency which has lower value than foreign currency and their revenue is collected in foreign currency which has higher value as compared to the domestic currency. Hence, depreciation of exchange rate can improve the debt-servicing capacity of export-oriented borrowers. On the other hand, it can adversely affect the debt-servicing capacity of borrowers who borrow in foreign currency (import-oriented firms).

3.6 STUDIES ON GHANA
In this section, a review of related studies conducted in the context of Ghana was critically examined. This study observed research works done in the context of Ghana on Non-Performing Loans appear to be scanty and very little. The study, however, made do with the existing work on Non-Performing Loans in Ghana.

Alhassan, Kyereboah-Coleman and Andoh (2014) examined the factors that account for the deterioration in the asset quality of Ghanaian banks during a period of financial crises using a unique dataset on 25 banks from 2005 to 2010. In their study, they classified asset quality (non-performing loans) of banks into three classes namely, substandard loans, doubtful loans and loss loans. By disaggregating the banks’ non-performing loans into three classes, the study attempted
to identify the source of persistence. Based on system Generalized Method of Moments estimations, found that the persistence of non-performing loans in addition to loan growth, bank market structure, bank size, inflation, real exchange rate and GDP growth are the significant determinants of banks asset quality in Ghana.

Amuakwa-Mensah and Boakye-Adjei (2015) in their study of the determinants of non-performing loans in the Ghana banking industry, employed panel data of twelve banks from 1998 to 2009. The study went further, after examining the determinants of all banks together, to study the determinants of NPLs for two sub-samples; small banks and large banks. The results of their panel regression model found that both bank-specific variables; previous year’s NPL, bank size, net interest margin, current year’s loan growth and macroeconomic variables; previous year’s inflation, real gross domestic product per capita growth, real effective exchange rates significantly affect NPLs in the banking industry. Further studies on the sub-sample showed that both bank specific factors; previous year’s NPLs, current year’s loan growth and macroeconomic factors; real effective exchange rate, real GDP per capita growth, previous year’s inflation rate affect NPLs of large banks. Interestingly, whereas bank-specific factors; previous year’s NPLs, current year’s loan growth are important in explaining NPLs, macroeconomic factors are not important in explaining NPLs for small bank
CHAPTER 4

METHODOLOGY

4.1. INTRODUCTION

This chapter describes the formulation of a research design and methodology adopted to achieve the stipulated goals for the study. In this chapter the study design and the population and sample are described. Also, the instrument used to collect the data, including methods implemented to maintain validity and reliability of the instrument are described.

The chapter gives an idea of the research process, the technique that was employed and the tools needed to arrive at the research objectives. In essence, this chapter provides a detailed description of the data used in the research, the source of the data, the methodology that was employed on the data and the justification for the choice of the method. The chapter begins with the estimation technique (methodology) that is employed on the data and justifies the choice of the method, the specification of the model, and then goes ahead to define the various variables used in the model. The choice of each of the variables is also justified.

4.2 NATURE OF DATA AND INSTRUMENTS OF DATA COLLECTION

This study used panel data of the sampled rural banks from 2013 to 2017. Again, some macroeconomic data within the same period that are vital to this study were also sampled. Panel data, also known as longitudinal data or cross-sectional time series data, is data that is derived from a number of observations over time on a number of cross-sectional units like individuals, households, firms or governments. By combining time series and cross-section observations, it gives more informative data. As noted by Gujarati (2004), panel data can better detect and measure effects that simply cannot be observed in pure cross-section or pure time series data. Primarily, the
study employed data collected from secondary sources for this study. Secondary data, for the purpose of this study, is more preferred to primary data because of its availability and affordability in terms of time and other key resources. Moreover, it affords an opportunity to collect high quality data (Saunders et al, 2007). In relation to the financial institution specific variables, data will be sought from the annual financial reports of the sampled rural banks. Other sources would include Bankscope and PWCs Ghana Banking Survey reports. Data on macroeconomic variables will be sought from the World Bank development indicator dataset and Economy Watch.

