UNIVERSITY OF CAPE COAST

DETERMINANTS OF NON-PERFORMING LOANS IN GHANA - A CASE OF SOME BANKS LISTED ON THE GHANA STOCK EXCHANGE

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BY

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DECLARATION

Candidate's Declaration

I hereby declare that this dissertation is the results 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: Kwabena Dwenti Tweneboa

Supervisors' Declaration

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

Supervisor's Signature……..Date……

Name: Dr. Mohammed Zangina Isshaq

ABSTRACT

The research seeks to assess the determinants of NPLs of listed banks in Ghana. The study used descriptive research design. Secondary data were collected from seven banks during the periods of 2010 to 2020. The results showed that there was a downward trend for the movement of NPLs from the periods of 2010 to 2019, before it began to rise in the year of 2020. There was up and down movement in the profitability of the banks. The highest profitability was recorded in the year 2019. Loan to deposit ratio (LTD), capital adequacy ratio (CAR), profitability, and bank size were the factors related to the bank that revealed negative and significant impact on NPLs. Lending rate showed a positive but not significant impact on NPLs. For the macro-economic indicators, money supply (M2) and gross domestic product (GDP) showed negative and significant impact on NPLs. Inflation had positive but insignificantly impacted on NPLs. The study concluded that for the banks to decrease their exposure to NPLs there in the need to increase their CAR, LTD, return on equity (ROE) and bank size (BS). Also, there was the need to increase macroeconomic determinants; GDP, and M2 so as to reduce the NPLs of the banks. The study recommended that banks should mobilize more deposits so as to improve their CAR and also minimize the deposits issued as loans. Also, central bank together with the Government have to develop strategies in controlling the macroeconomic indicators such us money supply and inflation so an to minimize NPLs.

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DEDICATION

To my dear wife, Ruth Nti.

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LIST OF ACRONYMS

NPLs	Non-Performing Loan
GDP	Gross Domestic Product
BoG	Bank of Ghana
ROE	Return on Equity
ROA	Return on Asset
CAR	Capital Adequacy Ratio
LDR	Loan to Deposit
M2	Broad Money Supply
BS	Bank Size
INF	Inflation
SPSS	Statistical Package for Social Science
LR	Lending Rate
OLS	Ordinary Least Square
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

Banks perform significant role in the country by granting loans to individuals, companies and other sectors. Banks face the risk of high loan provisioning which results in nonperforming loans (NPLs). Currently, the issue of NPLs in Ghana is of great interest to policy makers and researchers. High rate of NPLs in the banks reduces the confidence of investors and if its determinants are not rectified and not resolved would result in malaise in the financial sector and driving out investors from the country. What determines these nonperforming loans is not well dealt with by banks in Ghana and has caused many banks to be closed down by the Bank of Ghana (BoG).

The main purpose of this paper is to assess the determinant of NPLs of banks listed in Ghana. This paper will review literature on what determines NPLs, theories related NPLs and the conceptual framework of the study.

Background to the Study

Loans serves as the most common class of asset by which banking institutions earn most of their revenue, but they also pose the biggest risk to banking institutions. Messai and Jouini (2013), established that the decline in quality of loan serves as the primary source of problem in most banking institutions in advanced economies. NPLs have caused a considerable surge in failure of banks in both emerging and developed countries over the previous decade. As a result of NPLs, failures have occurred in over forty African countries, including Tanzania, Uganda, Congo, Cameroon, Burundi, Burkina Faso, Kenya, South Africa, and Ghana (Viswanadham, 2015). This prompted

some scholars to investigate the conditions that could trigger the activation of NPLs of banking institutions (Castro, 2013).

According to Aiyar and Bergthaler, (2015) different categories of factors are used to explain NPLs growth in recent years. The scholars explained that the one category deals with external factors. These external factors are made up of factors related to macro-economic issues which affects the credibility of the borrower to settle his/her loans. Internal factors which form the other category dealt with variables that relates to the banks. The macro-economic variables included; the rate of unemployment, broad money supply, GDP and high level of inflation rate. The internal factors comprise, loans to deposit ratios, capital adequacy ratios, profitability, and bank size. Nyarko-Baasi (2018), established that a lot of banks in the country and some other nations such as Indonesia, Thailand, Mexico, Japan and Malaysia have observed high NPLs during the year 2008. This was due to high economic crunches which affected those countries. This led to collapse of a lot of banks in Thailand and Indonesia.

In 2010, PricewaterhouseCoopers revealed that in Ghana, there is an upward trend in terms of NPLsS for the banks regardless of high deposits and rise in network in branches. For instance, Ecobank Ghana Ltd and Standard Chartered Bank Ltd., have showed level trend in income raising for the benefit of the bank. Nevertheless, Standard Chartered Bank Ltd., in 2015 observed a rise in NPLs of 12.1%, which then increased again to 22% in the year 2016. Meanwhile, the NPLsS of their counterpart (Ecobank Ghana Ltd) witnessed increase of NPLs from 11.5% to 16.3% respectively in 2015 to 2016 (BoG, 2020).

During the period of February, 2018, the report from Bank of Ghana revealed that the NPLs of banks are on the rise at 36.17% which is represented by increase of 3.9 to 5.4 billion cedis in just a year period. Due to NPLs, many financial institutions experienced minimal profit which resulted in their demise. Capital bank and UT bank serves as an evidence to this occurrence and this led to GCB taking over these banks. The reason for GCB which took over these banks was as a consequence from Capital bank and UT bank granting a lot of loans which were under performing and this resulted in high NPLs accrued by the banks.

Jeong and Jung (2013), espoused that it is essential for banks to find out the factors which contributed to their NPLs and develop strategies to bring it to minimum. As proposed by Aiyar and Bergthaler, (2015) in order to minimize NPLs, policies on credit should be designed and implemented in guiding and controlling the activities and directions for the banking institutions in issuing loans to their clients. When this is done, it contributes to the prevention of loans that would be highly problematic. According to Barongo, (2013) restructuring loan requirements, minimizing a lot of loan issuance, digitizing, proper monitoring of loan, adequate analysis of financial statements, taking appropriate collateral and documentation from the borrower will help to minimize NPLs.

Statement of the Problem

Reducing NPLs by banks in Ghana has been a constant challenge which is noted to be affecting their profitability and their survival. Regardless of impunitive measures like strengthening the Credit Reference Bureaus in reducing NPLs, the occurrence of NPLs is still on the rising trend.

The rise in NPLs have cause the collapse of many banks. For instance, from the year 2019 to 2020 about hooping number of 16 banks operating in Ghana collapsed as a result of the increased level of NPLs (BoG, 2020). This therefore calls for the need to assess the factors that determines NPLs. There are some gaps identified in the previous research works. The first gap identified was about the research methodology used by previous research works. For instance, the research embarked on by Saba et al. (2012) used OLS regression model, but did not employ other robust analysis like Hausmann test to determine the choice of either random effect or fixed effect model to verify the results. Louzis et al. (2010) employed correlation in their analysis and did not consider macro-economic factors like inflation and GDP in their analysis.

The second gap was about the location where the studies were conducted. Different studies on the determinants of NPLs and profitability were done in U.S.A (Saba et al. (2012), Western Europe (Louzis et al. 2010); Badar et al. (2013) and East African countries (Moti et al. 2012). The few studies done in the context of Ghana by Nyarko-Baasi (2018) used only ROE as a proxy for profitability. Also, in a research by Addae, (2017), considered inflation as the only macroeconomic factor in his study. This research work tries to fill these gaps by considering factors related to the banks and macro-economic indicators in assessing the determinants of NPLs of banks in Ghana.

Purpose of the Study

The main aim of the research is to assess the determinants of NPLs of banks listed in Ghana.

Objectives of the Study

Specifically, the study seeks:

1. To examine the effect of bank specific variables on NPLs of the banks.

2. To analyse the effect of macroeconomic variables alone on the NPLs of the banks.

3. To assess the combined effect of bank specific and macroeconomic variables on the NPLs of the banks.

Research Hypotheses

1. H1: LTD has significant effect on NPLs of the banks.

2. H2: CAR has significant effect on NPLs of the banks.

3. H3: ROE has significant effect on NPLs of the banks.

4. H4: LR has significant effect on NPLs of the banks.

5. H5: BS has significant effect on NPLs of the banks.

6. H6: GDP has significant effect on NPLs of the banks.

7. H7: M2 has significant effect on NPLs of the banks.

8. H8: INF has significant effect on NPLs of the banks.

Significance of the Study

The research used current data to assess the determinants of NPLs of the banks. Many of the previous studies done in the Ghanaian context did not consider macroeconomic indicators in assessing the determinants of NPLs, however this study does so by including macroeconomic indicators aside the bank specific factors in assessing the determinants of NPLs. The inclusion of both the bank and macroeconomic indicators will help the banks to develop strategies in mitigating the growing trend of NPLs and also assist the government to develop macroeconomic policies to help reduce NPLs accrued

by the banks. This will help the banks to issue loans which are of quality instead of granting loans in large quantity.

Delimitations

The research dealt with the determinants of NPLs on the banks' in Ghana. However, areas such as the relationship between NPLs and the profitability of banks, and other NPLs determinants like operational efficiency of the banks, ownership structure, and unemployment were not used in this research. This was due to lack of enough data on these variables in the Ghanaian context. The study was delimited to seven listed banks due to the fact that the data to be used for the study were to range from 2010 to 2020 and most of the banks did not have complete data during the required year span. Seven banks were willing and made the data on the study variables available to the researcher.

Limitations

The research was limited to few variables especially bank-specific variables. The other variables were eliminated due to inconsistencies of information regarding those variables which resulted in their elimination. The study also focused on listed banks in Ghana and did not generalised the findings to cover other nations. Another limitation was that the staff members were not engaged to share their views on some of the factors that causes loan default in their banks.

Definition of Key Terms

Return on Asset (ROA): This reveals the effectiveness in the employment of assets. It reveals the amount of net income obtained from the assets of the concerned banks.

Return on Equity (ROE): It indicates the amount of profit generated by the banks with investment from shareholders in the bank.

Capital Adequacy Ratio (CAR): This provides a measure to the financial viability of the banks as it provides the capacity of the banks to tolerate or absorb losses which are abnormal.

Loan to deposit ratio (LTD): It determines the liquidity of the banks by assessing the amount of money from the collected deposits that has been used for granting loans by the bank.

