UNIVERSITY OF CAPE COAST

EFFECT OF THE USE OF CREDIT REFERENCING BUREAUX ON LOAN QUALITY OF SELECTED BANKS IN GHANA

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BY

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DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature…… Date……

Name: Stephen Akalebey Agaawena

Supervisor's Declaration

I hereby declare that preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid downby the University of Cape Coast.

Principal Supervisor's Signature……..... Date…….

Name: Prof. William Gabriel Brafu Insaidoo

ABSTRACT

The study makes use of the Ghanaian banking industry's implementation of Credit Referencing Bureaus (CRBs) in 2010 as a natural experiment to assess the effect of CRBs on impairment loans (loan quality) and write-off loans by using a dataset from some selected banks in Ghana. The specific objectives were to investigate how the use of the CRB affects the quality of loans in Ghana's banking sector. The target population was 15 banks from 2012 to 2019. The Fixed Random and Effect Estimation was used in the study to determine whether CRBs adversely correlated with impairment and write-off loans in Ghana. The results suggest that banks that employ CRB services in their operations, particularly on loans administration can reduce their impairment loans and minimize information asymmetry, which improves banks' ability to forecast borrowers' behavior and put pressure on borrowers to make loans payments in order to avoid future loans denials by banks. The study also discovered that key predictors of loans quality are banks' capital, size, liquidity, profit before tax, Gross Domestic Product (GDP) growth rate, and inflation rate. The study recommends that banks in Ghana should frequently useCRB services and products since doing so will improve their loans quality and lower their exposure to impairment and write-off loans. Again, to strengthen theoperations of both banks and CRBs, it is recommended that the data source for CRBs be expanded with an increased publicity regarding CRBs existence in Ghana. Even though CRBs have a significant effect on impairment and write- off loans, they only cover about 10% of Ghana's adult population. Therefore, expanding data sources for CRBs can enhance the accuracy, consistency, and reliability of client evaluations, improving loan quality and reducing impairments and write-offs.

KEYWORDS

Credit Referencing Bureaux

Loans Quality

Loans Writeoffs

Loans Impairement

Bankinig sector

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DEDICATION

To my wife and children

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CHAPTER ONE

INTRODUCTION

The impact of Credit Referencing Bureaus on the quality of loans extended by certain Ghanaian banks is the subject of this research. There are a total of five major chapters; this first one serves as a synopsis of the study to set the stage for the rest of the work. At the outset, the chapter lays up the context of the research. Following this, the problem statement is provided, which explains why this study is necessary to address a current research gap. Accordingly, this part of the chapter provides the purpose, specific objectives and the research hypothesis. The chapter then proceeds to define and provide the boundary of the study, that is its delimitation. The limitations, which are the caveats of the study, are also provided. This chapter ends with how the rest of the dissertation has been organized.

Background to the study

Banks have been under intense scrutiny in the past two decades, attracting considerable interest from researchers and professionals (Hidemichi et al., 2014). This is due to the basic and important functions banks play in many economies, which determines whether economies succeed or fail (Crotty, 2008a, 2008b). Banks perform a wide range of tasks, including mobilizing savings, allocating resources, managing risk, overseeing managers, and facilitating transactions, which expose banks to a wide range of issues (Niepmann et al., 2017). One of the greatest function of banks worldwide is to provide loans or credit to borrowers based largely on their income. However, this function often exposes banks to many risks such as loans not performing, loan default, and bad debt due to the unknown surroundings,

borrowers' capabilities and readiness or willingness to repay granted loans (Greenidge & Grosvenor, 2010). These, therefore, make lending in developing countries a difficult task for banks because information on loans applicants' capacities and willingness to repay is difficult to determine.

The majority of people who apply for loans or borrow money do not have something to back them up financially (Gonzalez-Vega, 2003; Conning & Udry, 2007). Cavelaars and Passenier (2012) state that up to the 1960s, people had to meet with a bank representative in person to apply for a loan, explain why they needed the money, and prove they were creditworthy. They observed that lending has over the years been based on hardand relationship-based soft information (Cavelaars & Passenier, 2012). Indeed, the Ghanaian banking sector has and is still relying on hard and relationship-based soft information for lending to borrowers. This has led to impaired loans deteriorating according to the 2013 and 2014 Bank of Ghana (BoG) financial stability reports (BoG, 2013, 2014). For instance, the percentage of problematic loans rose from 6.1% in 2017 to 7.6% in 2018. From 7.6% in 2008 it increased again to 13.2% in 2009. There was a further strong rise in impairment loans from 13.2% in 2009 to 18.1% in 2010. The question of what accounted for the poor loans performance is a concern that needs to be investigated.

As explained by Vaughan and Stojanovic (1996), loan quality refers to how quickly borrowers are fulfilling their contractual obligations in terms of repaying their loans. It is the possibility that a bank will be reimbursed for the funds it lent to creditors. Poor loans quality lowers revenues for banks because banks tendto charge expected loans losses against earnings, due to suspicions

that loans may not perform (Vaughan & Stojanovic, 1996). The quality of bank loans is quite important because commercial banks loans to individuals and businesses account for a significant portion of the banking system's earning assets and contribute to their successful operation and stability (Wojnilower, 1962). While loans quality is very important for the operation and stability of lending banks, over the years, poor loans quality continues to be one of the common problems in the banking sector. Most studies regarding reasons why banks and economies fail concluded that failed financial institutions and banks usually have high percentages of impairment loans, which is caused by loans quality (Demirguc-Kunt & Huizinga, 1998; Barr & Siems, 1994; Whalen, 1991). After investigating the effect of loans quality on banks performance, Khalid and Amjad (2012) discovered that the amount of non-value- added activities needed to process problem loans decreased with the quality of the loans processing activities prior to loans approval.

Nonperforming loans were classified by the Committee of Basel on Banking Supervision (2016) as loans with a past-due balance of more than 90 days, with regional variances being a potential factor. Loans that have no interest and have been overdue for ninety days or more are considered nonperforming loans (Alton and Hazen, 2001). Nonperforming loans lead to low revenues as well as less liquidity for banks which affects their ability to meet short-term obligations. Customers' confidence in banks will be severely harmed if banks are unable to meet their short-term obligations such as withdrawal requests (Gomez, 2008). The percentage of non-performing loans in a bank's loans portfolio indicates the quality of the bank's loans and thus the profitability of its lending activities. It requires the provision for

partial or complete loans write-offs. Banks lose money on their equity capital due to write offloans, which makes the banks unwilling to make new loans, as the credit crisis is known. As a result, banks are reluctant to take on more risk through lending because of lower loans portfolio quality, which make them sensitive of their riskiness levels(Alhassan et al., 2014).

According to several studies (Gaitho, 2013; Luoto et al., 2007; Galindo & Miller, 2001), Credit Referencing Bureaus (CRBs) do impact banks and economies in general. CRBs are institutions that gather financial data from various banks and other financial institutions on clients' borrowings. They then process the information, store it, and at the request of lenders (in this case banks), provide creditworthiness rating or report of individuals or institutions seeking loans to banks for a fee to inform their lending decisions (Kusi, et al., 2015). CRBs institutions can thoroughly evaluate an applicant's borrowing history, repayment habits, and cash flow status, among other factors, using verified information (Munene, 2012). The main purpose of introducing CRBs is to help deal with issuesof moral hazards, adverse selection, and more importantly help improve poor loansquality in the banking sector (Triki & Gajigo, 2014).

Consequently, in 2012, a number of countries in North Africa, Sub-Saharan Africa, and the Middle East set up CRBs. After adopting the Credit Reporting Act 2007 (Act 726) just three years prior, Ghana became one of the rare West African nations to establish a CRB in 2010. This allowed for the implementation of information exchange through CRBs (World Bank, 2012). In Ghana, a consumer's credit application and creditworthiness must be assessed by banks using credit reference databases in accordance with Section

24 of Act 726, to establish approvalor denial of a loans.

Since the CRBs' inception and full operation in 2010, Ghana's credit referencing system has been used by the banking sector, particularly in the credit market. It provides credit reports to banks to assist their credit underwriting and administration processes. There was a 34% spike in financial services inquiries on credit reports from 2016 to 2017, according to the BoG's 2017 sector report. In 2017, the CRBs received a total of 2,222,311 enquiries from banks and other financial institutions, up from 1,662,740 in 2016, indicating that more banks and financial institutions are patronizing the services and at the same time complying with Act 726.

According to the 2019 credit referencing activity report, CRBs enquiries by banks increased to 2,820,946 in 2019, representing a 7% increase over the 2018 figure of 2,629,400 (BoG, 2019). The yearly sectorial distribution of CRBs enquiries/usage by banks and other financial institutions trends shows that banking sector CRBs enquiries significantly increased between 2012 and 2017. The total enquiries granted by the credit bureau to banks was 42,508 in 2012, which almost quadrable to 136,235 in 2013. The enquiries continued to increase by a constant number of 274,211 for 2014 and 2015 respectively. It again rose from 274,211 in 2015 to 215,881. In 2017 and 2018 the increasing trend continued with 227,956 and 739,765 enquiries, respectively. The trend continued in 2019 with 893,736 enquiries, representing a 3% increase when compared to the 2018 total enquiries of 739,765. The enquiry growth in other financial institutions followed a similar trend as the banks. For instance, Microfinance Institutions (MFIs) enquiries in 2012 were40,007, increased to 54,184 in 2013 and 118,396 in 2017. In 2019

the totalincreased to 135,245 from the 2018 figure of 212,553. These growing rates of enquiries show that the importance of information sharing within the banking sectoris being realized.

The information asymmetry and information sharing theories have also projected two key advantages of information sharing through CRBs, viz: increasingaccess to financing and lowering the number of bad loans (Brown et al., 2009; Brown & Zehnder, 2007; Luoto et al., 2007). Many empirical studies have examined the use of CRBs in industrialized countries. Examples of research that support this idea include Behr & Sonnekalb (2012), Brown et al. (2009), Djankov et al. (2007), and Brown & Zehnder (2007), all of which found that banks in industrialized economies perform better when they share information through CRBs. Furthermore, CRBs have shown to improve lenders' comprehension of borrowers (Miller, 2003), lower the cost of borrowing (Pagano et al., 2007; Luoto et al., 2007), alleviate credit risk (Brown et al., 2009; Brown & Zehnder, 2007), and increase borrowers' access to credit (Pagano et al., 2007; Luoto et al., 2007).

However, there have been few empirical studies in Africa on the use of CRBs and loans quality. Particularly, over a decade after the inception of CRBs inGhana, research has been conducted in areas such as relevance of CRB and its effecton Ghana's financial industry (Dankwah, 2012), CRBs and banks credit risk (Kusiet al., 2015), CRBs, bank credit risk and profitability (Kusi, 2015), role of information sharing in promoting or detracting from bank returns" (Kusi, et al., 2016), among others. To yet, nevertheless, research into how CRBs influence the quality of loans in Ghana's banking system is scant. Since there is a dearth of literature on the topic, this study uses 2010 as a

jumping off point to examine how the use of CRBs affected the quality of loans made by a few banks in Ghana's banking sector. Exploring this is critical because it may help banks, as well as regulatory and supervisory agencies, to adoptthe necessary actions and policies to prevent the quality of bank loans portfolios from deteriorating.

Statement of the Problem

CRBs are known to have certain effects on banks and economies in general (Gaitho, 2013; Luoto et al., 2007). Pagano et al. (2007) states that firms in Eastern European and former Soviet Union transition countries benefit from easier access to credit and cheaper borrowing rates when lenders share information through CRBs. Hahn and Lee (2008) stated that information sharing through CRBs, in general, improves credit scoring models. CRBs help boost the profitability of banks, according to Berger and Frame (2006), whereas Luoto et al. (2007) discovered that CRBs help improves loans access and increase the profitability of banks. Provisions for bad and dubious loans grow substantially in a negative macroeconomic climate, as Keeton and Morris (1987) found. A study by Keeton (1999) examined how nonperforming loans affected banks' lending practices in the Italian banking sector. The findings revealed that there is relationship between credit growth and decrease credit standards, which led to major loans default among United States banks. Bofondi and Ropele (2011) looked at how the macroeconomic conditions affected the quality of bank loans over a 20-year span in Italy. They found that rising Gross Domestic Product (GDP) had an inverse relationship with loans performance across the study period.

Amediku (2006) conducted a stress test of the banking sector in Ghana using quarterly data from 1995 to 2005 and concluded that adverse economic shock and rise in inflation were responsible for worsening banks' impairment loans. This finding was supported by Adusei (2018) when he examined the causes of bad loans in Ghana's banking system between 1998 to 2013. He found that banks non-performing loans in Ghana in 2016 were 17.29% with a maximum point of 18.08% in 2010 and lowest point of 7.68% in 2008. He further reveals that Ghana was ranked 9th out of 114 countries in terms of the worst non- performing loans, in 2016 with 17.29%, and 7th in Africa with 0.20%, tied with Macao internationally. Adusei findings is supported by data available at the Worldbank as shown on the graph below.

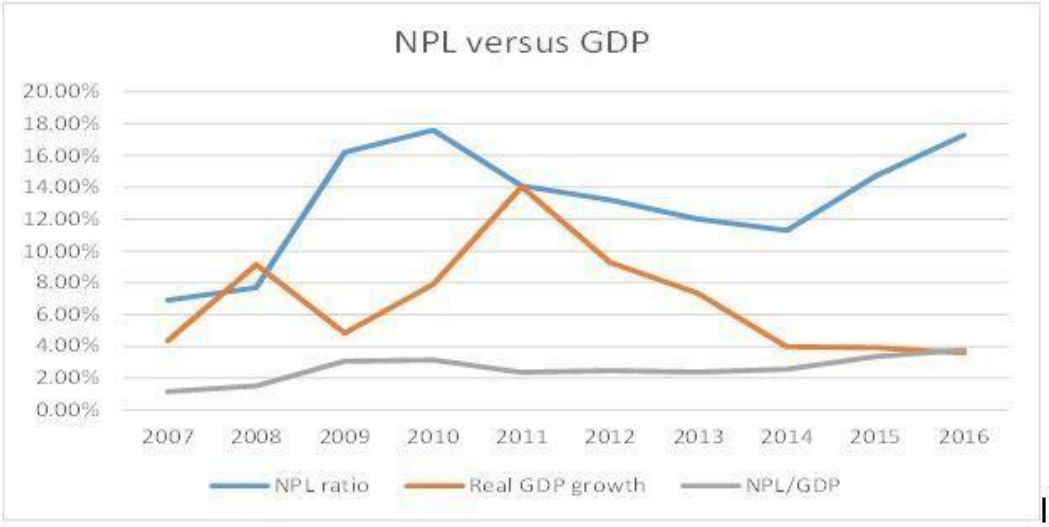

Figure 1: NPL versus GDP
Source: The World Bank (2019)

The deteriorating trend of nonperforming loans (NPLs) over the years as shown in the graph above is of great concern which calls for studies to be conducted so that policy recommendations can be offered to help curb the problem in the banking sector.