4.3 SAMPLING DESIGN

This section presents the techniques that were employed to select suitable sample with the aim of determining parameters of the population as a whole. Sample design encompasses the sample frame, sample size and sampling technique. Population is the complete set of elements that possess some common characteristic defined by the sample criteria established by the researcher. A sample is drawn to overcome the constraints of covering the entire population with the intent of generalizing the findings to the entire population. The population for this study would be all the rural banks in Ghana per the objectives of this study, hence the sample will be drawn from them.

As noted by Kothari (2004), good sample design must be viable in the context of time and funds available for the research study. Judgmental sampling is employed as it offers the opportunity to deliberately select items for the sample based on a set criterion and is non-probability in nature. Thus, this study employed purposive sampling technique to select the required sample of rural banks considering the time and funds available. To be considered for selection, the rural banks must have license to operate as such within the period under study. As at August 2018, there were
144 licensed rural banks in Ghana. In all, 58 rural banks out of the 144 were drawn and considered for the study. Data used for the study is a panel data from 2013 to 2017 and it considers rural banks with information within the period under review. As such the macroeconomic variables also cover the same period. The objective is to examine the impact of interest margin on nonperforming loans among rural banks in Ghana. Also, the sample size of 58 rural bank covers about 40% of the population hence it is sufficient to draw conclusions from it. The sample was chosen because of data availability as most of these rural bank does not publish their annual account. Again, time and resource constraint also contribute to limiting the number of sample under the study.

4.4 DATA ANALYSIS AND PRESENTATION

As noted by Kothari (2004), data has to be analyzed in line with the purpose of the research plan after data collection. Hence the secondary data collected is analyzed to determine its suitability, reliability, adequacy and accuracy. The data collected from stated sources is coded, checked and entered to simple excel program to make it easier for analysis. It is then processed and analyzed through STATA. The study utilises both descriptive analysis and econometric tools in the analysis and interpretation of the data. With regard to the descriptive analysis; table and percentage are employed and statistics such as mean, standard deviation, minimum and maximum values are generated to describe the characteristics of variables under investigation. Furthermore, multicolinearity test are conducted to ascertain the appropriateness of the model as well as the assumption of classical linear regression model. The degree of multicolinearity among the predictors will be analysed using correlation matrices. Regarding the econometric model, this study relies on panel data models; fixed effect and random effect models. The Hausman’s test is used to decide whether the fixed effect or random effect model is appropriate for consideration.
4.5 STUDY VARIABLES

The variables used in this study fall under two broad categories; the dependent variables and the independent variables. The dependent variable is the variable of interest that the research hopes to find answers to with the help of the explanatory or the independent variables.

4.5.1 DEPENDENT VARIABLE

The objective of this study is to ascertain the impact of interest margin on NPLs in some selected rural banks in Ghana, thus the dependent variable is NPLs.

Non-Performing Loan ratio is the outcome variable used in this study. It is measured in terms of NPLs to gross loan. The measure used by BoG to compare the level of NPLs among rural banks as well as in the industry is the amount of NPLs divided by the total amount of loans. Hence, the ratio of NPLs to total loans was used as a proxy for this study.

4.5.2 INDEPENDENT VARIABLES

It has been established by previous researches that NPLs is significantly influenced by internal factors under the control of financial institutions and some otherwise remote factors that are not directly under the control by managers of financial institutions. The ones that are under the control of management are classified as financial institution-specific whereas external factors beyond their control are classified under macroeconomic factors. The financial institution-specific and macroeconomic variables to be used to specify the econometric model of this study are discussed below.
4.5.2.1. Financial Institution-Specific Variables
Strong association between NPLs and several financial institution-specific variables is evidenced in the literature. These variables include size of the financial institution, profitability, loan growth, ownership structure, the quality of the loan portfolio, operational efficiency and net interest spread.

Loan growth: managers of financial institutions, lured by the opportunity to maximize returns especially during periods of economic boom, seek to rapidly expand credit activities. This, if not well managed may lead to adverse selection thus majority of loans ending up with low credit quality borrowers and increase the level of NPLs in the long run. Several empirical studies in the literature found a strong positive relationship between loan growth and NPLs (Keeton (1999), Salas and Saurina (2002), Jimenez and Saurina (2006)). As a result, a direct relationship is expected between loan growth and NPLs in this study. Loan growth will be measured by the annual percentage change in the loan portfolio of sampled savings and loans institutions in Ghana.