Bank Size (BS): This is the natural logarithm of the value of total assets of the banks.

Non-performing Loans (NPLs): They are loans in which for a long time period usually 90 days or more, its interest and principal are outstanding and conflicts the conditions and terms of the loan requirements.

Inflation Rate: This is the rate of change in the prices of services and goods. It occurs when the prices of services and goods are rising.

Gross Domestic Product (GDP): Is the total monetary or market value of all the finished goods and services produced in the country within its borders in a specified time period.

Interest rate/Lending rate: It measures the profit level between short-term borrowing cost and the income on lending in the long term.

Money Supply: Is the total amount of money in circulation.

Organization of the Study

The research is presented in five chapters. Chapter One presents the background of the study, the problem statement, the study purpose, the research objective and the research question on which the objectives are based.

It also presents the significance of the research, delimitations, and limitations in the study.

The Second Chapter presents a detailed review of the literature related to the survey. Emphasis is laid on the major theories that explain the major concepts on which the study is focused. The empirical evidence of the factors that determines NPLs and their relationships with it are also reviewed in this chapter. The chapter ends with the conceptual framework on which the study is based.

The Third Chapter provides the design of the research, data sources, model specification, selection of model, diagnostics tests and other essential issues. The presentation and discussion of the results from the data analysis is done at the Fourth Chapter. The Fifth Chapter summaries the results from the research, conclusions and recommendations. As well, a recommendation of future research is presented in this chapter.

CHAPTER TWO

LITERATURE REVIEW

Introduction

The chapter contains literature review germane to the achievement of the objectives of this study. The chapter begins with the theories backing the study. Since the study focuses on the factors that determines NPLs in banking institutions, literature and empirical evidence regarding these determinants are also reviewed. The chapter concludes with a detailed description of the conceptual framework for the research.

Theoretical Review

Theories which relate to the research are discussed in this sub-chapter. Theories such as information asymmetry theory, and theory of loan pricing are discussed below.

Information asymmetry theory

According to the asymmetric information theory, lending institutions (lenders) face a difficult task of differentiating ahead of time the borrower who is better from the one who is bad (Auronen, 2003). This difficulty can be ascribed to issues of ethical hazards and selection which is adverse.

According to the concept, the borrowers possess comprehensive and a lot of information about particular asset being acquired and, as a result, has a distinct advantage in bargaining the most favorable transaction conditions relative to the lenders (Bester, 1994). As a result, the partner who has not been fully informed about the precise goods or service of the transaction is at the vulnerability of the partner who has been informed adequately (Auronen, 2003).

Given the possibility that financial firms (lenders) may find it difficult to gather appropriate data and accurate information about their borrowers in order to minimize the rate of default in payment, they should strive to have better capacity to overcome information asymmetry difficulties and to reduce non-performing loans (NPLs). As a result, using asymmetric information, banks should be proactive in gathering the proper and sufficient information required to identify the elements that actively promote the development of nonperforming loans (NPLs). However, acquiring the relevant information improves the lender's ability to discern between the wrong and correct decision. This would place the bank in a better position to minimize the growth of NPLs (Auronen, 2003).

In order to prevent the wrong decision when it comes to minimizing the number of NPLs, banks in Ghana should examine the bank-specific determinants which affects the amount of NPLs in the industry. From the theory's guidelines, the current research was prompted to investigate the bank-related variables that impact the proliferation of non-performing loans (NPLs) across the banks, using Information Asymmetry Theory as a guide.

Theory of loan pricing

In accordance with the idea of the theory of loan pricing, banks would not occasionally attempt to gain maximum interest when lending, meaning that they are not expected to alter their interest rates (Mudzingwa, 2013). As a result, when interest rates of banks are set exceedingly high, they may suffer adverse selection issues since borrowers with high-risk are ready to take out loans with high interest rates. If such a borrower takes the expected loan, he/she is more possible to engage in moral hazard behavior, which leads them

in investing in projects which are high-risk with a higher chance of paying back the high interest rates (Chodechai, 2004).

The theory of pricing loan is quite valuable because it considers the spread of interest rates being a variable that influences NPLs across Ghanaian banks. According to the theory, banks should design systems for recognition and understanding the possible risk that a borrower faces, and in the event that they desire to minimize the interest burden on their loans, they should charge a lower interest rate. Interest rate spread is one approach to reduce the interest burden. Individual banks have the freedom to determine their own interest rate spreads, which allows this to happen (Sheefeni, 2016).

Conceptual Review

Concepts that relate to the study are explained in this subsection.

Definitions of non-performing loans

Many and varied definitions of nonperforming loans as a proxy can be extracted from literature, but these definitions virtually mean the same thing. For instance, Anthony and Nakita (2018) considered non-performing loans as credit facilities that banks do not profit from because they have been in default. Nonperforming loans are loans which financial institutions cannot recoup within a specified period as governed by the rules and regulations in a country. It is considered as the loan for which the interest to be paid and the principal exceeds 90 days overdue (International Monetary Fund, 2009). According to Chege and Bichanga (2017), NPLs are defined as loans that for a long time period does not create any income; this means that for the past 90 days, interest rate on such loans have not be paid. NPLs are loans for which its cash stream is not certain and is not considered by the bank as being able to

generate income until profit is generated from the loan, and there is lowering of the interest rate because of the borrowers' problem (Gathaiya, 2017).

Machiraju (2008), is of the opinion that NPLs is a major predictor determining the quality of credit. From the perspective of National Bank of Ethiopia, (2010), NPLs are loans that is experiencing a deteriorating credit quality for which the principal collection and/or loan interest or advances is in question. The specific borrowers act such as the circumstances of placing the loan at risk and petitioning for bankruptcy provides the grounds for classifying loan as doubtful or bad. Hue (2015), expounded on this by saying that one or more of the terms and conditions of the loan may be defaulted by the borrower or part of its asset may be in a country which is experiencing recession in the economy. Adusei (2018), provided a definition of NPLs as a loan which is not income generating or generating interest on the principal for the past 90 days or more.

Determinants of NPLs

The determinants of NPLs are grouped under bank specific factors and macroeconomic factors. These determinants are presented below.

Bank specific determinants

Individual bank determinants that impact banks' NPLs are referred to as bank specific factors or internal factors. Internal decisions made by management and board of directors have an impact on these factors. These factors are within the bank's power to control, and they differ from one bank to the other. These internal factors include; credit portfolio size and composition, capital, interest rate policy, deposit liabilities, labor productivity, quality of risk level managerial, bank size, ownership, and state of information

technology and so on (Dimitrios, Helen & Mike, 2016). Scholars frequently utilize the CAMEL framework to proxy bank specific variables. CAMEL is the acronym for capital adequacy, asset quality, management efficiency, earnings ability, and liquidity (Gupta, 2014). As a result, the subsequent section explicitly describes the bank-specific factors that were used in this research.

Return on assets (ROA): This analyzes the net income generated by total assets over a period of time by comparing the average total assets to the net income. The return on assets ratio, often known as the return on assets (ROA), assesses how effectively a bank can handle its assets in order to generate profits over a given period of time (Abebe, 2018). This ratio is useful for both investors and managers because the main purpose of banks is to raise revenue and earn profits. It allows investors to determine how well the bank is converting its investments in assets into profits.

Consequently, the return on assets ratio is an indicator of how successfully the bank can make a return on its investment in assets over a period of time. The return on assets (ROA) measures the efficiency with which a bank can transform the money spent to purchase assets into profits or net income after expenses are deducted. In short, if the ROA ratio is high, the bank will be able to generate profit with its performance. Since ROA gives a notion as to how well management is utilizing its assets to generate profit, it means that ROA can show how effective management is.

Different research works have proven the hypothesis for and against the fact that ROA and NPLs are significantly correlated. One possible example of such result is seen in studies by Makri et al., (2014), and Ahmed and

Bashir, (2013); who identified an association between ROA and NPLs to be positively significant. However, Selma and Jouini (2013), and Boudriga et al., (2009) revealed that riskier activities of banks such as high level of loan issuance are negatively correlated with NPLs, as it also support the argument that profit deterioration ratio of firms are determined by the return on assets.

Return-on-equity (ROE): This measures profitability by taking into account the number of Cedis in profit that the bank earns for each unit of investors' equity. Apart from ROE measuring profitability, it also measures efficiency. An increase in ROE shows that the bank is becoming more profitable and that it has more capacity to make profit while having less capital. It shows the quality of the bank's use of shareholder capital as well. Accordingly, ROE gauges how much of the bank's equity-investing profit comes from the bank itself. Researchers observed a range of outcomes between Bank profitability and NPLs's evaluated in terms of ROE. Ahmed and Bashir (2013), and Makri et al. (2014) identified the association between NPLs and ROE to be negative. As a result, it is predicted that there will be inverse relationship between ROE and NPLs.

Capital adequacy ratio (CAR): CAR measures the percentage of a bank's capital which represents its credit risk-weighted assets. To ensure that banks can handle a small amount of debt before becoming bankrupt, an international standard has been established that provides minimum capital adequacy ratios. Protecting depositors and promoting the sustainability and efficiency of the financial network both have minimum capital adequacy ratios as part of their safety and soundness measures. A liquidity ratio is a good indicator of a bank's solvency and ability to take on risk. For this reason, this

percentage is implemented to shield depositors while helping to safeguard financial institutions from operational inefficiency.

Makri et al. (2014) claims that there is a negative correlation between NPLs and the riskiness of the loan portfolio, thus supporting the claim that the loan portfolio is marked by a high NPLs. Despite that, the studies of Djiogap and Ngomsi (2012) show that, NPLs are positively correlated with capital adequacy ratio. It is therefore predicted in this study that there will be negative relationship between Capital adequacy ratio and NPLs, and this clearly indicate that, poorly capitalized banks that are well functioning are not discouraged from taking risks.

Loan to deposit (LTD) ratio: This is a ratio used to assess the quantity of loans a bank has used, the amount of deposits on hand compared to the loans. It is calculated by taking the loan amounts divided by the total amount of deposits. Another measure that evaluates customer friendliness is this ratio, which is simply the percentage of customers who show low level of defaults since the customers will have the anticipation of turning to their bank for financing needs (Ranjan & Dhal, 2003). When this situation is observed as preference for credit by the banks. The preference for credit that a bank shows is consistent with their desire for high credit scores. Evidence also shows that the ratio of the LTD has a significant influence on the level of NPLs within different facets of the banking industry. Based on this study, it is predicted that this ratio will be positively associated with NPLs.

