

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF BUSINESS**

**COLLEGE OF HUMANITIES AND SOCIAL SCIENCES**

**DEPARTMENT OF ACCOUNTING AND FINANCE**

**KNUST**

**MACROECONOMIC AND BANK LEVEL DETERMINANTS OF NON-  
PERFORMING LOANS IN GHANA**

**BY**

**MICHAEL MENSAH ADDAI**

**(PG8952219)**

**A THESIS SUMMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT  
FOR THE AWARD OF A MASTER OF SCIENCE DEGREE  
(FINANCE)**

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## DECLARATION

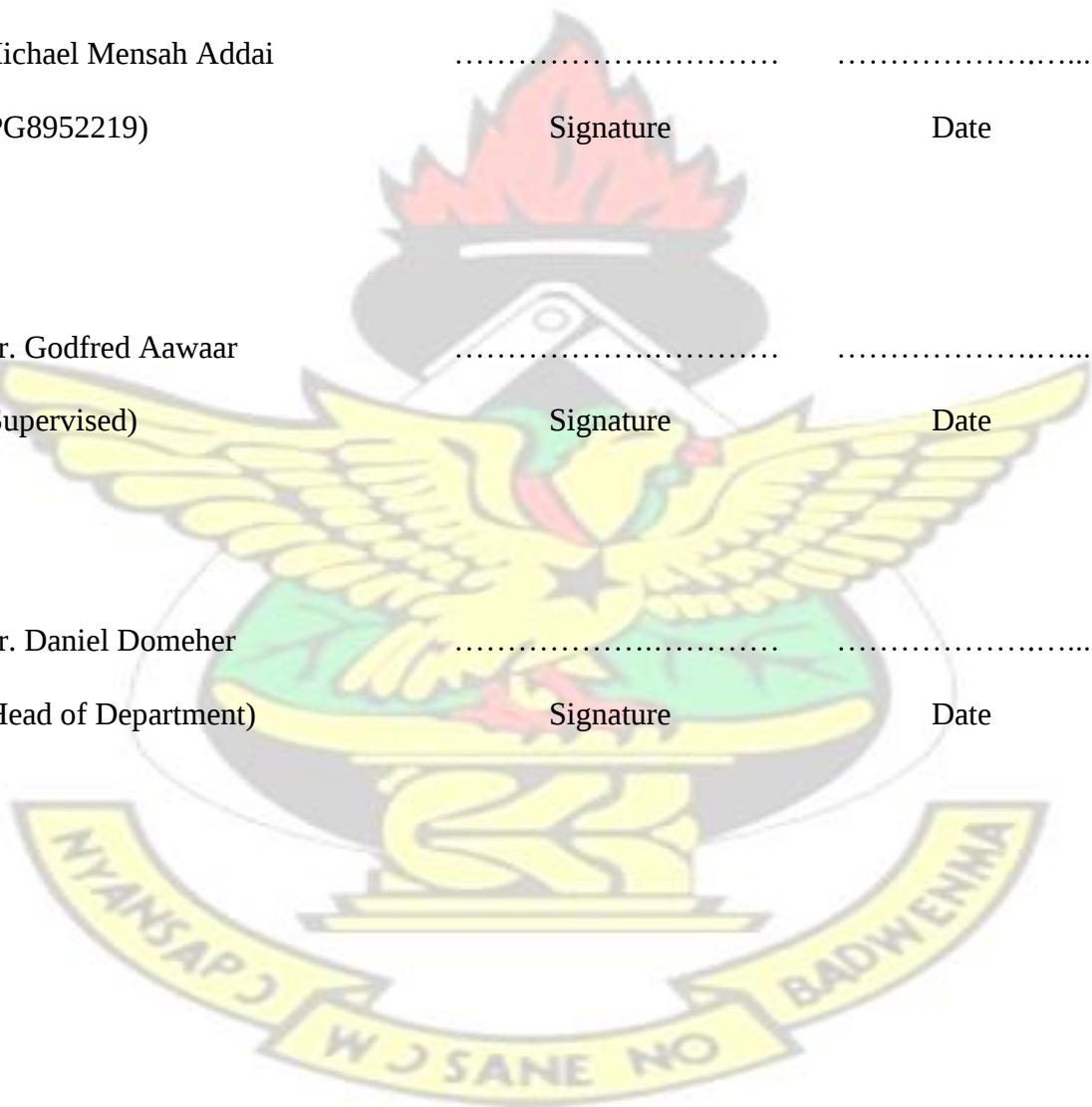
I, Michael Mensah Addai declare that this thesis is my own effort and that; it contains no material which has been previously presented by anyone for academic award at any university, except where specified. All references utilised in the study have been acknowledged from source.

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Michael Mensah Addai .....  
(PG8952219) Signature Date

Dr. Godfred Aawaar .....  
(Supervised) Signature Date

Dr. Daniel Domeher .....  
(Head of Department) Signature Date



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Had it not been God where would I “be”? I want to thank the almighty God for his continuous protection and blessings that I am here today. Without him, nothing would have been possible.

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## DEDICATION

To my lovely father, Francis Mensah; to my kind hearted mother, Felicia Nsiah who have supported me in both spiritual and physical needs; and to Mr. James Osei Yeboah (deceased- may his soul rest in peace) who took me from nowhere and gave me the life I'm living today. And finally, to my siblings, it's your encouragement and your prayers which have supported me to achieve this milestone.



## ABSTRACT

Non-performing loans in many developing and emerging economies have recently become a subject of concern especially in Ghana. Non-performing loans are loans that have past due for a period of 90 days without the borrower making any effort for repayment. NPLs began at the early stage of financial liberalization. NPLs which were a canker in the financial intermediation process could not be curtailed through privatization and liberalisation during 1980s and 1990s. However, there are a number of factors responsible for NPLs in Ghanaian banking sector. These factors can be classified as macroeconomic factors such as inflation, GDP per capital, lending rate, public debt, unemployment, etc. and bank level factors like liquidity, net interest margin, return on asset, bank size, and management efficiency etc. Unfortunately, unlike the banking sector of the developed and emerging economies, Ghana banking sector has experienced an increase in non-performing loans which has therefore, contributes to the collapse of many banks and have consequently received little attention by researchers. This study therefore seeks to examine the macroeconomic and bank level determinants of NPLs in Ghana. The study employed panel regression method to accomplish its objectives where the random effect estimation was appropriate after the Hausman test. Using macroeconomic and bank level data obtained from WDI and annual financial statements of various commercial banks from a period 2008-2018, it was found that both macroeconomic variables (i.e. public debt, inflation, real interest rate, and GDP per capital) and bank level variables (i.e. net interest margin, bank size, liquidity, management efficiency, and return on asset). However, unemployment, net interest margin, and ROA are not important in explaining non-performing loans. Finally, the sub-sample results conclude that macroeconomic and bank level determinants significantly affects non-performing loans of local banks more than foreign banks.

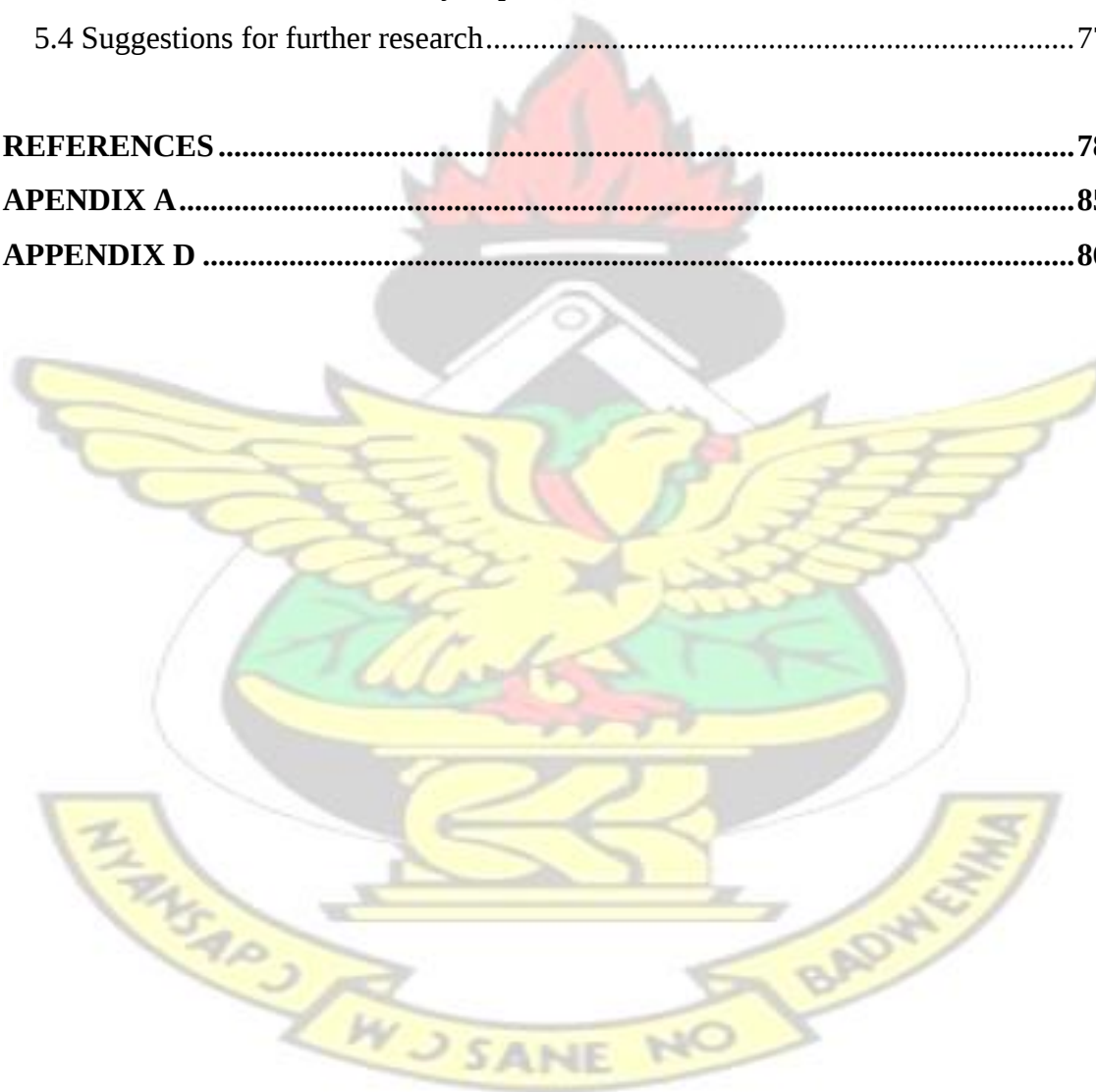
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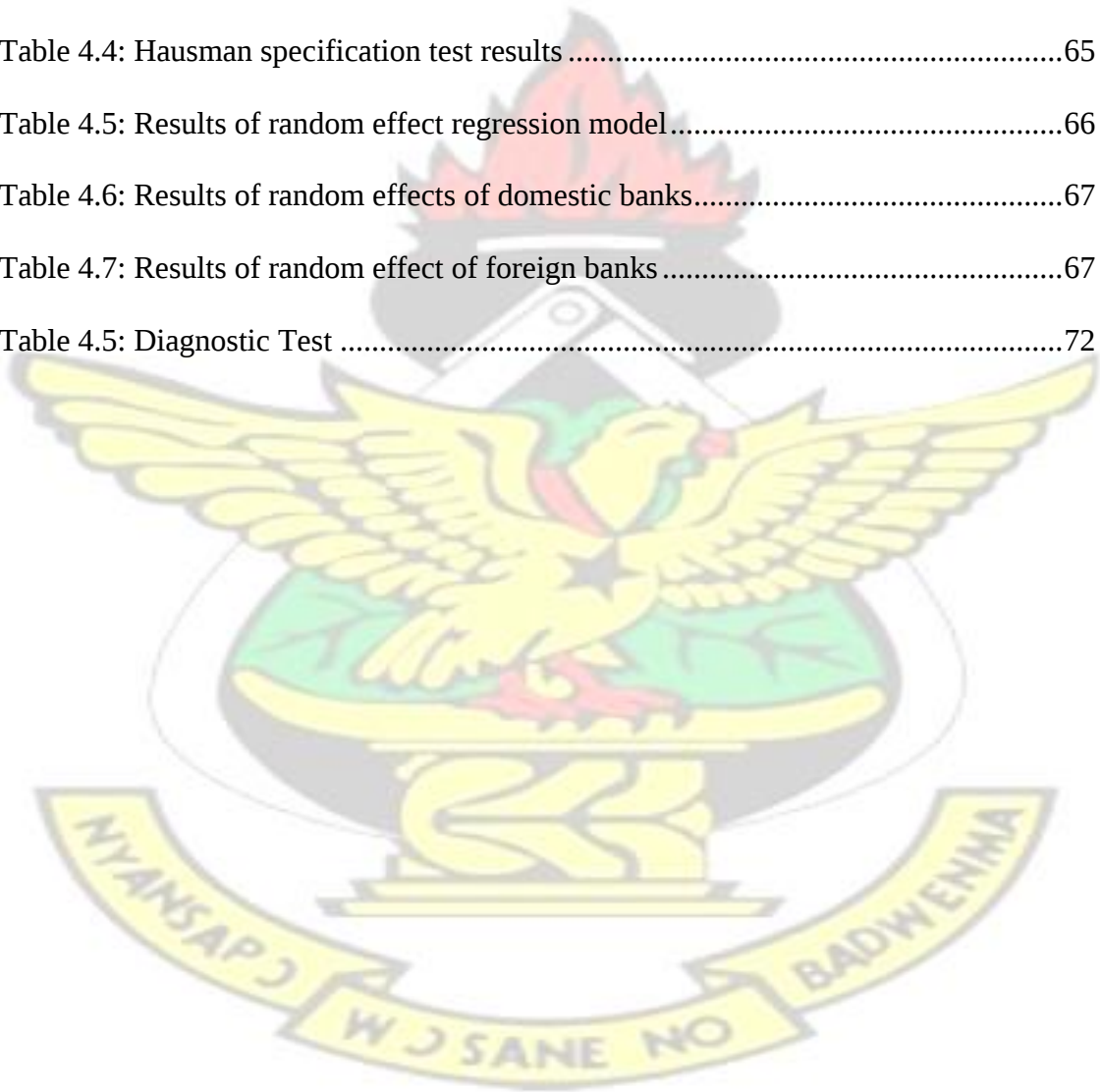
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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

The development of every economy depends on the stability and efficiency of the financial system. Financial institutions, like commercial banks promote transactions in various sectors of the economy where private and government companies collect funds to achieve the goals of specific investors. The banking sector is a vital part of the financial system by offering an intermediating function that enables the movement of funds from savers to lenders to boost development activities. Liberalization of the domestic and foreign financial markets has led to expanded credit accessibility for individuals, small and medium-size businesses and large corporations (Beju et. al, 2012). In the simplified term, there has been an enormous increase in the number of both domestic and foreign banks, accompanied by an increase in competition credit growth. However, Baselga and Olsagasti (2015) said that the provision of loans is the key source of revenue for the banks. Decrease liquidity and worst macroeconomic conditions often lead companies and individuals to fail to repay their loans and therefore to default on loans referred to as non-performing loans (NPLs). According to the IMF (2011), non-performing loans are those in which the principal or interest, or both, is unpaid for approximately 90 days or more.

Non-performing loans in many developed and emerging economies have recently become a subject of concern. High non-performing loans have an intricate effect on the balance sheets of banking firms and financial intermediaries, which are measured as delinquencies. Amuakwa-Mensah et al. (2017) suggested that high rate of non-performing loans are the primal cause of troubled banks. A declining NPL level

indicates a sound and reliable financial system, whereas high NPLs can indicate unsafe financial growth. A high level of NPLs is set as a prey and initially affects the individual banks and eventually destroys the financial system and the economy as a whole (Feijo, 2011). Therefore, when a borrower defaults on the loan repayment, it is classified as bad debt which is treated as a cost to the banks.

In order for a bank to be sustainable and highly effective for its continued existence, it must show signs of good financial performance and should not experience liquidity constraints due to NPLs in order to avoid insolvency (Nasya, 2020). A persistence increase of NPLs drain the financial position overtime and later contributes to financial crisis in the banking sector (Faroog et al, 2019).

The IMF conducted a report on the effects of NPLs for the financial industry in African countries from the above-mentioned repercussions on non-performing loans. The International Monetary Fund stated in 2011 that the level of asset loss in Ghana's banks ' balance sheet is higher, rendering Ghana's banking sector the third-highest in Africa's non-performing loan statistics. This led to the Bank of Ghana's development and stringent regulations ensuring that the banking sector adheres to fair and high-quality credit management practices. Such policies yielded positive results reported by the Bank of Ghana in July 2019 that significantly improved asset quality in the industry. Non-performing loans (NPLs) stock decreased substantially from GHC 8.74 billion in June 2018 to GHC 6.99 billion in June 2019, reflecting a contraction of 20.0 percent compared to the increase of 9.7 percent a year earlier.

The decline in the stock of NPLs coupled with a marginal pick up in credit growth resulted in a lower NPL ratio of 18.1 per cent in July 2019 from 22.6 per cent a year ago. When adjusted for the full loan loss category, the NPL ratio decreased from 12.3 per cent to 9.0 per cent, signalling a slowdown in the deterioration of bank lending quality. Despite all these changes in nonperforming loans, there is a need to investigate the deterministic factors responsible for NPLs.

Many studies (Asiama and Amoah, 2019; Qwader, A., 2019; Summatun, 2019; De Bock and Demyanets, 2012; Skarica, 2014) have documented that macroeconomic determinants do cause NPLs. According to Asiama and Amoah (2019) study, it highlighted that monetary policy rate has influence on NPLs. Policymakers should therefore focus on establishing a strong and effective financial environment, so that monetary policy can be used to influence the interest rate of the commercial banks. Qwader, A., (2019) was with the view that GDP growth rate and interest rate has significant effects on NPLs whilst unemployment and, foreign remittances are insignificant and has no influence on NPLs. Hence, the government should promote and ensure the development of domestic investments and penetrate into the growing international markets to attract labour force. De Bock and Demyanets, (2012) result showed that GDP growth rates, exchange rates and inflation are the main determinants of NPLs in the banking industry. In these studies, it can be seen that the macroeconomic indicators, for example, unemployment, public debt, inflation, lending rates, exchange rate, GDP) seem to determine the performance of the loan portfolio in the banking industry.