Profitability: As noted by Hu et al. (2004), profitable financial institutions are less engaged in risky activities as they have less pressure to create revenues. On the other hand, those with lower profitability are likely to engage in risky lending in particularly in order to close variance gaps and thus are exposed to credit risk. In the work of Jimenez and Saurina (2006), they found a negative relationship between profitability and NPLs. Thus, an indirect relationship is expected between profitability and NPLs in this study. There are several measures of profitability, but this study will use Return on asset (ROA).

Ownership structure: most existing literature focused on segregating financial institutions into state-owned and privately owned in their studies. Empirically, Salas and Saurina (2002), Hu et al. (2004), and Swamy (2012) suggested a positive association between state ownership of financial institutions and the volume of NPLs.
Size of the Financial Institution: Several studies reveal that large financial institutions are often associated with lower levels of NPLs compared to smaller ones. Empirical studies relating to the impact of bank’s size on NPLs have established that there is a negative correlation between the size of financial institutions and the level of NPLs (Salas & Saurina, 2002; Hu et al, 2006). This could be attributed to the fact that larger banks have better corporate governance ethics, risk management strategies and technology that enable superior credit risk management as compared to smaller financial institutions (Salas & Saurina, 2002). A prior, an indirect relationship between the size of a financial institution and NPLs is expected in this study. This variable will be measured by the natural log of total assets of each rural bank under consideration.

Net Interest Spread: Net Interest Spread represents intermediation spread which is employed in this study to assess the effect the cost of lending on NPLs. Basically, as interest rates rise, the debt burden on borrowers rise and if not matched by increase in their revenues, the borrowers are highly likely to default. Also borrowers with riskier investments are more willing to show interest in loans compared to prudent borrowers, leading to adverse selection. In a study in Sub-saharan African countries, Fofack (2005) found an insignificant indirect relationship between this variable and NPLs. However, a direct relationship between net interest spread and bank’s NPLs is expected in this study. This would be measured by the ratio of net interest income to total income of the respective banks.

4.5.2.2. MACROECONOMIC VARIABLES
Several macroeconomic factors have been found in the literature as important determinants of NPLs. These include annual growth in real GDP, the annual inflation rate, real effective exchange rate (REER), annual unemployment rate, broad money supply (M2) and GDP per capita. The variables to be considered in this study are discussed below.
**Real GDP growth:** Empirically, studies have shown an indirect relationship between the growth in real GDP and NPLs (Salas and Suarina, 2002; Fofack, 2005; and Jimenez and Saurina, 2005). This is largely explained by the increase in income levels brought about by strong positive growth in real GDP which enhances the debt servicing capacity of borrowers. An indirect relationship between real GDP growth and NPLs is expected in this study. Real GDP growth will be measured by the annual percentage change in real GDP in Ghana during the period under study.

**Inflation:** in basic economics literature, one of the known effects of inflation is the transfer of income from creditors to debtors. This is plausible when the interest on the loan contract is fixed, otherwise the debt burden may increase, reduce or remain same depending on the extent of the effect of the inflation on the nominal interest rate. Empirical studies shows that inflation affects borrowers’ debt servicing capacity through different channels and its impact on NPL can be positive or negative. Fofack (2005) found a positive relationship between inflation and NPLs in a number of Sub-Saharan African countries with flexible exchange rate regimes. On the contrary, Smadi (2010) found a negative association between inflation and NPLs in Jordanian commercial banking sector. This study will be indifferent in its expectation of the relationship between inflation and NPLs.

**Real Effective Exchange rate:** Businesses are exposed to exchange rate movements especially those involved in international business. Like inflation a change in effective exchange rate can also affects borrowers’ debt servicing capacity through different channels and its impact on NPL can be positive or negative. Thus the relationship between exchange rate and NPL is indeterminate in this study. The annual effective Exchange rate of the Ghana cedi in terms of US dollar.
4.6 MODEL SPECIFICATION

This study makes use of panel data. Panel data helps to control for variables that cannot be observed or measured like difference in business practices across companies; or variables that change over time but not across entities like national policies and regulations, international agreements, etc, thus it accounts for individual heterogeneity.