Macroeconomic factors

Due to the existing body of literature, it appears that there is a substantial connection between NPLs and economic factors like the

macroeconomy. A lot of macroeconomic indicators was propose in the literature as essential. There are various determinants of NPLs, these includes: Inflation rate, Real GDP growth, Real interest rate, Effective exchange rate, Broad money supply (M2), GDP per capital and unemployment rate (Fofack, 2005; Jimenez & Saurina 2006).

GDP: The level of NPLs and GDP growth recorded by commercial banks have an inverse relationship (Saba, Kouser, & Azeem, 2012; Louzis et al. 2010; Khemraj & Pasha, 2009; and Fofack, 2005). Literature explains this association by claiming that changes in the business cycle affect borrowers' ability to repay loans. When GDP grows strongly, this usually results in an increase in disposable income, which leads to an improvement in the debt-servicing capability of the borrower, which in turn reduces NPLs. When the economy slows down (negative or low GDP growth), both corporations and people reduce their cash holdings.

Problems such as this worsen borrowers' capacity to pay off their loans, which boosts the possibility of debt delays and the exposure of banks to credit risk. When evaluating NPLs in the financial industry, the author explains that each one is thought of as an inverse picture of an underperforming or unproductive firm that's in need of help. When the economy slows down, non-performing loans are projected to rise (Anthony & Nakita, 2018).

Lending rate/Interest rate: This is the cost of a total funds borrowed. The price borrowers pay for the use of money borrowed from creditors is called the interest rate. Interest can be regarded as the rent paid to money linked with NPLs and the lending rate. During periods of inflation, high

interest rates occur and high demand for credit occurs as credit growth also increases. These leads to the amount of money in the banking system to also tighten. Essentially, banks are also required to keep more money on hand (i.e., have higher reserve requirements).

There is an inverse relationship between a rise in interest rates and economic activity. Since interest is now more expensive, credit is not available, and business and the stock market are likely to take a hit. Interest-rate spread makes banking performing assets significantly more expensive because it increases the amount borrowers pay in interest on their loans (Joseph, 2011). A rise in interest rates diminishes the money that can be borrowed, which means that fewer people can pay off their debt. The return on a loan (i.e. the interest rate) is a variable that regulatory bodies like the Bank of Ghana (BoG) have discretion over when they are trying to implement monetary objectives in the scenario where the maximum and minimum lending rates are determined by the Board of Governors of the Federal Reserve.

According to Farhan et al. (2012) and Ranjan and Dhal (2003), an increase in interest rates restricts the ability of borrowers to repay the loan, therefore leading to positive relationship between NPLs and lending rate. This means that a higher loan rate will be associated with an increase in NPLs in this study. In concordance to the conclusions of Saba et al. (2012), this research is expected to indicate that lending rates are positively associated with NPLs. Therefore, in order to better reflect the typical lending rate utilized by commercial banks, this study employed the average of the Minimum and Maximum Lending Rate.

Inflation: The rate at which a currency loses its value is termed as inflation. While this is in one sense true, when it comes to pricing products and services, rising prices over time (or what a certain amount of money can purchase now compared to in the past) is known as inflation (Farhan et al., 2012). Inflation occurs when prices rise or when the value of money falls.

Massive printing of money, which increases supply in the economy may result in an increase in the inflation rate. Alternatively, some goods become much more difficult to find and, therefore, become more expensive. Inflation is an overall increase in the cost of goods and services over time in a country, and this is determined by the yearly change in percentage. As prices rise over time, the cost of goods and services increases. This means that, when inflation goes up, every dollar one is having will only be able to buy a lesser percentage of goods and services.

Farhan et al. (2012), Skarica (2013), and Klein (2013) report that NPLs are positively correlated with inflation. The same study also reveals that, as inflation increases, the quality of the loan portfolio declines. According to the theoretical model, inflation should diminish the real worth of debt, making it easier to lend. However, if high inflation occurs, nominal interest rates are likely to suffer, thereby lowering borrowers' ability to repay loans. Also, rising prices put additional strain on businesses, which in turn raises their prices. Finally, inflation lowered the real worth of money holdings, causing individuals to spend more time and money as opposed to depositing cash. Lowering wages for debtors might have a detrimental effect on their real income. In light of this, the relationship between NPLs and inflation could be described as either negative or positive.

Empirical Review

Non-performing loans and loan to deposit ratio (LTD)

Swamy (2012) embarked on a research to assess the macroeconomic variables that determines and NPLs of banks in Indian. The research employed panel data from 1997 to 2009. Profitability, operating expense to total assets, bank size, bank rate of lending, loan to deposit ratio, bank size, saving growth rate, per capital income, rate of inflation, and growth of GDP are the factors included in the study. The study found that loan to deposit ratio has positive impact on NPLs.

Louzis, Vouldis and Metaxas (2010) performed a research on the factors related to the bank and macroeconomic factors that determine NPLs. The study was based on a comparative research of consumer loan portfolios, businesses and mortgage. The study used secondary data from 1998 to 2008. The results from their study provided that, there is association which is positive between LTD and NPLs.

Misra and Dhal (2010), embarked on a research about pro-cyclical management of banks' NPLs. The case study was the Indian public sector banks. The study used secondary data and data was gathered from 1995 to 2008. Their study used the OLS method to predict the relationship between LTD and NPLs. The results from the study indicated that there LTD impacted NPLs positively.

Kristianti and Yovin (2016) performed a research on the factors which affects the performance of banks. The study sample 10 biggest private and government banks. Data was gathered from the periods of 2004 to 2013. The findings from their study reveals that LTD has significant impacted negatively

on NPLs of the banks selected for the study. Amoako (2015) performed a research on how bad loans affects the profitability of rural bank. The results from their study concluded that LTD was the major determinant of NPLs of the banks aside other related factors.

Ekanayake and Azeez (2015) performed a research about the variables that determine NPLs of bank. The study used secondary data and employed OLS regression to find out the significant variables that affects the NPLs of the banks. The results from their study indicated that LTD impacted positively on the NPLs of the banks. Hue (2015) conducted a study on NPLs and banks' sustainability. The research is performed on commercial banks in Vietnam and the study employed the OLS method. The findings from the study revealed that LTD accelerated NPLs significantly.

Non-performing loans and capital adequacy ratio (CAR)

The Sheefeni (2015) research indicates that the primary drivers of NPLs in Namibia are banks' operational efficiency variables, ROE, CAR, and ROA, of which CAR showed a positive correlation with NPLs. This means that, when the effectiveness of assets is reduced, NPLs will rise. In the years 1998-2011, Klein (2013) underwent a research about NPLs. The results from his research indicated that bank related factors and macro-economic factors were essential factors that determined NPLs. Nevertheless, the ability of the banking factors in determining NPLs was minimal.

Djiogap and Ngomsi (2012) sampled 35 banks situated at six African countries during the periods of 2001-2010. Their study reported that significant and negative correlation between NPLs and CAR. More so, Ranjan

and Chandra (2003), elaborated that increasing LTD ratio results in maximum risk for banking firms by increasing their NPLs.

Shingjergji (2013) embarked on a research on bank factors that impacts on NPLs of banks in Albanian. From the research CAR, profitability, net interest margin, and loan to asset ratio were employed as determining factors of NPLs. The research adopted regression model and data in panel form from the periods of 2002 to 2012 were used for the research. The study found that CAR has insignificant but negative impact on the NPLs of the banks.

Non-performing loans and profitability

Makri et al. (2014) studied the Eurozone's banking industry during the years from 2000 to 2008. The results indicated that NPLs are strongly linked to macroeconomic indicators (GDP, unemployment, and public debt), factor related to the bank, in the form of ROE, NPLs in the previous year, and CAR. The data shows a strong negative association between NPLs and profitability.

In a sample of European banks, Dimitrios, Helen and Mike (2016) found characteristics that potentially influence accounts that are suspected of fraud. Non-performing loans (NPLs) indicated a correlation between GDP growth and profitability of credit institutions. An increase in the profitability of credit institutions had a detrimental effect on NPLs. Additionally, these loans were positively impacted by personal taxes, real interest rate and unemployment rate.

Chege and Bichanga (2017) found that profitability had a substantial effect on the incidence of NPLs amongst commercial banks in Kenya. According to Asfaw, Bogale and Teame (2016), increasing NPLs significantly impairs financial firms' profitability in the Central area of Ethiopia. A research

conducted by Boakye-Adjei and Amuakwa-Mensah (2015) focuses on identifying the factors influencing NPLs from the banks situated in Ghana. The study concludes that both macroeconomic and factors related to the bank have significant influence on the NPLs rate using regression analysis. A negative association was witnessed to exist between NPLs and profitability.

As seen in the study by Malimi (2017), results evidence that poorly managed profitability is a cause of high NPLs levels. Islam and Nishiyama (2016); Sheefeni (2015) found negative association between profitability and NPLs. In a research by Gezu (2014), it was noted that profitability had a substantial negative influences on NPLs among commercial banks in Ethiopia. According to the conclusions of Ahlem and Fathi (2013) in their study, profitability has a negative correlation with NPLs. Also, according to the findings of Vasiliki, Athanasios and Athanasios (2014), which researched into the influence of profitability on NPLs, found that profitability had a minimal influence on NPLs ratio.

In Ethiopia, Gizaw, Kebede and Selvaraj (2015) performed a study in assessing the how the banks' financial performance is affected by credit risk. Data was collected by the researchers from 2003 to 2014 using 8 different financial institutions. Results from their research revealed that NPLs, CAR, provisions of bad loans impacted positively on the profitability of the banks. This impact was noted to be highly significant.

Chimkono, Muturi, and Njeru (2016) performed a research about the association between NPLs and banks' profitability. The research was conducted in Malawi for a seven years period using a sample period of 2008 to 2014. The research replaced profitability with ROA. The results indicated that

NPLs negatively affected the financial stability of the bank and this impact was significant.

Bentum (2012), conducted a research in Ghana about the factors/variables that determines financial institutions' profitability. In his study, the proxy for profitability was ROE. The results from the research indicated that capital and total assets were the influential factors that affected the profitability of the bank. NPLs, and macro-economic variables such as lending rate affected the profitability of the banks.