Accordingly, a number of studies (Shahidul and Nishiyama, 2019; Louzis et al. 2012; and Klein, 2013; Ofori-Abebrese, 2016) have asserted that bank level determinants are the primal cause of NPLs. However, international banks inclusion from advanced nations, high credit growth rate and loan loss provisions dilute the NPL level (A Dimitrios et al, 2016). Shahidul (2019) mentioned that bad luck, bad management, skimping and moral hazard significantly increase the default risk leading to non-performing loans. Louzis et al. (2012) and Klein (2013) hinted that the liquidity of a bank has an inverse impact on NPLs as a provision for loan loss to finance the bad debt. This loan loss provision reduces the cash reserves intended to support the banks during huge withdrawals. It reduces the financial position of financial institution by treating bad debt against assets side of the balance sheet.

Correspondently, other empirical evidence such as (Amuakwa-Mensah and Boakye – Adjei, 2015; Mensah 2019; Giacomo 2015; Ikram et.al, 2016; Amuakwa-Mensah et. al,2017; Abdul Fatao, 2015; Omar et. al, 2019; Laureando: Zatti, 2018) have proposed studies on macroeconomic and bank level determinants of NPLs. These studies suggest that the performance of loans cannot be solely determined by macroeconomic factors, but rather both macroeconomic and bank specific variables are key determinants of NPLs. Amuakwa-Mensah and Boakye –Adjei (2015) study revealed that inflation, GDP per capita and real exchange rate, bank liquidity, ROA and management efficiency significantly affects NPLs. Mensah (2019) concluded that exchange rate, GDP, bank size is positively related to NPLs whilst ROA is negatively related to NPLs but statistically insignificant. Zatti (2018) stated that loans to deposit ratio, public debt, ROA, ROE, GDP, inflation, unemployment significantly influence NPLs of banks. From the above documented literature, it is a concrete testament that there are

diverse opinions and on the subject matter, hence, the determinant of NPLs is inconclusive.

## **1.2 Statement of the Problem**

Literature has revealed different and a number of intriguing suggestions as the best fit to contribute to various assertions on macroeconomic and bank level determinants of non-performing loans. Most of these studies (Laxmi et al. 2018; Hauilu, 2019; Nguyen and Tran 2017) are conducted in developed and frontier markets and their results can never be a reflective suggestion for developing and emerging economies with divergent estimations. For example, Laxmi et al. (2018) showed that NPLs have significant positive relationship with export to import ratio, inefficiency and asset size and also GDP growth rate, capital adequacy and inflation have negative relationship with NPLs in banking sector. Nguyen and Tran (2017) studies found a negative relationship between NPLs and bank size, market share in financial sector. Hauilu, (2019) revealed that ROA is positively related with NPLs. However, these results can never be the same for emerging countries, for example, Ghana. This is because of many factors not limited to geographic settings, financial systems structures; macroeconomic policies etc. exist differently for various countries. Indeed, it is true that there is a different purview of different researchers on the subject matter.

However, to the best of my knowledge, there are very limited studies in Ghana pertaining to the subject matter under study. Studies such as (Amuakwa-Mensah and Boakye-Ajei, 2015; Mensah, 2019; Amoah, 2019; Amuakwa-Mensah et.al, 2017; Kyereboah-Coleman & Andoh, 2014, Ofori Abebrese, 2015) have been done which have not been fully address the issue of NPLs. Amuakwa-Mensah and Boakye –Adjei

(2015) study revealed that inflation, GDP per capita and real exchange rate, bank size, loan growth significantly affect NPLs in the banking sector. The study considered four bank specific variables (credit risk, bank size, loan growth, net interest margin) and macroeconomic variables (inflation, exchange rate, current GDP growth and previous GDP growth rate) respectively. Whereas, the variables selection was insufficient as it failed to include other variables such as; ROA, loan loss provision, management efficiency, bank liquidity, unemployment, public debt, private credit, export and import rate. Mensah (2019) employed only three bank specific variables (ROA, efficiency, and bank size) and four macroeconomic variables (interest rate, exchange rate, GDP, broad money supply) of NPLs who failed to evaluate whether the determinants of NPLs is different for domestic and foreign banks.

In a quiet interesting way, Asiamah and Amoah (2019) analysis mainly focused on monetary policy dynamics and non-performing loans. The study failed to include micro determinants such as ROA, loan growth, bank size, capital adequacy and many other bank level specific factors. Again, due to the disparities and limited variables considered by previous literature, this study will use the most current data and employ more theoretically based variables for the estimation analysis on the subject matter. The study therefore will contribute to scholastic literature and fill the gap on issues pertaining to macroeconomic and bank level determinants of NPLs.

### **1.3 Objectives of the study**

Based on the above arguments, the broad objective of the study is to evaluate macroeconomic and bank level determinants of NPLs. However, specifically, the study intends to:

- i. Examine macroeconomic determinants of non-performing loans.
- ii. Investigate bank level determinants of non-performing loans.
- iii. Evaluate whether the determinants of NPLs for domestic banks are different from foreign banks.

#### **1.4 Research questions**

The specific questions to be answered in this study are;

- i. What are the major macroeconomic variables accountable for NPLs in Ghana?
- ii. What are the bank level determinants responsible for NPLs in Ghana?
- iii. Are the determinants of NPLs different for domestic and foreign banks?

#### **1.5 Significance of the Study**

The study will be relevant to various stakeholders of the economy such as the government, academicians, researchers, banking sector players, and policy analysts. Furthermore, it will assist management of banks to make proper customer assessment before granting a loan to that customer. It will also guide them to make good decisions about their lending rate and to know whether provisioning for NPLs is necessary. It will also increase the knowledge base for analyst and researchers to give good advisory services on how to deal with NPLs. Regulatory bodies such as Bank of Ghana will also benefit from the outcome of this study whether to banks should increase their assets (size) for regulatory purposes. The government is not an exemption from this relevance such that the performance of the economy is highly based on the performance of the financial sector especially the banking industry.

### **1.6 Scope of the Study**

This study analyzes the determinants of nonperforming loans NPLs in the Ghanaian financial sector by limiting the concentration to 21 commercial banks in Ghana. This is because the commercial banking sector has recently experienced great financial crises leading to consolidation, absorption and merging of banks. The study will mainly focus on the major determinants of nonperforming loans, the association between NPLs and its determinants.

### **1.7 Summary of Methodology**

This study adopts the work and methodology of Amuakwa-Mensah and Boakye-Adjei (2015). The study uses quantitative research design and consider secondary data source. The population aimed for this study is all banks operating in Ghana. The sample is restricted to 21 commercial banks and these banks have experience high rate of NPLs and was selected using judgmental sampling technique. However, data for bank level variables which include (bank size, net interest margin, liquidity, return on asset and efficiency) and macroeconomic variables considered (inflation, unemployment, real interest rate, public debt, and GDP per capital) are sought from annual financial statement of various banks and World Bank development indicators (WDI) from 2008 to 2018 respectively. A panel data regression model technique which takes into account both fixed effect and random effect was adopted. The study may either adopt the fixed effect model or random effect model which uses the generalized least squares depending on the outcome of the Hausman test.

### **1.8 Limitations of the study**

In conducting this research, there were some shortcomings which hindered the successful outcome of the research results. The major shortcoming of this study is unavailability of data quality. It is mandatory for all commercial banks to publish their annual financial statement every year but most of the local banks do not which makes it difficult to have access to their financial statement that is used to compute the data for the bank level variables. Moreover, the econometric model did not place emphasis on dynamic panel which integrates the lags of NPLs among the independent variables in this study. Other variables such as exchange rate which is a major factor in international banking, management dispute, conflict of interest, and collateralization which may have variation on NPLs were not considered.

### **1.9 Organisation of the Study**

The rest of the study is organized into four chapters. In chapter two, the study will examine already existing knowledge on the determinants of NPLs. This brings to lights the various findings and argument put forward by researchers from develop nations, developing nations, Africa and not limited to Ghana. However, Chapter three focuses on the methodology for the study consisting of research design, data source, model specification and various approaches for conducting the study. Chapter four highlights the preliminary analysis of the data, the outcome of the study, discussion of the results of the study. The last chapter concludes the study; give a summary the results of the study, and also recommendations and suggestions for further research are addressed in this section.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter presents macroeconomic and bank level determinants of nonperforming loans. It is organised in seven sections; section one introduces the conceptual literature review and discusses the concept, the definition, measurement, causes and consequences as well as the determinant of NPLs. Section two also presents the overview of NPLs in the Ghanaian banking sector. The theoretical linkage of NPLs such as; the life cycle theory of consumption, asymmetry of information (adverse selection and moral hazard) and their assumptions are explored in section three. However, a survey of empirical studies on the determinants of NPLs is presented in section four. Thus, it addresses the body knowledge of NPLs in develop countries, developing countries, Africa, and Ghana respectively. The hypothesis formulation and conceptual frame work on macroeconomic and bank level determinants are captured in section five while a summary of the chapter is provided in section six.

#### **2.1 Conceptual Literature Review**

The financial system is the pillar of every economy in recent world development and the vital functions they render cannot be overlooked (Waqas, Fatima, Khan, & Arif, 2017). In today's developing countries, banks are the primary source of credit for individuals and businesses (Mirza et al, 2018; Raza & Shafqat, 2013). However, the traditional function of the bank involves taking deposit from the surplus unit and offering them as loans to the deficit unit (Kargi, 2011). According to Niu (2016), Baselga and Olasagasti (2015) loans is the main asset portfolio which provide earnings to banks. In view of this, it is necessary for the bank to manage their funds to service

their lending obligation. In spite of all these benefits, the existence of default risk may hamper the loan repayment making some loans nonperforming and, hence, nonperforming loans (NPLs).

### **2.1.1 Concept of non-performing loans**

Nonperforming loans have become a serious financial phenomenon for management of financial institutions to handle due to several problems it generates. This encumbrance reduces the profitability and soundness of financial institutions. The principal issue that sparked the problem of nonperforming loans can be traced back to 2008 global financial crisis which exposed many banks to huge impaired loans and asset deterioration which led many banks into bankruptcy (Amuakwa-Mensah et. al, 2017). After, there were less restrictions and deregulations in the global financial system to revamp the financial sector. As a consequence, many banks began granting more loans which set the grounds for a new cycle of credit boom. In addition, increases in loan advances without taking into account the operational procedures and unfavorable economic conditions resulted in many loans not performing well (Zatti, 2018).

#### **2.1.1.1 Definition of non-performing loans**

Nonperforming loans are default loans with no cash flow from either the principal or the interest payment. However, Jaswal et al, (2017) attributed NPAs interchangeably for NPLs of banks. In a quiet simple way, NPLs are financial assets that the interest or installments of principal payment have failed contrary to the specified terms of the credit contract for a specific period of time (Washeka and Karim, 2016). The definition of non-performing loans according to the IMF (2011) report states that NPLs are loans that the interest or principal or both payment are overdue for a period of 90 days.

Accordingly, nonperforming loans (NPL) are loans in which there is no cash flow from repayment of principal or interest for a specified period of time where no proper arrangements have been made for repayment.

#### **2.1.1.2 Causes of non-performing Loans**

For NPLs to occur there are several factors which trigger this canker to happen. Furthermore, the main causes of NPLs are as a result of poor credit management, high interest rate, high unemployment rate, illiquidity, low rate of return on assets, inflation, GDP, etc. However, these factors have been categorized as both institutional specific factors and external macroeconomic factors. Opinion on causes of NPLs was suggested by Simon (2013) who stated that external factors are considered to have caused NPLs more than institutional factors. This means that various governments should make their macroeconomic environment favorable to ensure credit quality.

#### **2.1.1.3 Measurement of NPLs**

Nonperforming loans have been used as a measure of credit risk in evaluating financial performance of commercial banks in Germany and France (Chaibi and Ftiti, 2015). According to Mutuku (2006), there are two popular methods used to estimate NPLs which can be categorized as; NPLs as measure of proportion of impairment allowances to gross loans and advances and any process after provision for loans loss. Again, NPLs refers to the proportion of impairment charged to gross loans and advances. Therefore, NPLs are estimated as bad debt over aggregate loans advances. In addition, this study sorts to adopt the measurement of NPLs used by Amuakwa-Mensah and Boakye –Adjei (2015) which expressed NPLs as a ratio of bad debt to total loans.

#### **2.1.1.4 Consequence of nonperforming loans**

Non-performing loans have an intricate outcome on the balance sheets of banking firms and financial intermediaries which are measured as delinquencies. Accordingly, increasing levels of non-performing loans are the primal cause of troubled banks (Amuakwa-Mensah et al. 2017). Declining levels of NPLs indicate a sound and stable financial system, whereas high NPLs can indicate unsafe financial growth. However, rising levels of NPLs are set as a prey which initially affects the individual commercial banks and ultimately ruin the financial system and the economy as a whole (Feijo, 2011). In the way indicated, when a borrower defaults on the loan repayment, it is classified as bad debt which is treated as a cost to the banks. This increase in NPLs associated with bad debts cause liquidity problems leading to a decrease in profitability and good financial position of banks.

In the recommendation statement, the sustainability of banks and its effective existence depend on good financial performance for which the banks should not experience constraints of liquidity due to NPLs (Summatun Nasya, 2020; Lee et al. 2019). A persistence increase of NPLs drain the financial position overtime and later contributes to financial crisis in the banking sector (Shahidul et.al, 2019). The management of NPLs manifest the gainfulness of any financial institution and thus a decrease in ratio of Non-performing loans prove the quality of asset of banks. Hence, a critical rise in the NPL ratio without appropriate regulatory and macroeconomic policies would trigger warning signs to commercial banks as unstable. According the Bank of Ghana report published in July 2019, non-performing loans had high impact on the collapsed banks representing 22.6 percent in 2018 and finally declined to 18.1 percent in July 2019.

### **2.1.2 Determinants of non-performing loans**

NPLs have been given an attention by many scholars due to its intricate effect on the banking system especially, Ghanaian banking sector. The deterioration of the banking industry due to NPLs causes an economic downturn because the banking sector serves as a backbone for the development of an economy. In order to curb the menace associated with the subject matter, there is the need to evaluate the deterministic factors of macroeconomic and bank level purported for causing NPLs. Some studies have been evaluated in order to discover these key factors that determine non performing loans in the banking industry. For example, Makri et al., (2013) took a study to figure out the causal elements responsible for NPLs in the banking sector of the Euro zone countries. Auto-regressive model was used for the analysis from the period of 2000-2008. The research brought to light that capital adequacy ratio, the previous year's non-performing assets, employment, return on equity, and aggregation of GDP growth affects NPLs.

According to Rahja (2016) the most positive significant factors that affect high percentage of loans and overall assets of banks are the bank level factors. This was pointed out after carrying out a research in the Jordan banking industry within the period of 2000-2012 using panel data regression. This clearly shows that the decision of management and how they utilize assets operation of banks have a definite effect on loan performance. Beck et al., (2013) discerned that growth in real GDP; prices of shares, lending rate, as well as exchange rate have a corresponding relationship with NPLs. From all the studies on NPLs, it is of concluding statement that increases in NPLs affect the profit of banks and even into bankruptcy.

### **2.1.2.1 Macroeconomic Determinant of NPLs**

The existing documented studies attest to empirical evidences that changes in macroeconomic variables like GDP, unemployment, inflation, real interest rate, public debt in the economic horizon are related to loan performance. When there is an improvement in the macroeconomic factors, the ability of borrowers to service their credit obligation also increases. The betterment of these economic environments will finally assist in decreasing the number of loan defaults and vice versa. However, below are discussions of these variables and their effects on NPLs;

#### **Gross Domestic Product per capital and NPLs**

The overall monetary value of goods and services produce in an economy within a period of time usually one year. A growth in a country's GDP creates employment which eradicates individuals' financial burden, profit of business and individuals increases which enhances their capacity to repay their loans to reduce NPLs (Makri, Bellas, 2014; Ramachandran, 2013). Conversely, a fall in GDP due to recession reduces the income of individuals as a result of unemployment and a decrease in the profit of businesses promotes loan default (Chaïbi & Ftiti, 2015). The banking sector is reluctant in giving out loans during this covid-19 pandemic due to its negative effects on GDP as it enhances loan default, hence, increase in NPLs. Some studies have different opinion on GDP; reportedly, Michaelides, & Vouldis, 2016; Louhichi & Boujelbene, 2016; Ozili, 2019) are of the same coin that GDP is negatively related to NPLs whilst others reported GDP as insignificant to NPLs. In summary, a growth in GDP reduces NPLs and a decrease in GDP increases NPLs.

### **Real interest rate and NPLs**

Interest rate is a monetary policy tool used by the central bank to affect money supply in an economy. The study considers real rate of interest which has been corrected for inflation to reflect real cost of funds to the borrower. According to Benton (2020) interest rate is the cost a lender charges a borrower to pay for the use of funds expressed as a percentage of the principal. One of the channels that monetary policy can be used to make changes in an economy is through the lending rates that commercial banks charge by lending to the private sector to meet their short and medium term needs. The banks normally charge different rates depending on the creditworthiness and the intended purpose of the borrowers (WorldBank, 2018). There exist a long run and a short run relationship between interest rate and NPLs such that rising NPLs are characterized by high interest rate (Amajad, 2019). When real interest rate is high, the capacity of borrowers for loan repayment decreases due to effect of high cost of borrowing whilst a fall in interest rate increases borrowers' capacity to repay their debt giving low loan default.

### **Unemployment and NPLs**

This is the case where the active aged labour force is actively looking for employment but cannot find one (OECD, 2017). Unemployment is a serious issue in recent developing economies which has influence on NPLs. During a period of economic growth, an increase in production requires more demand for labour. Therefore, unemployment rate will decrease as more labour is demanded which will increase their capacity to settle their loans with the end result of lower NPLs (Bofondi & Ropele, 2011; Messai & Jouini, 2013). According to Kjosevski et al, (2019) there is an impact

of unemployment on impaired loans. When unemployment is high, borrowers' capacity to service their loan obligation decreases corresponding to high loan default.