Based on the reviewed literature, it is evident that NPLs might be explained by both macroeconomic and financial institution-specific factors. The model used to ascertain the determinants of NPLs in this study is similar to that of Jiménez and Saurina (2005). The model is a simple linear regression function that links the ratio of NPLs to total loans and key macroeconomic and financial institution-specific variables.

4.6.1 Fixed–Effects Model

The fixed–effects model (FEM) assumes that there are disparities in the intercepts across rural banks:

\[ Y_{it} = \beta_{1i} + \beta_{2} X_{2it} + \beta_{3} X_{3it} + u_{it} \]

This effect is captured by the intercept term having an (i) subscript indicating that there may be heterogeneity. Gujarati (2004) explains that the term fixed–effects arises because although the intercepts may vary across banks they remain constant or fixed over time.

The model estimators can be made more efficient using first difference or within–group estimators. First difference estimators improve efficiency by differencing out individual effects. The alternative within–group method allows for dependent and independent variable data to be expressed as deviations from their means in a process called demeaning.
4.6.2 Random–Effects Model

An alternative model to the FEM is the Random–Effects Model (REM), which expresses the lack of knowledge on the true model through the disturbance term as opposed to through the intercept (Gujarati, 2004). Therefore, the REM investigates differences in the variance of error terms in the hope that an inference can be made on the general population based on these differences.

\[ Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \omega_{it} \] \hspace{1cm} (2)

\[ \omega_{it} = u_{it} + \varepsilon_{1t} \] \hspace{1cm} (3)

Equation 4 now has a composite error term, which is made up of two components that include \( \varepsilon_{1t} \) or the bank specific error component and \( u_{it} \), which is the combined time-series and cross section error component (Gujarati, 2004).

The general regression equation is of the form:

\[ \text{NPL}_{it} = \beta_i + \lambda_{BS} X_{BS_{it}} + \lambda_{ME} X_{ME_{it}} + \mu_i + \varepsilon_{it} \] \hspace{1cm} (4)

Where,

the subscripts \( i, t \) represents country and time period, respectively.

\( \lambda_{BS} \) and \( \lambda_{ME} \) are coefficients of the financial institution-specific and macroeconomic variables respectively to be estimated.

\( X_{BS}, X_{ME} \) are sets of macroeconomic and financial institution-specific variables, respectively.

\( \mu_i \) are the unobserved individual effects and \( \varepsilon_{it} \) is the error term.

Thus, by incorporating the outcome and predictor variables discussed above into the model, it becomes;
\[ \text{NPL}_{it} = \beta_0 + \beta_1 (\text{LGR})_{it} + \beta_2 (\text{ROA})_{it} + \beta_3 (\text{OWN})_{it} + \beta_4 (\text{SIZ})_{it} + \beta_5 (\text{NIT})_{it} + \beta_6 (\text{GDP})_{it} + \beta_7 (\text{INF})_{it} + \beta_8 (\text{RER})_{it} + \beta_9 (\text{LQR})_{it} + \epsilon_{it} \] 

Where;

i) \( \beta_0 \) is an intercept of the banks.

ii) \( \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \) and \( \beta_7, \beta_8 \) represent estimated coefficient for specific variables for bank \( i \) at year \( t \).

iii) LGR, ROA, OWN, SIZ, NIT, represent loan growth, return on assets, ownership structure, bank size and net interest spread respectively of bank \( i \) at year \( t \).

iv) GDP, INF, RER, represent real gross domestic product, real inflation rate, and real effective exchange rate respectively at year \( t \).

v) \( \epsilon_{it} \) represents error terms unobserved variables.
CHAPTER FIVE
ANALYSIS AND DISCUSSION

5.0 Introduction
This chapter presents the empirical findings of the study in the context of the objectives stated in chapter one. The study focused on assessing the impact of interest rate margin on non-performing loans on rural banks in Ghana. The chapter deals with the descriptive statistics, correlational analysis and, regression analysis. The results of the study are eventually discussed relative to the research hypotheses, research objectives, and other extant empirical literatures. The analyses at each stage were based on the objectives being addressed by the study.