In Ghana, Nkegbe and Yazidu (2015) performed a research on the factors/variables that influences banks' profitability. The profitability of the banks were represented by ROA, net interest margin and ROE. The independent factors for their research were liquidity, NPLs, operational efficiency, and size of the bank. The findings revealed that there was a downward trend in the performance of the banks. Moreover, the NPLs has a negative correlation with profitability.

Tengey and Asantey (2014) performed a study in assessing the influences of NPLs on the lending capacity and financial viability of banking firms. Secondary data were retrieved from the statement of finances from the sampled banks and these data were obtained ranging from 2008 to 2013 which makes data spine of 5 years. The results from the study revealed a negative correlation between NPLs and profitability at the 0.05 alpha level.

Non-performing loans and lending rate

Ali and Iva (2013) found that the following six variables affected NPLs levels in Albanian banking: Rate of GDP growth, inflation rate, real exchange rate, credit growth and the total loan rate. OLS regression was used

to analyze a longitudinal data collected from 2002 to 2012. They further identified positive association among rate of real exchange and loan growth, as well as a negative correlation between GDP growth and the total of nonperforming loans. However, lending rate and NPLs have a weak negative correlation. Lastly, inflation rates have almost no impact on NPLs.

A study done by Atem (2017) found that high interest rates affected the commercial banks' NPLs and the study suggested control of interest rates as a solution. Interest rate spread (IRS) showed significant and positive impact on NPLs's, according to a study done in Namibia by Sheefeni (2016). However, a study in Bangladesh opposes this as it found out that there is a negative impact of IRS on NPLs's (Mondal, 2016). Meanwhile, research done in Kenya by Chege and Bichanga, (2017) also indicated that high levels of NPLs are associated with a negative and linear association between interest rate spread and NPLs's.

Louzis, Vouldis, and Metaxas, (2012) conducted a research which aimed at determining the factors that affects NPLs. The study focused on banks located in Greek from 2003-2009. The data used for the study was a panel data. The research employed regression analysis tool during the analysis of the data. Their research identified GDP and lending rate as strong determinants of NPLs.

Sakiru et al. (2011) performed a research which focused on macroeconomic variables that determine NPLs. The research was conducted in Malaysian banking sector. Their study covered data from 2007 to 2009. Macroeconomic variables used included industrial production index, producer price and lending rate. Their research used the approach of ARDL and the

results indicated that rate of lending impacted positively and significantly on NPLs. It is anticipated that NPLs will increase which would lead to increasing borrowers' default rate.

Daniel and Wandera (2013) embarked on a research to determine how credit information sharing affects the nonperforming loans Kenyan banks. Secondary and primary data were accepted for the research spinning between the periods of 2007 to 2012. Variables such as Credit Criteria, legal framework, Management of loans, Interest/lending rates and Information Asymmetry were included in the study. The study indicated that the rate of lending positively and significantly association with NPLs.

Non-performing loans and bank size (BS)

Hyun and Zhang (2012) conducted a study on how macroeconomic variables and factors related to the bank impacts on NPLs. The research was conducted in the US for two sub-sample time periods which is before and during the financial crisis. During the years before the emergence of financial crisis, the study presented that the size of bank has no effect on NPLs. In the event of financial crisis, the size of the bank showed a positive association with NPLs.

Tomak (2013) embarked on a study on the factors that determines lending behaviour of banks in Turkey. The study population was 25 banks, however, 18 banks were sampled for the study. The data covered the periods of 2003 to 2012. The variables used were inflation rate, GDP growth rate, interest rates, access to long term funds and bank size. The results from the study indicated that the banks' NPLs was impacted positively and significantly by the size of the bank.

Swamy (2012) embarked on a research to assess the macroeconomic variables that determines and NPLs of banks in Indian. The study used panel data from 1997 to 2009. Profitability, operating expense to total assets, bank's rate of lending, loan to deposit ratio, the size of the bank, saving growth rate, per capital income, inflation rate, and GDP growth were the factors included in the research. The study identified the size of the bank to have strong and negative effect on NPLs.

Saurina and Salas (2002) performed a research which aimed at examining the determinants of loan problems in Spain. The study used panel data set which covers from 1985 to 1997 periods. The results indicated that bank size negatively affects NPLs of the banks considered for the study. Jimenez and Saurina (2006) investigated prudential regulation, credit risks and credit cycles of banks in Spain. The dependent variable in the research was NPLs and the explanatory variables were; bank size, interest rate, and GDP growth. The study found that bank size have no significant link with NPLs. Hu et al (2006) analyzed the association between income diversification, bank size, ownership structure and NPLs of Taiwan commercial banks. The data covered the periods of 1996-1999. The study shows that the bank size revealed negative correlation with NPLs.

Ahmad and Al-Samad (2009) analyzed the variables that affects credit risks of banks in Jordan banks. The data was collected during the periods of 1995-2005. Data was analyzed using regression analysis. Their results reveal that bank size significantly determines NPLs. Boakye-Adjei and Amuakwa-Mensah (2015) performed a research to investigate the factors that determines NPLs of banks in Ghana. Their findings provided that the size of bank has a

positive association with NPLs. The authors provided that as there is an increase in the bank size, such banks can increase their credit base which suggest that there is the possibility of a lot of clients defaulting, thereby resulting in high NPLs.

Gross domestic product (GDP) and Non-performing loans

The findings of Ramachandran, et al (2011) were confirmed by empirical analyses that employed an econometric model to find factors influencing risk of credit in the commercial banking sector in India. Longitudinal data was used in the study of 22 banks in the public sector in the government sector and fifteen banks in the private sector. It was shown that bank-specific variables together with macroeconomic variables have an essential influence for credit risk determination in commercial banking industry. Lagged NPLs assets have a clear and considerable positive effect on the GDP. Also, both private and public sector banks are at increased danger when their credit risk and GDP are out of sync.

Farhan, Satta, Chauhry and Khalil (2012) used a primary data collection method in order to explore the various economic variables that cause banking sector's NPLs of Pakistan. They performed this study on a dataset of 201 bank employees who made lending decisions or who handle the credit risk or manage NPLs portfolios.

Ahmed and Bashir, (2013) in conducting a research on the effect of a number of independent variables (Inflation, unemployment, energy crisis, exchange rate, interest rate and GDP growth) on the NPLs of the banking industry in Pakistan, regression and correlation analysis was conducted. In the study, Pakistan bankers found that a number of issues had a significant

correlation to the NPLs's in the Pakistani banking industry, including inflation, rate of interest, unemployment, exchange rate and energy crisis. The research further noted that, the relationship between GDP growth and NPLs was negative and significant.

In a specific group of nations (Italy, Spain, Portugal, Ireland and Greece) afflicted by negative economic and financial conditions, Castro (2013) examined the relationship that exists among macroeconomic variables and the risk of banking credit. Employing dynamic panel data techniques for the period 1997-2011, the conclusion was that both micro and macroeconomic factors impacted banking credit risk. To be specific, a country's increase in GDP correlates negatively with the number of nonperforming loans (NPLs).

Based on six economic drivers, including GDP growth and export growth, Kumarasinghe (2017) concluded that the rate of non-performing loans in the Sri Lankan banking sector is dependent on export growth and GDP growth. The research found that GDP and non-performing loans are positively correlated. Castro (2013) performed a research to examine the association with which microeconomic variables have on NPLs. The study was conducted on sampled banks selected from Italy, Portugal and Spain. The results provided that NPLs is significantly determined by the GDP rate of growth.

Non-performing loans and money supply (M2)

To assess the effects of macroeconomic factors on NPLs, the long-term and short-term dynamics of 36 banks situated in Pakistan were examined in an empirical study by Badar and Yasmin (2013) from 2002-2011. In the research the Vector error correction model was used. The following factors were included as elements of the broader economy: interest rate, GDP, exchange

rate, inflation, and money supply. In this analysis, strong negative long-term associations were identified between money supply, inflation, interest rate, exchange rate and GDP with NPLs's.

Rifat, (2016), performed a research on factors that determines NPLs, by using non-bank financial institutions. The study was carried out in Bangladesh and the software used for the data analysis was Stata software. The findings from the study indicated that money supply have negative impact on the NPLs of the banks. This suggested that money supply could bring down bad debt.

Glen and Mondragón-Vélez (2011) analyzed sampled 22 advanced economies for determine the factors that impact on NPLs. Data for the study was gathered between the periods of 1996-2008. The findings from their study revealed that money supply negatively impacts on the NPLs of the banks from the selected economies.

Prasad and Espinoza (2010) used panel data during the periods of 1995 to 2008 to examine the NPLs of financial firms in the Gulf Cooperation Council nations. The results from their study indicated a moderate positive and significant impact of money supply on the NPLs's growth.

Non-performing loans and inflation rate (INF)

Jusoff et al (2011), performed a research in the Malaysian banking industry during 2006-2009. To assess if interest and inflation affect the NPLs's, the study applied a Vector Error Correcting Model (VECM) on forty-eight monthly data. Interest-rate reveals that NPLs has a major impact on credit risk. In contrast, there is no significant correlation between NPLs and

inflation rate. Inflation cannot affect NPLs in the commercial banking sector of Malaysia in a short term.

As part of her study on the relationship between NPLs and the macroeconomy, Klein (2013) assessed the factors that determines and the macroeconomic performance of NPLs. The research was performed in South Eastern Europe, Eastern and Central, between 1998 and 2011 for 10 banks in each of sixteen nations. The research included indicators like GDP growth rate, unemployment, inflation and loan growth rate. The study utilized a fixed-effect model and reveal that inflation affected the occurrence of NPLs positively.

Saba et al. (2012) embarked on a research about the determinants of NPLs. The case study was US banking sector and the study used the OLS method. Their research identified that NPLs of the selected banks was affected positively and significantly by inflation. Louzis et al. (2010) also witnessed significant and positive effect of inflation on NPLs.

Skarica (2013) performed a study about the factors that affects NPLs. The study was conducted in eastern and Central European countries. The data for the study raged from the years 2000 to 2011 by employing the fixed effect model. The results from their study revealed that inflation affected NPLs of the banks positively and significantly.