### **Public debt and NPLs**

Public debt which can also be called sovereign debt is the debt attributed to the government outside its own jurisdiction (Kimberly Amadeo, 2020). In this study, public debt is the accumulation of a government annual budget deficit where the government spends more than its revenue. The borrowing helps the government to get extra funds for its developmental project in the short run. An increase in public debt raises the interest rate that must be paid on the loans and this may affect the private sector. Rising interest rate without a corresponding increase in GDP makes it difficult for business and individuals to pay their loans and with such an instance the loan maybe non performing (Amuakwa-Mensah et. al, 2017). A suggestion made by Makri et al. (2014) and Ghosh (2015) was that public debt is positively related with the NPL. Therefore, public debt positively affects NPLs.

### **Inflation rate and NPLs**

Pettinger, (2017) expressed his opinion that sustained increase in the general price of goods in an economy is called inflation. Inflation is a major macroeconomic factor that should not be ignored because of its role in the economy. In times of high inflation, the value of customers' purchasing power declines and hence little goods can be bought. Also, the real value of currency is been deteriorated making loan repayment more complicated as more money is needed to service the loans (Amuakwa-Mensah and Boakye Adjei, 2015). Nonperforming loans can either have negative or positive association with inflation. Rising inflation can cause easier payment of debt either by

deteriorating the real value of outstanding loans and or having low unemployment association as purported by the Philips curve (Nkusu, 2011). The central bank can reduce inflation by raising the policy rate of commercial banks which affect borrower's ability to service their credit facility. Now, it has clearly revealed that there is a link between inflation and NPLs.

#### **2.1.2.2 Bank level determinants of NPLs**

The country has experienced high default rate in the past and still worrying to all in recent times. Nonperforming loans have been attributed to so many factors which are not limited to institutional and industry specific variables. The credit policy of the bank is essentially the main factor in determining the subsequent levels of NPL. For short run maximization benefits, management try to expand credit facilities quickly and may hence take inadequate credit exposures which have led to outrageous and uncontrolled loan default of some commercial banks. Some of these variables considered in this study for evaluation are discussed below;

#### **Management efficiency and NPLs**

This variable is very crucial in determining how efficient a bank will be in generating profit can have a different proxy of financial ratios which include loan growth rate, earnings growth rate and total asset growth. However, operating efficiency is measured as cost incurred on operations over the income generated from it. Ofori-Abeberese (2016) represented bank inefficiency with management inefficiency has evidenced that banks with high NPLs is also associated with high inefficiency. Thus, management inefficiency positively causes NPL as a result of lack of quality management to skilfully scrutinize and underwrite credit facilities that are allotted to new clients

(Amuakwa –Mensah, 2015). The capacity of management to use its resources effectively so as to earn higher profit and also reduce operational cost such as charging lower rate on borrowers with low credit history with higher credit risk may affects loan performance.

### **Bank size and NPLs**

The size of banks can affect the bank's financial position as well as its ability to handle problems of information asymmetry, leading to a decrease in bad loans. This stipulates that banks that have fewer assets are able to perform good credit analysis in terms of difficulties. In a situation where a bank earns higher returns by incurring a higher cost of risk has high probability of experiencing an increase in NPLs at a point of economic stagnation and recession (Annie Mensah, 2019). Moreover, Rajha (2016) elaborated that banks that are larger in size are not primarily feasible in examining advance customers when compared with smaller banks. In addition, Moral hazard can be checked as big banks have larger spectrum to recognize the kind of borrower to deal with. Thus, a negative association is expected to exist between bank size and NPLs.

### **Liquidity (LQTY) and NPLs**

Liquidity in this study refers to how easy a bank can meet its short term cash and debt obligations without facing any difficulties (Jalil, M. and Biswas, A.A., 2018). Enough liquidity is needed to show a positive signal for banks rather, excess liquidity can cause different shortcomings as it reduces the profitability of banks and serves as a condition to raise bad loans. The excess liquidity affects the profit the bank earns in a negative manner (Iouzis et al, 2012). This is in line with the bank granting more loans for without strict access to avoid the trade off for unused funds. Loan to Deposit ratio have

been employed to measure how liquid a bank is. High loan to deposit ratio signals that banks grants more loans than cash flow intended to support the day to day activities, as well as interested in taking risk and is expected to lead to higher NPLs (Amir, 2019). In this case, a positive relationship is expected between NPL in this stance.

### **Return on assets and NPLs**

It is an all-encompassing measure of performance that indicates that management is using the bank's asset efficiently in generating income (Faroog et al, 2019). When the return on asset is higher the rising problem of NPLs is reduced because the risk faced by the banks is at a lower level though the lending rate maybe high which may contribute to higher profit. According to Makri et al. (2014) ROA has positive relationship with NPL. Contrarily, Messai and Jouini (2013) suggested there is negative association between ROA and NPLs. Thus, a decrease in profitability ratio shows that the bank is engaging in risky transactions which will increase the level of NPL.

### **Net Interest Margin (NIM) and NPLs**

The main source of income for the bank is interest income and the NIM is a ratio to measure how asset generate income. According to (Cahal et al, 2019) banks hold many asset and liabilities in different order and maturities which requires different interest charges. In the analysis of (Pasaman, 2017) the difference between interests expense and interest received divided by total earning assets is called NIM. If the spread is positive, it means the bank is receiving more interest on deposit invested than the interest it pays to customers. Again, research (Gunter et al, 2013) has witness that high NIM in the economy indicates loop holes in the financial sector such as; market risk,

unsoundness of banks, lack of competition, and presence of various regulatory impediments which draws on a signal of bank failure due to inefficient assets (loans). Due to the distortion higher NIM influences the operations of the financial sector, a positive link is expected to exist between it and NPLs.

## **2.2 Overview of NPLs in Ghana**

The banking sector in Ghana has undergone immense growth in number and its significant role to the development of the economy. The growth in the banking sector due to liberalization of the financial system and foreign bank participation in the domestic market sector resulted in easy accessibility of credit. In view of this, there were some financial reforms which helped to instilled discipline in the financial sector from 1986, 2003 and 2017-2019 that included Financial Sector Adjustment Program (FINSAP), Financial Sector Strategic Plan (FINSSP) and the Banking Sector Clean-up Exercise respectively. For a decade now, there has been a tremendous growth in loan advancement to meet the growing need of the economy. The assets of the banking sector declined due to high loan impairment leading to NPLs which have distorted the financial position of most banks. This menace arises as many banks were not putting in proper credit practices due to unnecessary competition among them and unfavourable macroeconomic environment. Accordingly, Ofori-Abeberese (2016) described NPLs as loans which the repayment has gone contrarily to the specified terms of the loan contract with no cash flow from the principal or interest payment for over a period which affects the quality of banks assets. NPLs have become a serious issue the banks in Ghana are facing that needs to be tackled with.

In a review of loan performances, the central Bank of Ghana annual report in February, 2017 indicated that the ratio of NPLs in the banking sector rose by 36.17% and this represents an increase of 4.7 to 6.4 billion cedis within the 12 months' period. As part of its regulatory measures to improve the assets of banks to reflect declining NPLs, the central bank adopted some policies to clean up the unscrupulous banks by increasing the capital requirement, ensuring good corporate governance, good credit management etc. In line with this regulatory requirement, most banks license were evoked, others merged, and some were even taken over by other banks. The bank of Ghana, after enforcing all these regulatory measures issued a report in 2019 that the asset improved its quality significantly during the period under review. The industry's total value of Non-Performing Loans (NPLs) declined significantly from GH¢8.74 billion in June 2018 to GH¢6.99 billion in June 2019, constituting a negative growth of 20.0 percent compared with the 9.7 percent growth recorded a year earlier. The decline in the volume of NPLs coupled with the marginal pick-up in credit growth resulted in NPL ratio dropping from 22.6 percent a year ago to 18.1 percent in June 2019. When adjusted for the fully-provisioned loan loss category, the NPL ratio reduced to 9.0 percent from 12.3 percent, indicating a slowdown in deterioration of loan quality.

### **2.3 Theoretical Literature Review**

These theories seek to explain the underlining intellectual thought regarding the subject under study. Below are the discussions of these theories and their linkage to the subject matter;

### 2.3.1 The life cycle theory of consumption

This economic theory was developed by Franco Modigliani and Richard Brumberg in 1950s. It describes how people spend and save their income across their lifetime. The basic assumption of this theory suggests that individuals seek smooth consumption throughout their lifetime by resorting to borrowing when their earnings are low and saves when earnings increase. Theoretically, life-cycle consumption model is associated with macroeconomic determinants of NPLs. Macroeconomic environment necessarily affects borrowers' financial standings and their debt serviceability (Louzis, et.al, 2012).

Notwithstanding, this happens as a result of high risk of unemployment which makes it difficult for the unemployed to service his debt obligation. Unemployment and public debt risk on NPLs is supported by Irina and Angela (2016). GDP growth rate is seen as an improvement in the economy. Government borrows to meet the growing need of the country in the form of developmental projects which increases the employment rate in the economy. High employment has positive transformation into more incomes which improves the debt servicing capacity of borrowers, hence, NPLs becomes lower. On the more serious note, economic recession results in a decline in real GDP growth have a consequence of lowering incomes (Khemraj & Pasha, 2016). The study of Amuakwa-Mensah and Boakye-Adjei (2015) explained that GDP per capita negatively affects NPLs in Ghana. They also argue that real GDP is statistically significant on large banks but has no effects on small banks. This signifies that NPLs are closely associated with economic cycle which has implicated effects on NPLs.

### **2.3.2 Information asymmetry theory**

This theory was proposed by Löfgren et al.(2002) with the contribution of George Akerlof, Michael Spence and Joseph Stiglitz in 1970<sup>s</sup> “Markets of Asymmetric Information”.Asymmetric of information theory suggest that one person to economic transaction possess more information than the other party. This lack of information creates an imbalance of power in transaction between a creditor and a borrower which sometimes cause the credit transaction to go awry. Specifically,Akerlof indicated that asymmetry of information can give rise to the problem of adverse selection and moral hazard.

#### **2.3.2.1Adverse Selection**

Adverse selection in credit happens when the creditor does not have full information of the borrower before the loan contract is established among the parties. This theory suggests that the party that has more information prior to the credit transaction has position of advantage and control on the contract than the one with little information. However, when there is existence of equal information among the parties to economic transaction, it helps to decrease adverse selection (Husien Cetin, 2019). As a consequence, those who are likely to default are those who always seek loans. Richard (2011)suggested it's of great challenge to distinguish between borrowers who are good from bad ones due to the problem of adverse selection. In such situation, it becomes difficult in making accurate decision and negotiation if there is limited information about the contract under consideration. Adverse selection reveals a significant positive impact on bad debt as prospective lenders have difficulties in predicting loan repayment opportunities leading which promote high rate of NPLs

### **2.3.2.2Moral hazard**

According to this theory, anytime a party in an agreement does not have to suffer the potential consequences of a risk, the probability of a moral hazard increases. This comes as a result of lenders' inability in detecting how much wealth their debtors might have accumulated before the loan facility is serviced, and not during the application process. Moreover, if lenders find it difficult in exercising proper appraisal on the capacity of the borrower in repayment of the loan, credit risk may arise leading to NPLs. The bank fears that borrowers may spend the funds more and engage in risky ventures which will reduce the likelihood of repayment. According to Mubarak Hossain and Mahmud Chowdhury (2015) creditors will also lend at a higher rate to a borrower with high probability rate of default. This in turn worsens the borrower's ability in servicing the loan due to high lending rate leading to high rate of NPLs. Interestingly, due to the inability of borrowers in servicing their loans; banks devote considerable resources in order to evaluate loan applicants and the policing of borrowers to ensure timely loan repayment which also increases cost of operations which decreases the efficiency of management in loan underwriting.

### **2.4Empirical Literature Review**

Literature studies on NPLs have been greatly carried out in recent years on for the reason of its high rising cost and long term effect on the financial sector. Moreover the determinants of NPLs have been independently evaluated by many literatures on macroeconomic and, bank level factors such as (Chaibi and Ftiti, 2015; Messai and Gallali, 2019; Ofori Abeberese, 2016; Laryea et al, 2016). These studies have resulted in many diverse and contradicting conclusions on the subject matter in the space of macroeconomic and bank specific perspective.

### **2.4.1 Macroeconomic determinants of NPLs**

The movement of macroeconomic variables and their performance with NPLs are established in business cycle models which have important role in the financial service (Williamson, 1985). Macroeconomic environment necessarily affects borrowers' capacity to service their debt and it has a great impact on borrowers' balance sheet (Louzis, Vouldis, & Metaxas, 2012). This can be attributed to shocks of macroeconomic indicators which emanate from poor macroeconomic management by various governments in the domain of political and global perspective. This means that the economic decision taken by various governments in affecting aggregate demand, money supply and, the behaviour advanced economies have influence on the financial system of smaller dependent economies.

#### **2.4.1.1 Macroeconomic determinants of NPLs from developed countries.**

Previously documented literatures such as (Li Liu et al, 2020; Messai & Jouini, 2013; Chaibi and Ftiti, 2015; Laxmi et.al, 2019; Zatti, 2018; Petkovski, 2017) have given justification on the determinants of NPLs relative to macroeconomic indicators in the developed economy. Li Liu et al, (2020) made an investigative analysis on sovereign debt distress and bank non-performing loans (NPLs) using a large sample of developed and emerging countries. It was argued that sovereign debt shows an important determinant of NPLs. In addition, a study conducted by Messai & Jouini (2013) who tried to identify the factors of nonperforming loans where 85 banks consisting of three European countries, Italy, Greece and Spain from the period of 2004 – 2008 were taken into account. It was discovered that GDP has negative correlation with nonperforming loans whilst unemployment, real interest rate has positive relationship with NPLs. Chaibi and Ftiti (2015) investigated the driving force of credit risk measured by NPLs in Germany

and France within the period 2005–2011. It was found that these variables are able in explaining the NPL in the sample countries. Laxmi et.al (2019) study reassessed the vulnerability of the banking industries using aggregate NPL data of 49 high-income countries over 2000–2015. The results reveal exports, gross national income as the significant indicators of NPLs other than previous studies (Beck et al., 2015; Kauko, 2012). Zatti (2018) underlined the principal determinants of Non-Performing Loans in European Union banks, the results found a positive relationship between GDP and NPLs which is contrary to the findings of CESEE countries (Klein, 2013), the Euro banking system (Makri et al., 2014; Dimitros et al., 2016; Messai et al., 2013, Kjosovski and Petkovski, 2017).

Accordingly, another interesting study made a suggestion on the determinants of NPLs using GMM estimator on macroeconomic variables by Dimitros et al. (2016). The study pinpointed that unemployment and public debt is highly correlated between impaired loan losses and tax income ratio when compared with the findings of Makri et al. (2013). It means that when personal income tax increases, the net income of the population declines lowering their capacity to repay their debt and this leads to an increase on non-performing loans. Plahuta (2019) found that GDP and unemployment rate are significant in explaining NPLs in the Italian banking system. In the analysis of Dong Wei (2019) effects of Macroeconomic determinants on non-performing loans of Chinese commercial banks were addressed. It made a conclusive statement that an increase in the money supply in the short run will lead to an increase in the non-performing loans ratio. According to Messai and Gallali (2019), using P-VAR approach evidence from 18 European countries in assessing macroeconomic determinants of credit risk found that macroeconomic determinants are actually considered as early

warning indicators which was also affirmed by (Monokroussos et al., 2016). Saba et al. (2012) study examined the factors responsible for NPLs ratio in the US banking sector hinted that macroeconomic factors such as Interest rate and Real GDP per capita are associated with the NPLs rate. This suggests that US banks should consider Real GDP per Capita while issuing loans and advances. İslamoğlu (2015) examined the effect on non-performing loans using quarterly data of 13 banks in Istanbul from 2002-2013 and concluded that a decrease in interest rate causes an excessive loan growth in the long run and increases non-performing loans.

#### **2.4.1.2 Macroeconomic determinants of NPLs from developing countries.**

Correspondently, empirical evidence and documented literature studies such as (Ozili, 2019; Gulati et. al, 2019; Ekanayake, 2018; Ramkrishna and Patil, 2018; Sergey, 2019; Nathan et.al 2020; Laxmi Koju et. al 2018; Abidet.al, 2019) expressed their thought on the macroeconomic determinants of NPLs indeveloping countries. According to Ozili (2019), business cycle fluctuations (GDP) and inflation have negativelationship with NPLs which affects bank performance in Nigeria. A study carried out by Abidet.al, (2019) on conceptual frame work on relevant macroeconomic variables that have implicated effects on the non-performing loans (NPLs) in conventional banks of Pakistan. It was asserted that the gap between the demand and supply of energy (energy gap), corruption and political stability hinder the operation of businesses make it difficult for borrowers to settle their loan facility in developing countries. Nathan et.al,(2020)employed a quarterly data from 2002 -2017 in Uganda commercial banks for their research. The study opined that NPLs increased with higher lending rates, real effective exchange rates, and unemployment rate while growth in GDP lower NPLs.Ekanayake (2018) used panel data to ascertain the impact of macroeconomic for

the period 2003 -2013. The study found that civil war significantly affects the level of nonperforming loans of commercial banks in Sri Lankan.

#### **2.4.1.3 Macroeconomic determinants of NPLs from African countries.**

All the same, the prevailing macroeconomic environment has great influence on NPLs in Africa. Sergey (2019) stressed that NPL is sensitive to interest rate in national currency and unemployment rate. As labour earns higher in the form of wages and salaries, the capacity of borrowers to offset their loan repayment rises. Studies like (Adeola and Ikpesu, 2017; Tyona et al., 2017; Sheefeni, 2015) have been carried out on nonperforming loans in Africa economies such as Namibia and Arab countries like Morocco, Tunisia. These studies employed macroeconomic variables such as inflation, lending rates, exchange rates, and the Gross Domestic Product (GDP) in their analysis. The study concluded on different evidence of the impact inflation, exchange rates as well as lending rates on NPLs in their economies. Akinlo and Emmanuel (2014) also investigated the factors of NPLs using annual data from Nigerian central banks for the period of 1981-2011. Using Johansen method of co-integration and unit root testing, the study found that GDP growth is negatively associated with NPLs in the long run; similar to that of Silaban (2014) and Haniifah (2015). Nargis et al, (2019) examining the influence of factors of economic growth on NPLs. The study reveals that NPLs rate is significantly influenced by unemployment, inflation, real interest rate, and one lag period of NPLs

#### **2.4.1.4 Macroeconomic determinants of NPLs from Ghana**

Despite of all the empirical documented studies pertaining to non-performing loans, only a handful of studies such as (Amuakwa-Mensah and Boakye-Adjei, 2015; Amuakwah-

Mensah et al, 2017; Ofori-Abebrese, 2016; Alhassan et al, 2014; Asiamah and Asamoah, 2019; Kakra and Ameyaw, 2010; Anne Mensah, 2019) have been done in the Ghana banking industry. Amuakwa-Mensah and Boakye-Adjei (2015) examined macroeconomic and industry specific factors of NPLs in the Ghanaian banking industry. The approach adopted for estimating the study was a panel regression. The data for the study was retrieved from the Bank of Ghana and World Development Indicators dataset. The research gave a conclusive statement that real GDP per capita is significantly positive to NPLs of large banks rather than small banks. However, in a period of economic recession, cash flow for institutions and private consumers decline and the possibility of default increases which adversely affect the financial sector (Ofori-Abebrese, 2016).