Keeton (1979) and Stiglitz and Weiss (1981) say that information inequalities in the credit markets are a primary driver of loans defaults. Due to information asymmetry, banks are more likely to discriminate against high-risk loans consumers who can afford the banks' high loans prices. According to the 2019 credit referencing activity report, the credit referencing system serves as a tool for loans recoveries because it provides information on borrowers which enables banks to track, trace and remind borrowers of their repayments periods and eventually get repayment from borrowers (BoG, 2019). Figure 1 shows is the trend of the banks' enquiries of CRBs services during the period of the study.

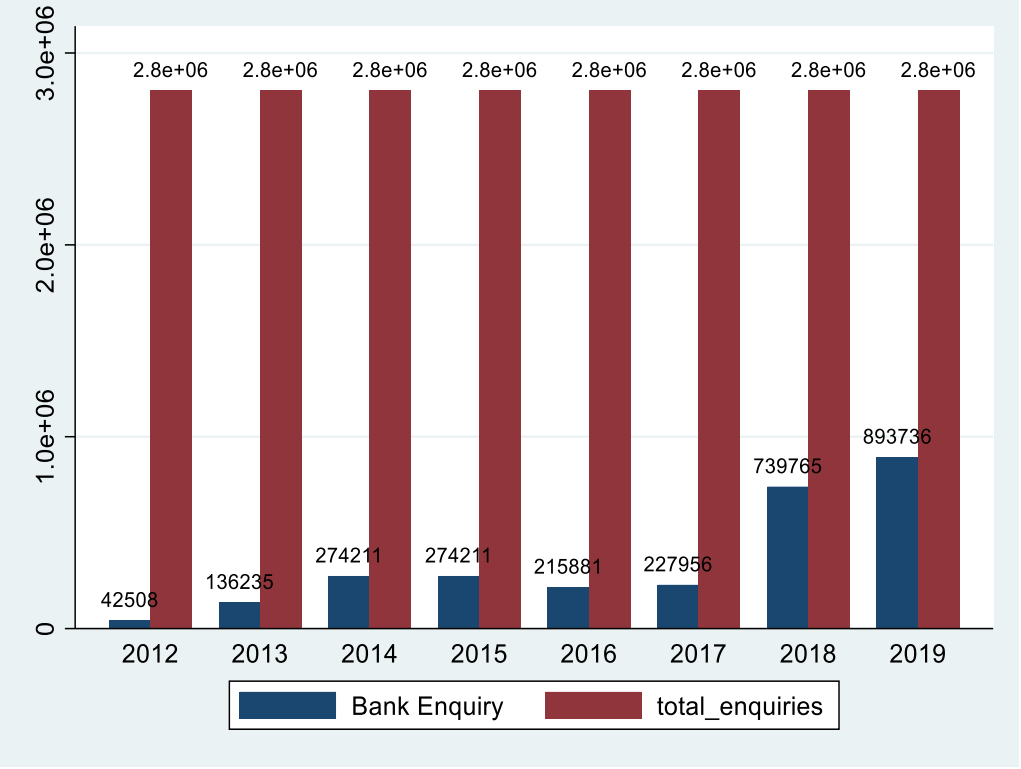

Figure 2: Trend of the banks' enquiries of CRBs services

The graph illustrates the trends in "Bank Enquiry" volumes against the total number of enquiries from 2012 to 2019. The blue bars represent the yearly "Bank Enquiry" count, while the red bars indicate the total enquiries

across all years combined, which remains constant around 2.8 million. Over the years, "Bank Enquiry" volumes show a substantial increase, particularly from 2017 onwards, where there is a significant jump in 2018 and 2019 to 739,765 and 893,736, respectively. This upward trend suggests a growing demand for banking enquiries during this period, highlighting an increased usage of CRB services. However, since the total enquiries do not change, this graph may imply that "Bank Enquiry" services increasingly dominate the total enquiry volumes over time.

Previous research on CRBs (like., Berger & Frame, (2006); Luoto et al., (2007);Behr & Sonnekalb, (2012)) used dummies and trends to determine the effects of CRBs on banks and other financial institutions before and after their adoption, which is not a true reflection of poor quality measured. However, this study uses CRBs as a variable at the level of the bank that is thought to provide an estimate that is more accurate than the dummies utilized in earlier studies. In this study, CRBs as a variable of interest is measured in two ways. The first measurement is by taking the natural logs of CRB enquiries by banks. This is represented by CRBX as proxy for the frequency of the use of CRB services by the banks.

This study is unique because the study uses impaired loans ratio as loans loss to assess loans quality. The impairment loans ratio, which is calculated as impaired charges on loans and advances divided by total loans and advances, is a better representation of the poor quality of loans because it reflects actual loans loss for a certain given period, and it is less commonly utilized in an empirical study (Chaibi & Ftiti, 2015). Finally, Since this topic has not been previously covered in literature, this study sets out to rectify that

by exploring how CRB impacts the quality of loans in Ghana's banking system. A freshly developed and enhanced CRB measure will be provided by this study, contributing to the growing body of information on CRBs.

Research Objectives

The overall goal of this research is to explore the effect of the use of CRBs on loans quality of selected Banks in Ghana. To accomplish this general objective, the research is divided intotwo specific objectives, which are to:

1. determine the effect of the use of the Credit Reference Buraux on write-off loans of selected banks in Ghana.
2. investigate the use of Credit Reference Buraux on loans quality in Ghana.

Research Hypotheses

Two hypotheses are tested in this study. First, this study anticipates CRBs and write-off loans, to have negative relations, like Pagano et al. (2007). This meansthat as the usage of CRB products and services by banks increases, write-off loansare expected to reduce. This is how it is expressed:

1. **H_0:** The use of CRB does not affect write-off loans of selected banks in Ghana.

H_1: The use of CRB affects write-off loans of selected banks in Ghana.

On the hand, CRBs are expected to have a significant positive impact on banks write-off loans, according to this study. This means that by employing CRB products and services in their lending functions, banks increase their chances of fully recovering their loans and advances, thereby reducing impaired loans (increasing loans quality). Based on Padilla and Pagano (1997), Bennardo et al. (2009); Bennardo et al. (2015); Pagano and Jappelli

(1993), this hypothesis contends that CRB puts pressure on borrowers to repay their loans satisfactorily out of concern that they will be denied credit in the future by other banks if they default.This can raise the quality of the loans. The hypothesis is stated as:

1. **H_0:** The use of the CRB has no effect on loans quality of banks in Ghana.

   H_1: The use of the CRB has an effect on loans quality of banks in Ghana.

Significance of the Study

Research into how CRBs affect loan quality in Ghana's banking sector is important for the industry as a whole, CRB institutions, and individual bank clients. Findings from this research will add to what is already known about CRB's impact on loan quality in Ghanaian financial institutions. Research on CRB effects has been extensive in the US, EU, and Asian countries, but in the African setting, particularly in Ghana, relatively little has been done. Therefore, the results of this study will contribute to a better understanding of how the usage of CRBs affects the quality of loans in the banking sector in Ghana in particular, and Africa as a whole. The research will also serve as a manual for policymakers, bank management, and CRB management on how to enhance the operation and services of CRB institutions to reap the most advantages. This study will provide a reference for future researchable topics within this wide issue in the context of Ghana for interested academics in the domains of CRBs on loans quality.

Organisation of the Study

The research is organized into five sections. Chapter one, "Introduction," delves into the connection involving CRBs, lending by banks, and loan quality. Background information, a statement of the problem,

objectives, a research hypothesis, the study's importance, an outline, and a conclusion make up the research paper. The second chapter is a literature review covering the study's numerous components. The chapterThree presents the methodology adopted in carrying out the analysis. The fourth chapter shows the presentation of results and discussions. The last chapter of the study is organized into summary of findings with conclusion and recommendations and is followed by references and appendices.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This section examines research on the Ghanaian banking system, CRBs generally and in Ghana as well as their history. This chapter recalls and discusses major occurrences of CRBs in Ghana from 2012 to 2019. The chapter also includestables and charts that analyze and examine CRBs and the Ghanaian banking sectorinclinations.

Theoretical Review

To determine the effect of the use of CRB on loans quality in the banking sector in Ghana, this study is guided by the following theories: information sharing, moral hazard, adverse selection, and information asymmetric. These theories arediscussed subsequently.

Information Asymmetric Theory

Freimer and Gordon were the first to propose the idea of information asymmetry (1965), while Stiglitz and Weiss were the ones to build on it (1981). Their main point was that there is a lack of reliable financial data on market participants due to information asymmetry in the credit sector. De Meza and Webb (1987) argue that asymmetric knowledge can lead to over-lending or credit excess, which is a strong disagreement with the results of Stiglitz and Weiss (1981). According to Allen and Santomero (1998), banks are better at thoroughly screening and monitoring borrowers than other investors. Banks, according to Freixas and Rochet (1999), have the expertise to obtain and treat private information. For better money management and account opening, banks require greater in-depth understanding of a business's

revenue, expenses, and growth and development (Diamond and Ranjan, 2000). Despite the plethora of data, there is room for improvement in the way banks and businesses share information. According to Freixas and Rocket (1999), there are information asymmetries among banks that hinder the development of prices (interest rates) from clearing the credit market.

It may be difficult to distinguish between good and bad borrowers, according to the information asymmetry hypothesis (Auronen, 2003), which can lead to problems like adverse selection and moral hazards (Richard, 2011). It stands to reason that in any given market, the side with more information—here, a borrower—should be able to negotiate better terms than the side without—here, a lender or bank. Consequently, the less knowledgeable party is more likely to make a poor or erroneous choice since they do not fully grasp the nature of the good being traded. According to Bester (1994) and Bofondi and Gobbi (2003), banks have accumulated a sizable amount of low-quality debt. Stiglitz and Weiss (1981) claim that banks' demands for collateral result in adverse selection and subsequently credit rationing. Furthermore, they claim that borrowers at low risk typically anticipate a low rate of return. Because of this, low-risk borrowers have lower incomes than high-risk borrowers and therefore, more likely to be unable to furnish collateral. As a result, banks' increased demand for collateralcould have the same adverse selection effect on a bank loans. Bester (1985) also asserted that banks should only offer loans or credit contracts with floating interestrates and collateral restrictions in order to avoid credit rationing.

Moral Hazard Theory

Moral hazard is the possibility that one of the parties to a contract did not do so in good faith by providing false information about their liabilities, assets, or ability to pay. They usually have an incentive to take on more risk than is reasonable in an effort to increase their chances of success (Myerson, 1991). According to Myerson (1991), moral hazard in banking and other financial organizations was the main cause of the banking sector's financial catastrophe. The moral hazard concept states that when there are no consequences for additional loan requests, borrowers are more inclined to skip payments. Reason being, lenders have a harder time estimating a borrower's wealth at the moment of application than they do when the debt is due. Borrowers may be inclined to default on loans if lenders lack the ability to ascertain their wealth. (Wandera and Kwambazi, 2013) said. Alary and Goller (2004) show that lenders will raise rates to prevent this and that will eventually contribute to the market's breakup. Banks nowadays, according to Freixas and Rochet (2008), rely on information economics, which was absent from conventional Keynesian and monetarist models. An important aspect of human behavior, moral hazard, new models for micro- and macroeconomic theories of banking in business cycles should be taken into consideration as economists seek deeper understandings into factors that contribute to macroeconomic instability.

Adverse Selection Theory

An adverse selection theory about credit markets was developed by Stiglitz and Weiss (1981). The hypothesis is predicated on two key assumptions. First, lenders are unable to distinguish between borrowers' risk

tolerance and appetite, and second, credit agreements are subject to restrictions. Thus, when project proceeds are less than loans obligations, the borrower is relieved of the obligation to pay out of pocket. The focus of this investigation is on involuntary default which contributes to the reduction of loans quality, with the assumption that borrowers will repay their loans if they have the financial resources to do so. A loans agreementlenders and a borrower who is not concerned about risk that restricts the borrower's responsibility signals to borrowers their preference for risk and to lenders their aversion to it. To put it differently, an existence of restricted borrowers' accountability necessitates that lenders exercise due diligence before issuing credit because lenders are entirely responsible for the risk of a problem.

In other words, the Adverse Selection Problem arises when lenders are unable to differentiate between good and bad borrowers, and all borrowers are charged a standard interest rate that reflects their collective experience. Deservingborrowers will be driven out of the market if the rate is higher than they should be, which will force banks to impose even higher rates on those who stay. By exchanging credit information, the lender may identify good borrowers fromproblematic borrowers in the market. Lenders can much more correctly determine borrower risk with more information, and they may then establish loans terms and conditions appropriately**.**

Information Sharing Theory

According to Zaheer and Trkman (2017), the information-sharing theory aims to deduce what makes people able to and what limits their ability to share information with one another. It is based on the premise that individuals' attitudes toward information sharing can be impacted by both

corporate policies and culture as well as individual variables (Constant et al., 1994). Among the many advantages associated with sharing knowledge in the banking credit market is the belief that loan performance can be improved. Knowledge sharing in an unequal information market, moral hazard, and adverse selection have all been the subject of prior empirical research. When borrowers are able to share information with their competition, it creates a moral hazard situation in which borrowers are motivated to perform better than they otherwise would have been if they had kept their information to themselves (Padilla & Pagano, 1997). Borrowers would like not default, as doing so would make their information about default public, which could lead to higher interest rates and reduced funding options from their present banks and the market at large (Padilla and Pagano, 1997).