Carlos (2012) performed a research about the variables which affects NPLs of banking firms. The study used the OLS method of estimation by the use of SPSS software. The study was conducted in Italy and Spain. The research revealed inflation to show no significant effect on NPLs.

Conceptual Framework

This research is aimed at assessing the determinants of NPLs of banking institutions found on the Stock Exchange of Ghana. From the reviewed literature, there was evidence that both bank and macroeconomic factors have the power to determine NPLs of all the financial firms noted in the review. The financial firm factors which predicts NPLs included return on asset (ROA), loan to deposit ratio (LTD), return on equity (ROE) and capital adequacy ratio (CAR). Macro-economic variables included inflation rate (INF), lending rate (LR), bank size (BS), broad money supply (M2) and gross domestic product (GDP).

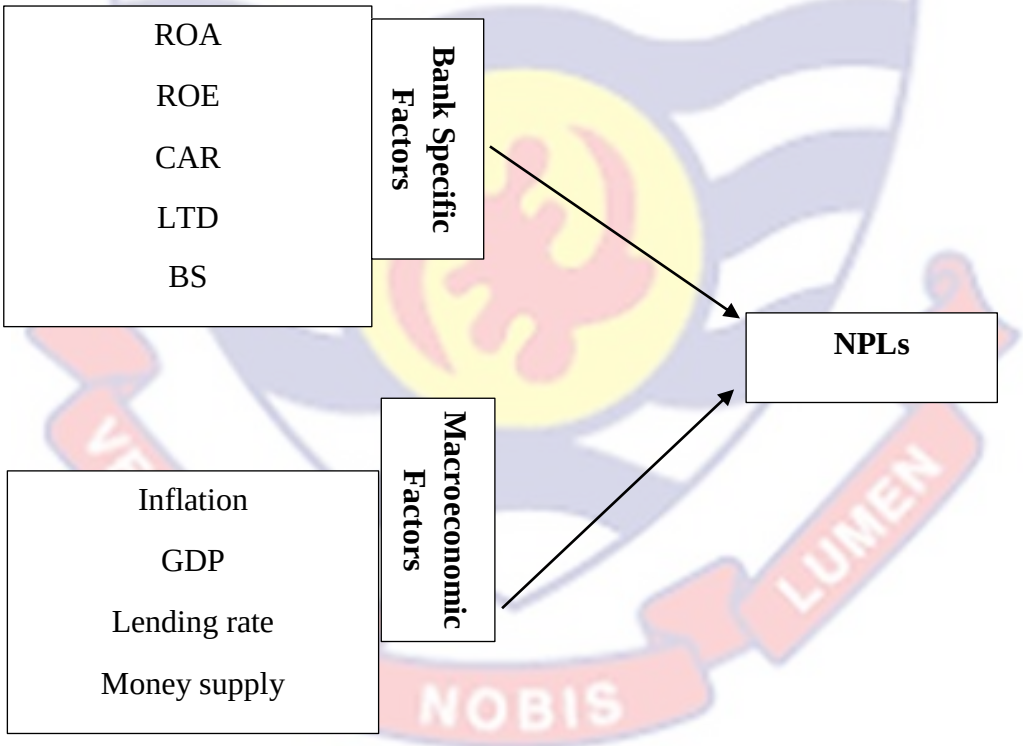

Figure 1: Conceptual framework
Source: Author's construct (2021)

Chapter Summary

This section of the research considered the theories related to the research, the review of previous studies, and the conceptual framework. The theoretical aspect described the theories that have bearing on the study. The information asymmetry theory and theory of loan pricing were noted to have bearing on the research. From literature, it was revealed that NPLs is influenced by both bank and macro specific factors. The review of previous research works analysed the findings from other research works which have relationship with this study. The conceptual framework presented the researchers' idea about how bank specific and macro specific factors affecting NPLs was explored.

CHAPTER THREE

RESEARCH METHODS

Introduction

The detailed description of the methodology adopted for the research during the course of this survey is provided in this section. The design of the research, data sources, data processing and analysis, model selection, and diagnostics tests are clearly described in this chapter. The ethical considerations made during the course of the study are also described in this chapter.

Research Design

A research design refers to a framework that is created or formulated by a researcher so as to assist the researcher during the course of a research (Marczyk, DeMatteo & Festinger, 2005). The selection of the wrong design of the research implies that the results of a study are likely to be invalid or unreliable or both (Majid, 2018). This makes the research design very important. For the purpose of this research, the explanatory research design is employed.

Explanatory research design assists to assess the impact of explanatory variables on a dependent variable. In other words, it helps to find out the cause and effect among variables and the association between such variables (Englander, 2016). Explanatory research design is observed to have bearing for analyzing the objectives of this research and this makes it suitable for this research.

Research Approach

Saunders, et al (2019) indicated that research approach consists of quantitative and qualitative. In qualitative research approach, data is gathered by spoken language or written procedure. In qualitative research numbers are not used to describe the data (Allen, 2015). Hence, such data can be gathered through observations, and interviews with participants. This makes it not appropriate for this study.

With respect to the quantitative research approach, hypothesis is tested by comparing the data collected with what is expected to occur theoretically. Quantitative research approach gives large exposure to series of events which allows the combination of statistics in a large sample (Trafimow, 2014). More so, quantitative approach enables the application of statistical methods, hence, it makes it easy for generalising the results from the research. This is because the results are usually based on quantitative measures instead of mere interpretation and hence enables future applications and comparisons with other studies.

Therefore, considering the nature and purpose of this research in which a lot of the analysis would be in the nature of quantitative, hence, quantitative research approach was applicable to this study.

Population

Population refers to a group of persons, firms or subjects from which a sample is drawn (Nsowah-Nuamah, 2005). The sample should be a representative of the population. Basing on that definition, the target population of the study were all the banks listed on the Ghana stock exchange. There were a total of about 23 listed banks on the Ghana stock exchange

(BoG, 2020) as at the time the research was conducted. This forms the population size for the study.

Sample size and Sampling Technique

A sample is a considerable number of respondents, observations or subjects that represent a target population (Rowley, 2012). A sample should be a representative of the population. For this study, the sample was selected based on the ability of the sample to provide all the required data about the variables of the study. From all the banks contacted only seven (7) of the banks were able to provide the needed and updated information needed for the study.

The sampling technique adopted for the study was purposive sampling technique. With this sampling technique only the banks that were able to provide all updated data for the study were selected.

Measurement of Variables

The measurement of the variables are presented in this section. It is organized into dependent variables and the explanatory variables.

Dependent variable

The dependent variable in this study was nonperforming loans (NPLs). NPLs can be considered as loans in which for a long time period usually 90 days or more, its interest and principal are outstanding and conflicts the conditions and terms of the loan requirements. Tseganesh (2012), opined that the asset quality of the banks are represented by how much of NPLs the banks are experiencing. NPLs is computed as follows;

$$\text{NPL ratio} = \frac{\text{NPLs}}{\text{Gross Loans}}$$

Independent Variables

Return on equity (ROE): This indicates that return rate of equity being invested in business. It measures the rate of net income expressed in a percentage of shareholders' equity. In simple terms, it indicates the amount of profit generated by the banks with investment from shareholders in the bank. Hence, ROE provides a value for the amount the bank is gaining from their investment in equity. ROE is computed as;

$$\text{ROE} = \frac{\text{Net Profit}}{\text{Total Equity}}$$

Capital adequacy ratio (CAR)

This provides a measure to the financial viability of the banks as it provides the capacity of the banks to tolerate or absorb losses which are abnormal. According to Habtamu (2012), CAR further shows the capability of the banks to undertake more businesses. CAR is computed as;

$$\text{CAR} = \frac{\text{Total Equity}}{\text{Total Asset}}$$

Loan to deposit (LTD) ratio

LTD determines the liquidity of the banks by assessing the amount of money from the collected deposits that has been used for granting loans by the bank. It indicates the association between deposits and loans. Makri et al. (2014), made it clear that, LTD determines the income sources and the bank's liquidity in terms of its asset which is related to loan. LTD is computed as;

$$\text{LTD} = \frac{\text{Total } \textit{Loans}}{\text{Total Deposit}}$$

Bank size

Relative market share of bank ***i*** at time ***t*** computed as: log (Total Asset). It is a measure of log of total assets where total assets are made up of noncurrent and current assets which is the sum of stockholders' equity and total liabilities.

Interest rate/lending rate

Lending rates serves as part of the macroeconomic indicators which determines NPLs. It is associated with the cost of funds borrowed. Interest rate measures the profit level between short-term borrowing cost and the income on lending in the long term. According to Joseph (2011), interest rate spread escalates the loan costs charged on the borrower, hence affecting performing of bank's assets.

Inflation rate

This is the rate of change in the prices of services and goods. It occurs when the prices of services and goods are rising. Based on a more similar opinion, inflation is about persistent rise of the price aggregate of services and goods leading to a decrease in the purchasing power of currency. An unexpected and high inflation rate can affect the economy and makes it difficult for peoples to raise money for investment. In similar vein, with the existence of inflation, resources are transferred from savers and lenders to borrowers, because loans can be repaid by borrowers with Ghana cedis which might be worthless. Inflation can be regarded as the change in percentage of the consumer index price. This suggest that, a rise in inflation results in the rise of borrowing cost and makes the repayment of loan difficult to the borrowers.

Gross domestics product (GDP)

When there is growth in the economy, economic activities and living standards becomes better hence borrowers have the ability to settle loans when due and this will cause the rate of default to reduce and as a result decrease NPLs.

Broad money supply (M2)

Money supply refers to the amount or stock of money available in the economy. It is dependent on the monetary policy pursued by the Central Bank. It is assumed that when money supply increases in an economy, banks portfolio will deteriorate and hence will adversely impact on NPLs.

Data Source

The research considered different banks and for that matter secondary data in the form of panel are sourced for the research. The secondary data on the macroeconomic factors were sourced from the BoG website, and the bank specific factors were gathered from the financial statements which are well audited from the financial institutions. The data collected consisted of both bank and macroeconomic indicators. Data were sourced during the year span of 2010 to 2020 which makes an interval of 10 years. This was to provide current data interval from the banks' financial statement for data analysis.

Data Processing and Analysis

The data gathered from the banks selected for the research were prepared and carefully entered into Microsoft Excel. This helped in the preparation of the data before the main analysis. The data after its preparation in Microsoft Excel are imported to STATA version 15 software for analysing

the data. Statistical Package for Social Science (SPSS) was also engaged as a helping tool for analysis.