Alhassan et al. (2014) have also documented that there is a positive significant impact of high inflation rate on NPLs in the Ghana banking industry, pinpointing that high inflation rate makes assets portfolio of banks to be impaired which deteriorate the bank's balance sheet. A documented study employed macroeconomic variables such as real interest rate inflation, real exchange rate, GDP growth rate, unemployment rate, loans growth and money supply and gave a concluding statement that these variables are important in explaining NPLs (Asiamah and Amoah, 2019). Kakra & Ameyaw (2010) conducted a study to assess the consequences of inflation on the profitability of banks concluded that there is a positive significant relationship between inflation rate and assets of loans which affects banks' profitability.

However, in addition to testify the determinants of NPLs in Ghana, Amuakwa-Mensah et al. (2017) focused on re-evaluating the macroeconomic and bank level determinants of NPLs where 2007–2009 financial crises were taken into consideration. They noticed that macroeconomic environment hugely affects NPLs in Ghana, hence, confirming the results obtained by Amuakwa-Mensah and Boakye-Adjei (2015). They addressed with respect to the financial crises such that the effect of NPLs was conditioned on the level of credit risk. Annie Mensah (2019) made investigations into the determinants of non-performing loans of listed banks in Ghana using a quantitative research design which allows for both entity and time dimension. Using a panel data for the estimates, he demonstrated that Inflation and GDPG were significantly related to NPLs while M2GDP was not significant. It was further recommended that the government should have a firm macroeconomic policy in stabilizing its economy. Fatao et al. (2015) identified and analyzed the deterministic factors responsible for bad debt. The results pointed out that Inflation and real effective exchange rate had statistically significant effects on the level of NPLs in the banking sector of Ghana. However, the results of fixed effect regression model revealed the insignificant effect of GDP on NPLs.

#### **2.4.2 Bank level determinants of NPLs**

Operational activities of various banks and occurrences such as bad news, moral hazard, adverse selection, liquidity challenges etc., in the banking sector also have great deal on the performance of loans. Normally, variances in financial regulation and how the banks are been supervised by the regulator affects their risk management practices and loan performances (Amuakwah-mensah and Boakye Adjei, 2015). Clearly, the determinant of NPLs is not only attributed to the performance of the macro economy but also the lukewarm activities of individual banks in granting of loans.

#### **2.4.2.1 Bank determinants of NPLs from developed countries**

In a quiet simple way, many scholars have expressed their interest in determining these factors in the advanced nations such as (Klein, 2013; Marki et. al, 2014; Messai and fathi, 2013; Umar and Gang Sun, 2016; Zatti, 2018; Giacomo Plahuta, 2019; Radosław and Krzysztof, 2020). In the study of Radosław and Krzysztof (2020), he identified the credit risk determinants of banks in European Union countries were coupled with high level of impaired loans as at 2017. Panel based approach was employed for the analysis and it was shown that higher NPLs is highly affected by high concentration of banks, lower return on assets and the size of the bank. Giacomo Plahuta (2019) brought to light in his literature that big banks are highly sensitive to NPLs than smaller banks. Further, a sample consisting of 9 European countries were chosen (Denmark, France, Germany, Italy, Belgium, etc) to evaluate the responsible factors for causing NPLs. The findings were bank managers' choice, ROE, and efficiency creates risk on loans leading to bad debt (Ziti, 2018). Studies conducted by scholars such as Klein (2013) and Marki et al, (2014) proved that factors which indicate management efficiency (ROA, ROE, NIM) contribute to a lower rate of nonperforming loans in total loan portfolio. This means that banks with good management have quality assets which generate higher profits that ensure safe and reliable banking business.

#### **2.4.2.2 Bank level determinants of NPLs from developing countries.**

The study on bank specific determinants of nonperforming loans is not limited to only the advanced nations but also to developing countries as well due to their high dependence on the banking sector for credit. Continually, Kojuet.al, (2019) evaluated determinants of nonperforming loans (NPL) in the Nepalese banking system employed both static and dynamic panel estimation techniques. The findings of the study

demonstrated that NPLs have significant positive relationship with inefficiency, whereas, assets size and capital adequacy is negatively related. Moreover, Sergey (2019) examined the determinants of nonperforming loans in the Armenian banking sector during the period 2004-2016. The analysis considered some regional factors such as housing price, return on assets, loan loss. The results of the study showed that ROA, housing price and loan loss provision have negative impact on NPLs. A study to ascertain the factors of NPLs in Sri Lanka was undertaken by Ekanayake (2018). He stressed that ROA as a proxy for bank inefficiency has a negative influence while that of non-interest income as a proxy for income diversity is positively related to NPLs. According to Washeka and Karim (2016) an empirical analysis was made into the determinants of nonperforming loans in the Bangladesh banking sector deposit to loan ratio is positively related to MPLs, ROA, loan loss provision have negative impact on loan portfolio.

Evaluation of major factors of loan delinquency in the Vietnam banking system reveals that the bank size and market share negatively influence credit risks resulting in NPLs (Duong and Huong, 2016). A contributing quota was made by Fatima et al, (2017) on bank-specific factors like management inefficiency, bank profitability, capital adequacy ratio and leverage. It was ascertained that these variables have a significant contribution towards credit risk in the south Asian economy. Comparatively, NPLs in Bangladesh are set to lower than what we have in Pakistan, but yet still India has the lowest ratio of non-performing loans. Rachman et al. (2018) employed fixed-effect panel regression by assessing the implications of bank-specific factors impacting credit risk asserted that profitability and credit growth could lower bank's credit risk which would rather result in lower NPLs as banks adopt better management practices and credit control

system. Klein (2013) found similar result regarding bank's profitability influence to bank's NPLs. Moreover, Rachman et al. (2018), Klein (2013) studies gave a contradicting statement that increase in credit growth results in high rate of bank's credit risk.

#### **2.4.2.3 Bank level determinants of NPLs from African countries.**

In relation to the justification of determinants of NPLs, a number of documented literatures (Ozili, 2019; Mpofu, 2020; James, 2019; Mosha, 2016; Mwangi et al, 2019) have been done on bank level determinants of NPLs in African countries. Ozili (2019) study examines the factors responsible for banking stability in relation to nonperforming loans in Nigeria. The findings reveal that bank efficiency, the size of bank, regulatory capital ratios, greater financial insight and banking concentration are significant determinants of banks credit portfolio. The study of Mpofu (2020) investigates the determinants of nonperforming loans (NPLs) using data from eight selected sub-Saharan African economies. In conclusion, a decrease in NPLs is achieved when ROE, ROA, and total liabilities to total assets ratio increase. James (2019) addressed the conclusion statement of his study that institutional characteristics have statistically significant positive relationship with default loans in microfinance banks in Kenya. Mosha (2016) made an investigation into what determines loan defaults in microfinance institutions in Tanzania. It was known that the loss of collateral as a security and deny of future loans were the major effects of loan defaults.

In addition, Hailu Megersa and Sankar (2019) also made an analysis on the determinant of NPLs in Ethiopia and discovered that nonperforming loan ratio (NPLR) has negative and significant effect whereas Capital Adequacy Ratio (CAR) has relatively positive

significant effect on NPLR. Identifying bank specific determinants of commercial banks relative to NPLs in Kenya, regulatory capital, credit exposure, bank funding, bank size and corporate governance were considered. However, bank size, regulatory capital; bank funding and corporate governance were found to be positive and significant effect on financial stability which used NPLs as a proxy (Mwangi et al, 2019). Johannes (2015) aimed at assessing bank-specific determinants for non-performing loans in commercial banks in Namibia by using time series approach. The results found return on assets, return on equity, loan to total asset ratio as the main factors of non-performing loans. An evaluated study by Abiodun and Mlanga (2019) found fund source, loan quality, liquidity, management quality, and direction of efforts were bank specific factors that were statistically significant to the loan performance while capital strength was insignificant.

#### **2.4.2.4 Bank level determinants of NPLs from Ghana**

However, Ghana's financial system is not exempted from the problem of NPLs. To our knowledge, there have been empirically but limited documented studies (Ofori Abeberese, 2016; Laryea et al, 2016; Amuakwa-Mensah and boakye-adjai, 2015; Amuakwa-Mensah et al, 2015; Annie Mensah, 2019) on the subject matter. According to Laryea et al, (2016) the study aimed at evaluating the determinants of NPLs as well as its impact on banks profitability. The study used a sample of 22 Ghanaian banks within the period from 2005-2010. The study employed panel model where fixed effect was appropriate for estimating three different empirical models. The findings indicate that banks with large capital engage in more credit risk that promotes NPLs while increased bank size leads to lower levels of NPLs. Ofori-Abeberese (2016) acknowledged that bank's interest rate, loan to asset ratio and loss provision over

reserve are the bank specific factors that influence loan performance in HFC Bank in Ghana. Inclusive, it was admitted that previous year's NPL, bank size, net interest margin (NIM), and current year's loan growth are significant in explaining NPLs (Amuakwa-Mensah and Boakye-Adjei, 2015). It was further proven that these variables affect NPLs in larger banks than smaller banks.

However, Amuakwa-Mensah and Marbuah (2015) used a dynamic panel and an Arellano-Bond estimation technique to estimate the determinants of credit risk and its effect of the introduction of universal banking license on in the Ghanaian banking industry. It was found that total loan to asset was set as a proxy for NPLs. The study observed a positive effect of universal banking policy on credit risk indicating that universal banking policy has the potential of increasing NPLs. Correspondently; Annie Mensah (2019) made an investigation into the determinants of non-performing loans of listed banks in Ghana. The study considered panel regression model for estimation. The research found bank size to be positive and statistically significant to NPLs while ROA and efficiency variables were negatively related to NPLs but not significant in explaining NPLs. In order to reaffirm the findings of the

## **2.5 Conceptual Framework and Hypothesis Formulation**

### **2.5.1 Hypothesis Formulation**

Many literatures such as (Amuakwa-Mensah and Boakye-Adjei, 2015; Amuakwa-Mensah et al, 2017; Ofori-Abebrese, 2016; Akinlo and Emmanuel, 2014; Giacomo Plahuta, 2019; Asiamah and Asamoah, 2019; Li Liu et al, 2020; Bahuddin et al, 2018; Amajad, 2019; etc. ) have documented studies on macroeconomic and bank level determinants of NPLs. These studies suggest that there are many factors which affect

NPLs of which some of these are macroeconomic and bank level factors. Some macroeconomic factors affecting NPLs are GDP per capital, inflation, unemployment, public debt, lending rate, etc whilst bank level factors may include liquidity, ROA, net interest margin, management efficiency, bank size, etc. For example, Bahuddinet al, 2018 and Amajad, 2019 indicated that there is a long run and a short run relationship between interest rate and NPLs such that rising NPLs is characterized by high interest rate. However, Amuakwa-Mensah and Boakye-Adjei, 2015 admitted that previous year's NPL, bank size, net interest margin, and current year's loan growth, interest rate, and previous year's rate of inflation are significant in explaining NPLs in Ghanaian banking industry.

Correspondently, Akinlo and Emmanuel (2014) also made investigation into the driving factors of NPLs using annual data in Nigerian central banks for the period of 1981-2011. Using Johansen co-integration method and an error correction approach, and unit root testing, it was known that GDP growth, and inflation, unemployment, private sector credit, stock market price index have long run significant effect on NPLs; having results similar to Prasanna (2014) and Haniifah (2015). Koju et.al, (2019) evaluated determinants of nonperforming loans (NPL) in the Nepalese banking system where both static and dynamic panel estimation approaches were used. The findings of the study revealed that NPLs have positive significant relationship with inefficiency. Whereas, assets size and capital adequacy is negatively related to NPLs. In a study to examine the relationship between the dynamics of monetary policy and nonperforming loans in Ghana, it was discovered that monetary policy in the form of lending rate is highly influential on loan performance.

Base on the above,the following propositions have been worded relative to independent and explanatory variables according to the required influence evidenced by previous studies discussed above:

Hypothesis 1: There exist statistically significant association between GDP and NPLs.

Hypothesis 2: There exist statistically significant association between interest rate and NPLs.

Hypothesis 3: There exist statistically significant association between unemployment and NPLs.

Hypothesis 4: There exist statistically significant association between public debt and NPLs.

Hypothesis 5: There exist statistically significant association between Inflation and NPLs.

Hypothesis 6: There exist statistically significant association between Inefficiency and NPLs.

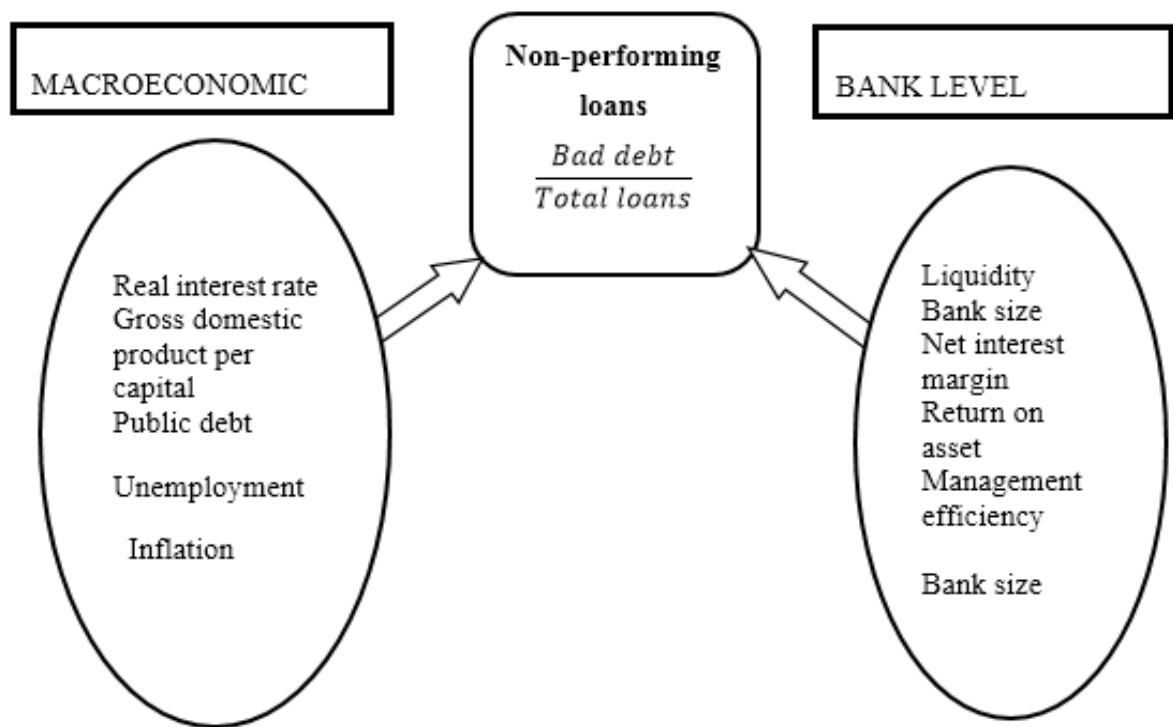
Hypothesis 7: There exist statistically significant association between Bank Size and NPLs.