Pagano (1993) found that providing full information on an individual's credit history with other banks resolves adverse selection difficulties when financial institutions have an existing information advantage. Brown and Zehnder (2007) demonstrate that without credit information exchange and ethical banking, the credit market will collapse. Their research also asserts that sharing information motivates borrowers to repay their loans, and allows lenders to discover applicantswith solid credit histories. According to Kallberg and Udell (2003), credit bureaus'historical data has a strong default prediction ability, making financial institutions less susceptible to adverse selection and, consequently, reducing the default rate on bank loans. Doblas-Madrid and Minetti (2013) use contract-level data from an American credit bureau to study how lenders sharing information affects firms' performance in the loan market. They discovered that sharing information reduces contract defaults

and nonperforming loans, especially when organizations are transparent. They recommended a reduction in using guarantees and contract restrictions.

A shift toward higher-performing clients is one consequence of information sharing, while a little improvement in repayment performance is another (Luoto et al., 2007). In their study, Kusi et al. (2017) looked at how sharing credit information affected the risk that banks in both low- and high-income African countries faced. The research proved that sharing information helps keep bank credit risk under control. At least in theory, banks are better able to weather bad loans and remain in business over the long haul when they share information with one another. According to Kusi et al. (2016), Ghanaian banks see an increase in profitability if they have the ability to obtain reports or information from CRBs. Information processing, according to Hauswald and Marquez's (2003) research, safeguards screening microfinance organizations from rivals and lets them reap rents. Therefore, screening returns will be enhanced by screening technology developments.

Good borrowers with lower risk may be offered more attractive rates, encouraging credit demand, but fewer higher-risk consumers would be rationed out of the marketplace since lenders couldn't give them acceptable rates (Barron and Staten, 2008). Padilla and Pagano (1997) state that when banks offer credit default information, borrowers are motivated to exert more effort in their endeavors. When people fail to repay their debts as agreed upon, it reflects poorly on their creditworthiness and can lead to higher interest rates or even exclusion from future credit opportunities. As Pagano and Jappelli (1993) showed, banks are able to assess the creditworthiness of petitioners and lend to them as safe when lenders share information about them. This reduces

the risk of adverse selection. By disclosing this information, borrowers may feel pressured to act in a way that benefits banks.

Conceptual Review

Overview of Banking in Ghana

Beginning in 1953 with the establishment of the Bank of Ghana (BoG) by the Bank of England, banking in Ghana can be traced back to the early 1950s. As an issuing bank, the Bank of Ghana (BoG) was split off from the Ghana Commercial Bank, which expanded to become the largest commercial bank with an exclusive hold on accounts with public corporations. On March 6, 1957, the Gold Coast declared its independence from the UK and changed its name to Ghana. Following the BoG's takeover of the currency in July 1958, the Cedi was introduced as the country's first national currency, superseding the previous West African notes. Everything was handed over to the Ghana Commercial Bank. The main objective in forming the BoG was to provide a centralized authority to manage the country's money.

At the time, only Barclays Bank, Standard Bank, and Bank of Gold Coast were active in Ghana. However, in 2014, there were 27 multinational banks in Ghana: 15 of the banks were foreign owned banks and 12 were local banks (BoG, 2014, Price Waterhouse Coopers, 2014). The number of banks increased from 27 in 2014 to 34 in 2017, comprising 50% local and 50% international banks (BoG, 2018). However, the current number of banks in Ghana has reduced to 23 in 2019 from the 34 in 2017: 14 banks were foreign banks, whereas nine (9) were domestic or local banks (Price Waterhouse Coopers, 2019).

Most of the public sector banks went bankrupt in the 1980s, with the privatesector accounting for 41% of non-performing loans (Kapur et al., 1991, pp. 60–61).During this time, Ghana and many other developing economies underwent numerous prudential banking reforms, led by the World Bank. The Banking Law 1989 (PNDCL 225), Bank of Ghana Act 2002 (Act 612), Banking Act 2004 (Act 673), and Banking Amendment Act 2007 (Act 738), all of which were passed in Ghana, were examples of such reforms. Under the financial sector adjustment program, PNDCL 225 was updated and featured additional regulations such as riskexposure restrictions, a 6% capital adequacy ratio, uniform accounting standards, auditing scope expansion, and the BoG's on-site and off-site bank supervision.

The BoG was given further supervisory authority in 1992 after the Bank of Ghana Law 1989 (PNDCL 291) was changed. Under the new law, there was a considerable change in the minimum capital adequacy ratio, which was raised from 6% to 10%. Act 738, which succeeded Act 673 added additional duties to ensure the soundness and stability of Ghana's financial system and establish offshore banking and other offshore financial services such as insurance and leasing with the intention of making Ghana the regional financial hub of Africa and luring diaspora investment. Some of the major reforms in the Ghanaian Banking system from 2000 to 2017 are summarized below.

Table 1: Major Reforms of Ghanaian Banking Sector from 2000 to 2017

YEAR	REFORM(S) AND REGULATION(S) INTRODUCED
2000	The transfer of guaranteed deposits and the closure of three insolventbanks: Bank for Housing and Construction, Cooperative Bank, and Bank of Credit and Commerce
2002	The central bank's independence was created by the Bank of Ghana Act of 2002, with price and financial stability as its main objectives. Also, the Real Time Gross Settlement (RTGS) System, also known as the Ghana Interbank Settlement System (GISS) was put into operation
2003	The BoG started improving its risk-based prudential supervisory procedures. The minimum capital adequacy ratio has also been raised from 6% to 10%. A system of paper-based credit clearing was implemented by the BoG. The Banking Act of 2004 was substituted for the Banking Law of 1989 (PNDCL 291)
2004	In response to the implementation of the universal banking licence rule, the BoG issued a directive requiring all banks to increase their minimum stated capital requirements from GH¢20thousand to GH¢7 million by the end of 2006. Commercial banks were no longer able to impose maintenance, transaction, or transfer fees. The BoG was given statutory authority to oversee payment networks by the Payment System Act 2003.
2006	Banks are no longer required to hold 15% of their deposits in reserve. TheForeign Exchange Act of 2006 was enacted to liberalize foreign exchange inflows into Ghana for the purpose of foreign direct investment.
2007	Re-denomination of the Cedi. To provide a legal regulatory framework for credit reporting in Ghana, Act 726 was passed. The Banking Amendment Act of 2007 was passed to permit offshore banking and to make it possible for Ghana to create international financial services. Implementation of risk-based supervision of banks. The International Financial Reporting Standards (IFRS) was introduced, and all banks wereto report their financial position and performance according to the IFRS.
2008	The Borrowers and Lenders Act of 2008 established a framework for full transparency in creditor-borrower relationships, with a focus on the role of collateral in credit distribution. Money laundering became unlawful following the creation of the Anti-Money Laundering Act 2007 (Act 749). The Switch (e-zwich) and a Biometric Smartcard are used to operate a shared electronic platform.
2009	The banks' minimum capital requirements were raised from GH¢7 million to GH¢60 million to help banks strengthen their capital bases and take on more risk. The authorization and introduction of mobile payment services had taken place.Cheque Codeline Clearing (CCC) was established,

	reducing the time it takes for a cheque to clear from 5 to 8 days to 2 days across the country.
2010	The first CRB started operation in Ghana. As part of the Automated Clearing House initiative, the computerized direct credit transfer systemwas launched.
2011	Only Ghana cedis must be used to meet the statutory reserve requirement of 9%.
2013	The monetary policy rate and reserve requirement were both raised to 16% and 10% respectively. Banks by requirement were to have aminimum stated capital of GH¢120 million.
2016	Only the Ghana cedis must be used to meet the statutory reserve requirement of 9%. The BoG enacted for the first time the Ghana Deposit Protection Act 2016 (Act 931) in July 2016 to protect depositors with banks and non-bank financial institutions, microfinance institutions, and Savings and loans companies. The BoG introduced the Banks and Specialized Deposit-Taking Institutions Act 2016, as the primary law by which the sector is supervised.
2017	To safeguard depositors' funds and prevent insolvency, the Government of Ghana carried out a serious clean-up operation in the banking industry in 2017. For existing banks and new entrants, the minimum paid-up capital was increased from GH¢120 million to GH¢400 million (a 233.33% increase) as of the effective date of September 11, 2017, and banks must comply by the end of December 2018.

Source*:* Annual Reports of the BoG, Ghana Banking Survey, and International Monetary Fund's Country Reports (2019)

Credit Referencing Bureaus

Collateral is a major source of security for loans and credits issued to both individuals and companies by lending institutions over the years. Most developing nations have a large informal sector population, which means that lending institutions have sometimes had to endure fierce competition inside the financial systems. Lending institutions have had to abandon collateral-based lending in certain instances to develop their clientele base while maintaining a profit (Beck et al., 2004). According to Ibtissem and Bouri (2013), borrowers take loans or credits from several sources due to the competitive financial market and lending institutions' lenient credit appraisal criteria. Because lending institutions, particularly banks often have limited or

no information on borrowers' credit histories, this practice result in a considerable increase in multiple borrowing (Charles and Mori, 2016). So, for banks and financial institutions to deal with multiple borrowing and loans nonperformance, there is the need to share credit information among financial institutions. Thus, the foundation of financial institutions to promote information sharing on borrowers was prompted by over-indebtedness that result from multiple borrowing (Pagan, 2014).

CRBs emerged in the 1800s in the USA as a means by which financial institutions can share credit information about borrowers. Credit reporting bureaus (CRBs) aggregate data on customers' credit histories shared with them by banks and other financial organizations, and then make this data easily accessible to other lending organizations. There are more than a hundred different private credit referencing registries around the world (Kallberg & Udell, 2003), and they're all unique. In 1934 and 1946, respectively, Germany and France were the pioneers in Europe to do this (Klein, 2013). A far more sophisticated reporting systems exist on industrialized continents, such as the Americas and Europe, because of the availability of borrower credit information (Jappelli et al., 2005). However, South Africa, Egypt, Tunisia, and Morocco were among the first Nations in Africa to establish public rating agencies. Uganda, Ghana, and Kenya are among the other African nations that during the past ten years, have used the services of private credit bureaus (Tumusiime-Mutebile, 2011).

Credit Referencing Bureaus in Ghana

Although the necessary legislation (Act 726) was enacted in 2007, CRBs were established with a provisional license in March 2008 (BoG,

2008). To improve the delivery of good, accurate, trustworthy, and quality credit information-sharing services, it was granted two years to collect and synchronize financial data from banks in Ghana. CRBs began operating fully in Ghana in April 2010 (World Bank, 2014). The Act permits banks to share information on their customers and to transmit all their financial transaction records to the CRB. This was important to bolster banks' lending propositions, which had been hit by a slew of problems. The very first CRB to operate in Ghana was XDS Data Company until the latter half of 2013, when Hudson Price and Dun and Bradstreet Credit Bureau Limited were added, bringing the number of CRBs to three. The purpose of CRBs in Ghana was to make it easier for banking industry players to share borrowers' credit information to reduce the high defaulting rates caused by multiple borrowing.

To make an informed lending choice, banks and other financial institutions may request borrowers' credit history from CRBs that compile financial information about borrowers' credit history submitted by regulated lending institutions. Submitting borrower data to CRBs in 72 hours of engaging into credit contracts and updating the status of the facilities on a monthly basis are mandatory requirements of Section 24 of Act 726 for all financial organizations licensed by the BoG. In order to ensure that banks in certain European and American countries can make trustworthy financial decisions, CRBs compile data from a wide variety of sources, including tax agencies, utility companies, and financial court rulings (Miller, 2003). The three CRBs in Ghana were only notified of monthly financial reports from banks, savings and loan associations, and microfinance organizations as of the date this study was carried out (2019).

The BoG with the support of the Ministry of Finance in 2020 completed the development of the Credit Reporting Regulations that was passed by Ghana's Parliament and into effect in March 2020. The Regulations are intended to ensure that Act 726 is effectively implemented and that best practices in the creditreporting system are incorporated. The Regulations now include other institutions and contain standard rules for corporate governance of credit bureaus, norms for data submission and data quality as well as dispute resolution procedures and penalties for noncompliance institution. Additionally, the Regulations establish additional data sources for credit bureaus, which include government institutions that issue credit, utility companies, telecommunication firms, shops, and others (BoG, 2019). During the study period, the CRB in focus, the XDS Data Bureau offered five different products and services to banks and other financial institutionsas well as consumers in Ghana. This research focuses on only the XDS Data CRB because of the period that the research covered (2012 – 2019). While the other two CRBs have their offices in North America, Europe, and Africa, the XDS Data CRBis Headquartered in South Africa.

Credit Referencing Bureaus' Products and Services in Ghana

CRBs in Ghana normally collect, maintain, and process credit related data into credit reports or other products in accordance with the requirements of Act 726 for the use of banks and financial institutions in their lending administration procedures and respective data subjects. The XDS Data Bureau offered five different products and services to banks and other financial institutions as well as consumers in Ghana. The five goods provided may be divided into two categories:consumer and business centered products.

Consumer Related Products and Services

There are three reports under the consumer related products and services. The first is the *Consumer Basic Trace Report*, which includes information on a borrower's personal details, credit account, address, guarantor details, and telephone number(s) (XDS Data Ghana, 2022a). This is designed to help lenders such as banks and financial institutions in completing "know your customer" (KYC) documentation on a customer. The second is the *Consumer Basic Credit Report*, which is information that includes a borrower's personal data, a summary of credit accounts, a comprehensive account status, and monthly payment histories(XDS Data Ghana, 2022a). The last is the *Detailed Credit Profile Report*. In addition to the information provided in the basic credit report, this report includes a section on the status (performing or non-performing) of all facilities held by a borrower (XDS Data Ghana, 2022a). This information is very useful in determining behaviour and exposure of borrowers.

Commercial-Related Products and Services

Two major services are rendered by XDS Data under the commercial relatedproducts and services. The first is the *Basic Commercial Report*, which contains bank or company registration details, directors, and credit account summary (XDS Data Ghana, 2022b). It is designed to provide background information on banks and basic information on credit exposure. The second is the *Detail Commercial Credit Report*. Adding to the information in the basic commercial report, this report includes credit ability position and payment behavior of banks and companies thathelps lenders to determine the risk profile of potential borrowers (XDS Data Ghana, 2022b). Product and services

rendered by XDS Data is presented in Table 2 below. As can be seen in Table 2, Consumer Detailed Credit Product patronage increased from 31291 in 2012 to 259241 in 2014. However, Consumer Basic Credit Product patronage declined from 98693 in 2012 to 61140 in 2013, and then to 59504 in 2014. Consumer Basic Trace Products decreased from 5215 in 2012 to 5141 in 2013 and 4887 in 2014.