Model Specification

This study seeks to assess the determinants of NPLs of listed banks in Ghana. In reference to this, the dependent variable for the research was NPLs. Return on asset (ROA), loan to deposit ratio (LDR), return on equity (ROE), Capital adequacy ratio (CAR), inflation rate (INF), lending rate (LR), bank size (BS), broad money supply (M2) and gross domestic product (GDP) were the explanatory variables. These variables were chosen due to the fact that, they were the variables that the banks have full and current data available on. The general regression model which forms part of the research is presented below.

$Y_{it} = \beta o + \beta X_{it} + \varepsilon_{it}$

Where: - Y_{it} represented the variable which is dependent in relation to a specific bank 'i' and at time 't' specific.

The constant term is represented with β0.

The coefficients of the independent variables are represented with β, and X represented the independent variables for a particular bank 'i' at time 't'. The error term is represented with εit.

Based on the variables of the study and substituting them into the general equation, the estimated model below is developed.

$$NPL_{it} = \beta_0 + \beta_1(LTD)_{it} + \beta_2(CAR)_{it} + \beta_3(ROE)_{it} + \beta_4(LR)_{it} + \beta_5(BS)_{it} + \beta_6(GDP)_{it} + \beta_7(M2)_{it} + \beta_8(INF)_{it} + \varepsilon_{it}$$

Where;

β0 is an intercept

β1 to β8 represented the coefficients for the respective independent variables. NPLs, CAR, ROE, LTD, and INF represented Nonperforming Loans, Capital Adequacy Ratio, Return on Equity, Loan to Deposit Ratio and inflation respectively

LR, BS, GDP, and M2 represented lending rate, Bank Size, gross domestic product, and broad money supply respectively.

The error term is represented with it which serves as a check for variables that were omitted from the model.

The coefficient of the explanatory variables were assessed with the employment of ordinary least square (OLS) technique. The justification for the use of the OLS is from the recommendations from Petra (2007), who espoused that OLS is a good performer of regression analysis as compared to other estimators. According to Onyango and Olando (2020), this can only be ascertained when there is minimal cross section for the data. Therefore, the OLS remains applicable to the analysis of this research since the above indicators hold.

Different statistical tests in the form of random effect models and fixed effect model were applied to the data. In determining as to whether the adoption of fixed effect models or the random effects models, the Hausman-Test will be employed. Brooks (2014), indicated that the Hausman- Test, can be used to assess how effective the random effect model is, therefore giving a clue as to whether the employment of fixed effect models or random effect models. The selection of either models is based on the p-value of the Hausman- Test. A significant p-value computed against the Hausman- Test

gives evidence for the selection of fixed effect model and if not significant then the random- effects model is justified for its selection.

Diagnostic Tests

Heteroscedasticity and multicollinearity were used as a diagnostic tools for determining the robustness of the data. Multicollinearity which has the power in determining the correlation and strength of the association between the variables were used. Under the multicollinearity analysis, the correlation and variance inflation factor (VIF) were used. A correlation coefficient of 0.8 that may exist between the variables gives a signal of the existence of collinearity between such variables. If a situation like that occurs, the variable that show such a high collinearity is dropped. To confirm the existence of collinearity, the VIF was applied as a further test. As a rule of thumb, variables that have high VIF value of 10 or above are eliminated for further analysis.

To test for the existence of equal variance that might appear on the disturbance term, the heteroscedasticity test was applied. To test for this, the Breusch-Pagan test was applied. For the Breusch-Pagan test, at the 95% confidence level, when the p-value is found to be below 0.05 give evidence of the existence of heteroscedasticity in the set of data. On the other hand, if the p-value is above 0.05, then there is absence of heteroscedasticity in the set of data.

Ethical Consideration

As part of the ethical considerations regarding every research work, the managers who represent the sampled banks were issued with letters for the acquisition of their financial reports which were audited. To give the banks

enough time to organize the data, they were given the letters in two weeks time for data collection. A clause was stated in the letter that, the data to be taken was to be used for only academic purpose.

Chapter Summary

The section describes the methodology adopted during this research. It entails the design of the research and justified why it is adopted. It also describes the research data sources, data processing and analysis for this study. It then describes the model selection and diagnostic tests. In reference to the objectives, the study found it essential to employ exploratory research design. The research used OLS estimation and diagnostic tests such as VIF and heteroscedasticity. The study was limited to 7 banks. Moreover, the research design adopted for the study lacks the power to cater for the accuracy of the data organized from the banks and may lead to biasness in the results of the study.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

The main aim of this research is to assess the determinants of NPLs of listed banks in Ghana. The analysis of the data is presented in this chapter of which the discussion of the findings followed suit. Panel data from 2010 – 2020 from the 7 banks was collected for the research. The chapter is systematically grouped under descriptive statistics, trend analysis, robustness test, model selection and regression analysis.

Descriptive Statistics

This section provides the descriptive analysis of the variables contained in this study and is presented in Table 1. Test statistics such as maximum score, minimum score, mean and standard deviation values were employed for the interpretations of the results.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
NPLs	77	12.95	11.484	2.51	62.22
LTD	77	69.364	19.689	23.41	123.35
CAR	77	12.73	3.328	6.18	21.58
ROE	77	27.606	11.766	4.65	72.18
LR	77	13.356	1.408	9.18	14.48
BS	77	21.693	1.396	18.778	25.03
GDP	77	53.945	12.345	32.214	72.465
M2	77	27.275	2.527	21.953	30.549
INF	77	10.687	4.776	.407	17.455

NPLs-Non-Performing Loan; LTD-Loan to Deposit Ratio; CAR-Capital Adequacy Ratio; ROE-Return on Equity; LR-Lending Rate; BS- Bank Size; GDP-Gross Domestic Product; M2- Money supply; INF-Inflation.
Source: Field data (2021)

The maximum and minimum nonperforming (NPLs) recorded by the banks were respectively 62.22% and 2.51%. The average NPLs was noted to be 12.95%. The NPLs showed a standard deviation figure of 11.48 and this value is near the mean value. This provides the evidence of maximum differences relating to the NPLs of the banks. The implication for this is that the banks were able to incur 12.95% of NPLs on the average from the total amount of loans issued by the banking firms. Per the BoG (2008) requirements, banking firms which operates in Ghana are mandated to maintain and possess NPLs of below 5%. As presented in Table 1, the banks' NPLs have exceeded that recommended threshold. This shows that the banks' NPLs has been a constant challenge for Ghanaian banks.

Concerning Loan to Deposit (LTD) ratio, the mean value is shown to be 69.36%, and with 23.41% and 123.35% representing the minimum and the maximum values respectively. Its standard deviation value is small with 19.69%. Because the average LTD (69.36%) is high, it shows that the banks may be lacking the needed deposit credit demands which may not be expected. This further shows that the banks would have the challenge of not making enough profit as they may be predicted. Return on Equity (ROE) used as a profitability substitute revealed mean value of 27.61%. The maximum and the minimum values were observed to be respectively 72.18% and 4.65%. An indication like this is an indication that the banks might be in a position of sound financial condition.

The average value for Capital adequacy ratio (CAR) was noted to be 12.73%, It's maximum and minimum values reported respective values of 21.58% and 6.18%. The disparities in the values was shown to be 3.33%.

Because the banks minimal CAR value of 12.73%, there might be high possibility that the banks may not meet the capital requirements and be able to cater for losses. Hence, the banks that have minimum CAR are in the position of being insolvent and might find it difficult to settle their debts due to the unexpected losses.

Lending rate (LR) revealed an average score of 13.36% and with respective values of 14.48% and 9.18% being the maximum and minimum values. The standard deviation value presented a value of 1.41%. The respective maximum and the minimum bank size are 25.03% and 18.78%. this showed a standard deviation score of 1.40 suggesting that it is the least deviated variable in the study. The average bank size is 21.69%. In terms of GDP, its mean value was $53.9 billion which showed a standard deviation score of $12.3 billion. $32.2 billion and $72 were the respective maximum and minimum values. When a country's GDP is good, it shows minimal level of the banks experiencing high NPLs. The minimum and maximum broad money supply (M2) recorded values of 21.95 and 30.55 respectively with an average value of 27.28.

More so, the highest and the lowest inflation rate were respectively 17.45% and 0.41%. When inflation is high borrowers might not be able to accumulate the enough money to pay off their creditors.

Trend of Profitability and nonperforming loans

The trend of nonperforming loans and profitability is displayed in Figure 2 below.

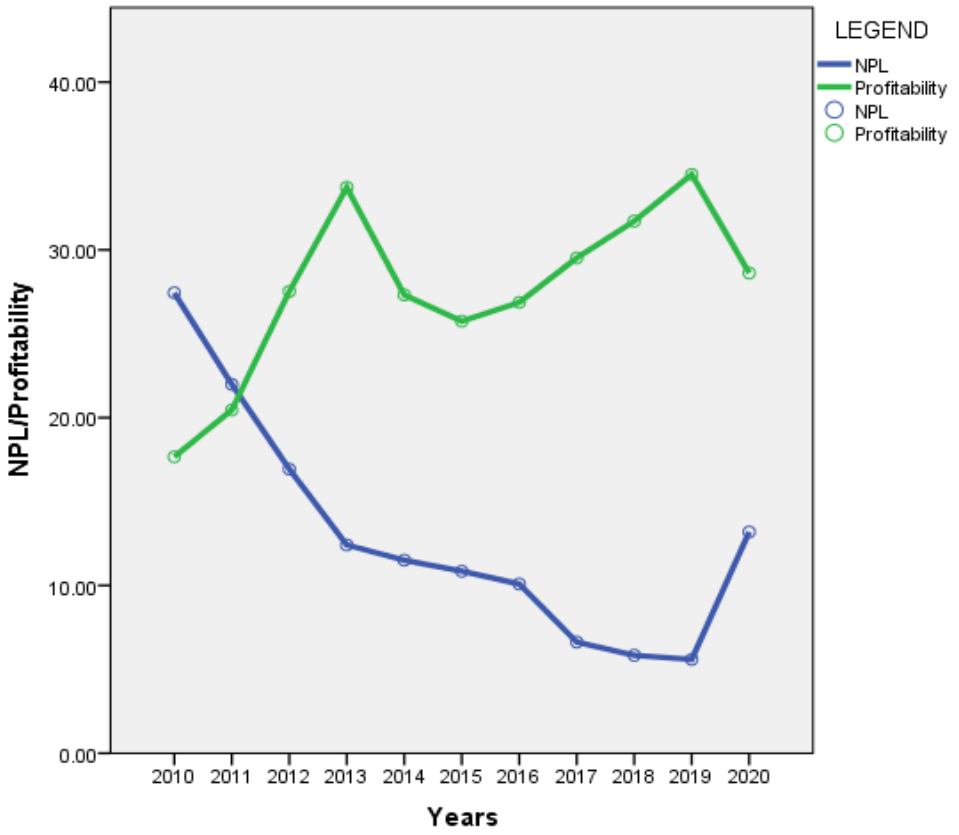

Figure 2: Trend of NPLs and profitability
Source: Field data (2021)

According to Figure 2, there is gradual downward trend observed in the NPLs of the banks in the years of 2010 to 2019. From there it raised again which is noted in 2020. This decrease in the trend of the NPLs might be from the consequence of the intensifying of the supervision by the BoG and the documents required before loans are issued. This helped to improve loan quality and the banks reducing the rate at which they give bad loans in high quantity to clients. Irrespective of the banks financial statements showing downward trend of NPLs in the years 2010-2019, the average NPLs of the banks was still above the threshold value as earlier shown at the descriptive analysis section. Hence, downward pattern of NPLs is observed by this research.