Hypothesis 8: There exist statistically significant association between NIM and NPLs

Hypothesis 9: There exist statistically significant association between ROA and NPLs

Hypothesis 10: There exist statistically significant association between Liquidity and NPLs

The following unique variables are suggested in the study to analyze their overall effect on NPLs. The proposed conceptual framework below has been developed to show how these variables are linked to NPLs as discussed in the documented literature



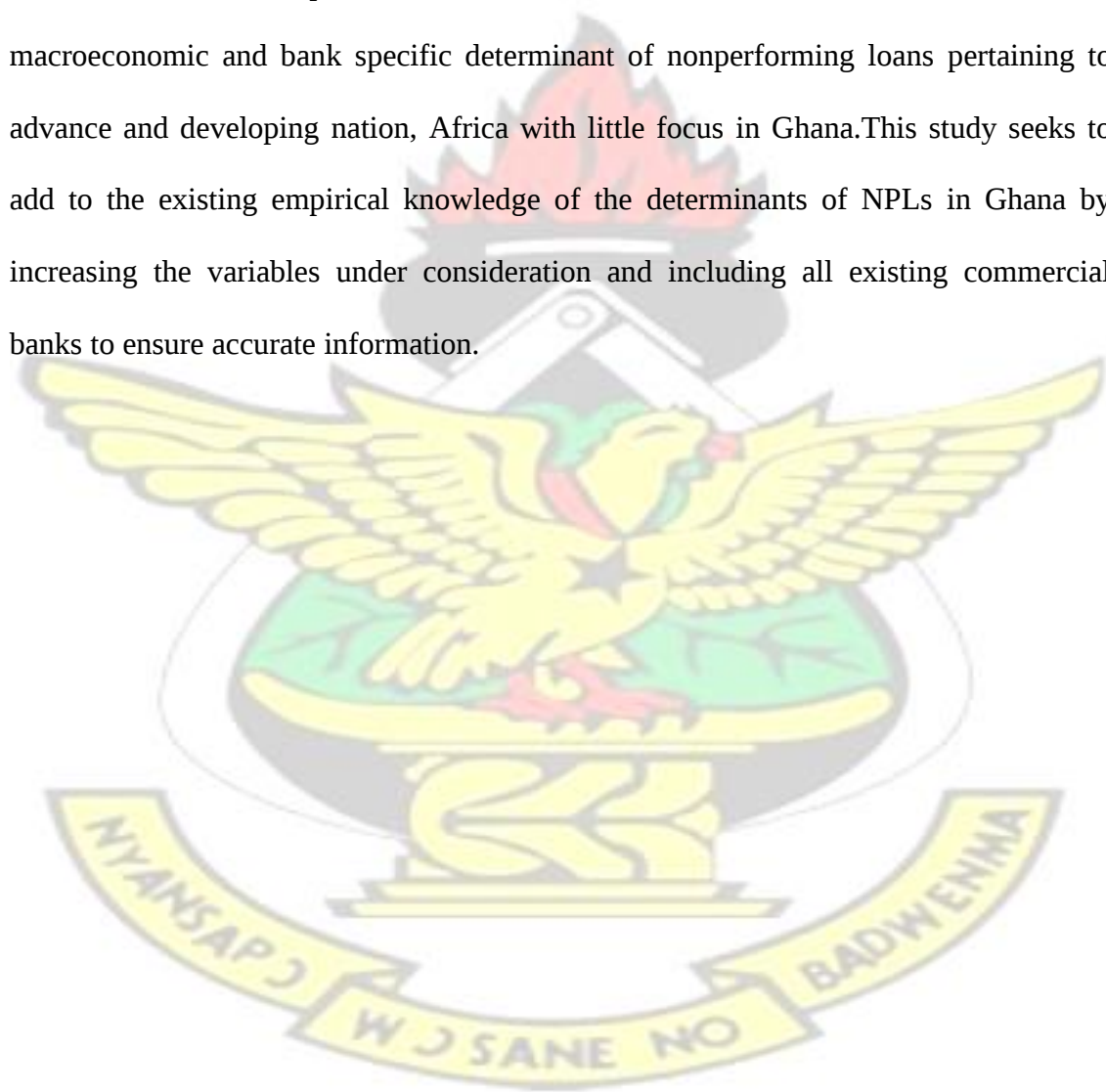
**Figure 2.1: Conceptual framework** Source: Researcher field construct, 2020

## 2.6 Summary of Chapter

This chapter sought to examine empirically the macroeconomic and bank level determinants of NPLs in Ghana. First, it introduced the definition of NPLs and explained the causes, the functions in the economic growth process, consequences, and the determinants and provides an overview of NPLs in the Ghana banking space. Second, it presented the theoretical underpinning macroeconomic and bank level determinants of NPLs which considered business cycle, asymmetry of information theory. Intuitively, banks find themselves in difficult position to differentiate between bad borrowers and good ones due to the problem of asymmetric information. Moral hazard and adverse selection makes banks prone to the risk of default in credit services by Mensah, (2019). Moreover, empirical literature on NPLs which mainly focused on macroeconomic and bank level factors is presented. From the empirical review above,

the main challenges that confront financial institutions is the risk that loans may go bad (Ofori-Aberbrese, 2016).

However, macroeconomic factors which have impact on loans should be managed well to minimize the level of non-performing loans (Asamoah and Asiama, 2019). The hypothesis and conceptual framework have been explained in relation to the dependent variables and the independent variable. There have been a number of studies on macroeconomic and bank specific determinant of nonperforming loans pertaining to advanced and developing nations, Africa with little focus in Ghana. This study seeks to add to the existing empirical knowledge of the determinants of NPLs in Ghana by increasing the variables under consideration and including all existing commercial banks to ensure accurate information.



## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

This chapter presents the methodology and data acquired to analyze the macroeconomic and bank level determinant of nonperforming loans. The chapter is structured in six main sections. Section one introduces the research design and discusses research approach adopted for the study, research type used and the research strategy adopted for the study. The data are described in section two and it explains the sample for the study, type of data used and, the data collection process. The illustration of the general econometric model is in section three. It discusses a panel model which consists of fixed and random effect. The model in for the study is specified in section four, capturing all the deterministic factors in relation to the dependent variable. It also shows the diagnostic test of the study. Section five presents the variables and their measurement used in the study; both dependent and independent whilst a summary and concluding comment of the chapter is provided in section six.

#### **3.1 Research design**

Explanatory research type was considered to evaluate the variables of macroeconomic and bank level in determination NPLs in this study. It was chosen because it allows us to adapt to new data and have better understanding of the subject area. In the work of Saunders et al, (2009), explanatory research design attempts to produce better causal relationship between variables. However, a case study strategy was adopted for this study based on the research design employed from 2008-2018. A quantitative research method is chosen as a result of the secondary data used to achieve the stated objectives of the study. According to Creswell (2017), research design that is quantitative is very

reliable and accurate because of its precise quality as it can easily represent the whole population under study.

### **3.2 Data and data source**

A panel data is employed for the study estimation. However, data on the dependent (NPLs) and independent (macroeconomic and bank level) variables were collected from annual secondary source. Moreover, the bank level is secondary which were sourced from annual financial statements of selected commercial banks. Additionally, we used secondary macroeconomic data which were also retrieved from the World Bank Development Indicator database from 2008-2018. The data was screen out using Microsoft excel application. The starting date of the data is from 2008 to 2018 and it considers banks with current information and having granted license for operation within the period for the study. The year 2008 is chosen as the base year because the financial system was stable excluding the global financial crisis and which also extends to the year Ghana experienced banking crisis.

#### **3.2.1 Sample Size**

The population of this study is all banks (commercial banks, savings and loans, rural and community banks) which are many in Ghana. The study centred on 21 commercial banks. Judgmental sampling technique was used in selecting 21 commercial banks for a period of 10 years. However, this was inspired by Maxwell (1996) that deliberately, events are chosen in order to give vital information that cannot be obtained from other choices. Judgmental sampling technique was chosen because the selected sample was done based on banks with available data, current information and the years in operation. These banks which were considered subject to data availability as at 2018 are;

Absa Bank Ghana Ltd, Access Bank Ghana Ltd, Agricultural Development Bank of Ghana, Bank of Africa Ghana Ltd, Cal Bank Ltd, Ecobank Ghana Ltd, FBN Bank Ghana Ltd, Fidelity Bank Ghana Ltd, First Atlantic Bank Ltd, GCB Bank Ltd, Guaranty Trust Bank, National Investment Bank, OmiBSIC Bank Ghana Ltd, Prudential Bank Ltd, Republic Bank Ghana Ltd, Societe Generale Ghana Ltd, Stanbic Bank Ghana Ltd, Standard Chartered Bank Ghana Ltd, United Bank for Africa Ghana Ltd, Universal Merchant Bank Ltd, and Zenith Bank Ghana Ltd..

### 3.3 Econometric Model

This research is built on a panel data models which considered both fixed effects and random effects. Panel data were used to estimate the various impacts macroeconomic and bank level variables have on NPLs. The methodology assumes heterogeneous qualities of dissimilar institutions with different and broad elements, having adequate degrees of freedom and more data variability. Given a general model of the form (Greene, 2002);

$$y_{it} = z'_{it}\beta + s'_i\alpha + \varepsilon_{it} = z'_{it}\beta + \lambda_i + \varepsilon_{it}(1)$$

Firstly, by taking equation (1) into consideration, the vector  $z_{it}$  comprises of  $M$  regressors which exclude a constant term. The individual heterogeneity nature is denoted by  $s'_i\alpha$  where the vector  $s_i$  incorporates a fixed term and a particular individual or a set of associative specific characteristics which have been followed or not, all have been captured into the constant term over a certain time ( $t$ ) period.

### 3.3.2 Fixed Effect Model

In relation to the fixed effect model, from equation (1), if  $s_i$  (the individual differences) is not followed which maybe correlated with  $x_{it}$  then using the least squares to estimate  $\beta$  (vector) will generate biased and inconsistent outcome as a result of variable omission. In effect of such an instant, the model from equation (1) above will be modified to be;

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

Where  $\alpha_i = s'_i\alpha$  which denotes all discernible effects and defines a computable conditional mean. In the regression model,  $\alpha_i$  is considered to be constant which assumes that all individual heterogeneity or group-specific are captured into it.

### 3.3.3 The Random Effect Model

With respect to random effect, the individual differences which have not been detected can presume to have correlated with the individual factors. For that matter, the random effect model in equation (1) is transformed as;

$$y_{it} = z'_{it}\beta + E[s'_i\alpha] + \{s'_i\alpha - E[s'_i\alpha]\} + \varepsilon_{it} = z'_{it}\beta + \alpha + v_i + \varepsilon_{it} \quad (3)$$

The linearity assumption is now satisfied in equation (3) constituting a combined stochastic term that may exhibit consistency or uniformity, but when estimated by least squares may produce inefficient and inconsistent outcome. The random effect technique defines that  $v_i$  exhibit particular group random variable which is the same as  $\varepsilon_{it}$  with the exception of each particular group having an individual cast into the regression undistinguishable in each time space. The generalized least squares (GLS) are employed to estimate variables in the random effect model when the variance

structure is recognized, whereas, in the case of unknown variance, the Feasible Generalized Least Square (FGLS) is used. In this study, the random effect model is estimated by using the GLS. According to Baltagi (2001) GLS based on the true variance constituents is BLUE as well as FGLS estimators are considered to be asymptotically effective as either the sample size approaches infinity if the variance is assume to be known.

#### **3.3.4 The Hausman's Test**

The Hausman specification test is used to detect correlation between the error elements and theregressors in a random effects model. Moreover, it helps to make comparison between the fixed and random effects and decides which approach is appropriate. The assumed hypothesis of the Hausman's test is that both the random effects and fixed effects estimators are consistent and no correlation exists between them (Hausman, 1978). However, if there is existence of correlation between them, the random effects estimator is inconsistent and bias. Thus, it violates the Gauss-Markov assumptions, and the fixed effects model becomes the best estimator. This means we reject the null hypothesis that there is no correlation in the random effect and accept the fixed effects estimation.

#### **3.4 Model Specification**

The escalations of NPLs have detailed explanation connected to both macroeconomic and bank level determinants based on the review of previously documented literature. The empirical model used to determine the macroeconomic and bank level determinants of NPLs in the Ghanaian banking sector is adapted from Jiménez and Saurina (2005). The regression model is a linear function that relates the ratio of bad

debt or NPLs to total loans in relation to vital macroeconomic and bank-level determinants. Base on the general equation, the regression equation is expressed as;

$$\begin{aligned} \ln NPLS_{Q_{i,t}} = & \beta_0 + \beta_1 \ln NIM_{i,t} + \beta_2 \ln BSIZE_{i,t} + \beta_3 \ln ROA_{i,t} + \beta_4 \ln LGTY_{i,t} + \beta_5 \ln EFF_{i,t} + \beta_6 \\ & \ln INFL_t + \beta_7 \ln GDP\_CP_t + \beta_8 \ln PD_t + \beta_{13} \ln UNMPL_t + \beta_{14} \ln RINT_t + \varepsilon_{i,t} \quad (4) \end{aligned}$$

For  $i = 1 \dots N, t = 1 \dots T$

Where;

NPL– Nonperforming Loans

NIM–Net Interest Margin

BSIZE–Bank Size

ROA–Return on Asset

LQTY–Liquidity

EFF– Efficiency

INFL–Inflation

GDP\_CP – Gross Domestic Product per Capital

PD– Public debt

UNMPT– Unemployment

RINT– Real Interest Rate

### 3.4.1 Diagnostics Test

Regression is based on proposed assumptions of which some are; normal distribution of residuals, the existence of correlation between the error terms, the residuals variance must be constant and the correlation between the explanatory variables (Torres-Rayna, 2007; Im-Pesaran-Shin, 2003; Harris- Tzavalis, 1999; Bruitung and Das 2005). The

study adapted an econometric test which comprises of hetroskedasticity, autocorrelation or serial correlation and multicollinearity and normality test to ascertain that the assumptions of the regression analysis are satisfied.

#### **3.4.1.1 Normality Test**

Many of the statistical procedures which include correlation, regression, and variance analysis are based on the assumption that the data complies with normal distribution or a Gaussian distribution (Karl Gaussian, 1777-1855). This test assumes that the data set is well-modelled for a normal distribution without any deviation or an outlier within the population or sample set. The data set is tested against the null hypothesis that it is normally distributed

#### **3.4.1.2 Heteroscedasticity Test**

This is the case where the variance of the error term is not constant or where the variance of the residual is not homoskedastic, and assumes that the error terms are normally distributed (Breusch Pagan, 1979). Interestingly, the occurrence of hetroskedaticity violates the assumptions of the classical linear regression model that the variance of the residuals is not variable in the fixed effect model. If this problem exists transforming the variables into logs can solve the problem.

#### **3.4.1.3 Autocorrelation or Serial correlation test**

Serial correlation tests are appropriate to macro panels with long time series for about 10 years and above and not in micro panels with short time period (Andrews-Ploberg, 1996). This rises when the error terms are correlated or serially correlated. In the case of autocorrelation, the coefficients of the regressors have smaller standard errors and

higher R-squared. Therefore, we test to see if there is no autocorrelation in our regression model and if there exist, it is appropriate to use generalized least squares (GLS) procedure.

#### **3.4.1.4 Multicollinearity Test**

This is situation where the repressors' or explanatory variables are highly correlated with each other in a specified regression model. This is carried out to check if the independently specified with no influence within the model. Null Hypothesis,  $H_0$ : There is no perfect multicollinearity. That is the explanatory variables exhibit no perfect linear relationships. Farrar & Glauber (1967) in their study posit that the existence of correlation between explanatory variables should not exceed 0.70 and contrary to rule proves multicollinearity among variables.

### **3.5 Variables Description and Measurement**

This section is outline and gives justification on each determinant factor selected for the dependent and explanatory estimation. The expected sign of each variable selected will also be assign by this section, and also specify the source of each variable and its measurement.

#### **3.5.1 Dependent Variable-(Non-performing loans)**

Nonperforming loans are loans which are no more generating cash flow from either the principal or the interest payment for a period of time due to due to the violation of the debt contractual terms. However, when the borrower violate the terms and conditions pertaining to the payment of the loan which deteriorate the quality of banks assets then that loan becomes nonperforming. Mathematically, NPLs is calculated as;

$$NPLs = \frac{BAD\ DEBTS}{TOTAL\ LOANS}$$

From the above model,  $\ln NPL_{Q_i,t}$  represents the natural log of the ratio of bad debt charges to total loans for bank  $i$  in year  $t$ . In this study we describe NPLs as the ratio of bad debt to total loans. Bad debt charges were extracted from the annual report by the banks on their income statement and the total loans and advances on their statement of financial position. Bank failures that have become normal could be avoided with proper policies efficiently implemented to curb the impairment in banks assets quality by Epure and Lafuente (2015).

### 3.5.2 Independent Variables

Detailed discussions of the regressors in this study are given in this section, their expected sign influence on the dependent variable, and with supportive empirical evidence. In this study the independent variables comprised of return on asset, loan loss provision, bank size, operating efficiency, net interest margin, liquidity, Loan growth, Loan to asset ratio, inflation, gross domestic product per capita, interest rate, exchange rate, export to import ratio, public debt, unemployment. These variables were selected from already reviewed documented literature base on the level of influence they have on nonperforming loans.

#### 3.5.2.1 Net Interest Margin (NIM)

The main source of income for the bank is interest income and the NIM is a ratio to measure how asset generate income. Cahal et al, (2019) in his studies posit that banks hold many asset and liabilities in different order and maturities which requires different interest charges. The difference between interests paid on deposit by the banks to customers (interest expense) and interest the bank gets on deposit invested (interest

received) is the spread. According to Pasaman (2017) the difference between interest expense and interest received divided by total earning assets is called NIM. If the spread is positive, it means the bank is receiving more interest on deposit invested than the interest it pays to customers and vice versa. Thus, in our study, NIM denotes the natural log of NIM for each bank in the banking industry at time t. Thus, NIM is measured as;

$$NIM = \frac{INTEREST\ INCOME - INTEREST\ EXPENSE}{TOTAL\ EARNING\ ASSETS}$$

### 3.5.2.2 Management Efficiency (EFF)

This variable is very crucial in determining how efficient a bank will be in generating profitability and can be measured by different financial ratios which include loan growth rate, earnings growth rate and total asset growth. However, operating efficiency is measured as cost incurred on operations over the income generated from it. Previously documented literature such as Ofori-Abeberese (2016) where she represented bank inefficiency with management inefficiency has evidenced that banks with high NPLs is also associated with high inefficiency. Thus, management inefficiency positively causes NPL as a result of lack of quality management in terms of knowledge inability to skilfully scrutinize and underwrite credit facilities that are allotted to new clients.

Management efficiency (EFF) =  $\frac{OPERATING\ EXPENSES}{OPERATING\ INCOME}$ , thus, efficiency is expected to have a negative sign.

### 3.5.2.3 Return on Asset (ROA)

This ratio measures the return on the firm's resources (its assets). It is an all inclusive measure of performance that indicates the total that management is able to achieve on

all the firm's assets. There has been proven evidence by Ghosh (2017) who highlighted that highly profitable corporate involve in less riskier investment activities. High ROA of a bank demonstrate that the bank is performing very well in utilizing of its assets in generating revenue for its shareholders. Mathematically, Return on Asset is given as;

$$ROA = \frac{\text{EARNINGS AFTER NET PROFIT}}{\text{TOTAL ASSETS}}.$$

There are other studies that have shown either positive or negative link between Return on Asset and NPLs. Ahmed (2013) and Makri et al. (2014) in their study hinted that NPLs and ROA are significantly and a directly related which contradicted the findings of Selma and Jouini ( 2013).

#### **3.5.2.4 Bank Size (BS)**

The bank size can be measured by using the log to capture the assets of banks by Vithessonthi (2016). Annie M.D Mensah (2019) postulated that the assets of banks thus consist of both current and non-current assets which represent shareholders equity as the capital invested in the business and liabilities. Bank Size is calculated as;

$$\text{Bank Size (BS)} = \log \left( \frac{\text{ASSETS OF BANK } i}{\text{TOTAL ASSET OF ALL BANKS AT YEAR } t} \right)$$

Based on previously literature, there is strong evidence purporting a direct relationship existing between bank size and NPLs. In a situation where a bank earns higher returns by incurring a higher cost of risk has high probability of experiencing an increase in NPLs at a point of economic stagnation and recession. A study by Misra and Dhal (2010) demonstrated that there a direct link between larger banks with increase in NPLs due to poor financial position of the bank. In view of this we expect a positive relationship between bank size and NPLs.