5.1 Data description and Discussion of results
This section presents an initial summary of the variables being studied. Summary statistics comprising frequencies, mean, standard deviation, minimum and maximum values of the variables used in the model are presented.

Table 5.1 presents the observation, the mean, standard deviation, maximum and minimum values of each of the variables in the data used. In essence, it provides a summary of the entire data used in this research.

The mean and standard deviation of all the variables on the topic under discussion has been illustrated on table 5.1. The table also reports the minimum and maximum score of dependent and independent variables. The mean score for the return on assets (ROA), which is a measure of financial performance, and also the dependent variable is 13.5 with minimum and maximum values of 2.08 and 45 respectively. The standard deviation of 9.398 accounted for the variation between the minimum and maximum values noted earlier.
Table 5.1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>OBS</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>80</td>
<td>13.509</td>
<td>9.398</td>
<td>2.080</td>
<td>45.000</td>
</tr>
<tr>
<td>RER</td>
<td>80</td>
<td>5.538</td>
<td>2.363</td>
<td>3.490</td>
<td>9.300</td>
</tr>
<tr>
<td>LGR</td>
<td>80</td>
<td>13.356</td>
<td>3.641</td>
<td>7.072</td>
<td>17.150</td>
</tr>
<tr>
<td>Int. Rate</td>
<td>80</td>
<td>16.707</td>
<td>8.042</td>
<td>18.700</td>
<td>27.000</td>
</tr>
<tr>
<td>INF</td>
<td>80</td>
<td>10.210</td>
<td>8.324</td>
<td>9.600</td>
<td>15.300</td>
</tr>
<tr>
<td>GDP</td>
<td>76</td>
<td>4.883</td>
<td>3.9867</td>
<td>3.500</td>
<td>7.470</td>
</tr>
<tr>
<td>SIZ</td>
<td>80</td>
<td>1.67</td>
<td>1.04</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>OWN</td>
<td>80</td>
<td>0.438</td>
<td>0.499</td>
<td>0.000</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Source: Estimated from STATA 11

For the period under review, the RER of the rural banks under consideration recorded an average of 5.538 with a variation of 2.36 and a minimum and maximum value of 3.49 and 9.3, respectively. Loan Growth Rate (LGR) recorded an average of 13.356. The implication is that Rural Banks in Ghana increased the loans granted significantly. This implies that due diligence might have not be done on the background of borrowers before loans are granted. This may therefore make the loan recovery very difficult.
Table 5.1 shows that ROA recorded a mean of 13.50. in essence Rural Banks under consideration in this study have witnessed a significant profitability, on the average. The implication of the mean is that Rural Banks averagely recorded more than 10% returns on the assets during the period under study.

From Table 5.1, interest rate, which is the variable of interest in this study recorded a maximum of 27% and a minimum of 18.7%. it can be deduced that interest rate witnessed some instability in the years under review. This makes the study very crucial especially when the mean interest rate recorded 15.7%.

It is also recorded in Table 5.1 that inflation recorded a maximum value of 15.3% and a minimum of 8.3%. studies have established that a change in inflation has a tendency of impacting loan performance. The mean value of 10.2% clearly indicate that inflation was stable in the years in perspective and hence, a priori, may be insignificant to loan performance among rural banks.