Table 2: Figures of XDS Data Products and Services from 2012 to 2014

Year	Consumer Basic Credit	Consumer BasicTrace	Commercial Basic Credit	Commercial Detailed Credit	Consumer Detailed Credit	Grand Total
2012	98693	5215	39366	4931	31291	179496
2013	61140	5141	6330	41782	228794	343187
2014	59504	4887	5636	40566	259241	369834

Source: XDS Data Credit Referencing Bureau

Commercial Basic Credit Product began with 39366 customers in 2012 before plummeting to 6330 and 5636 customers in 2013 and 2014, respectively. Between 2012 and 2013, Commercial Detailed Credit Product had a rise in usage, going from 4931 to 41782; however, in 2014, usage fell to 40566. Overall, Table 2.2 suggests that more people became familiar with CRB's products overtime and choose consumer-focused products over commercial ones.

Credit Information Index from 2013 to 2019

For both emerging and industrialized nations, the World Development Indicators determines the depth of the credit information exchange index. "Rules regulating the scope, availability, and level of accuracy of credit

information accessible by public or private credit registries" are considered in calculating the credit information sharing index. The existence of more credit information to aid in lending decisions is represented by higher values on the index, which spans from 0 to 8, reflecting information sourced from both public and commercial bureaus (Global Economy, 2022). In 2010 and 2011, Ghana has the worst possible information sharing index, which is zero. However, as the minimum and maximum values, the index grew sharply from zero in 2011 to five in 2012 and further from five to six in 2013. The most recent value is six points in 2019. For comparison, the global average in 2019 was 5.28 points based on 186 countries. Figure 2.1 presents the credit information sharing index of Ghana between 2013 and 2019 obtained from the Global Economy online database (Global Economy, 2022).

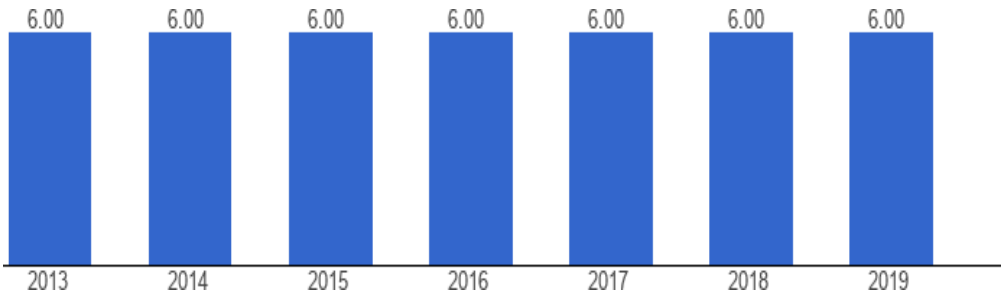

Figure 3: Ghana's Credit Information Sharing Index from 2013 to 2019

It is clear from the chart in figure 2 that when banks in Ghana decide to lendmoney, it helps to know if the borrower has loans from other banks, has he or she made payments on time, etc. The credit information index reveals if banks exchange this type of information. The Ghanaian sharing index has a scale of 0 (no sharing) to 6 (great degree of sharing). This means that the banking sector share information since the higher index is 6.

Write-off Loans

A formal recognition in banks financial accounts that a borrower's asset nolonger has value is referred to as a "write-off" in accounting parlance. Loans are often written off after they have been fully provisioned and have no chance of being recovered. The International Financial Reporting Standards (IFRS) mandates full or partial loans write-offs if "a bank has no reasonable expectations of recovering the contractual cash flows on a financial asset." However, the bank may still enforce, sell, or transfer the credit to another party despite a write-off. A loans cannot be forgiven when it is written off. The borrower still owes the bank money, but the asset has been removed from its financial statements because it is uncollectible. If the borrower resumes making payments on its debt or the exposure is sold, a recovered sum would then be recorded in the profit and loss account (Bauze, 2019).Loans write-offs experiences vary internationally and across nations. According tothe Bank for International Settlements survey, most jurisdictions do not specify a time frame for loans write-offs, leaving banks to decide whether to take such action or not (Bauze, 2019).

Write-off Loans Practices

According to a guidance document on prudential provisioning backstop published by the European Central Bank (Bauze, 2019), secured loans should be fully provisioned seven years after recognition, whereas the unsecured loans shouldbe fully provisioned after two years.

According to Bauze (2019), in the United States, the loans must be written- off within the month after it is classified as a loss. When the loans's collectability is in doubt, it is categorized as a loss under United States

regulatory categorization. In some nations in Latin America and the Caribbean region, the time frames for write-offs range from seven to twenty-four months, sometimes depending on the loans's initial maturity (Bauze, 2019). The Bank of Albania changed its "Credit RiskManagement" legislation in 2014 by adding new criteria for loans written offs, following three years of the loans being categorized as a loss. The banking system's impaired loans ratio decreased as a result of this modification, reducing impairment loans from 22.9% in March 2015 to 18.2% in December 2015.

In order to address the impaired loans stock in the nation, the National Bank of Serbia established a regulation on written-off loans in August 2017. When provisions for impairment were equivalent to 100% of a loans's gross book value, the regulator mandates an immediate accounting write-off of the impaired loans. The country's impairment loans ratio falls from 12.2% in 2017 to 7.2% in 2018, as a result of this action taken. In December 2015, amendments to credit risk management were made by the National Bank of the Republic of Macedonia. Theseamendments mandate that banks write-offs fully provisioned loans "two years after the date as of which the bank had been obligated to make impairment or allocate special reserve in the amount of 100%." The impaired loans ratio reduced as a resultof this action, falling from 10.8% at the end of 2015 to 6.6% at the end of 2016.

Write-off Loans Practices in Africa

In African, only Kenya and Uganda have regulatory frameworks in place that allow for debt write-offs. To stop the accumulation of bad loans on bank balance sheets, the regulators in Kenya and Uganda have chosen to enact regulatory measures. According to the Prudential Guidelines published by the

Central Bank of Kenya in 2013, loans that have been categorized as losses must be written off if norecoveries have been made within 180 days following the classification. The Bank of Uganda mandates banks to delete fully provided loans falling under the loss category 90 days after the classification date. These policies were adopted by both nations despite having low NPLs levels at the time. According to Bauze (2019), banks and the financial system gain from aggressive nonperforming loans write- off policy in a number of ways.

The first benefit is that banks will be able to focus more time and resources on their primary activity, which is financial intermediation when the problem of impaired loans is resolved. To avoid becoming an asset management firm for bad loans, the bank can manage NPLs properly, including writing them off. This would free up resources for future lending. Second,while the primary goal of bad loans write-offs is the sale of assets with a low chanceof recovery, the typical outcome is a reduction in the impairment loans in banks. Country experience demonstrates that this is a particularly effective strategy for rapidly lowering the impairments loans ratio. Thirdly, as long as loans are paid back, financial statements are unaffected. Fourth, a decline in the impairments loans ratioought to help the rating agencies assess the problematic loans facing the bank or the financial system.

Empirical Review

This section reviewed previous research on CRBs and loans quality. It permits us to comprehend what earlier researchers did to distinguish their study from other studies.

Information Sharing

Armstrong (2008) found, using data from a number of nations throughout the globe, that credit registries lead to more stable banking sectors, higher loan volumes, more consumer lending growth, and better access to financing. Many borrowers work hard to repay their loans, but the bank they approach for new loans doesn't know about their excellent repayment history, which leads to little compensation (Hansen et al., 2014). When borrowers don't pay back their loans as agreed, banks have no choice except to pass the expense on to other consumers through increased interest rates and other costs. Disclosure lessens moral hazard, according to empirical research. For example, research by Doblas-Madrid and Minetti (2013) shows that borrowers whose credit is more open tend to pay back loans more quickly when there is less late payment activity.

Without reputational banking and credit information exchange, as shown by Brown and Zehnder (2007), the credit market will implode. Furthermore, they discovered that sharing information encourages borrowers to pay back their debts, which enables lenders to find candidates with strong credit histories. According to studies, information sharing has a favorable impact on the credit market in two ways. First, lack of an ability to share information with credit reporting bureaus, borrowers are motivated to repay loans only when they intended to keep their current lending connection. Borrowers in economies with credit information sharing lenders, on the other hand, had a better chance of keeping their current lending connection by fulfilling their loans.

That is, lenders have the ability to collect and exchange information about borrowers, which can help them repay their loans. Second, information sharing diminishes a lender's information monopoly over its borrowers, lowering the extrafees that lenders may charge borrowers (Brown & Zehnder, 2007). Information sharing assisted lenders in reducing substantial short-term losses from borrowers. Doblas-Madrid and Minetti (2013) discovered that lenders were more likely to advance smaller, shorter-term loans after they started sharing credit-related information, indicating that credit information sharing enables lenders to be aware of borrowers' total indebtedness and appropriately reduce or deny highly indebted.

Loan Quality

Several studies, including those by Demirguc-Kunt (1989), Whalen (1991), and Barr and Siems (1994) discovered that loan quality is a statistically significantpredictor of insolvency: insolvent banks had high rates of bad loans before they went bankrupt. Monitoring, negotiating workout programs, seizing, and selling assets, and refocusing executive management attention are just a few of the additional costs associated with bad loans that might provide the impression of low-cost efficiency, but not always the truth. In addition, from 1984 to 1990, Clair (1992) looked at loans growth and quality for a sample of Texas banks. The resultsshow that bank capital has an influence on the relationship between loans growth and loans quality. Rapid loans growth, in other words, lowers loans quality, has the greatest impact on banks with low capital adequacy ratios. According to theliterature, robust loans portfolios are crucial assets for banks because of their favorable impact on bank performance. Sadly, a few of these loans have poor performance and

eventually accrue bad debts, which lower banks' viability. These poor loans pose a cost to banks in terms of the effect they have on the quality of their asset portfolio.

Since lending is one of the primary activities of banks, the loans portfolio is one of the bank's largest asset and main source of revenue (Morsman, 1993). Therefore, the effect of a decrease in loans quality or "loans default", which refers to the inability to collect or repay a loans, on banks cannot be underestimated. When a borrower cannot make the principal payment on a loans and interest and/or installments after they have become due, the loans is classified as a defaulted loans or a non-performing loans (Chowdhury & Adhikary, 2002). A loans is seen to be of poor quality when it no longer "performs" or brings in earnings for the bank. As a result of many banks focusing on commercial or wholesale lending, management finds it challenging to maintain the required liquidity position (Akhtar, 2007). The majority of these loans are long-term, which could cause a bank to run out of cash (Kashyap et al., 2002). This may result to banks inability to function properly as itmay not be able to meet its demand deposit by costumers.

Write-offs loans Empirical Review

Bad debts are accounts receivables that have been determined to be uncollectible by the banks. In such situations, they (bad debts) are written off, and the associated sums deleted from a bank's balance sheet. Bad loans typically result from borrowers' inability to pay back their loans and interest within the allotted time frame and affect the financial stability banks as the creditor (Aballey, 2009; Agu & Okoli, 2013). In the context of this study, a bad loans is one where a bank lends money but is later unable to recoup the

loansed sum, which may have a detrimental financial impact on the bank. Because they are essentially incompatible with the bank's financial position, bad loans get their name. When loans are labelled "bad loans", there is a danger the borrower will not be able to pay back the principal and interest (Chelagat, 2012; Wongnaa & Awunyo-Vitor, 2013). Since bad loans have several negative effects, including reducing lending to the defaulting bank, individuals, and other businesses, they should be avoided. The support for this assertion was established in Ghana by Appiah (2011) and Awunyo-Vitor (2012).

Poor loans, according to studies, have two main effects on banks that restrict their ability to lend money and function financially. This evidence is supported in different context by Abd Karim et al. (2010), Obamuyi (2009), Munene and Guyo (2013), Chelagat (2012), and Aballey (2009). In general, the main effect of loans defaults on banks is that increasing credit default swaps restricts banks' financial development (Abd Karim et al., 2010; Dong et al., 2017). For one thing, bad loans eat away at banks' liquidity, which in turn makes it harder for them to lend money to people and start new businesses. Banks can't invest in other promising businesses since their cash are tied up in bad loans, say Abd Karim et al. (2010). As a result of these impacts, banks are unable to generate enough revenue, leading to poor financial achievement (Abd Karim et al., 2010; Nawaz et al., 2012). Lending operations account for a larger portion of a banks' revenue and earnings (Abd Karim et al., 2010; Munene & Guyo, 2013). As a result, when banks incur substantial losses from their lending capital, they are likely to see a bigger portion of their revenue eroded. If a bank's capacity to lend money to other businesses and people is

impaired in a single fiscal year, it will be practically unable to do so in the following fiscal years as well. In the next fiscal year, the bank will cut back on lending or cease lending altogether.

Impairment Loans

Loans loss provisions (LLP) or impairment loans can be divided into several categories (Ghosh 2015). Impairment loans may be influenced by firm-specific issues as well as macroeconomic factors (Ashraf & Butt 2017; Beck et al., 2015). The bank-specific factors are those that can be regulated by the bank or by a central bank putting in place procedures to keep these elements under check (Beck et al., 2015; Louzis et al., 2012; Makri et al., 2014). Macroeconomic factors, on the other hand, describe economic situations that are frequently uncontrollable, and policymakers must take them into account when developing policies (Messai & Jouini 2013). Banks normally provide higher loans loss provision in their operating, which is a sign of inefficiency in management, and it is frequently linked to actual losses. Banks with low credit quality are those that most times face greater risk in their loans portfolios, resulting in increased impairment loans (Beck et al., 2015).

Chapter Summary

In conclusion, the chapter dealt with several hypotheses and empirical studies that either support or refute the subject matter being studied: information sharing, adverse selection, information asymmetry, moral hazard, write-off loans, and impairment loans. Various theories were examined with pertinent reasons offered to justify why these theories underpinned this research. Empirical findings on CRBs, write-off loans, loans quality and impairment loans were also discussed in this chapter.

CHAPTER THREE

RESEARCH METHODS

Introduction

In this chapter, the methodology of the study is detailed. This section delves into the nature of the study, the research methodologies employed, and the reasoning behind their selection. This chapter goes even more into the methods and reasoning behind the processes that will be employed to accomplish the research goals. This chapter reiterates the importance of the study's model definition by detailing the model's variables and providing an explanation for their selection.