### 3.5.2.5 Liquidity (LQTY)

Liquidity in this study explains how easy a bank can meet its short term cash and debt obligations without facing any difficulties. According to Rasiah (2010) some regulatory authorities have mandated every bank to hold some liquid assets in order to deal with bank runs when the need arises. A bank would be considered to be more liquid if it has adequate cash and other assets that are highly liquid and be used to raise funds easily to meet its obligations and other financial claims as they fall due. Loan to Deposit ratio have been employed to measure the liquidity ratio in this study as;

$$LQTY = \frac{\text{TOATAL LOANS GRANTED}}{\text{TOTAL CUSTOMERS' DEPOSIT}}$$

High loan to deposit ratio indicates that banks grants more loans than the cash flow indented to support the day to day activities, increase in this ratio brings out the bank is interested in taking risk and is expected to lead to higher NPLs. in this case a positive relationship is expected between NPL in this stance.

### 3.5.2.6 Inflation Rate (INFL)

The increase in overall price level of goods in an economy is called inflation. Inflation is a major macroeconomic factor that shouldn't be ignored because of its role in the economy. In times of high inflation, the value of customers' purchasing power declines and hence little goods can be bought and also the real value of currency deteriorates making loan repayment more complicated as more money is needed to service the loans. Previously documented literature such as Amuakwa-Mensah and Boakye Adjei (2015) suggested that inflations implicate effect on NPLs. Kusmayad et al. (2017) also pinpointed that inflation cause's high loan default hence positively related to NPLs

which contrasted the works of Škarica ( 2014); Vogiazas & Nikolaidou(2011); Zribi & Boujelbène (2011)

### **3.5.2.7Gross Domestic Product per Capita (GDP\_CP)**

Total monetary value of all goods and services produce in an economy within a period of time usually one year divided by the total population is called GDP Per Capita. There is evidence that demonstrate that GDP per capita is negatively related to NPLs (Ayyappan & Ramachandran, 2013; and Dash & Kabra, 2010). A growth in a country's GDP creates good standard of living, profit of business and individuals increases which enhances their capacity to repay their loans, and during recession little profit is generated making it difficult to settle their loans. A growth in GDP of a country indicates an increase in favourable economic activities as a measure for economic growth.

### **3.5.2.8Unemployment (UNMPT)**

Unemployment is a powerful factor associated with NPLs. This is the case where the active labour force is actively looking for employment but can't find one. As pointed out by Messai & Jouini (2013) during high unemployment, cash flow for the labour force reduces which also reduce the amount of goods and services they bought. In view of this, borrower's ability to settle their loan repayment also reduces as a result of the reduction in cash flow, hence NPLs. According to Ahlem S. M. and Fathi Jouini (2013), there is a positive impact of unemployment on impaired loans. When unemployment is low borrowers capacity to service their loan increases which will also reduce NPLs. Hence, we expect a positive association between unemployment and NPLs.

### 3.5.2.9 Real Interest rate (RINT)

Interest rate is a monetary policy tool used by the central bank to affect money supply in an economy. There have been several paths in which changes in interest rate influence aggregate demand and output prices. One of the channels that monetary policy can be used to make changes in an economy is through the lending and borrowing rates that are charged on the borrowers of funds by commercial banks. When the central bank raises the base rate of commercial banks, the commercial banks also charges high rate on loans and the interest offer on savings account rises (Ofori-Abebrese, 2016). High interest rate discourages businesses to go in for loans and those who will go for credit finds it difficult to pay back the loan which result in high NPLs. Furthermore, if interest rate goes down, more loans are given out and the ability of businesses to pay their principal and interest is assured reducing bad debt (Bofondi and Ropele, 2011). Thus, a positive nexus between interest rate and NPLs is expected.

### 3.5.2.10 Public Debt (PD)

Public debt which can also be called sovereign debt is the debt attributed to the government outside its own jurisdiction (Kimberly Amadeo, 2020). In this study, public is the accumulation of a government annual budget deficit where the government spends more than her revenue. It is measured as;

$$\text{Public debt} = \frac{\text{TOTAL DEBT OF A COUNTRY}}{\text{TOTAL POPULATION}}.$$

Borrowing funds by the government helps the government to get extra funds for its developmental project in the short run. An increase in public debt raises the interest rate that must be paid on the loans and this may affects the private sector. Rising interest rate without a corresponding increase in GDP makes it difficult for business and

individuals to pay their loans and with such an instance the loan maybe non performing (Amuakwa-Mensah et. al, 2017). Makri et al. (2014) and Ghosh (2015) suggested that public debt is positively correlated with the NPL. Hence, public debt positively affects NPLs.

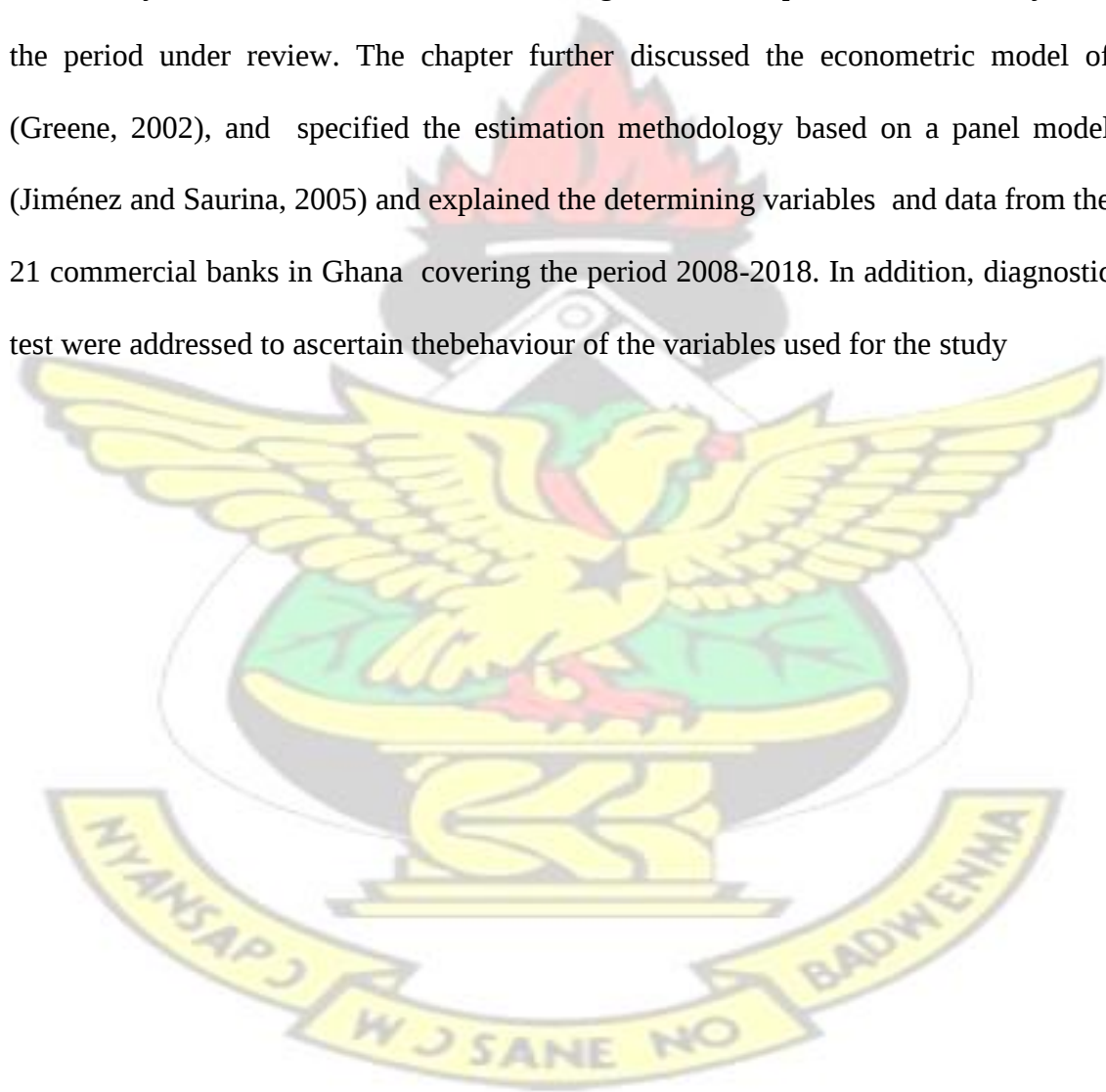
**Table 3.1: Macroeconomic and Bank-level variables used in this study and their expected sign with the non-performing loans**

| Variables                      | Expected sign | Supporting literature                                        |
|--------------------------------|---------------|--------------------------------------------------------------|
| Nonperforming loans(NPLs)      |               |                                                              |
| Net Interest Margin (NIM)      | Negative      | Melanie klein (2020)                                         |
| Bank inefficiency(BI)          | Positive      | Ahlem S. M. and Fathi Jouini (2013)                          |
| Return on assets (ROA)         | Negative      | Louzis et al. (2012), Ofori-Abeberese (2016)                 |
| Bank size (BS)                 | Positive      | Amuakwa-mensah and Boakye-Adjee (2015), Annie M.D (2019)     |
| Liquidity (LQTY)               | Negative      | Jameel (2014), Anjom and Karim (2016)                        |
| Inflation rate (INF)           | Positive      | Alhassan et al. (2014), Wikutama (2010)                      |
| GDP per capita growth (GDP_CG) | Negative      | Ayyappan & Ramachandran, 2013; and Dash & Kabra, 2010        |
| Interest rate(IR)              | Positive      | Asiama K. and Anthony Asiamah (2018)                         |
| Public debt rate(PDR)          |               | Makri et al. (2014) , Ghosh (2015)                           |
| Unemployment(UNPL)             | Positive      | Ahlem S. M. and Fathi Jouini (2013), Sergey Avetisyan (2019) |

*Figure 3.1: Author's own construct*

### 3.6 Summary of chapter

This chapter sought to examine empirically the macroeconomic and bank level determinants of NPLs in Ghana. This chapter gives explanation to the approach and methodology used to carry out this study and to check whether the fixed effect or the random effect is appropriate. Quantitative research was chosen because it helps the study to be relinquished from any pressure of influence by the researcher. The sample of the study was all 21 commercial bank having licensed to operate in Ghana subject to the period under review. The chapter further discussed the econometric model of (Greene, 2002), and specified the estimation methodology based on a panel model (Jiménez and Saurina, 2005) and explained the determining variables and data from the 21 commercial banks in Ghana covering the period 2008-2018. In addition, diagnostic test were addressed to ascertain the behaviour of the variables used for the study



## **CHAPTER FOUR**

### **RESULTS AND DISCUSSION**

#### **4.0 Introduction**

The present chapter focuses on macroeconomic and bank level determinants of nonperforming loans in Ghana which accomplishes objectives one, two and three. The chapter is structured in seven main sections. The preliminary analyses of the data including trend, descriptive, correlation, and unit root test are presented in section one. The result for the objective which seeks to determine macroeconomic determinants of NPLs is presented in section two. Section three discusses the results of macroeconomic and bank level determinants of NPLs. This is done to ascertain whether these variables are important in explain NPLs. The study objective to see whether the determinants of NPLs of domestic banks are different from foreign banks is also discussed in section four. However, the residual diagnostics test is layout in section five. Finally, section six gives a summary description of the various sections of the chapter.

#### **4.1 Preliminary Analysis of Data**

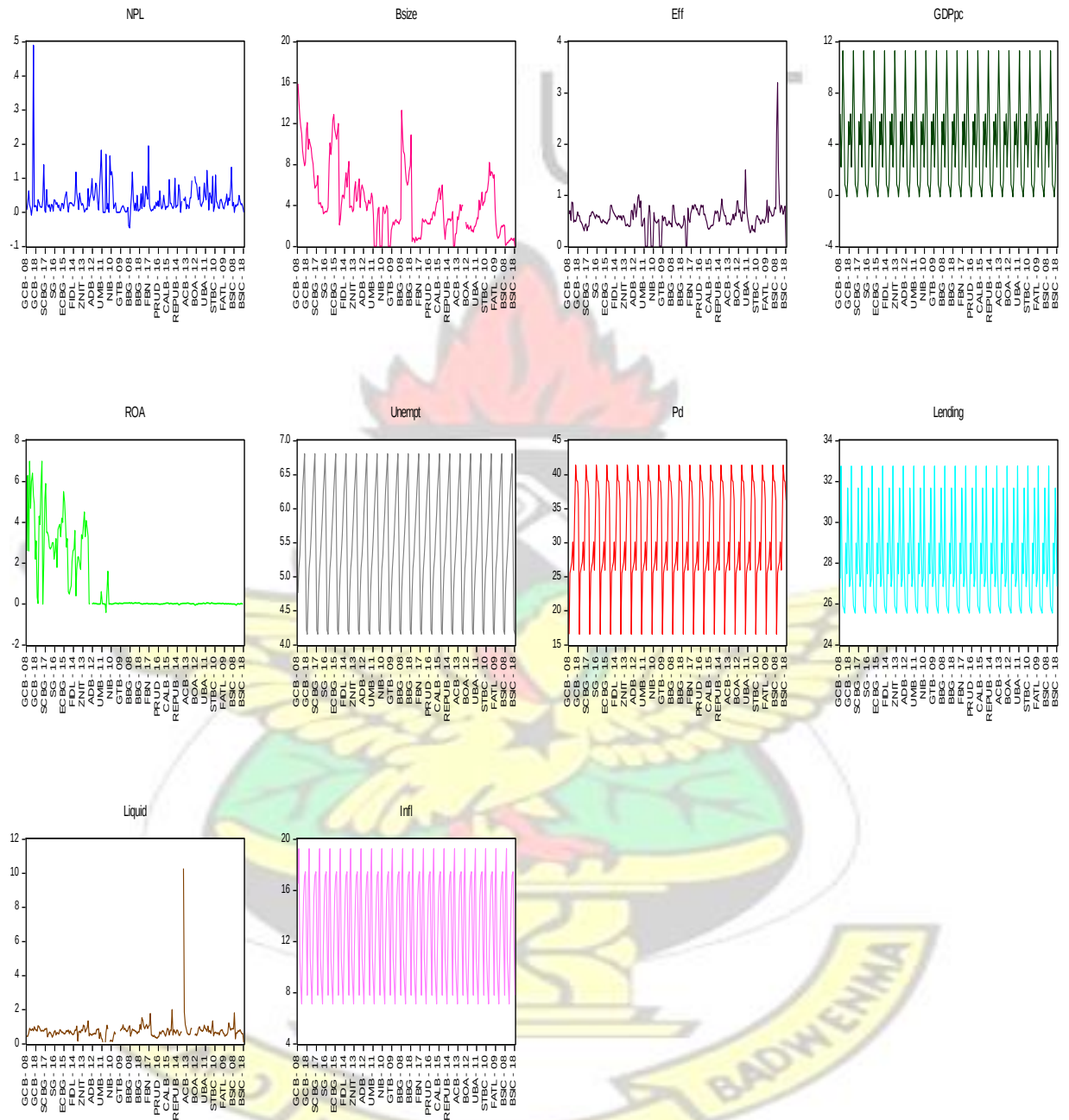
The data consists of ten annual macroeconomic and bank level variables which starts from December, 2008 to 2018 obtained from the commercial banks annual financial statements and macroeconomic variables form World Bank development indicators. The data is panel data set made up five macroeconomic variables which includes inflation, lending rate, unemployment, public debt, GDP per capital and the bank level factors from 21 commercial banks consisting of Absa Bank Ghana Ltd, Access Bank Ghana Ltd, Agricultural Development Bank of Ghana, Bank of Africa Ghana Ltd, Cal Bank Ltd, Ecobank Ghana Ltd, FBN Bank Ghana Ltd, Fidelity Bank Ghana Ltd, First Atlantic Bank Ltd, GCB Bank Ltd, Guaranty Trust Bank, National Investment Bank,

BSIC Bank Ghana Ltd, Prudential Bank Ltd, Republic Bank Ghana Ltd, Societe Generale Ghana Ltd, Stanbic Bank Ghana Ltd, Standard Chartered Bank Ghana Ltd, United Bank for Africa Ghana Ltd, Universal Merchant Bank Ltd, and Zenith Bank Ghana Ltd. The ratio of natural log of bad debt over total loans and advances is used as a proxy for NPLs, while natural log of cost to income ratio also serves as a proxy for management efficiency and total deposit to total loans as proxy for liquidity. The following sub-sections details the trend analyses, descriptive statistics, correlation analysis and the unit root test of the variables data set.

#### **4.1.1 Trend Analyses**

To envision the behaviour of nonperforming loans and the various determinants, figures 4.1.1 presents a graph showing the pattern of NPLs of commercial banks, both local and foreign banks operating in Ghana from 2008-2018. Respectfully, it also provides a graphical behaviour macroeconomic and bank level variables from 2008-2018. In the figure, it can be observe that x-axis denotes the years whereas y-axis denotes the level of NPLs. From the initial reflection in figure 4.1.1, there was a fast increase in NPLs and this support the position of 2018 banking crisis in Ghana as a result of sharp depletion of assets and escalation of NPLs. in a similar way, the behaviour of the bank size also demonstrates a sharp increase in 2015 and a sharp drop in 2016 where the signs of the banking crisis in Ghana began boom. During 2017-2018 it started increasing due the banking sector regulation for banks to increase their operating assets and their capitalization by Bank of Ghana. The return on banks assets exhibited a smooth and return which was reported stationary before the banking crisis from 2008 to 2015. Now, it started to portray high and low unexpected returns as banks involved in risky assets. The new banking regulations on how to operate banks assets yielded good

results as it is increasing after the banking sector clean-up. Below is the graphical presentation of the various trends;



**Figure 4.1: Trend characteristics of macroeconomic and bank level determinants of NPLs in Ghana banking sector.**

Source: Authors' calculations from data obtained (2008-2018).

The efficiency of banks before was high between 2008 and 2014. Afterwards, it has experienced a continuous drop as management was not putting the resources of the bank into efficient use where the operating cost was much higher than the operating income from 2015-2018. The liquidity of nature of the banks has been on the decreasing since there have been competition among the banks for granting more loans with little increase the deposit rate. All the macroeconomic variables reflect a stationary response to NPLs (GPD per capital, inflation, lending rate, public debt and unemployment) in all these periods.