5.1 Correlation Matrix

The linear dependency of the explanatory variables is determined using the correlation matrix. The Pearson Product Movement Coefficient of correlation for pairs of independent variables measures the degree of linear relationship between two or more variables. Table 5.2 below shows the correlation matrix for the variables used in the study and indicates that weak correlation exists between the independent variables used in the study. This therefore prevents any potential multicollinearity problems in the regression estimate.
Table 5.2: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>Int. Rate</th>
<th>SIZ</th>
<th>GDP</th>
<th>INF</th>
<th>LQR</th>
<th>OWN</th>
<th>RER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Int. Rate</td>
<td>-0.216</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LGR</td>
<td>0.179</td>
<td>-0.979</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZ</td>
<td>-0.062</td>
<td>-0.008</td>
<td>0.038</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP</td>
<td>-0.219</td>
<td>-0.088</td>
<td>0.088</td>
<td>0.050</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>-0.131</td>
<td>0.381</td>
<td>-0.392</td>
<td>0.039</td>
<td>0.165</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OWN</td>
<td>0.211</td>
<td>0.000</td>
<td>0.000</td>
<td>0.210</td>
<td>0.000</td>
<td>-0.001</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>RER</td>
<td>0.381</td>
<td>0.275</td>
<td>0.380</td>
<td>0.000</td>
<td>0.214</td>
<td>0.122</td>
<td>-0.234</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Source: Estimated from STATA 11

Generally, there is supposed to be a weak correlation among the independent variables in order to avoid issues of multicollinearity. The correlation between the independent variables ranges from 0.000 to 0.381, which the highest value is the correlation between LGR and Int. Rate.

5.3 Regression Results

According to Sayrs (1989), panel data has two main leading models that can be used to estimate the regression variables. The two models are the fixed and random effect models. In instances
where researchers decide to control variables that are absent and vary between cases but are fixed over time, they use the fixed effect model. The fixed effect model provides the opportunity to track the changes in the variables over time to estimate the effect of the independent variables on the dependent variables. Between the two models, the fixed effect is the most extensively used procedure for panel data analysis. Statistically speaking, this model provides the researcher with results that are more consistent but could be the less effective model to run in certain situations.

The random effect is used where some omitted variables may be constant over time but vary between cases, others may be fixed between cases but vary over time. In order to determine between fixed effect and random effect in terms of fitting the data generation process. The null hypothesis for the test is that the random effect is the appropriate model for the data. Running a Hausman specification test at five (5) percent level enables the researcher to choose between fixed and random models.

In presenting the results in this study, the study presents both the fixed effect and the random effect. This is done with the view of enhancing clarity.

5.3.1 Hausman Test

To decide between fixed or random effects, it is crucial to run a Hausman test where the null hypothesis is that the preferred model is random effects vs. the alternative the fixed effects. The Hausman test evaluates the null hypothesis that the coefficient estimated by the random effect estimator is the same as the ones estimated by the constant fixed effects estimator. If the Hausman test is insignificant (P-value is greater than .05), then the null hypothesis is not rejected implying the random effect model will be used (Torres-Reyna, 2007). The Hausman test results, which aims
at helping the researcher choose between the random and fixed effect model is also presented for justification.

Lastly, the study presents the adjusted $R^2$ and the $R^2$ figures. Chin (1998) posits that the adjusted $R^2$ measures the appropriateness of the regression model. Chin (1998) further recommended adjusted $R^2$ values for endogenous latent variables based on 0.67 (substantial), 0.33 (moderate) and 0.19 (weak).
Table 5.3 showing how economic variables and bank specific factors both interact influence NPLs.