Research Philosophy

The research philosophy in this study is rooted in a positivist approach and is aligned with the quantitative research paradigm**.** This approach emphasizes objectivity, measurement, and empirical analysis, suitable for assessing the effect of Credit Referencing Bureaus (CRBs) on loan quality in Ghanaian banks. The positivist framework supports testing hypotheses derived from established theories, such as information asymmetry and moral hazard, through statistical models. Here, the research employs panel data analysis to objectively quantify relationships among variables over time, allowing for rigorous, measurable insights.

Using a structured, quantitative approach aligns with the positivist philosophy by allowing the study to draw generalizable conclusions across the banking sector. This choice is based on the need to capture trends in loan quality and write-offs objectively, accounting for bank-specific and economic factors without researcher bias.

Research Design

Research approach exemplifies the gathering, measurement, and analysis of observed facts, which could be quantitative or qualitative or both. This study is conducted using a quantitative research design. Quantitative research, according to Cooper and Schindler (2001), is concerned with numbers and measuring observed verifiable concrete facts: information is acquired, assessed, and communicated in numerical form. The information was gathered in panel form. Panel data is created through a combination of time series with cross-sectional observations and provides more accurate statistics, more degrees of freedom, and greater efficiency (Eric, 2021).

Panel data can identify biases brought on by omitted factors as well as temporal and firm variations and its estimation provides more compelling results compared to traditional time series and cross-sectional analysis (Wooldridge, 2009). The panel estimating technique overcomes the drawbacks of cross-sectional and time-series estimation by allowing for both long-run and short-run effects while also helping to compensate for omitted variables and bank-specific effects (Stock & Watson, 2002). The panel estimation according to Hsiao (2014), increases degrees of freedom and reduces problems of data multicollinearity.

Research Approach

This study adopts a quantitative research approach to empirically examine the impact of Credit Referencing Bureaus (CRBs) on loan quality in Ghanaian banks. The approach involves collecting numerical data from annual reports, CRB records, and macroeconomic databases over an 8-year period across 15 banks, thereby allowing for robust measurement and objective

analysis. The use of panel data analysis enables the study to capture both cross-sectional and time-series variations, which enhances statistical accuracy, increases degrees of freedom, and mitigates the risk of omitted variable bias. This structured quantitative methodology aligns with the positivist research philosophy by emphasizing measurable outcomes and enabling the derivation of generalizable insights. Panel estimation techniques will be utilized to assess both long-run and short-run effects of CRB involvement on loan quality, while also accounting for bank-specific and macroeconomic factors. This methodological rigor supports a comprehensive understanding of CRBs' role in shaping loan performance trends within the Ghanaian banking sector.

Data sources

Annual data from 15 banks in Ghana covering a period of 8 years were usedin the study. In terms of the selection criteria, for a bank to be selected, it should beoperating in Ghana within the study period and has all the data needed for the study. The information used in this analysis came from a variety of sources, including audited financial statements of banks, annual activity reports of CRBs, and world development indicators. The CRB reports and the national office are the sources for the CRB variable, which is the variable of interest. The World Development Indicators database provided all of the macroeconomic statistics, while the African financials database was used to glean the specific variables pertaining to the banks from their annual reports. From 2012 until 2019, the data is available. This time frame was thought to be long enough to offer enough data to ascertain the effect of the CRB on loans quality and to obtainmost recent data and produce findings that reflect current trends.

Population

A full set of people, instances, or things that have some distinguishing observable traits is called a target population (Banerjee & Chaudhury, 2010). A population can be anything from a collection of people or dwellings to a collection of services, elements, or events (Field, 2005). From 2012 to 2019, there were 23 banks in Ghana's banking sector. Nevertheless, fifteen chosen Ghanaian banks constituted the population of interest.

Sample Size

The sample consisted of 15 carefully selected banks in Ghana. Annual data extracted from the selected banks from 2012 to 2019 were therefore used. The study was restricted to the selected banks due to inadequate readily available data from the other banks' annual financial statements reports.

Table 3: List of banks used in the study

Bank Name	Brief History
Agricultural Development Bank (ADB)	Established in 1965, ADB focuses on agricultural financing in Ghana but has since expanded to provide universal banking services.
Republic Bank Ghana Limited	Formerly HFC Bank, it became Republic Bank Ghana in 2018 after a takeover by Republic Financial Holdings Limited, based in Trinidad and Tobago.
Ecobank Ghana	Part of the Pan-African Ecobank Group, it was established in 1990 to provide banking services across Africa and has grown to become one of Ghana's largest banks.
Consolidated Bank Ghana (CBG)	Formed in 2018 through the merger of five insolvent Ghanaian banks during the banking sector reforms.
Standard Chartered Bank Ghana Limited	The oldest bank in Ghana, established in 1896, it focuses on corporate, retail, and institutional banking services.
Societe Generale Ghana	Established in 1975 as SG-SSB, it became Societe Generale Ghana after its majority acquisition by Societe Generale Group, a multinational French bank.
Access Bank Ghana	A subsidiary of Access Bank Plc, Nigeria. Established in Ghana in 2009, it offers a wide range of banking and financial services.

Bank Name	Brief History
GCB Bank Limited	Formerly Ghana Commercial Bank, it was established in 1953 to serve Ghanaians and has become the largest indigenous bank in Ghana.
Prudential Bank Limited	Established in 1996, it is a wholly Ghanaian-owned bank that focuses on serving SMEs, corporate clients, and retail customers.
CAL Bank Limited	Founded in 1990, it is a publicly listed bank that provides corporate, retail, and SME banking services in Ghana.
Absa Bank Ghana Limited	Formerly Barclays Bank Ghana, it rebranded to Absa in 2020 as part of a broader strategy by its parent company, Absa Group Limited, headquartered in South Africa.
Zenith Bank Ghana Limited	A subsidiary of Zenith Bank Plc, Nigeria. Established in Ghana in 2005, it focuses on corporate and retail banking.
Stanbic Bank Ghana Limited	A member of the Standard Bank Group, headquartered in South Africa, Stanbic began operations in Ghana in 1999, offering corporate and retail banking services.
Fidelity Bank Ghana Limited	Established in 2006 as an indigenous Ghanaian bank, Fidelity has grown rapidly and offers a full range of banking services for retail and corporate clients.
OmniBSIC Bank Ghana Limited	Formed in 2019 through the merger of OmniBank Ghana and Sahel Sahara Bank, it focuses on providing banking services to individuals and businesses.

Data Collection

The data for the study was collected from secondary sources. Data were extracted from the annual reports of the audited financial statements of the fifteen selected banks for an eight-year period from 2012 to 2019. Also, the 2019 credit bureau activity report, and other useful information held at the CRBs national office were collected. The data extracted from the banks include total assets, equities, impairment charges on loans and advances, deposits from customers, and write-off loans. The data collected from the CRBs include the enquiries of CRB services by banks, as well as the cost incurred by banks in enquiryCRB services.

Data Analysis Method

Two different data analysis techniques are employed for this study: economic modelling and empirical modelling. The next sections discussed each ofthe data techniques in detailed.

Econometric Model

In this study, fixed effect and random effect models were used for the estimation to determine the effect of the use of CRB on loans quality. To determine whether the fixed or random effect model is suitable, the Hausman (1978) test was carried out. The theoretical foundation for Equations (1), (2), and (3) in your thesis is grounded in econometric modeling, specifically utilizing fixed effects and random effects models to address bank-specific and macroeconomic factors influencing loan quality and write-offs in the Ghanaian banking sector.

Equation (1) is designed to incorporate both observable and unobservable individual or group-specific effects that may remain constant over time. The model represents the relationship between a dependent variable, such as loan writeoffs, and independent regressors while accounting for fixed effects specific to each bank (or group). Here, the vector x'_{it} includes the set of regressors without a constant term, and $s'_i\alpha$ represents constant individual effects. This structure is helpful for mitigating bias when unobserved characteristics are correlated with the regressors. It provides a way to isolate the true impact of each independent variable on loan quality by controlling for unique bank characteristics that do not change over time.

Equation (2) extends from Equation (1) under the fixed effects model assumption. It introduces an estimable conditional mean, represented by

$\alpha_i = s_i'\alpha$, which accounts for group-specific constants in the regression. This formulation views the constant term α_i as unique to each group (or bank). If we assume unobserved heterogeneity is correlated with individual variables, the model becomes appropriate for handling such fixed effects. Here, the fixed effects capture unique, constant characteristics across groups, addressing potential endogeneity between the individual effects and the regressors.

Equation (3) incorporates the random effects model, where the group-specific component u_i is considered a random variable that only varies between groups (not over time within a group). This model assumes that u_i is uncorrelated with the regressors, differing from the fixed effects approach. It is especially useful when analyzing variance across banks or groups rather than within a single entity. The model is estimated using generalized least squares (GLS) if the variance structure is known or feasible GLS when unknown. The random effects model is chosen over fixed effects when the Hausman test fails to reject the null hypothesis, indicating no correlation between group-specific effects and the regressors.

Considering Greene (2002), the study adopted a simple regression model as;

$y_{it=}x'_{it}\beta+s'_i\alpha \ +\varepsilon_{it} \quad =x'_{it}\beta \ +c_i+\varepsilon_{it}$…….…… (1)

From equation (1) the vector x'_{it} contains the K regressors which do not include a constant term. The vector $s'_{i\alpha}$ contains a constant term plus a number of individual or group-specific variables that may be observable or unobservable, all of which are assumed to remain constant across t. this vector is used to describe the individual effect. The least square estimator of β (vector) will be biased and inconsistent under the fixed effect model if s'_i in equation (1) is unobservable while being correlated with

x'_{it}. In this situation, the model derived from equation (1) will be;

$y_{it} = x'_{it}\beta + \alpha_i + \varepsilon_{it}$ ..... (2)

When all observable effects are represented by the expression, $\alpha_i = s'_i\alpha$ which also designates an estimable conditional mean. The constant term α_i in the regression model is seen by the fixed effect method as being group specific. If it can be assumed that, regardless of how it is expressed, the unobserved individualheterogeneity in the case of random effect is associated with the individualvariables, the model in equation (1) becomes;

$y_{it=}x'_{it}\beta + [s'_i\alpha] + \{s'_i\alpha - E[s'_i\alpha]\} + \varepsilon_{it} = x'_{it}\beta + \alpha + u_i + \varepsilon_{it}$..... (3)

Equation (3) represents a linear regression model with a compounding noise that, while inefficient, might be consistent when estimated using least squares. This random technique stipulates that u_i is a group-specific random element, similar to ε_{it} with the exception that there is only one draw for each group and that draw enters the regression in the same way every period. Generalized least squares (GLS) is used to estimate random effect when the variance structure is known, and feasiblegeneralized least squares is used when the variance is unknown. In this study, the estimate of the random effect model was done using the GLS. Under the null hypothesis that the individual effect is uncorrelated with the other regression in the model, it contrasts the fixed and random effects in relation to Huasman's (1978) specification test. The fixed effect model is the most effective because, in cases when it correlates, the null hypothesis is rejected, showing that a random effect model produces biased estimators and violates one of the Gauss- Mrkow conditions.

This study employs fixed effects and random effects models to assess the influence of variables such as bank-specific factors and macroeconomic

conditions on loan quality in the Ghanaian banking sector. The fixed effects model is particularly advantageous for controlling unobserved, time-invariant characteristics unique to each bank. By isolating these characteristics, the model reduces potential bias from omitted variables that could correlate with the regressors, improving the precision of the estimates.

On the other hand, the random effects model allows for the examination of variations between banks rather than within individual entities, assuming that the group-specific error term is uncorrelated with the predictors. This study employed the **Hausman test** to determine the suitability of each model, leading to the choice of the random effects model where the test showed no correlation between the error term and the regressors. This dual-model approach strengthens the reliability of findings by leveraging the strengths of both models to capture different dimensions of bank data variability over time.

Empirical Model

It is clear from the literature evaluation in this study that macroeconomic variables and bank-specific factors can both contribute to the explanation of loans quality. Jiménez and Saurina's (2005) empirical model were adopted to determinethe effect of the use of CRB on loans quality in the Ghanaian banking sector. The model is a simple linear regression function. The generic regression formula has the following forms:

$$LOWRTO_{it} = \alpha_i + \beta_1 IMPLO_{it} + \beta_2 LIQUIDit + \beta_3 CAP_{it} + \beta_4 CRBX_{it} +$$

$$\beta_5 CBRX_{it-2} + \beta_6 GDPGROWTH_{it} + \beta_7 INF_{it} + \beta_8 BSIZE_{it} +$$

$$\beta_9 PROBT_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

$$LOQ_i = \alpha_i + \beta_1 LIQUID_{it} + \beta_2 CAP_{it} + \beta_3 LOWRTO_{it} + \beta_4 CRBX_{it} +$$

$$\beta_5 CBRX_{it-2} + \beta_6 GDPGROWTH_{it} + \beta_7 INF_{it} + \beta_8 BSIZE_{it} + \beta_9 PROBT_{it} +$$

$+\varepsilon_{it}$…….. (5)

In Equation (4), the variables serve to model **write-off loans (LOWRTO)** as a reflection of bank loan quality. The dependent variable, LOWRTO, captures the portion of loans deemed uncollectible, impacting a bank's financial stability. Key predictors include **IMPLO (Impairment Loans)**, which represent the allowances banks set aside for expected loan losses, indicating risk management practices. **LIQUID (Liquidity)** is another critical measure, representing the bank's ability to meet obligations, while **CAP (Capital Adequacy)** signifies its financial strength. The **CRBX** variable and its lagged version, **$CRBX_{t-2}$**, measure the frequency of credit referencing bureau enquiries and their delayed influence on loan quality, revealing how proactive credit checking practices affect loan outcomes over time. **GDPGROWTH** and **INF (Inflation)** provide macroeconomic context, capturing how economic growth and inflation affect borrowers' repayment capabilities. Lastly, **BSIZE (Bank Size)** and **PROBT (Profit Before Tax)** offer insights into how scale and profitability potentially relate to loan quality.

In Equation (5), **LOQ (Loan Quality)**, calculated through impairment loans, becomes the dependent variable. Here, **LOWRTO** is an independent variable to assess how write-off loans impact the remaining loan portfolio's quality. Similar to Equation (4), **LIQUID, CAP, CRBX, $CRBX_{t-2}$, GDPGROWTH, INF, BSIZE,** and **PROBT** play roles in shaping loan quality, with each indicator contributing to how effectively banks manage their impaired loans. The constants in these equations, denoted by **α (alpha)**, represent fixed, individual firm effects rather than universal constants. This setup allows the model to account for unique, unobserved factors across each

bank, reflecting variances that are specific to individual banks rather than assuming a uniform effect across all entities.