#### 4.1.2 Descriptive Statistics

Table 4.1 below describes summary statistics of the various variables employed in determining NPLs of commercial banks from 2008 to 2018. The figure depicts the sample observations, mean, median, maximum, minimum standard deviation and the probability. NPLs measured by bad debt divided by total loans ranges from -4.5 to 49%. It has an average of 0.038, 0.025, 0.047, 4.715, and 40.557 as median, standard deviation, skewness and kurtosis respectively. The highest mean effect is recorded in public debt (31.110) followed by lending rate (28.110) with Net Interest Margin having the lowest mean return of the determinants. This indicates that public debt has the highest effect on loan performance followed by lending rate in Ghana.

The variability as a measure of standard deviation in Table 4.1.2 shows very high in public debt (7.206), lending rates (28.110) and inflation (4.509) with the lowest recorded in NIM (0.061). By looking at the data, half of the variable deviations are above the rule of thumb 2 and half is less than. This status is further strengthening by public debt and lending rate having high minimum values for NPLs of 16.584, 25.560

and 7.126 respectively. Thus, this is consistent with the expected signs that increase in public debt, lending rate and inflation results in high NPLs. The mean return of liquidity 0.771 and 0.000 minimum values suggests that highly liquid banks have less NPL in their asset portfolio. In the light of these characteristics, lower risk is indicative of potential lower NPLs, it is equally an indication of higher potential losses in terms of higher risk in areas of poor credit assessment, poor management and unfavourable macroeconomic economic indicators.

**Table 4.1: Summary statistics of macroeconomic and bank level determinants of NPLs**

| VAR. | OBS | MEAN   | MED.   | MAX.   | MIN.   | ST.DV | SKEW<br>NESS | KURTO<br>SIS | PROB.  |
|------|-----|--------|--------|--------|--------|-------|--------------|--------------|--------|
| NPL  | 219 | 0.038  | 0.025  | 0.490  | -0.045 | 0.047 | 4.715        | 40.557       | 0.0000 |
| BS   | 219 | 4.466  | 3.800  | 15.900 | 0.100  | 3.263 | 1.056        | 3.631        | 0.0000 |
| EFF. | 219 | 0.589  | 0.560  | 3.200  | -0.530 | 0.283 | 4.553        | 39.665       | 0.0000 |
| GDPC | 219 | 4.013  | 3.959  | 11.315 | -0.114 | 3.376 | 0.656        | 2.623        | 0.0002 |
| INFL | 219 | 13.149 | 12.375 | 19.251 | 7.126  | 4.059 | -0.053       | 1.572        | 0.0008 |
| LQTY | 219 | 0.771  | 0.720  | 10.290 | 0.000  | 0.701 | 11.525       | 156.274      | 0.0000 |
| RINT | 219 | 28.110 | 27.500 | 32.750 | 25.560 | 2.272 | 0.813        | 2.522        | 0.0002 |
| NIM  | 219 | 0.086  | 0.081  | 0.850  | 0.005  | 0.061 | 9.096        | 114.514      | 0.0000 |
| PD   | 219 | 31.110 | 30.112 | 41.429 | 16.584 | 7.206 | -0.275       | 2.217        | 0.0154 |
| ROA  | 219 | 1.0173 | 0.038  | 7.000  | -0.400 | 1.749 | 1.611        | 4.498        | 0.0000 |
| UNMP | 219 | 5.4932 | 5.450  | 6.806  | 4.157  | 0.832 | -0.102       | 1.982        | 0.0073 |

*Source: author's computation 2020; NPL represents non-performing loans, BSIZE means bank size, INEFF stand for inefficiency, GDPC shows GDP per capital, INFL means inflation, LQTY represents liquidity, RINT denotes real interest rate, NIM stand for net interest margin, PD represents public debt, ROA refers to return on assets, UNMP indicates unemployment.*

The distributional properties of loan performance determinants, as shown by the sixth and seventh column, appear to exhibit extreme observations. In Table 4.1, the determinants (bank size, ROA, Liquidity, Inefficiency, NIM and GPD\_CP , real interest rate) show a positive skewness, while three of the macroeconomic variables (Inflation, Public debt and Unemployment) show negative skewness. Positive skewness signifies a distributional effect with an asymmetric tail that leads to more positive values, while negative skewness shows an influence distribution with an asymmetric tail that leads to more negative values. Thus, the skewness in the annual determinants of NPLs suggests that determinants distribution is normally symmetric. On the other note, the significant high values of kurtosis assume that the annual determinants of NPLs in Ghana banking sector are leptokurtic distributed.

#### **4.1.3 Correlation Analysis**

Correlation expresses the extent to which the factors that determines non-performing loans are associated. The correlation analysis helps to reveal whether there exists multicollinearity among the determinants of NPLs. The estimated values provide the strength of the correlation and the sign shows the path of the relationship between the NPLs determinants. From table 4.2 the variables used for the study exhibit no multicollinearity because all the coefficients fall under 0.70. The variables demonstrate multicollinearity if the correlation between them exceed 0.70 (Farrar & Glauber, 1967). The highest value recorded was -0.606 which is between GDP\_CP and inflation presenting strong negative correlation followed by inflation and real rate of interest, bank size and return on asset with values of 0.602 and 0.598 respectively showing high positive correlation between these variables.

However, all the bank level variables which includes bank size, efficiency, net interest margin, return on assets shows weak negative correlation values -0.042,-0.048, - 0.004, -0.046, -0.025 with NPLs. Also, all the macroeconomic variables employed reported weak positive correlation between NPLs with the exception of GDP\_CP having a negative weak correlation across all NPLs determinants used in the study. In terms of correlation within the macroeconomic and bank level determinants of NPLs in Ghana, the statistics reveals that correlations are high between macroeconomic determinants than for bank level determinants.

**Table4.2: Correlation of macroeconomic and bank level determinants of NPLs**

|              | NPL    | BS     | EFF    | GD_CP  | INFL   | RINT   | NIM    | PDT    | ROA    | UNPT   | LQTY |
|--------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| <b>NPL</b>   | 1      |        |        |        |        |        |        |        |        |        |      |
| <b>BS</b>    | -0.042 | 1      |        |        |        |        |        |        |        |        |      |
| <b>EFF</b>   | -0.048 | -0.083 | 1      |        |        |        |        |        |        |        |      |
| <b>GDPCP</b> | -0.079 | 0.005  | 0.074  | 1      |        |        |        |        |        |        |      |
| <b>INFL</b>  | 0.083  | -0.042 | 0.010  | -0.606 | 1      |        |        |        |        |        |      |
| <b>RINT</b>  | 0.039  | -0.039 | 0.118  | -0.416 | 0.602  | 1      |        |        |        |        |      |
| <b>NIM</b>   | 0.004  | 0.062  | -0.042 | -0.051 | 0.004  | 0.161  | 1      |        |        |        |      |
| <b>PDT</b>   | 0.121  | 0.017  | -0.151 | -0.027 | 0.005  | 0.232  | 0.176  | 1      |        |        |      |
| <b>ROA</b>   | -0.046 | 0.598  | -0.151 | -0.027 | -0.029 | -0.031 | 0.091  | 0.046  | 1      |        |      |
| <b>UNPT</b>  | 0.114  | -0.071 | -0.140 | -0.414 | 0.175  | -0.209 | -0.003 | 0.132  | 0.048  | 1      |      |
| <b>LQTY</b>  | -0.025 | -0.109 | 0.003  | -0.037 | 0.067  | 0.125  | 0.045  | -0.016 | -0.028 | -0.087 | 1    |

*Source: Author's calculations on sample from 2008-2018: NPL means non-performing loans, BS refers to bank size, INEF is inefficiency, GDP\_CP denotes GDP per capital, INFL represents inflation, RINT means real rate of interest, NIM represents net interest margin, PDT refers to public debt, ROA means return on assets, UNPT denotes unemployment, LQTY means liquidity.*

#### 4.1.4 Unit Root Test

The study adopted both the method of Im et al. (2002) and the Levin et al. (2002) unit root test to determine the stationarity of the variables and their order of integration. The two methods were used for comparison in order to affirm the accuracy of the results for better understanding. The null hypothesis of both methods assumes that the corresponding data exhibit unit root against the alternative hypothesis that the data do not have unit root. The two approaches of the unit root are presented in table 4.3 below

**Table 4.3: Results of unit root test**

| Variable | Levels<br>(intercepts) |                     | 1 <sup>st</sup> ( Difference) |                      | OI |
|----------|------------------------|---------------------|-------------------------------|----------------------|----|
|          | LLC                    | IPS                 | LLC                           | IPS                  |    |
| NPL      | -3.0456<br>(0.0012)    | -1.6187<br>(0.0528) | -1.9971<br>(0.0229)           | -2.8246<br>(0.0024)  | 0  |
| LNBS     | 0.7315<br>(0.7678)     | 2.3272<br>(0.9900)  | -6.5876<br>(0.0000)           | -3.8732<br>(0.0001)  | 1  |
| GDP_CP   | -6.5927<br>(0.000)     | -1.3256<br>(0.0925) | -8.0179<br>(0.0000)           | -2.8092<br>(0.0025)  | 0  |
| ROA      | -12.2274<br>(0.0000)   | -2.4713<br>(0.0067) | -.6509<br>(0.0001)            | -3.8322<br>(0.0001)  | 0  |
| PDT      | -1.3242<br>(0.0927)    | 1.0357<br>(0.8498)  | -6.1067<br>(0.0000)           | -2.6995<br>(0.0035)  | 1  |
| EFF      | -10.8793<br>(0.0000)   | -3.9565<br>(0.0000) | -7.7280<br>(0.0000)           | -4.3950<br>(0.0000)  | 0  |
| UNPT     | 4.1316<br>(1.0000)     | 2.0693<br>(0.9807)  | -4.8170<br>(0.0000)           | -0.0490<br>(0.0480)  | 1  |
| LQTY     | -2.4310<br>(0.0075)    | -1.3998<br>(0.0808) | 0.6694<br>(0.0748)            | -1.4278<br>(0.0767)  | 0  |
| INFL     | -8.8808<br>(0.0000)    | -6.3286<br>(0.0000) | 2.0584<br>(0.0996)            | 0.0738<br>(0.0529)   | 0  |
| NIM      | -2.6387<br>(0.0042)    | -1.3649<br>(0.0861) | -6.0522<br>(0.0000)           | -3.3888<br>(0.0004)  | 0  |
| RINT     | -4.2261<br>(0.0000)    | -2.7351             | 7.5514<br>(0.0010)            | -0.6827<br>(0.00247) | 0  |

*Author's own construct from sample estimates 2008-2018. Levels means the coefficients, prob. Refers to probability, OI represents order of integration.*

The results for the unit root tests for all equations used LLC and IPS in table 4.3 test procedures show that the series are all stationary at levels in Levin, Lin and Chu except bank size and unemployment; whereas, Im, Pesaran, Shin approach also reported stationary at levels with the exception of bank size, public debt and unemployment. However, all the variables under consideration reported stationary after taking first differencing.

## 4.2 Analysing the results of the study objectives of macroeconomic and bank level determinants of NPLs in Ghana.

### 4.2.1 Hausman test

**Table 4.4: Hausman specification test results**

| Test Summary                                   |           | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob.  |
|------------------------------------------------|-----------|-------------------|--------------|--------|
| Cross-section random                           |           | 9.359256          | 10           | 0.4984 |
| Cross-section random effects test comparisons: |           |                   |              |        |
| Variable                                       | Fixed     | Random            | Var(Diff.)   | Prob.  |
| LNPDT                                          | -0.060362 | -0.053029         | 0.000028     | 0.0142 |
| LNROA                                          | 0.005797  | -0.000750         | 0.000010     | 0.0419 |
| LNRINT                                         | 0.182231  | 0.152632          | 0.000398     | 0.0808 |
| LNBSIZE                                        | -0.001353 | 0.000209          | 0.000002     | 0.3027 |
| LNLQY                                          | 0.021206  | 0.021540          | 0.000013     | 0.9274 |
| LNGDP_CP                                       | -0.006222 | -0.005639         | 0.000000     | 0.0897 |
| LNUMPT                                         | -0.015436 | -0.008402         | 0.000018     | 0.0981 |
| LNNIM                                          | 0.144502  | 0.123203          | 0.003011     | 0.6979 |
| LNEFF                                          | -0.020182 | -0.026437         | 0.000049     | 0.3700 |
| LNINFL                                         | -0.045483 | -0.038835         | 0.000016     | 0.0939 |

This section presents the results of the estimation regression. The study utilized both fixed and random effect models for examining the association between the dependent and independent variables used in the study. By choosing between the fixed and random effect models, the Hausman test was executed and the random effect was proven to be appropriate. The Hausman test hypothesis that the fixed effect model is appropriate and as such the study failed reject the null hypothesis that random effect model is appropriate as against the alternate hypothesis of fixed effect model. Hypothetically, a statistically insignificant p-value (0.4984) of table 4.4 of the Hausman test uses random effect otherwise fixed effect (See appendix A and B for pooled OLS and Fixed effects regression estimates)

**Table 4.5: Results of random effect regression model**

| Dependent Variable: LNNPL   |             |                    |             |           |
|-----------------------------|-------------|--------------------|-------------|-----------|
| Number of observations: 219 |             |                    |             |           |
| Variable                    | Coefficient | Std. Error         | t-Statistic | Prob.     |
| C                           | -0.162668   | 0.260685           | -0.624004   | 0.0533    |
| LNPDIT                      | -0.053029   | 0.021407           | -2.477126   | 0.0142**  |
| LNROA                       | -0.000750   | 0.002352           | -0.318985   | 0.7501    |
| LNRINT                      | 0.152632    | 0.086897           | 1.756460    | 0.0806*   |
| LNBSIZE                     | 0.001165    | 0.000635           | 1.835004    | 0.0682*   |
| LNLQY                       | 0.021540    | 0.007693           | 2.799845    | 0.0057*** |
| LNGDP_CP                    | -0.003675   | 0.001554           | -2.364172   | 0.0192**  |
| LNUNPT                      | -0.008402   | 0.025062           | -0.335261   | 0.7378    |
| LNNIM                       | 0.123203    | 0.124621           | 0.988622    | 0.3242    |
| LNEFF                       | -0.035882   | 0.015229           | -2.356226   | 0.0196**  |
| LNINFL                      | -0.038835   | 0.021848           | -1.777497   | 0.0772*   |
| R-squared                   | 0.84193     | Mean dependent var |             | 0.019974  |
| Adjusted R-squared          | 0.81861     | S.D. dependent var |             | 0.037986  |
| S.E. of regression          | 0.37385     | Sum squared resid  |             | 0.244583  |
| Durbin-Watson stat          |             |                    |             | 1.492112  |

Source: Author's estimation 2020: Significance level: 1% (\*\*\*), 5% (\*\*), 10% (\*)

**Table 4.6: Results of random effects of domestic banks**

Dependent Variable: LNNPL

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.     |
|--------------------|-------------|--------------------|-------------|-----------|
| C                  | 0.022765    | 0.080425           | 0.283059    | 0.0774    |
| LNBSIZE            | 0.849855    | 0.334415           | 2.541323    | 0.0150**  |
| LNGDP_CP           | -0.351152   | 0.229584           | -1.529515   | 0.1340    |
| LNEFF              | 0.245002    | 0.515224           | 0.475524    | 0.6370    |
| LNINFL             | -2.440056   | 0.886992           | -2.750934   | 0.0089*** |
| LNLQY              | -0.752264   | 0.295521           | -2.545553   | 0.0149**  |
| LNROA              | -0.113899   | 0.070893           | -1.606637   | 0.1160    |
| LNPDT              | 3.204084    | 0.888695           | 3.605379    | 0.0009*** |
| LNRINT             | -7.598591   | 1.849945           | -4.107469   | 0.0002*** |
| LNUNPT             | 1.264695    | 0.539525           | 2.346101    | 0.0858**  |
| LNNIM              | -0.104549   | 0.183921           | -0.568442   | 0.5729    |
| R-squared          | 0.378237    | Mean dependent var |             | -3.743770 |
| Adjusted R-squared | 0.338341    | S.D. dependent var |             | 0.890788  |

Source: Author's estimation 2020: Significance level: 1% (\*\*\*), 5% (\*\*), 10% (\*)

**Table 4.7: Results of random effect of foreign banks**

Dependent Variable: LNNPL

| Variable           | Coefficient | Std. Error         | t-Statistic | Prob.     |
|--------------------|-------------|--------------------|-------------|-----------|
| C                  | 0.001254    | 0.000602           | 2.083097    | 0.0386    |
| LNBSIZE            | -0.055595   | 0.132529           | -0.419490   | 0.6755    |
| LNPDT              | 0.014597    | 0.014736           | 0.990568    | 0.3236    |
| LNUNPT             | -0.196370   | 0.090399           | -2.172269   | 0.0315**  |
| LNROA              | -0.113871   | 0.058396           | -1.949971   | 0.0532*   |
| LNINFL             | -0.018345   | 0.038564           | -0.475702   | 0.6350    |
| LNEFF              | 0.270272    | 0.366316           | 0.737810    | 0.4619    |
| LNNIM              | 0.560561    | 3.272603           | 0.171289    | 0.8642    |
| LNGDP_CP           | -0.049216   | 0.036441           | -1.350570   | 0.1790    |
| LNLQY              | -0.199634   | 0.341390           | -0.584767   | 0.5596    |
| LNRINT             | -0.078471   | 0.038263           | -2.050841   | 0.0421**  |
| R-squared          | 0.54383     | Mean dependent var |             | -3.717784 |
| Adjusted R-squared | 0.5371      | S.D. dependent var |             | 1.018944  |

Source: Author's estimation 2020: Significance level: 1% (\*\*\*), 5% (\*\*), 10% (\*)

### **4.3 Discussion of results**

#### **4.3.1 Examining macroeconomic determinants of non-performing loans**

From table 4.5 it is clearly seen that public debt, inflation, GDP per capital and real interest rate are all significant considering their p-values. In further, macroeconomic variables explain NPLs in the Ghana banking industry which is in accordance with earlier studies like (Amuakwa-Mensah and Boakye Adjei, 2015; Amuakwa-Mensah et al, 2015; Annie Mensah; 2019; Ofori-Abebrese et. al, 2016; Amuakwa-Mensah and Marbuah, 2017; Asiamh and Amoah, 2019), with the exception of unemployment which is not statistically significant. The results suggest that public debt is negatively related to NPLs. This implies that the government borrows to increase its developmental projects which in turn boost the economy and strengthen the financial sector. The increase in these developmental projects promotes GDP growth and accelerates the economy and therefore, increasing borrowers' capacity to repay their debt. The study suggests an opposite finding of Kumar and Woo (2010), Islamoglu (2015) that high debt slows growth which increases NPLs. Amuakwa-Mensah et al, (2017) proposed a contradictory argument that public debt positively affects NPLs in the Ghana banking industry.