The years 2010 to 2013 recorded an increasing pattern in the profitability among the banking firms. Nevertheless, a downward trend in the profitability was recorded from the periods 2013 till 2015, when it raised again in the year 2019.

A decrease of the profitability was again observed during the period of 2020. Hence, it can be seen that as the NPLs increased in 2020, the profitability of the bank decreased in that same year.

Validity and robustness of the data

In ascertaining the robustness and validity of the regression model, the assumptions of the Classical Linear Regression Model (CLRM) need to be achieved. According to Brooks (2008), the variables would be employed for the regression analysis provided that the CLRM assumptions are satisfied. A variable that does not satisfy the CLRM assumptions are omitted during the regression analysis. In maintaining the quality of research, the data is assessed for its robustness. Tools for assessing data robustness included multicollinearity and heteroscedasticity test. This robustness test prepared the way for the regression analysis. This contributes to mitigate or eliminate any data misspecification so as prevent spurious regression results.

Multicollinearity

To test for the possibility of any exact or high correlation among the independent variables, the Pearson correlation test was used. A high or strong association among two variables is an indication that such variables might be revealing similar characteristics or measuring the same item. To correct the occurrence of such situation, one of the variables have to be dropped from

being included in the analysis. Variance inflation factor (VIF) and multicollinearity were employed to test for multicollinearity.

Kamil, Mosenthal, Pearson and Barr (2014) recommended that when the coefficient of the correlation is below 0.5 it shows the existence of weak relationship among the variables, and when the coefficient exceeds the value of 0.5, but less than 0.8, it shows that the relationship is moderate. Coefficients more than 0.8 is a sign of the existence of high collinearity among the variables have such coefficients. Table 2 shows the correlation among the variables.

Table 2: Correlation among Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) LnLTD	1.000							
(2) LnCAR	0.331	1.000						
(3) LnROE	-0.181	-0.380	1.000					
(4) LnLR	-0.348	0.097	0.413	1.000				
(5) LnBS	-0.218	0.263	0.127	0.433	1.000			
(6) LnGDP	-0.354	0.132	0.380	0.715	0.514	1.000		
(7) LnM2	-0.101	-0.113	-0.324	-0.281	-0.101	-0.499	1.000	
(8) LnINF	0.225	0.041	-0.134	-0.135	-0.163	-0.260	0.023	1.00

Source: Field data (2021)

As presented in Table 2, the correlation among the variables are all moderate and weak. However, the correlation between GDP and lending rate hade a high coefficient of 0.715. This gives a clue of the likelihood of multicollinearity among these two variables. As further confirmatory analysis the VIF was applied. When a particular variable has a VIF of above 10, then

such variable has to be omitted as it might be showing multicollinearity with other indicators and if maintained might affect the regression analysis.

Table 3: Variance Inflation Factor of the Explanatory Variables

	VIF	1/VIF
LnGDP	3.421	.292
LnLR	2.367	.423
LnCAR	1.793	.558
LnROE	1.769	.565
LnM2	1.675	.597
LnLTD	1.654	.605
LnBS	1.54	.649
LnINF	1.124	.89
Mean VIF	**1.918**	.

Source: Field data (2021)

From Table 3, all the variables have VIF of less than 10. The mean VIF is noted to be 1.918 and this is highly less than the threshold value of 10. This means that all the variables are not affected with multicollinearity. Hence, the explanatory variables do not have high association with each other.

Heteroscedasticity Test

The assumption of the Homoskedasticity test is that, the observations or the variables should have the same probability distribution and disturbance term. In other words, the explanatory variables need to show the same variance for their disturbance terms. The Breusch-Pagan test is employed in order to assess the existence of heteroscedasticity. In Breusch-Pagan test, at the 95% confidence level, when the p-value is less than 0.05, it gives evidence of the existence of the problem of heteroscedasticity, if not then there is no problem of heteroscedasticity. Table 4 presents the Homoskedasticity test of the variables.

Table 4: Heteroskedasticity Test

Chi-Square	3.14
P-value.	**0.078**

Source: Field data (2021)

As presented in Table 4, there is a p-value of 0.078 (7.8%). This p-value is above 0.05 (5%), confirming the lack of the problem of heteroscedasticity among the data.

Determinants of nonperforming loans

This is the main aspect of the research. This section presents the analysis of the determinants of NPLs. It also considers the factors that are significant determinants. To perform the analysis the Hausmann test is applied to determine whether fixed effect or random effect regression analysis was employed. The independent or explanatory factors in this analysis were; NPLs, CAR, ROE, LTD, INF, LR, BS, GDP, and M2, whereas the dependent variable is NPLs.

Selection of Model

Models such as either random effects or fixed effects model must be selected for the regression analysis. The Hausman test was employed to assist in the selection of the model. According to the Hausman Specification test, when the p-value is more than 0.05, then the random effect model is selected, conversely, when the p-value is less than 0.05, then it opens the door for the use of fixed effect model. As shown at the Appendix, the Hausman Specification test revealed p-value of 0.729 being above 0.05. This means that the p-value is not significant confirming the choice of random effect model for assessing the NPLs determinants. Table 5 displays the analysis of the determinants using the fixed effect model.

Table 5: Random Effect Regression Model

LnNPLs	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
LnLTD	-1.075	0.235	-4.57	0.000	-1.536	-0.614
LnCAR	-0.728	0.261	-2.79	0.005	-1.238	-0.217
LnROE	-0.436	0.118	-3.68	0.000	-0.668	-0.204
LnLR	0.529	0.502	1.05	0.292	-0.455	1.513
LnBS	-3.935	1.692	-2.33	0.020	-7.250	-0.619
LnGDP	-1.773	0.367	-4.83	0.000	-2.493	-1.053
LnM2	-1.821	0.560	-3.25	0.001	-2.917	-0.724
LnINF	0.077	0.040	1.92	0.055	-0.002	0.157
Constant	70.361	8.281	8.50	0.000	54.130	86.592
Mean dependent var			2.290	SD dependent var		0.705
Overall r-squared			0.606	Number of obs		77.000
Chi-square			213.699	**Prob > chi2**		**0.000**
R-squared within			0.775	R-squared between		0.246

**** p<0.01, ** p<0.05, * p<0.1*

Source: Field data (2021)

As indicated in Table 5, there is an R-Squared value of 0.606. This indicate that there is 60.6% of the variations in NPLs were jointly explained by the independent variables. Since, the independent variables have the strength in explaining more than half (60.6%) in terms of the variation observed in the dependent variable, thus this provides the justification of the model having enough power to predict the NPLs of the banks. The model revealed p-value of 0.00, implying that random effect regression model is significant.

Concerning NPLs determinants, the results from Table 5 indicated that, CAR, LTD, ROE, BS, GDP and M2 have significant values of 0.005, 0.000, 0.000, 0.020, 0.000, and 0.001 respectively to be less than 0.05, thus indicating that they significantly determine NPLs of the banks. On the other

hand, LR and INF showed significant values which are above 0.05 and for that matter do not significantly determines the NPLs of the banks. The regression model is then developed from the coefficients shown in Table 5.

$$LnNPLs = 70.36 - 1.08(LnLTD) - 0.73(LnCAR) - 0.44(LnROE) + 0.53(LnLR) - 3.94\ (LnBS) - 1.77\ (LnGDP) - 1.82(LnM2) + 0.08(LnINF) + \varepsilon$$

According to the equation above, CAR, LTD, ROE and BS have coefficient of -1.08, -0.73, -0.44 and -3.94 respectively. The coefficients for these variables is an indication that CAR, LTD, ROE and BS are negative and significant factors that determines the NPLs of the banks. More so, 1% rise in CAR, LTD, ROE and BS results in a significant reduction in NPLs by respective 1.08%, 0.73%, 0.44% and 3.94% keeping the other variables constant.

The macroeconomic determinants; GDP, and M2 showed respective coefficient values of -1.77, and -1.82 with their significant values being less than 0.05. This means that both GDP and M2 determines NPLs of the banks negatively and this is statistically significant. A 1% rise in GDP and M2 results in significant and respective decline in NPLs by 1.77% and 1.82%, keeping the constant the other variables.

INF is a positive determinant of NPLs by revealing value of 0.08 for the coefficient and its p-value is more than 0.05. Thus, 1% appreciation in INF would result in 0.08% appreciation in NPLs holding the other variables constant.

From Table 5, LTD, CAR, ROE, BS, GDP, and M2 all have p-values less than 0.05. This means that LTD, CAR, ROE, BS, GDP, and M2 have

significant effect on NPLs of the banks. This means that the study failed to reject H1, H2, H3, H5, H6, and H7 and concluded the following;

LTD has significant effect on NPLs of the banks, CAR has significant effect on NPLs of the banks, ROE has significant effect on NPLs of the banks, BS has significant effect on NPLs of the banks, GDP has significant effect on NPLs of the banks and M2 has significant effect on NPLs of the banks.