Each variable's role in these equations is to examine its direct and indirect impact on loan quality and banks' ability to manage bad debts within the Ghanaian banking sector. The models consider both bank-specific and macroeconomic factors to predict how these elements affect loan performance and overall portfolio quality.

Diagnostic test

First, the study used the Variance Inflation Factor (VIF) to perform a Multicollinearity Test, which ensures that the results are reliable. The presence of highly correlated independent variables in a regression model is known as multicollinearity, and it causes the standard errors and coefficient estimates to be inflated and unstable. In order to detect possible multicollinearity problems, we calculated the VIF values. VIF values above the threshold of 10 suggest multicollinearity, which can distort interpretation of the results. In cases where high multicollinearity was detected, steps were taken to address it, such as dropping or transforming variables, to ensure the stability and accuracy of the model's estimates.

The study also conducted an Autocorrelation Test using the Wooldridge test for serial correlation in panel data. Autocorrelation occurs when the residuals (errors) of the regression model are correlated across time, which can lead to biased standard errors, thereby affecting the reliability of statistical inference. Autocorrelation is common in time series and panel data and, if uncorrected, can lead to misleading conclusions. The Wooldridge test specifically tests for serial correlation in the panel data context. Where autocorrelation was

detected, adjustments were made by using robust standard errors or feasible generalized least squares (FGLS) to provide more accurate standard errors.

A Heteroskedasticity Test was performed using the Breusch-Pagan/Cook-Weisberg test to address possible concerns with non-constant variance. Inefficient estimations and untrustworthy hypothesis testing can result from heteroskedasticity, which happens when the variance of the residuals varies across observations. The presence of heteroskedasticity means that some observations may have more influence on the results than others, potentially skewing the findings. In cases where heteroskedasticity was detected, the study utilized robust standard errors, which adjust for such variance irregularities, ensuring the validity and reliability of the model's estimates.

Together, these diagnostic tests provide confidence that the model is robust and that the statistical inferences drawn from it are valid and reliable.

Table 4: Data Description and Measurement

Variables	Measurement	Expected sign	Source of Data
LOWRTO	Write-off loans /Total loansand advances	(-)	Audited banks annual financial statement Reports
LOQ	Impairment loans / Totalloans and advances	(-)	Audited banks annual financial statement Reports
LIQUID	Total loans and advances /Deposit from costumers	(-) / (+)	Audited banks annual financial statement Reports
CAP	Total assets / Total equity	(+)	Audited banks annual financial statement Reports
CRBE	Naturallog of CRB enquiries	(+)	XDS Credit Bureaus, Ghana
$CRBE_{it-2}$,	Previous CRB enquiries	(-)	
GDP	Annual growth rate of GDP	(-)	WDI
INF	Annual inflation rate	(-)	WDI
BSIZE	The natural log of bank totalassets	(-)/(+)	Audited banks annual financial statement Reports
PROBT	The natural log of bankprofit before tax	(+)	Audited banks annual financial statement Reports

Source: Authors' computations (2023)

Variables Inclusion and Justification

Write-off loans

A write-off is a loans that has been provisioned, that records the chance that a balance sheet asset will not be fully recoverable. According to Omare (2016), provisions expense is the cost of anticipating the loss of value in a loans portfolio throughout the relevant time periods during which that asset provides income, rather than waiting until the asset's actual loss is recognized. In this study write-off ratio, is defined as the value of written-off loans divided by the total loansand advances extended to borrowers. The ratio

represents loans that have been declared as bad debt and are therefore deleted from banks' books due to a clear indication that they would not be recovered. When the ratio is high it means bankswrite-off loans are increasing. When it is found that a loans is not recoverable, it is called a write-off loans. Losses are written off since loans loss reserves havepreviously been set aside in the books for future losses. Write-off loans in this studyis expected to record a negative value when banks employ the services of CRB (CRBX).

Credit Referencing Bureau

This is the first study to examine the impact of interest as a bank-specific variable on loan quality in Ghana; it was previously unexplored. On the other hand, two distinct metrics are employed with the relevant variable. To begin, we have CRBX, which is the natural logarithm of all the inquiries made by banks using CRB services over the study years. Next, we divide the entire cost of CRB service inquiries that banks incur by the total loans and advances (abbreviated as CRBCR) to get the cost ratio of CRB service inquiries. These criteria were implemented since previous research on CRBs information sharing had utilized subpar dummies (Brooks, 2008; Wooldridge, 2009). Previous research by Brown and Zehnder (2007), Luoto et al. (2007), Barron and Staten (2003), and Padilla and Pagano (1997) also found similar results. It was expected that CRBX will have a favorable correlation with loan quality in this study.

Impairment Loans

When it is likely that a bank would not be able to collect all sums due in accordance with the original contractual conditions of the loans arrangement based on the current information and circumstances available,

that loans is considered impaired. The question of whether the borrower is making payments in accordancewith the contract is central to the definition of an impaired loans. In other words, a loans is considered impaired when it is likely that a bank would not be able to recoverall sums owed, including interest and principal, in accordance with the terms of theloans arrangement. A loans is typically considered impaired if it shows the same degree of flaws and likelihood of loss. In reality, some banks consider a loans to beimpaired if it is listed as a non-accrual loans on the statement of conditions in income. Loans that are nonaccrual are nonperforming, making it simple to classify them as impaired or impairment loans. According to the Federal Reserve, anonaccrual loans is one that is maintained on a financial statement due to adeterioration in a borrower's financial position, or one for which full payment of interest or principal is not anticipated or is one for which principal or interest has been in default for a period of 90 days or more unless it is both secured and in the process of collection.

Loans Quality

The quality of a bank loans is defined as the timely manner with which borrowers are fulfilling their contractual commitments. While banks continue to diversify their product offerings to include deposits, insurance, and other financial services, loans portfolio remains a major asset. Loans quality is an important part ofbanks' performance and banks' failures are common due to a decline in their loans' quality, which might be avoided if effective preventive measures are put in place (Epure & Lafuente, 2015). With reference to empirical literature, this study postulates the use of impairment loans ratio as a proxy for bank loans quality (LOQ). Following Alhassan et al. (2014), loans

quality is measured as the ratio of impaired loans to total loans and advances. A higher ratio indicates lower bank loans quality. In this study, the expected relationship between impaired loans and CRBXis negative.

Bank Size

In empirical investigations, bank size is represented by the natural log of bank total assets. It has mixed findings with impairment loans (loans quality). The strength of a bank and its ability to deal with information asymmetry issues can be influenced by the bank's size, which can result in lower levels of bad loans. Larger banks are assumed to have higher credit management systems with regard to both people and financial resources that provide thorough screening of loans applicants and, consequently, a lower default rate. On the other hand, it is also asserted that evaluation, supervision, and monitoring become more difficult if banks grow too big and sophisticated and take on more exposure to loans defaults (Kusi et al., 2016). According to Rajha (2017), larger banks are not necessarily more effective at conducting advance screening clients in comparison to their smaller partners. The size of a bank may serve as wide opportunities and expansion that should reduce bank loans loss, though, there are still conflicting empirical findings about the connection between bank impairment loans and bank size. However, this study is expecting the relationship between bank size and impairment loans (loans quality)to be negative.

Capital Adequacy

According to Alhassan's (2017) analysis of the capital adequacy of Ghanaian banks using dynamic panel models, the country's banks actively transform liquidity and have a positive relationship with bank solvency. The

solid solvency position strengthens the capacity of banks to absorb potential loans losses and increases their ability to develop intermediation, indicating greater stability in the banking industry (BoG, 2020). Capital adequacy and impairment loans has a negative association, according to a study by Makri et al., (2014). However, Djiogap and Ngomsi (2012) found a relationship between impairment loans and capital adequacy to be positive. However, Capital adequacy and impairment loansare expected to be positively related.

Liquidity

The bank's liquidity is its capability to keep enough cash to be able to meetits maturing commitments. In other words, liquidity is the ability of banks cash and other current assets to satisfy liabilities maturing during the accounting year, including accounts payable and short-term debts. Liquidity is expected to have a negative relationship with impairment loans.

Gross Domestic Product Growth

The study includes GDP growth, which is defined as the annual percentagein real GDP. This variable is included to account for the changes in loans demand, and variations and loans repayments within Ghana as well as potential variations inadverse selection and moral hazard in the market cycle (Andrianova et al., 2015; Altunbas et al., 2009). According to Beck et al. (2013), the rate of asset quality is associated with an increase in real GDP. This comes about because of real GDP growing strongly, typically translates into higher incomes, improving borrowers' capabilities to pay off debts, and decreasing impaired loans (loans quality). On the other side, in times of a downturn in the economy, where GDP growth is negative,economic activities decrease, which lowers national savings and lowers the purchasing power of

the populace (Khemraj & Pasha, 2009). As a result, the borrowers are unable to pay back their advances, increasing the default loans. Louzis et al. (2012) and Saba et al., (2012) back up this claim. However, the relationship between GDP and impairment loans in this study is expected to be negative.

Inflation

Inflation refers to the general trend of a country's goods and services prices rising over time. How impairment loans relate to inflation is unclear. This is due to the fact that high inflation is generally connected with low unemployment (as seen by the Phillips curve) and so makes debt repayment more manageable, either by lowering the real value of residual loans or, more simply put, by lowering the actual value of debt. However, when compensation is sticky, it can reduce actual wages, which can hamper the ability of some borrowers to service their obligations (Nkusu, 2011).

According to some research, inflation and impaired loans have a positive relationship, meaning that when inflation is rising, the default rate will also rise, driving higher impaired loans (Wikutama 2010; Khemraj & Pasha, 2009). A fall in inflation, on the other hand, is crucial for economic expansion and, as a result, helps borrowers be able to repay their loans. The effect of inflation on impaired loans can be positive or negative (IMF, 2016). The correlation between inflation and impairment loans is positive (Klein, 2013; Tomak, 2013). In this study, it is anticipated that inflation will have a negative relationship with impairment loans.

Profit Before Tax

Profit before tax (PBT) is the gross profit a company makes before income tax is deducted. The total revenue, operating costs, interest expenses,

and other factors are all considered in the determination of profit before tax value. Profit before tax is often referred to earnings before tax. On the income statement, which is created annually by banks, the profit before tax value is usually noted. This variable was included in the estimation as a controlled variable. It is expected that the CRB will have positive relationship with profit before tax.

Chapter Summary

The study's methodology is described in this chapter. The research design was introduced in the first section of the chapter, along with a justification for its use. It was determined that the quantitative research is used since the study aims to produce results that are not in any way influenced by the researcher. Once more, it was clarified that every research study's population is its main point of interest; as a result, selected 15 Ghanaian banks comprised the population of this study. Furthermore, it was gritty that the regression model was used because the panel data approach was used in this investigation. The dependent variables, write-off loans and impairment loans and the explanatory variables were also described. Finally, the chapter emphasized several predictions or correlations that the study anticipates exist between the dependent and independent variables chosen to investigate the drivers of loans quality in Ghanaian banks.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents the results of the study. It focuses first on the descriptive statistics obtained from the data followed by the inferential statistics.

Descriptive Statistics

Descriptive statistics in the form on means, standard deviations as well as minimum and maximum values are generated from the data, which are presentedin Table 4.

Table 5: Summary of Descriptive Statistics

Variable	*Obs*	*Mean*	*SD.*	*Min*	*Max*
Write-off Loans	120	-0.039	0.068	-0.398	0.023
Impairment Loans	120	-0.084	0.41	-4.507	-0.001
Liquidity	120	0.57	0.252	0.001	1.801
Capital Adequacy	120	0.16	0.077	0.015	0.768
CRB Enquiry	120	12.42	0.895	10.657	13.703
GDP Growth	120	5.724	2.476	2.121	9.293
Inflation Rate	120	12.534	3.694	7.144	17.455
Bank Size	120	16.047	2.422	13.423	22.265
Profit Before Tax	120	12.847	2.58	9.4	19.52

Key: Obs: Observations; *M*: mean; *SD*: Standard deviation; Min: Minimum value; Max:Maximum value

Source: Authours' computation (2023)

As can be seen in Table 4, for write-off loans (LOWRTO), the maximumwithin the selected banks is 0.023 and the minimum is -0.398, with an average value of -0.039. The extent to which the write-off loans index deviates from the mean is 0.068 within the selected banks. On average for the

period 2012 to 2019, the mean value of impairment loans which is used as proxy for loans qualify for the 15 banks is -0.084. The annual minimum value is -4.507 and the maximum value is -0.001, with an average variation of 0.41 among the banks used for the study. Liquidity measured as the ratio of loans and advances to deposits provides the opportunity to assess the growth in the liquidity of the banks over the years. With the 15 banks, the average mean value for liquidity is 0.57 with a variation of 0.252 within the banks. The maximum value for the liquidity of banks is 1.801 and the minimum is 0.001.

Capital adequacy (CAP) as a bank-specific variable has a minimum and maximum values of 0.015 and 0.768 respectively within the banks. The mean value for capital adequacy is 0.16 and the variation within the banks from the mean is 0.077. The CRB enquiry (CRBX), measured as the natural log of total CRB enquiries made and used by banks in the study period has a mean value of 12.42 and a standard deviation of 0.895 from the mean. Its minimum and maximum values are 10.657 and 13.703 respectively. The annual growth expressed as a percentage of GDP has an average value of 5.724 with the maximum and the minimum values of 9.293 and 2.121 respectively. The deviation from the mean value is 2.476 in the selected banks.

Inflation was used as proxy for the annual inflation rate within the banks. It has a mean value of 12.534 percent and a standard deviation of 3.694 percent from the mean. The maximum and minimum values were 17. 455 and 7.144 respectively.

The bank size provides the opportunity to assess the growth in the size of the bank over the years. With the 15 selected banks for the study, the average

value for bank size is 16.047 with a variation of 2.422 from the mean. The maximum value for the size is 22.265 and the minimum is 13.423. This indicates that each of the banks within the sample has at least an average bank size of 13.42. Bank profit before taxfor the selected banks has a mean value of 12.847. The deviation from the mean among the banks is 2.58. Profit before tax recorded a maximum value of 19.52 and a minimum value of 9.4 respectively.

Trends of Loans from 2012 to 2019

This section present results on the trend of loans conditions over the 8 yearsunder consideration. Focusing on average figures, results on CRBX and write-off and impaired loans are presented. Figure 2 below presents the trends of write-off loans based on average figures from the 15 banks.