<table>
<thead>
<tr>
<th></th>
<th>Fixed</th>
<th>Random</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int. Rate</td>
<td>0.36**</td>
<td>0.26**</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.17)</td>
</tr>
<tr>
<td>ROA</td>
<td>-0.13</td>
<td>-0.11</td>
</tr>
<tr>
<td></td>
<td>(0.13)</td>
<td>(0.14)</td>
</tr>
<tr>
<td>LGR</td>
<td>0.028*</td>
<td>0.037*</td>
</tr>
<tr>
<td></td>
<td>(0.052)</td>
<td>(0.053)</td>
</tr>
<tr>
<td>OWN</td>
<td>0</td>
<td>7.27</td>
</tr>
<tr>
<td></td>
<td>(.)</td>
<td>(4.60)</td>
</tr>
<tr>
<td>SIZ</td>
<td>-13.9</td>
<td>-11.3</td>
</tr>
<tr>
<td></td>
<td>(12.0)</td>
<td>(9.89)</td>
</tr>
<tr>
<td>GDP</td>
<td>-8.83***</td>
<td>-6.48**</td>
</tr>
<tr>
<td></td>
<td>(2.76)</td>
<td>(2.65)</td>
</tr>
<tr>
<td>INF</td>
<td>2.79*</td>
<td>2.26*</td>
</tr>
<tr>
<td></td>
<td>(1.47)</td>
<td>(1.52)</td>
</tr>
<tr>
<td>RER</td>
<td>-0.56***</td>
<td>-0.48***</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>Constant</td>
<td>366.9***</td>
<td>228.4***</td>
</tr>
<tr>
<td></td>
<td>(100.8)</td>
<td>(78.8)</td>
</tr>
<tr>
<td>Observations</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.40</td>
<td>0.56</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.17</td>
<td>0.23</td>
</tr>
<tr>
<td>F-statistics</td>
<td>5.985 [0.000]</td>
<td>31.328 [0.000]</td>
</tr>
<tr>
<td>Hausman test statistics</td>
<td>4.69 [0.584]</td>
<td></td>
</tr>
</tbody>
</table>

Standard errors in parentheses

$^* p < [0.10], ^{**} p < [0.05], ^{***} p < [0.01]$
Table 5.3 presents how bank specific variables and other carefully selected economic variables influence loan performance among rural banks in Ghana. In discussing the results, this study used the random effect model from Table 5.3 because the Hausman test could not reject the null hypothesis at 5 percent significant level.

From Table 5.3, it can be observed that Interest Rate, GDP, Inflation, loan growth and Real Exchange Rate are the variables that significantly impact Non-performing loans among Rural Banks in Ghana.

5.4 Discussion of the Results

From the table, Loan Growth and Interest Rate fluctuation the (bank-specific variables) has a significant influence on loan performance. Interest rate is observed to have a significant and a positive impact on non-performing loans. This supports the earlier findings of Salas and Saurina (2002) and Hu et. Al (2006). A rise in interest rate is seen to increase non-performing loans. This makes a lot of sense in the sense that when interest rate rises, the cost of borrowing increases. This makes it difficult for borrowers to defray their loans with the interest. It is therefore not surprising that the findings show a significant but a positive relationship between interest rate and NPLs. The implication is that as interest rate rises, cost of borrowing increases and that has a ripple effect on the ability of borrowers to pay back the loan and the accompanying interest.

In relation to loan growth, it can be noticed that is positive and significant to non-performing loans. The intuition is that as rural banks give out more loans to clients, there is the high tendency that most of the customers will default. Messai and Jouini (2013) observed that financial institutions that grant loans to few clients have low rate of non-performing loans than financial institutions that give out loans to relatively many clients. Makri, Tsagkanos and Bellas (2014) postulate that
banks are able to conduct due diligence and undertake effective monitoring when loans are granted to fewer customers hence the low tendency for clients to default. It is therefore not surprising that this study found a positive relationship between non-performing loans and loan growth in rural banks.

Inflation, which measures the rise in general price level, significantly impact loan performance. From Table 5.3, it can be observed that inflation positively correlate with NPLs. It can be deduced as inflation rises in Ghana, as expected, prices of goods will also rise. Loans acquired is likely to be inadequate to serve its intended purpose and hence borrowers may not reap the expected returns to service the loans acquired.

In relation to exchange rate, it is observed that it is negatively correlated with NPLs in rural banks. It is argued that borrowers who indulge in foreign trade suffer when the cedi depreciates against the major currencies. It is worthy to note that when the cedi depreciates, borrowers will have to incur extra cost in importing and consequently may be unable to pay back loans. Similarly, depreciation of the cedi will have a ripple effect on prices of goods and services in general which makes the cost of borrowing more expensive and hence higher NPLs.