However, LR and INF has p-values more than 0.05. This implies that LR and INF have insignificant effect on NPLs of the banks. The study therefore rejected H4 and H8 and concluded that LR has no significant effect on NPLs of the banks, and INF has no significant effect on NPLs of the banks.

Discussion of Findings

The study assessed the Determinants of Non-Performing Loans in Ghana - A Case of Some Banks found on the Stock Exchange of Ghana. The conceptual framework model developed in reference to the literature review was validated empirically. The factors that determine NPLs was tested and confirmed using random effect regression model. The discussions of the findings are done in accordance with the empirical and theoretical evidence.

Loan to deposit ratio (LDT) showed a significant and negative impact with NPLs. When a bank receives less deposits and issues more loans, such banks are exposed to high level of NPLs. This is in accordance with the findings from Kristianti and Yovin (2016); This disagrees with the findings from Swamy (2012); Louzis et al. (2010); Misra and Dhal (2010).

The findings on CAR indicated that it is a significant and negative determinant of NPLs. The negative value of the coefficient from the regression results provides the evidence that there existed an inverse association between

NPLs and CAR. This is in conformity with the assertion that the banking firms that are robust in capital have the capacity to prevent high level of risk as they are viable financially. This further shows that the selected banks have minimal capacity in embarking on less risky loans. This might result from better regulations for the banking firms. Therefore, due to these effective controlling measures put in place by the bank of Ghana led to CAR impacting negatively on the NPLs. This provides the evidence that the sampled banks have the strength to meet the central banks requirements for CAR. In addition, the management of the banking firms have the merit of absorbing NPLs from their capital. This observation is in tandem with the study performed by Makri et al. (2014); Shingjerji (2013); Djiogap and Ngomsi (2012); Hyun and Zhang (2012). However, it disagrees with the findings from Sheefeni (2015).

It was also evident that ROE has significant and negative effect on NPLs. With coefficients value of -0.44, the results suggest moderate impact of ROE being a proxy for profitability on NPLs. Nevertheless, a decrease in ROE leads to increased NPLs level. The significant and negative association between NPLs and ROE confirms the availability of better management of shareholders' invested funds. This helped the banks to gain high level of profit. This observation is in agreement with research findings from Makri et al. (2014); Klein (2013); Hyun and Zhang (2012); Dimitrios et al. (2016); Chege and Bichanga (2017); and Boakye-Adjei and Amuakwa-Mensah (2015), but disagrees with Louzis et al. (2012).

Lending rate (LR) was observed to show positive and insignificant association with NPLs. When the lending rate it reduces the number of peoples would have the chance to borrow from the bank. Situation like this

reduces the total amount of loan to be issued which reduces the banks' NPLs risk exposure. However, the observation here is different. This is in accordance with the study performed by Konfi (2012); Farhan, Sattar, Chaudhry, and Khalil (2012); Louzis et al. (2010); Ranjan and Chandra (2003); Tomak (2013); Atem (2017); Daniel and Wandera (2013). These scholars identified positive and significant association between AvLR and NPLs. Nonetheless, it is in refutation with the results from the research by Ali and Eva (2013); Ahmad and Bashir (2013); Sheefeni (2016); (Mondal, 2016); Chege (2014); Hyun and Zhang (2012); Saba et al. (2012).

Bank size was noted to have negative and significant impact on NPLs. The negative impact suggest that larger banks have good technologies and strategies for managing risk. This helps them for gathering enough information, analysing and processing which leads to minimal NPLs level in comparison with smaller banks. This is in agreement with the findings from Swamy (2012); Saurina and Salas (2002), but disagrees with Tomak (2013); and Boakye-Adjei and Amuakwa-Mensah (2015).

For macroeconomic indicators, negative and significant association between GDP and NPLs was identified. This provides the evidence that NPLs has inverse relationship with GDP and that as there is decrease in GDP, there is increase in NPLs. According to Kumarasinghe (2017), who indicated that as there is an improvement in the growth of the economy, the rate of loan default is minimized. Thus, for NPLs to reduce, there is the need for improving the economic situation of the country. This is in accordance with Farhan et al (2012); Castro (2013); However, it disagrees with the findings from

Kumarasinghe (2017), who identified significant and negative impact of GDP on NPLs.

INF is identified to exhibit an insignificant and positive relationship with NPLs. This indicates that as NPLs increases so does INF. When inflation is high, there is higher individuals' volatility in the banks' profitability which causes loan default. This is in tandem with the findings from Klein (2013); Louzis et al. (2010); and Saba et al. (2012).

Money supply showed significant and negative impact on NPLs. As aggregate money holdings expand in an economy, banks' portfolios will diminish, resulting in more NPLs. This is in line with the findings from Badar and Yasmin (2013); Rifat, (2016); Glen and Mondragón-Vélez (2011). Nonetheless, it disagrees with the findings from Espinoza and Prasad (2010).

Chapter Summary

This chapter considered the results and discussions of the study. It presented the descriptive statistics of the individual variables, the trend of profitability and NPLs, validity and robustness of the data. It also looked at the bank specific and macroeconomic factors that affected NPLs. This chapter was written in accordance with the objectives of the study. Therefore, it followed the order of bank specific factors that affected NPLs, macroeconomic factors that affected NPLs and the combined effect of bank and macroeconomic factors that affected NPLs. In addition, the discussion of the findings with reference from previous studies were undertaken.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The main aim of the research is to assess the determinants of NPLs of banks. The chapter entails the research summary of the findings and provides the conclusion and recommendations based on the results from the research. The research used panel data ranging from 2010 to 2020. The research data is composed of bank and macroeconomic indicators of NPLs.

Summary of the Study

Banks do grant loans and advances to individuals, business organizations as well as government in order to enable them operates on investment and development activities as a mean of contributing toward the economic development of a country in general and aiding their growth in particular. Many of the loans granted by the banks to individuals and business organizations remain unpaid which results in NPLs. These NPLs are determined by factors which are caused by the banks (bank specific factors) and macroeconomic indicators. The bank specific factors included loan to deposit (LTD) ratio, capital adequacy ratio (CAR), return on equity (ROE), lending rate (LR), and bank size (BS). The macroeconomic factors included gross domestic product (GDP), money supply (M2) and inflation rate (INF). These factors are noted by some researchers to be instrumental in determining the capacity of NPLs.

Summary of Key Findings

The summary of the research findings identified in the previous chapter is entailed in this sub section. The research covered panel data on NPLs, LTD,

Return on Equity (ROE), Capital Adequacy Ratio (CAR), Lending Rate (LR), Bank Size (BS), Gross Domestic Product (GDP), Money Supply (M2), and Inflation (INF), from the years of 2010 to 2020. Statistical analysis tools such as robustness test, descriptive statistics, and Hausman Test were conducted to choose random effect model for the variables of the research.

From the findings of the research, the maximum and minimum NPLs by the banking institutions are respectively 62.22% and 2.51%, and 12.95% being the mean value. The mean value for Loan to Deposit (LTD) ratio, was 69.36%, with the respective minimum and maximum values represented as 23.41% and 123.35%. Capital adequacy ratio (CAR) showed mean value to be 12.73% and this made the banks not meeting the capital requirements and less possibility of absorbing losses Profitability (ROE) revealed respective maximum and minimum values of 72.18% and 4.65% providing mean value of 27.606%. The mean value for Lending Rate (LR) was 13.36%, its respective maximum and minimum values were identified to be 14.48% and 9.18%. Bank size recorded the least disparity of 1.40, which was the least deviated variable in the study.

The country's mean GDP was $53.9 billion and the respective maximum and minimum figures being $72.4 billion and $32.2 billion. The average money supply (M2) recorded value of 27.28. In addition, the respective maximum and the minimum rate of inflation as at the time of this research were 17.45% and 0.41%.

The trend analysis showed downward slope for NPLs from 2010 to 2019 and began to rise from 2019 to 2020. Whilst NPLs was declining, the

profitability of the banks increased from the years of 2010 to 2013 before it dropped till the year 2015. It then raised again 2019 and declined in 2020.

When robustness tests were performed, there was absence of heteroscedasticity and multicollinearity.

After random effect regression model was applied for determining the NPLs' determinants, it was identified that ROE, CAR, LTD and BS were negative and significant bank specific NPLs' determinants. On the macroeconomic indicators, GDP, and M2 were negative and significant determinants of NPLs, with INF having positive but insignificant determinant of NPLs.

Conclusion

- The first objective considered the effect of bank specific variables on NPLs of the banks. It was concluded that LTD, CAR, ROE and BS all have negative effect on NPLs. Which means an increase in LTD, CAR, ROE and BS results in high NPLs. However, increasing LR led to increase in NPLs.
- The other aspect of the study focused on the effect of macroeconomic variables alone on the NPLs of the banks. This conclusion under this is that decreasing GDP and M2 resulted in increasing the NPLs of the banks. Nevertheless, an increase in inflation resulted in increase in NPLs of the banks.

The study therefore recommended that banks should reduce the required money for issuing loans from the banks' deposit and the central bank should effectively control money supply and inflation.

Recommendations

To address some of the issues identified in the study, the recommendations below are developed.

The results from the study revealed that when CAR increases, NPLs reduces Therefore, it is recommended that the banking firms should adopt essential strategies for more deposit mobilization. By doing this, their CAR would be improved, hence strengthening their financial status. This therefore may resource the banks in tolerating or withstanding operational or abnormal losses as a consequence from NPLs.

It was also noted that NPLs are impacted negatively by LTD. Based on this, it is recommended to the banks to minimize the total money issued as loans from the acquired deposits. Thus, the banking firms are not to grant a lot of loans when their total deposit is less.

The central bank and the Government have to develop strategies in controlling the macroeconomic indicators such us money supply and inflation, due to the fact that they impacted the NPLs of the banks.

Suggestions for Further Studies

Since, this research employed secondary data for assessing the determinants of NPLs, future study could focus on primary data from the employees' perspective on the determinants of NPLs.

More so, future research could focus on how the determinants of NPLs impacts on the profitability of the banking firms.

Finally, research work that focused on the role of bank managers in mitigating NPLs of the bank is highly suggested.

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APPENDIX

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

Test: Ho: difference in coefficients not systematic

chi2(8) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 5.26
Prob>chi2 = 0.7294
(V_b-V_B is not positive definite)