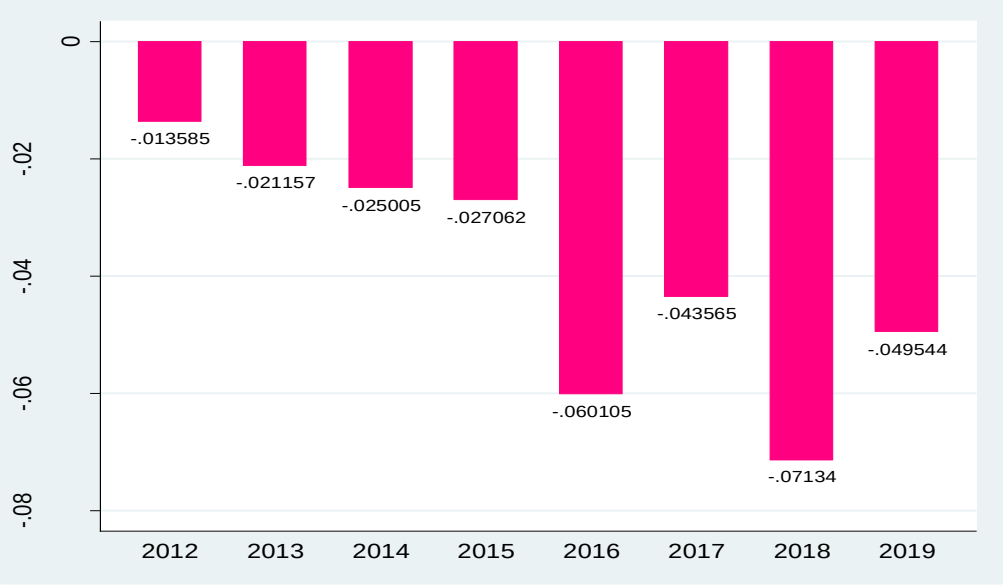

Figure 4: Write-offs Loans on an Annual Basis (2019)

Figure 2, which is bar graph, shows the trends in average write-offs loans from 2012 to 2019 of the selected banks. The graph shows that, on average, write- offs loans increased from 2012 to 2016 from 0.013585 to -

0.060105. The magnitude of increase from 2012 to 2015 was smaller as compared to magnitude between 2015 and 2016. Write-offs loans decreased from -.0.060105 in 2016 to -0.043565 in 2017 but again increased to -0.07134 in 2018 before decreasing to -0.049544 in 2019. This suggest that the rate of banks loans recovery and bad loans varied from year to year. Impaired loans are also analysed, which results are presented in Figure 4.1 below. The figure shows the trends of impaired loans from 2012 to 2019 in the 15 selected banks, covering a period of 8 years. The bar graph indicates the banks' yearly variations in impaired loans increased from -0.033957 in 2012 to -0.322141 in 2013. However, in 2014, impaired loans decreased to -0.023863 but rise to -0.056601, -0.069894, and -0.075299 from 2015 to 2017 before drastically falling in 2018 and 2019.

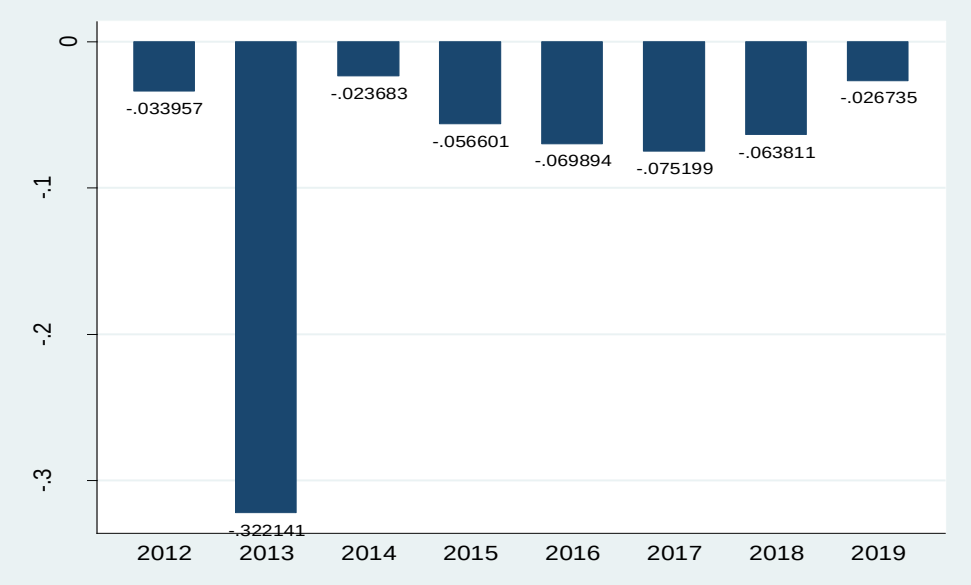

Figure 5: Annual Trends of Impairment Loans (2019)

In terms of CRBX enquiries, Figure 4.3 present the trends from 2012 to 2019.

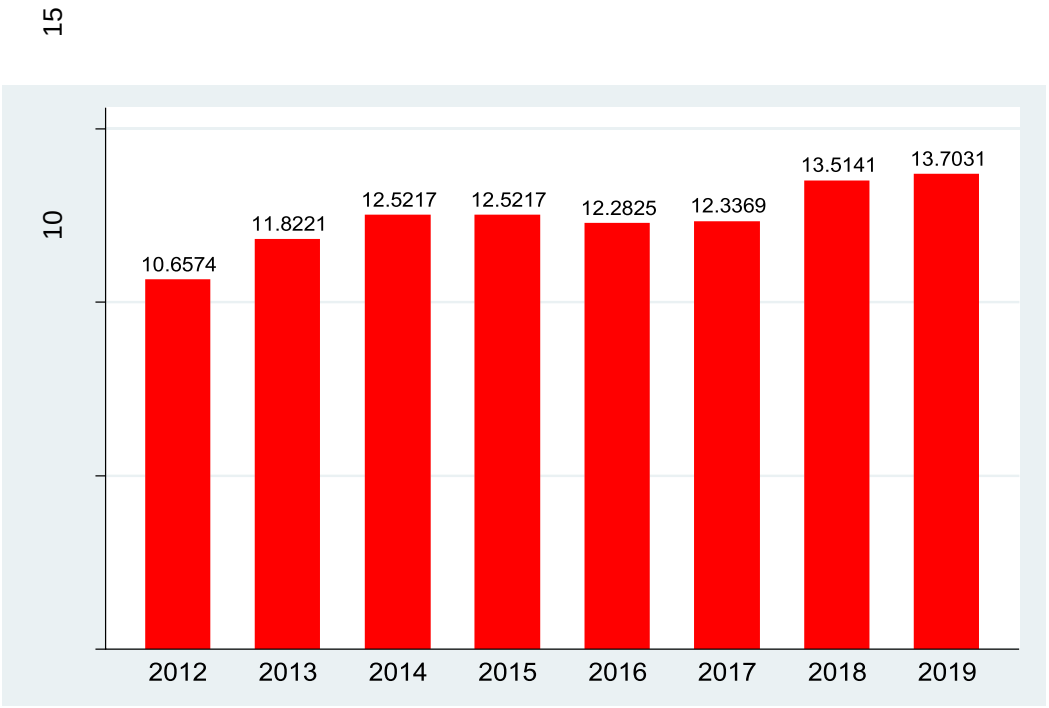

Figure 6: CRBX Annul Enquiry Trends (2019)
Source: Author's Computation (2023)

Figure 6 shows the trends in impairment loans from 2012 to 2019 in selectedbanks covering a period of 8 years. The graph indicates the variations in the CRBXenquiries in the banking sector in Ghana. The graph shows that, on average, CRBX enquiries by banks increased from 10.6574 in 2012 to 11.8221 in 2013 and 12.5217 in 2014 but remained constant in 2014 and 2015 with 12. 5217. CRBX enquiries by banks again increased from 12.2815 in 2016 to 12.5141 in 2018 and 13.7031 in 2019.

Correlation Results

Table 6: Pairwise Correlations of the Variables under Consideration

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Write-off Loans	1.000								
(2) Impairment Loans	-0.038	1.000							
(3) Liquidity	.112*	0.052	1.000						
(4) Capital Adequacy	-0.034	-0.041	-0.038	1.000					
(5) CRB Enquiry	-0.201*	0.054	-0.153*	0.064*	1.000				
(6) GDP Growth	0.038	-0.053	-0.117*	0.020	-0.355*	1.000			
(7) Inflation Rate	0.075*	0.009	0.157*	-0.097*	-0.346*	-0.686*	1.000		
(8) Bank Size	0.140*	0.085*	0.009	0.094*	0.084*	0.063*	-0.094*	1.000	
(9) Profit Before Tax	0.206*	0.063*	0.013	0.154*	0.023	0.056	-0.060	0.962*	1.000

$^{*}p<0.05$, $^{**}p<0.01$, $^{***}p<0.001$ indicates significance levels of 95%, 99% and99.9%, respectively.
Source: Author's computation (2023)

Table 5 reports the degree of correlation between the variables used in the study, which shows the degree of association among variables. Pearson correlation test for the collinearity of each variable with respect to the other variables required to meet the set objectives. It is revealed from the matrix that the association between the explanatory variables do not demonstrate any severe existence of the problem of multicollinearity – correlation exceeding 10% (Braun et al., 2013). The correlation matrix above indicates that liquidity, inflation, bank size, and profit before tax are all positively and significantly associated with write-off loans. Other variables that are positively related to write-off loans are not significant. CRB enquiry is negatively and significantly related to write-off loans. On the opposite of this, impairment loans and capital adequacy are negatively associated with write-off loans, but they are not significant.

Regression Results

In order to determine the effect of the independent variables on the dependent variables, regression analyses were conducted. However, to assess each variables acceptability in the models, the Variance Inflation Factor (VIF) was used as shown below in Table 7.

Table 7: Variance Inflation Factor for Dependent and Independent Variables

	VIF	1/VIF
GDP Growth	8.239	0.121
Inflation Rate	7.968	0.125
CRB Enquiries	5.117	0.195
Liquidity	1.097	0.911
Write-off Loans	1.089	0.918
Bank Size	1.073	0.932
Capital Adequacy	1.031	0.97
Impairment Loans	1.02	0.981
Mean VIF	3.329	

Source: Author's computation (2023)

The first regression estimation results presented in Table 7. An In order to determine if the panel estimation is based on a fixed effect or a random effect model, the Hausman test was used. Since the p-value from the Hausman test is more than 0.05, indicating that the null hypothesis is not rejected (difference in coefficients is systematic), the study decided to apply the random effect regression model for the pooled sample. Following the Hausman test for the pooled sample, the panel regression estimation in columns (1) and (2) of Table 8 was chosen for both objectives one and two.

With an F-test p-value greater than 0.05, we can see that the model is sound; this means that the independent variables adequately account for the dependent one. The results show that write-off loans and impairment loans (Loans quality) in Ghana's banking sector are influenced by both bank-specific and macroeconomic variables. Bercoff et al. (2002), Jiménez and Saurina (2005), and Ranjan and Dhal (2003) are among the scholars whose earlier work is consistent with this.

Table 8: Regression of CRB on Write-off and Impairment Loans (Loans Quality)

Dependent Variables:	**Write-offs Loans**	**Impairment Loans**
Independent Variables	**Random Effect Estimates**	**Random Effect Estimates**
Liquidity	0.0869*	0.0226
	(0.0454)	(0.0310)
Capital Adequacy	0.215*	-0.139
	(0.128)	(0.101)
CRB Enquiries	-0.00914	0.0162
	(0.0194)	(0.0176)
L2.CRB Enquiries	-0.0542***	-0.0483***
	(0.0187)	(0.0162)
GDP Growth	-0.0166***	-0.0121**
	(0.00622)	(0.00560)
Inflation Rate	-0.0106***	-0.00695**
	(0.00395)	(0.00355)
Bank Size	-0.0174	-0.0293***
	(0.0111)	(0.00860)
Profit Before Tax	0.0199*	0.0285***
	(0.0102)	(0.00799)
Impairment Loans	-0.362***	
	(0.127)	
Write-off Loans		-0.190**
		(0.0955)
Constants	0.867**	0.576
	(0.388)	(0.353)
N	90	90
Hausman Test	0.9995	0.2818

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$ indicates significance at 95%, 99% and 99.9%levels, respectively. The estimation was done using xtreg command in Stata.
Source: Authors' computation (2023)

CRB Impact on Write-off and Impairment Loans

Table 7 estimates the effect of CRB on write-off loans and impaired loans (loans quality). The CRB enquiries and usage by banks included in this study as bank specific variable was to determine whether the application of CBR servicesby banks has an effect on banks' write-off and impairment loans. The result revealed a negative relationship between CRB and write-off loans but positively related to impairment loans and statistically

insignificant. The CRBE coefficient was 0.0176 for impairment loans The result shows that when a bank increases its usage of CRB by 1 unit in the first year of enquiry, it will lead to an increase of 0.0176 amount of impairment loans, but the increase is not significant. This finding suggest that banks do not gain the benefit of CRB services in the very first year of application of service because borrowers mostly do start repaying their loans in the first year. The CRBE coefficient was 0.0194 for write-off loans. This means that a 1% unit of the usage of CRBE by banks reduces write-off loans by 0.0273 amount.

However, the two years lag of CRBE was negatively related to write-off and impairment loans in both specifications and statistically significant at 99.9% level for both write-off and impairment loans. The coefficients of the lag of CRBE are -0.0542 for write-off loans and -0.0483 for impairment loans. This implies that a 1% increase in the use of CRB by banks leads to a reduction of write-off and impairment loans by 0.0542 and 0.0483 amounts, respectively. This signifies that if banks use CRBE services in giving loans to their clients, loans quality will improve in the banking sector in Ghana since it helps to reduce impairment loans and avoid write-off loans. With this finding, the researcher therefore argues that the higher significant level of the two years lag of the variable of interest (CRB) is due to the fact that when banks applied the services of CRB, in a particular year in their loans' advancement, the benefits do not come just immediately or within the same year the services were used. This is simple because borrowers would not have started repaying back loans immediately. It therefore makes sense to lag the CRBE variable two years behind.