Empirically, real interest rate positively affects NPLs whilst GDP per capital reported negative influence on NPLs. Both have significant effects on NPLs respectively. From the Table 4.5 the results show that a unit increase in real interest rate makes loans more expensive which imposes high default risk on loans. The study argues that high interest rate and low GDP per capital reduce the loan repayment ability of borrowers which increases NPLs. The study is consistent with earlier studies such as (Amuakwa-Mensah and Boakye Adjei, 2015; Annie Mensah, 2019; Amuakwa-Mensah et. al, 2017).

Intrinsically, the results doesn't support the findings of İslamoğlu (2015) which came with a conclusive statement that a decrease in interest rate causes an excessive loan growth in the long run and increases non-performing loans.

However, the results revealed that unemployment is inversely related to NPLs which reject the expected hypothesis that high unemployment leads to high NPLs. *Ceteris paribus*, high unemployment in the economy creates economic downturn which decreases credit growth that has implicate effects of reducing NPLs in the long run. This is because the unemployed has no productive venture which will allow him to meet the credit accessibility requirement. In this study, unemployment is not statistically significant, meaning it does not explain NPLs. However, the result is different from that of (Chaibi and Ftiti, 2015; Makri, 2013; Obaid, 2017; Prasanna, 2014; and Haniifah, 2015) but similar to the findings of Akinlo and Emmanuel (2014). Additionally, inflation reported a negative association with NPLs. This suggest that high inflation rate in the economy makes loans less valuable and reliefs the borrowers for early repayment, and hence, decreases default risks holding other factors constant. Moreover, our empirical estimation is consistent with the findings of Amuakwa Mensah and Boakye Adjei, 2015, Zribi and Boujelbene (2011), Ekanayake and Azeez (2015), and Anjom and Karim (2016), whilst it is in contrast with the results of Nkusu (2011). Nonetheless, Castro (2013) also found statistically insignificant effect of inflation on NPLs.

#### **4.3.2 Examining bank level determinants of non-performing loans**

Again, from table 4.5 the coefficient of the explanatory variables and their respective p-values are presented. It shows that NPLs is significantly explained by bank level

determinants. Correspondently, the result shows negative and highly insignificant relationship between ROA and non-performing loans even at 10 percent significant level. This means that the return on asset has no influence on NPLs loans in the Ghanaian banking sector and it's consistent with studies like (Annie Mensah, 2019; Ofori Abeberese, 2016, Laxmi Koju et. al, 2017). However, this study draws contrary to the studies of (Amuakwa-Mensah et. al, 2017; Messai, 2013; Gulati et. al, 2019) who suggested that if banks ROA increases, they engaged in prudent lending which decreases NPLs. correspondingly, the result of bank size is clearly in line with our priori anticipation of positive and significant effect of bank size on NPLs. It is in line with studies like (Amuakwa-Mensah and Boakye-Adjei, 2015; Annie Mensah, 2019; Louzis et al., 2012; Chaibi and Ftiti, 2015; Lelissa, 2014) and places contradictory position with Amuakwa-Mensah and George Marbuah (2017). Relatively, large banks approve loans to large borrowers without proper loan underwriting which later deteriorate the asset quality than smaller banks. Thus, this argument failed to accept that large banks are able to diversify their loan portfolio which reduces NPLs (Louis, et. el, 2012; Laryea et. al. 2016).

Continually, liquidity assumes positive and significant effects on NPLs. Highly liquid banks are able to extend more credit to meet the financial need of their borrowers which increases loan growth. However, the study suggests that an increase in loans without proper monitoring and recovery exposes the bank to default risk leading to high NPLs and affirms with the studies of (Gosh, 2017; Gabriella Chiesa and Jose Manuel, 2020; Laryea et. al, 2016). On the contrarily, Ndanu Ngungu and Farida Abdul (2020) ascertained that bank liquidity is insignificant in influencing the level of NPLs in Kenya banking sector but Amir (2019) indicated that excess bank liquidity is inversely

related to NPLs such that more loans recovery is the meaning of reducing NPLs which boosts bank liquidity. Net Interest Margin (NIM) is positively related to NPLs but statistically insignificant in determining NPLs in Ghana banking industry. The result is consistent with what we expected earlier which shows that higher interest rates are a cost to borrowers which in turn serves as income to the banks. However, the study gave a different proposition to the earlier findings like (Amuakwa-Mensah and George Marbuah, 2015, Amuakwa-Mensah and boakye Adjei, 2015). Their studies suggest that NIM is negatively related to NPLs and statistically significant which means higher NIM decreases NPLs.

Moreover, management efficiency is negatively related to NPLs and statistically significant. This means that if managements are efficient, they are able to operate the bank's assets to earn high returns at less cost. Concurrently, decreasing operating expenses means that management has the necessary skills to handle loans to earn higher income which decreases NPLs. The results is in line with studies like (Ahlem S. M. and Fathi Jouini, 2013; Annie-Mensah, 2019; Ofori-Aberese, 2016). The result is contrary to the findings of Amuakwa-Mensah and George Marbuah, 2017; Amuakwah-Mensah et al, 2015 that reported a positive relationship between management efficiency and NPLs.

#### **4.4 Examining whether the determinants of non-performing loans for domestic banks are different from foreign banks**

The sub-sample estimation results of table 4.6 and 4.7 clearly shows that six variables bank size, inflation, liquidity, public debt and unemployment do significantly explained NPLs in the local banks. Hitherto, only three variables unemployment, ROA, and real

interest rate are statistically significant which influence NPLs of banks with foreign origin. This means that the effect of macroeconomic and bank specific variables affect NPLs in local banks more than and different foreign banks. In a simple way, the greater effect of these variables on NPLs of local banks compared to foreign banks can be assigned to the fact that inappropriate government economic policies and unfavourable macroeconomic environment affects more NPLs of local banks. Also, local banks seem to have inefficient staff in assessing and underwriting of loans before extending their credit to the borrower. Returning to foreign banks, NPLs depends on ROA which is the only bank level variable. The practices of the foreign banks are been controlled by parent company and as such have highly efficient staff in managing the banks; they are very keen in extending their credit enhancement across foreign markets where the performance of these does not depend on the performance of the Ghanaian economy. (See Appendix C and D for Hausman test for local banks and foreign banks).

#### 4.5 Diagnostics Test

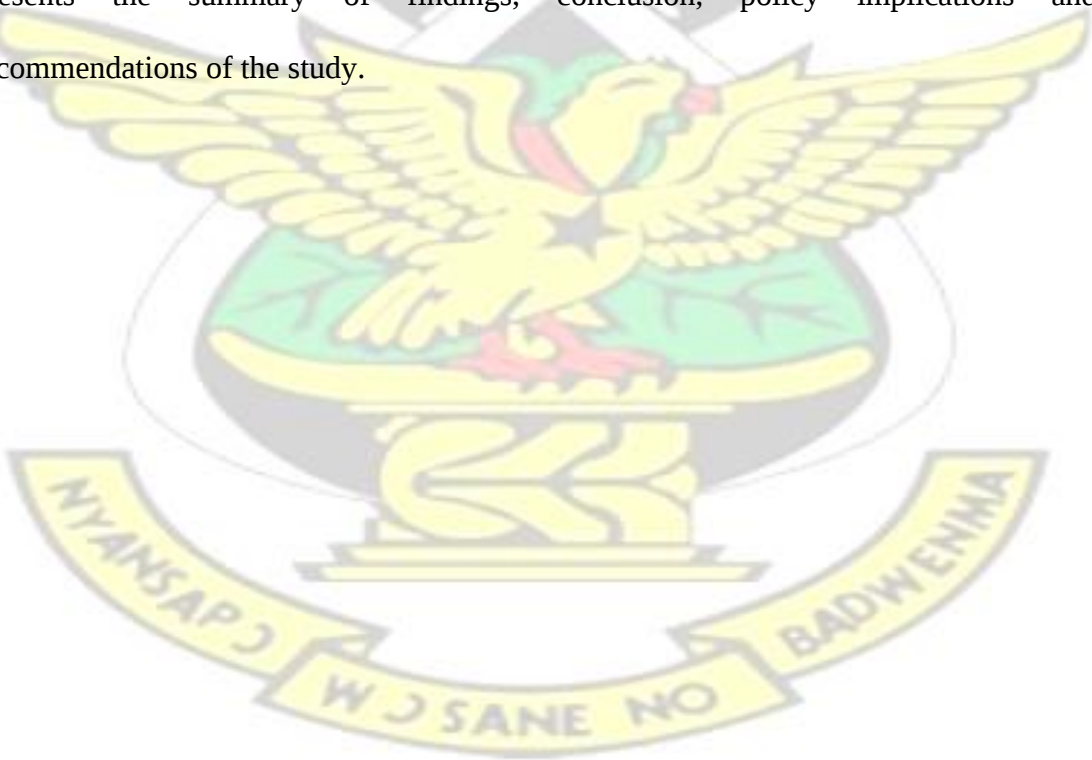
In order to ascertain that the estimates conform to the assumptions of the linear regression model and there is no problem in the residual analysis. The following test such as normality, heteroscedasticity, autocorrelation have been evaluated and presented in Table 4.5 below.

**Table 4.5: Diagnostic Test**

| Test                                |        | Chi-Sq | P-value | Inference            |
|-------------------------------------|--------|--------|---------|----------------------|
| Breusch-Godfrey<br>Correlation      | Serial | 0.516  | 0.398   | No Autocorrelation   |
| Breusch-Pagan<br>Heteroscedasticity |        | 0.225  | 0.452   | Its Homoscedastic    |
| Jarque-Berra                        |        | 13.349 | 0.1345  | Normally Distributed |

#### 4.6 Summary of Chapter

This chapter sought to examine empirically macroeconomic and bank level determinants of non-performing loans in Ghana. First, the preliminary analysis of the data from 2008 to 2018 was made which includes trend analysis, descriptive analysis, and correlation analysis and unit root test to know how the data good the data is. Second, the chapter staged and discussed the empirical results of the study. The study considered both fixed effect and the random effect approach where the Hausman test for comparison was estimated and found the random effects to be the appropriate estimation for the analysis which predominantly proved to be consistent with others previous documented studies. The chapter concluded that both macroeconomic and bank level determinants affects NPLs of commercial banks in Ghana. The next chapter presents the summary of findings, conclusion, policy implications and recommendations of the study.



## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.0 Introduction

This chapter focuses on macroeconomic and bank level determinants of NPLs in Ghana. The chapter is organized in four main sections. Section one presents the summary of findings on macroeconomic determinants of NPLs, bank level determinants of NPLs, and the results of whether the determinants of NPLs for domestic banks are different from foreign banks. Conclusion of the study is exhibited in section two. This section outlines the final achievement of the research which answers the research questions raised in the study. Section three demonstrates the policy implication and suggested recommendation of the study for policy makers and analyst to consider its implementation. Lastly, suggestions for further studies are also presented in section four. This highlights any issues which could have been addressed and fill a gap in the literature to be looked at later.

#### 5.1 Summary of findings

High rate of non-performing loans in the economy have become a serious problem and recently have received many attentions by all stakeholders. Increasing non-performing loans set as a signal for unstable banks because it dilutes the operating assets of the bank. In view of that, there is a need to analyse the driving factors as which causes non-performing loans to surge. These factors have been categorised in the literature into macroeconomic and bank level determinants. The main objective of this study was to examine macroeconomic and bank determinants of NPLs in Ghana and also to indicate whether the determinants of NPLs of domestic banks are different from foreign banks. There are many documented studies which have been carried out by financial experts,

economists, policy analyst and many more on macroeconomic and bank level determinants of NPLs in various (develop, developing, Africa) countries and Ghana. The related literature review centred on these studies, factors responsible for NPLs and their policy instruments suggested by various authors.

The study sought to examine the driving factors of NPLs of commercial banks in Ghana categorised into macroeconomic and bank level determinants using panel data from 2008-2018. The goals of the study were accomplished by considering 21 commercial banks in Ghana. The appropriate estimation technique used for regression was the random effect after conducting the Hausman test. The preliminary of the data including trend, descriptive, correlation analysis were executed as well as some diagnostics test were also carried out on the sample data. The estimation methods used to check the stationarity of the selected variables were Im et al. (2003) and Levin et al. (2002). It was indicated that macroeconomic and bank level variables were not stationary at levels but rather became stationary after first differencing.

Correspondingly, the results of the first objective revealed that GDP per capital, real interest rate, inflation, public debt were statistically significant in explaining NPLs in Ghana whilst Unemployment wasn't important. With respect to the second objective, bank size, liquidity, and efficiency were proved to have influence on NPLs statistically. Again, the third goal highlighted an interesting argument that macroeconomic and bank level variables have great influence on NPLs in domestic banks than foreign banks in Ghana. In a nutshell, it can be clearly seen from the findings that macroeconomic and bank level determinants do influence NPLs in Ghana.

## 5.2 Conclusion

The high rate of financial instability in recent times has led to the attention of many researchers, policy analyst and academia's to examine its causes. According to the literature, NPL set as an important proxy for measuring the financial system stability of a country. However, Ghana's banking sector has experienced an increase in NPLs in recent years which specifically cause troubled banks.

There have been a number of previous studies on the subject matter in the advance, developing, and Africa countries as well as in Ghana to ensure the determinants of NPLs. One reason that can be given is that, high interest rate, low GDP per capital, low public debt, large bank size, high liquidity, low management efficiency, low inflation, etc. Ghana banking industry is Susceptible to an increase in NPLs. However, it is impossible to make inference in purview of NPLs by considering all variables. This made the researcher to carry out this investigation to draw conclusion on whether macroeconomic and bank level variables really determines NPLs and also to find out if the determinants of NPLs for domestic banks are different from foreign banks. The primal findings of the results suggest that indeed, macroeconomic and bank level variables influence NPLs and exert more on domestic banks' NPLs than foreign banks in Ghana.

## 5.3 Recommendations and Policy implications

The findings of the study have important policy effects in the Ghana banking sector. The study brought to light a significant relationship between bank size, GDP per capital, efficiency, liquidity, real interest rate, inflation, public debt and NPLs. Moreover, unemployment, ROA, and net interest margin have no relationship

with NPLs. Again, the estimation of the sample study found statistically relationship between bank size, liquidity, ROA, public debt, real interest rate, unemployment and NPLs of domestic banks whilst NIM, inflation, GDP per capital and efficiency have no association with NPLs. Only unemployment, ROA, and real interest rate have statistically significant association with NPLs in foreign banks.

Based on the findings; this study recommends that regulatory authorities should have stringent supervision over big banks operating in the country because they have high credit risk exposure. However, banks should also employ efficient staffs that have quality skills to generating more income by incurring fewer expenses. Also, highly liquid banks should grant loans to good and credible borrowers to reduce their credit exposure. Notwithstanding, the Ghanaian banks should consider the macroeconomic condition in the country when extending their credit to borrowers to limit the level of default. Moreover, the government should focus on establishing strong financial system in the economy. This can be done by setting measures by reducing cost of borrowing and cost of bank operation and ultimately, interest spread, controlling inflation, and encouraging private sector borrowing to increase production of goods and services to reduce NPLs in the Ghanaian economy.

#### **5.4 Suggestions for further research**

The study, however, can be further explored by future researchers by taking into account other explanatory variables like, gold prices, oil prices, foreign remittances, corporate governance, collateralization, etc. to understand what better determines NPLs. Moreover, further studies can investigate how monetary policy rate and fiscal measures affect NPLs in the Ghanaian banking sector.

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## APENDIX A

### Results of Pooled Least Squares

Dependent Variable: LNNPL

Total panel (unbalanced) observations: 204

| Variable   | Coefficient | Std. Error | t-Statistic | Prob.  |
|------------|-------------|------------|-------------|--------|
| C          | 0.074400    | 0.033767   | 2.203291    | 0.0288 |
| LNBSIZE    | 0.001158    | 0.000634   | 1.825069    | 0.0697 |
| LNGDP_CP   | -0.005712   | 0.006337   | -0.901354   | 0.3686 |
| LNROA      | -0.003667   | 0.001553   | -2.360858   | 0.0193 |
| LNPUBLICDT | -0.046902   | 0.022588   | -2.076386   | 0.0393 |
| LNINEFF    | -0.035124   | 0.015269   | -2.300274   | 0.0226 |
| LNUNEMPT   | -0.028608   | 0.026123   | -1.095150   | 0.2749 |
| LNLQY      | 0.021635    | 0.007025   | 3.079716    | 0.0024 |
| LNINFL     | -0.029478   | 0.023299   | -1.265212   | 0.2075 |
| LNNIM      | 0.073244    | 0.114305   | 0.640782    | 0.5225 |
| LNLRATE    | 0.099995    | 0.049198   | 2.032499    | 0.0436 |

## APPENDIX B

### Hausman test for foreign banks

| Test Summary         | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob.  |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 13.274770         | 10           | 0.2087 |

## APPENDIX C

### Hausman test for domestic banks

| Test Summary         | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob.  |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 7.977377          | 10           | 0.6627 |

## APPENDIX D

### Results of Fixed Effect Regression Model

Dependent Variable: LNNPL

| Variable | Coefficient | Std. Error | t-Statistic | Prob.  |
|----------|-------------|------------|-------------|--------|
| C        | -0.271348   | 0.274663   | -0.987933   | 0.3248 |
| LNBS     | -0.001135   | 0.001851   | -0.612956   | 0.5408 |
| LNGDP_CP | -0.005933   | 0.006398   | -0.927303   | 0.0552 |
| LNROA    | 0.005355    | 0.004064   | 1.317778    | 0.1896 |
| LNPD     | -0.056754   | 0.022870   | -2.481605   | 0.0142 |
| LNUNEMPL | -0.007979   | 0.026179   | -0.304773   | 0.7610 |
| LNNIM    | 0.148513    | 0.137798   | 1.077760    | 0.2829 |
| LNINFL   | -0.047450   | 0.022741   | -2.086506   | 0.0386 |
| LNEFFI   | -0.008235   | 0.015203   | -0.541682   | 0.5888 |
| LNLQTY   | 0.021325    | 0.008615   | 2.475257    | 0.0144 |
| LNRINT   | 0.194832    | 0.093333   | 2.087507    | 0.0385 |