Again, from Table 5.3 GDP, Exchange Rate and Inflation are the variables, precisely economic factors, which have the tendency to exert some influence on loan performance among rural banks under consideration and by extension all rural banks. Louzis, Vouldis and Metaxas (2012) in a similar study to examine the impact of macroeconomic factors on NPLs in Greece found negative correlation between GDP and NPLs. The results in table 5.3 also indicate that GDP is negatively associated with NPLs. The negative relationship between GDP and NPLs imply that as GDP of Ghana increases, NPLs reduce. GDP has a bearing on the standard of living of people. A rise in
GDP implies a higher standard of living and hence people are highly likely to pay off loans. The rate of default thereby reduces as stated by Messai and Jouini (2013).
CHAPTER SIX
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter of the thesis presents a summary of the entire study. The chapter again presents the main findings of the study, conclusions as well as recommendations for further studies. This chapter is divided into four major sections. The first section presents the summary of the study. The second section discusses the key findings of the research while the third section emphasizes the conclusion and recommendations of the study for policy makers and government. The final section of this study provides the gaps that may be worked on in future studies.

6.2 Summary

The financial sector of Ghana witnessed what many described as “financial crisis” in the early part of 2017. Many financial institutions became insolvent stemming from high levels of non-performing loans in the financial sector. Ghana as a country is currently experiencing one of the worst financial crises the country has ever experienced since it became a Republic. So far, over seven (7) commercial, retail and investment banks in the country have been declared insolvent by the Bank of Ghana (BoG) leading to massive loss of jobs and financial investments which have so far cost the in the excesses of GH ¢ 12.7 billion of taxpayers’ money which could have been invested in social programmes and infrastructural projects to alleviate poverty (GNA, 2017). The Rural and Community Banking institutions in the country has not been left out of this mess with most of them being declared insolvent which has led to majority of their customers losing their savings (GNA, 2017).
It is against this backdrop that this study critically and carefully examined how certain factors interact with interest rate margin to influence NPL among rural banks in Ghana. This study is very vital taking into consideration the negative repercussions of NPLs and the rate of ascendency in the country.

**6.3 Main Findings**

Chapter Five (5) of the study presented a careful discussion and analysis of the results of the study. From chapter 5, the study observed that both bank-specific variables and certain economic factors influence loan performance among rural banks in Ghana. The main factors that were identified to influence non-performing loans among rural banks in Ghana include interest rate, GDP, inflation, real effective exchange rate and loan growth.

Interest rate is observed to have a significant and a positive impact on non-performing loans. A rise in interest rate is seen to increase non-performing loans. This makes a lot of sense in the sense that when interest rate rises, the cost of borrowing increases. This makes it difficult for borrowers to defray their loans with the interest.

GDP is negatively associated with NPLs. The negative relationship between GDP and NPLs imply that as GDP of Ghana increases, NPLs reduce. GDP has a bearing on the standard of living of people.

The study again found a positive relationship between NPLs and Inflation. The implication of the results is that, as inflation increases in a country, the cost of doing business increases. It is established that rural banks provide loans to people who are mostly informal workers.
Lastly, it is observed that NPLs are negatively impacted by real effect exchange rate. It can be deduced that a rise in exchange will lead to a fall in non-performing loans.

6.4 Recommendations

From the findings in the study, it was observed that GDP plays a significant role influencing loan performance in rural banks. The study deduced that as and when GDP rises, the rate of non-performing loans falls. This study therefore recommends that the government of Ghana has to put in place measures that are geared towards a continuous growth of GDP in Ghana. This will have a ripple effect in achieving the government’s intention to boost confidence of Ghanaians in the financial sector and enhance financial inclusion.

Again, government should endeavor to reduce inflation in the country. When inflation increases, cost of borrowing also increases which leads to higher chance of loan default. Government should put in measures to reduce unnecessary spending that leads to an increase in inflation.

6.5 Suggestion for Future Research

This study sought to examine the impact of interest rate margin on non-performing loans among rural banks in Ghana. It found that interest rate has a significant impact on loan performance. One limitation of this study is that, it focused only on rural banks.

This study recommends that future research work should delve into how interest rate may influence loan performance in saving and loan Companies and other financial sector of Ghana in general.
REFERENCES


economic driver while applying banking regulations”, organized by the canadian high commission in joint collaboration with the chartered institute of bankers of Nigeria (CIBN) and the royal bank of canada (RBC) on march (Vol. 7).