This result is consistent with the findings of Kwambai and Wandera's (2013): use of CRBE enhances transparency among banks and that in turn helps banks to give out prudent loans, acts as a discipline against borrowers defaulting, reduces borrowing interest charges on loans, among others. The finding is also supported by a study conducted by Kusi et al. (2015) on CRBs activities in Ghana,which found that the use of CRB services improved loans quality by increasing banks predictive power by providing them sufficient, dependable, and accurate information and reducing the possibility of unfair selection and loans repayments. Also, the presence of CRBs put borrowers under pressure to repay their debts to avoid loans denials in future because any default with one bank or lender is reportedto all other banks. This aids banks in recovering their debts and advancing money, leading to loans quality improvement. This study finding is also consistent with thefindings of Omare (2016), which revealed that the use of CRB by banks lower write-off loans. Findings of other earlier studies like Bennardo et al., (2009), Luoto et al. (2007), Jappelli and Pagano (2000, 2002) are in line with the result of this study. The result means that CRB can assist banks in making circumspect loans, which can result in a decrease in impairment loans (improved loans quality).

Liquidity Impact on Write-off and Impairment Loans

Loans to total deposit ratio measures banks liquidity – the amount of moneya bank has used to make loans out of the deposits it has received. Bank liquidity measured as total loans and advances to total customers deposits was positively related to write-off and impairment loans in the two models in Table 6. The coefficient of liquidity was 0.0454 and statistically significant in

Model 1 (write- off loans) at 95% level. This suggests that when there is an increase in banks' liquidity by a unit, it will lead to 0.0454 amount of write-off loans increase. Impairment loans recorded a coefficient of 0.0310 but statistically insignificant. This suggest that a unit increase in a bank liquidity leads to 0.0226 amount increase in bank impairment loans (low quality of loans). This finding is consistent with Makri et al. (2014) which stated that the amount of impairment loans in the bankingsector is positively and significantly impacted by the loans to total deposit ratio.

Capital Adequacy Impact on Write-off and Impairment Loans

There was a positive and statistically significant relationship between impairment loans (Model 2) and bank capital adequacy (Model 1), where capital adequacy is defined as total equity to total assets. On the other hand, write-off loans and impairment loans were shown to have no relationship (Model 1). This indicates that impairment loans will drop by 0.139 amount for every unit rise in bank capital. But the amount of loans that will have to be written off will rise by 0.215% for every unit increase in capital. Since these banks have sufficient capital, they can eliminate or write off existing loans. This finding lends credence to the Moral Hazard hypothesis, which states that banks with sufficient capital have sufficient equity to cover credit losses charged to equity reserved funds; it is in line with the findings of Berger and DeYoung (1997). Therefore, compared to banks with lower capitalization, those with higher capitalization are more likely to have a higher number of write-off loans. The study's author speculates that well-capitalized financial institutions can afford to write off more loans and, thus, incur higher bad debt from the increased credit advances they provide to borrowers. According to

the results, banks with a lot of capital are more likely to lend money to their customers because they can afford to lose money on bad loans. This result contradicts the findings of Agoraki et al. (2011) and Boudriga et al. (2009).

GDP Growth on Write-off and Impairment Loans

From the regression results, GDP has a negative relationship with write-off and impairment loans cross both specification with coefficients of 0.00622 and 0.00560, respectively. In both specifications, GDP growth is statistically significant at a 99% confidence level for write-off loans and 99.9% confidence level for impairment loans. What this means is that the expansion of GDP growth by 1% will lead to a reduction in the banks' write-off loans by 0.0166 amount and a reduction in impairment loans by 0.0121 amount. This signifies that GDP growth is very instrumental in reducing banks' impairment and write-off loans in Ghana and hence, improve loans quality. This result is consistent with Beck et al., (2013),who found that real GDP growth typically translates into higher incomes, improve borrower's ability to pay off debt, and therefore reduce impairment and write-off loans. The negative relationship and significant impact on write-off loans is also in line with Keeton's (1999) analysis of loans growth and the Pecking Order Theory. He contends that banks ease up on lending conditions and procedures to draw in customers during periods of economic expansion, which discourages people and businesses from borrowing because they would have adequate finances internally.This study finding contrasts with Athanasoglou et al. (2005), which suggests that when there is a general growth in an economy, people may not need money from the banks and that will make them not bother to repay their borrowed funds to the banks, hence may contribute to the

growth of loans write-offs in banking sectors.

Inflation on Write-off and Impairment Loans

The coefficients on inflation were found to be negatively related to both impairment and write-off loans as indicated in columns (2) and (3) in Table 6. The coefficients are 0.00395 for write-off loans and 0.00355 for impairment loans, which are statistically significant across the two specification models at 99% and 99.9% confidence levels for write-off and impaired loans, respectively. This means that a 1% increase in inflation leads to a reduction of 0.0106 amount in write-off loans and 0.00695 amount of impairment loans. This indicates that a higher level of inflation is associated with declining levels of bank write-off and impairment loans. This implies that as inflation rate goes up, borrowers' ability to repay their loans and advances increases. This finding is consistent with the IMF (2016), whichstated that high inflation affects impairment loans negatively, suggesting that inflation can improve debt servicing ability by lowering the outstanding principal amount, which influence impaired loans. Other studies like Klein (2013) also posit that higher inflation causes a fall in real debt services, which lowers impaired loans. However, the finding is contrary to a study by Wikutama (2010) who stated that inflation and impaired loans have a positive relationship, meaning that when inflation is rising, default rate will also rise, driving higher impaired loans to bad loans which ends up being written off. He added that high inflation reduces the purchasing power of consumers and so, increases loans repayment default and bad loans exposure that may lead to write-off loans.

Bank Size on Write-off and Impairment Loans

According to the regression results in Table 8, the size of banks as represented by the natural log of total assets was a highly and adversely significant predictor of impairment loans. In Column 3 on Table 6, the coefficient of impairment loans was 0.00860 and statistically significant at 99.9% confidence level. This suggests that when a bank size expands by 1 unit, impairment loans willreduce by 0.0293 amount, indicating that as banks grow larger, they become betterable to manage their loans and lower impairment loans.

This empirical result is consistent with past research (see Salas & Saurina, 2002; Ranjan & Dhal, 2003; Hu et al., 2006). They interpret this finding to suggest that bigger banks are more effective than smaller banks at screening loans applicants before loans are extended because bigger banks have more resources, both human and financial. Also, larger banks have the means to monitor borrowers through the use other strategies like theapplication of CRBs to recover both principal and interest from borrowers and to reduce adverse selection.

Profit Before Tax on Write-off and Impairment Loans

Profit before tax (PBT) also known as gross profit is the profit a company makes before income tax is deducted. The total revenue, operating costs, interest expenses, and other factors are all considered in the determination of profit before tax value. PBT is often referred to as pre-tax profit and earnings before tax, which can be noted on annual income statement. This variable was included in the estimation to find out whether or not PBT positively or negatively impact on loans of banks that use of CRB

services. PBT was found to be positively related to both write-off and impairment loans with coefficients of 0.0102 for write-off loans and 0.00799 for impairment loans. The coefficient for write-off and impaired loans were statistically significant at 95% for write-off loans and 99.9% for impairment loans. This implies that a unit increase in banks' gross profit will lead to an increase of impairment loans by 0.0285 amount and write-off loans by 0.0199 amount. This finding is consistent with studies by Angbazo (1997), Alexiou and Sofoklis (2009), Athanasoglou et al. (2008), Chiorazzo et al. (2008), DeYoung and Rice (2004), and Hernando and Nieto (2007), which reported direct relationship between bank profitand assets quality.

Impairment Loans Impact on Write-off Loans

Impairment loans were included on the regression (Module 1) as an explanatory variable. The inclusion of this variable in the estimation was to determine the effect of impairment loans on write-offs loans in the Ghanaian banking sector since impairment loans always precede write-off loans. Impairmentloans were found to be negatively related to write-off loans. From the regression results in Table 8, impairment loans recorded a coefficient of 0.127, which is statistically significant at the 99.9% confidence level. Since the coefficient is negative, the result implies that a 1% unit increase in impairment loans will lead to 0.362 amount reduction of write-off loans by banks.

Write-off Loans on Impairment Loans

Similar to impairment loans used as an explanatory variable, wrote-off loans were also included as an explanatory variable to determine its impact on impairment loans. The result of the regression indicates that write-off loans is

inversely related to impairment loans with a statistically significant coefficient of 0.190 at the 99% confidence level. As the coefficient is negative, the result shows that every unit increase in write-off loans will lead to a reduction of bank impairment loans by 0.190. This finding is supported by Bauze (2019) who posits that banks and the financial system gain from an aggressive non-performing loans write-off policy in several ways. The first benefit is that banks will be able to focus more time and resources on their primary activity, which is financial intermediation when the problem of impaired loans is resolved through write-offs. In order to avoid becoming an asset management firm for bad loans, banks can manage impairment loans properly, including writing them off. This would free up resources for future lending. Second, while the primary goal of bad loans write-offs is the sale of assets with a low chance of recovery, a typical outcome is a reduction in impairment loans in banks. Country experience demonstrates that this is a particularly effective strategy for rapidly lowering the impairment loans ratio. Thirdly, as long as loans are paid back, financial statements are unaffected and finally, a decline in the impairment loans ratio ought to help the rating agencies assess the problematic loans facing the bank or the financial system.

Chapter Summary

The procedures that produced the fixed and random estimation results were covered in the chapter. Before arriving at the random estimation, it was necessary to assess the normality of the variables and correlation under both OLS and GLS. According to the chapter's findings, CRB lowers bank impairment and write-off loans while boosting loans quality in the banking

sector. In addition, factors other than CRB were discovered to affect loans quality, including bank size, liquidity, capital adequacy, PBT, GDP growth, and inflation.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The summary, conclusions, and recommendations are to be presented in thislast chapter. The objective is to provide the study's key findings and offer policy recommendations to commercial banks facing the issue of loans impairment and write-offs in the Ghanaian banking sector.

Summary of the Study

Examining how CRBs influence the quality of loans in Ghana is the primary goal of the research. The study examined the impact of CRB on loan quality in Ghana using fixed effect and random effect models. Data used in the study came from a variety of sources, including the World Governance Indicators (WGI), the World Development Indicators (WDI), and company-level information gleaned from publicly available yearly financial statements on different stock markets.

The preliminary findings suggested that, CRB has a negative relationship with write-off loans but positively related to impairment loans and statistically insignificant. Whiles Liquidity, capital adequacy and profit before tax had a positive and statistically significant relationship with write-off. Impairment loans, GDP and inflation had an inverse relationship with write-off loans

The second objective concluded by accepting the null hypothesis that there is no significant relationship between CRB and quality of loans. It revealed that CRB is positively related to impairment loans but statistically insignificant.

Liquidity and profit before tax had a positive relationship with impairment whiles loans write-off, capital adequacy, GDP, Inflation and Bank size had a negative relationship with impairment

Conclusions

The study concludes that since the introduction of CRBs in 2010, loan quality has improved as well as Write-off loans redueced. Though improvements are observed in loans quality indicators in the presence of CRBs, improvements in thebanks' loans quality indicators can only be partly (not fully) associated with the introduction of CRBs. Indeed, theories and empirical studies have highlighted that,other variables influence improvement in loans quality (see Chaibi & Ftiti, 2015; Castro 2012; Dietrich & Wanzenried, 2011; Luoto et al., 2007). There are many ways in which CRBs have influenced on banks' lending procedures and loans portfolios.

First, CRBs increase bank predictive power by giving them sufficient, accurate, and trustworthy information, which reduces the likelihood of unfair selection and loans quality. Second, the presence of CRBs aid banks in recovering their loans and advances by putting pressure on borrowers to repay their debts to avoid future loans denials as any default with one bank or lender is reported to all other banks. This generally lowers credit losses while increasing banks' loans quality. Additionally, CRBs are specialized organizations and offer accurate and competent assessments of bank clients, enabling banks to make lending decisions at a reasonable cost.

Recommendations

Based on the study's analysis of loan write-offs, loan quality, and the role of Credit Reference Bureaus (CRBs), several targeted recommendations

can be made to strengthen the loan management practices in Ghana's banking sector.

First, expanding the data sources available to CRBs can significantly reduce loan write-offs. By including alternative data, such as utility bills, tax records, and legal judgments, CRBs could provide banks with a more comprehensive perspective on borrowers' financial behavior. This broader range of data would enable banks to make better-informed lending decisions and reduce adverse selection, ultimately lowering the frequency of loan write-offs.

Additionally, enhancing public awareness about the influence of CRBs on credit access is crucial for improving loan quality. Borrowers should understand that their financial behavior, including defaults, is recorded and could affect future credit opportunities. Public education campaigns focusing on the consequences of non-payment and the benefits of maintaining a good credit record could incentivize better repayment behavior, leading to fewer loan defaults and improved loan quality within banks' portfolios.

A stronger emphasis on regulatory compliance and monitoring is also recommended. The Bank of Ghana should enforce CRB-related regulations more strictly to ensure that all financial institutions contribute accurate, timely data. Such regulatory pressure would promote more consistent information-sharing across banks, enhancing CRB functionality as a reliable credit-tracking tool and ultimately supporting better loan quality in the sector.

Finally, banks are advised to leverage lagged CRB data to make more accurate lending decisions. The study found that using CRB information from previous years—particularly with a two-year lag—provides valuable insights

into a borrower's long-term financial reliability. Incorporating this historical data in credit assessments can reduce loan impairments and improve portfolio quality by identifying reliable borrowers based on proven payment patterns over time. These recommendations emphasize the effective use of CRB resources and enhanced regulatory practices to improve loan quality and minimize write-offs, providing a strategic approach to sustainable loan management in Ghana's banking sector.

Future Research Direction

Future studies can evaluate the impact of credit referencing bureaus on different types of loans: The impact of credit referencing bureaus may vary depending on the type of loans being offered. Future research could examine the impact of credit referencing bureaus on different types of loans, such as personal loans, small business loans, and agricultural loans.

Again, future works can consider investigating the impact of credit referencing bureaus on other loans quality metrics. While loans quality is an important measure of the effectiveness of credit referencing bureaus, other loans quality metrics could also be examined. These could include measures of loans delinquency, default rates, and recovery rates.

Lastly, future studies can analyze the impact of credit referencing bureaus on the credit market structure. The use of credit referencing bureaus can lead to changes in the credit market structure by enabling new lenders to enter the market and compete with existing lenders. Future research could investigate the impact of credit referencing bureaus on the credit market structure in Ghana.

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