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THE EFFECTS OF MACROECONOMIC VARIABLES ON NON-PERFORMING LOANS OF COMMERCIAL BANKS IN GHANA

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DECLARATION

Student's Declaration

I, **Anastasia Essilfie**, declare that this work except quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my original work, and it has not been submitted either in part or whole for another degree anywhere.

Signature: ………………………………..

Date: 6ᵗʰ December, 2023

Supervisor's Declaration

I, hereby declare that the preparation and presentation of this work were supervised by the guidelines for the supervision of dissertations as laid down by the University of Education, Winneba.

Mr. Edward Daniels (Supervisor)

Signature: ....

Date: 6ᵗʰ December, 2023

DEDICATION

Praise God, from Whom all blessings flow; Praise Him, all creatures here below; Praise Him above, ye heavenly host; Praise Father, Son, and Holy Ghost. I dedicate this body of effort to my parents Rev. Dr. Emmanuel Kweku Badu Essilfie and Mrs. Ama Essilfie; to my siblings, Hagios Essilfie and Benedicta Essilfie for their continued support, love and prayers throughout my MBA programme.

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LIST OF ABBREVIATIONS

NPL   : Non-Performing Loan

GDP   : Gross Domestic Product

INFL   : Inflation rates

logINFL   : Log of Inflation rates

EXCH   : Exchange rates

UNEMPL   : Unemployment rates

INT   : Interest rates

IMF   : International Monetary Fund

Covid-19   : Coronavirus Disease 19

PCR   : Provision Coverage Ratio

ILO   : International Labour Organization

OLS   : Ordinary Least Square

ABSTRACT

This research delved into the impact of the Covid-19 pandemic on the Non-Performing Loan (NPL) rates of commercial banks in Ghana. Employing Covid-19 annual recorded rates as a moderating variable, the study scrutinized the interaction with key macroeconomic indicators: Gross Domestic Product Growth rates, Exchange rates, Unemployment rates, Interest rates and Inflation rates. The investigation focused on NPL rates compiled from nine commercial banks listed on the Ghana Stock Exchange with a minimum operational history of seven years in Ghana, spanning from 2010 to 2022. Employing statistical tools to ensure the dataset adheres to assumptions, including normality, multicollinearity, and autocorrelation tests, the study utilized Ordinary Least Squares (OLS) Regression. Employing a quantitative research approach and a Quasi-experimental research design, the analysis revealed an inverse moderating effect of Covid-19 on the relationship between GDP growth rates and NPL rates, deviating from prior studies. Notably, the study highlighted a heightened impact on non-performing loans during the presence of Covid-19, indicating a potential surge in NPL rates. The moderation of Covid-19 on exchange rates suggested a substantial influence on currency values, significantly affecting the ability of entities to meet loan obligations. The study also identified a positive relationship between inflation rates and non-performing loan ratios. This signified that fluctuations in inflation may directly influence the stability and performance of loans within the financial system, a revelation of considerable consequence.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The International Monetary Fund-IMF (2006) defines Non-Performing Loan (NPL) as any loan whose interest and principal payments are over 90 days overdue. The issue of Non-Performing Loans (bad debt) is crucial to every financial sector. Both developed and developing nations devise strategies to deal with Non-Performing Loans within their banking sectors, including dealing with the impact of the macroeconomic shocks. Nations have been hit with global crises like the Global Financial Crisis of 2007-2008 and the adverse effects of the coronavirus pandemic of 2020/2021. A bank's NPL ratio is essential because it can affect bank profitability. Corona Virus Disease 19 (Covid-19), caused by the novel severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), is a highly contagious respiratory illness that emerged in late 2019 and quickly spread around the world. The worldwide spread of Covid-19 prompted the World Health Organization (WHO) to declare the outbreak a Public Health Emergency of International Concern (PHEIC) (Zarocostas, 2020) and officially classify it as a pandemic on March 11, 2020 (Cucinotta & Vanelli, 2020). It led to widespread health and economic impacts, such as severe illness and mortality, lockdowns, travel restrictions, and a rapid development of vaccines to combat the virus (Di Domenico et al., 2020). Other preventive measures implemented included regular hand washing, use of face masks and most importantly, social distancing and quarantining (Onyeaka et al., 2021). The impact of Covid-19 caused immense instability across various sectors of the economy, including our financial markets. Additionally, the outbreak caused significant market movements and affected

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economic activity in a number of countries (Romadhon, 2022). The banking sector also saw a decrease in their profitability. There was basically a disruption in the intermediation role played by banks.

According to the European Central Bank (ECB Report, 2022) Banking Supervision report, it was noted that the non-performing loans ratios, which represent the proportion of loans that are not being repaid on time, are anticipated to experience a rise across European Banks over the upcoming years. This potential increase in non-performing loans could pose challenges to the financial stability and performance of the European banking sector. For instance, it was reported that by June 2015, banks that report to the European Banking Authority (EBA) had accumulated almost EUR 1.2 trillion of NPLs and by June 2019, the aggregate of NPLs amounted to EUR 636 billion, reflecting a nearly 50% decline from the figures recorded in June 2015. The reduction in NPLs was primarily ascribed to the execution of NPL sales and securitizations (EBA Report, 2019). However banks under the ECB's direct supervision had non-performing loans worth over €550 billion on their books in mid-2020. And as indicated in the ECB's 2022 report, there was a further improvement in asset quality. The non-performing exposures held by significant banks decreased to €349 billion by the end of September 2022. This represents the lowest level since the initial publication of supervisory data on significant banks in 2015. (ECB Report, 2022). European banks tend to work out their NPL portfolios internally via write-offs, collateral repossession, collateral liquidation, or cash collection (EBA Report, 2019)

In the context of Ghana's economy, NPLs rose from GHS 4.4 billion in December 2015 to GHS 6.2 billion in December 2016, indicating a 17.3% NPL ratio (Bank of Ghana, 2017). In comparison, the NPLs subsequently increased to GHS 8.58

billion in December 2017 from GHS 6.2 billion in December 2016. These statistics translate into a 22.7% NPL ratio in 2017 as compared to 17.3% in 2016 (Bank of Ghana, 2018). A loan write-off directive was released by the central bank in June 2018 to save the industry's large non-performing loans. Despite this directive, non-performing loans were estimated at GHS 6.65 billion for 2018, which was still very high (Bank of Ghana, 2019). Through its strategic monetary policy measures, the Bank of Ghana recently implemented several key initiatives. Initially, the institution decided to decrease the key interest rate from 16% to 14.5%, aiming to stimulate economic activity and encourage borrowing. Additionally, the Bank of Ghana reduced the reserve requirements for lenders from 10% to 8%, a move designed to enhance liquidity within critical sectors of the economy. Notably, the Bank also made pivotal adjustments to the cost of fund transfers through mobile money, ensuring that transactions below GHs100 incurred no charges whatsoever. These multifaceted interventions were implemented to bolster economic resilience, promote financial inclusion, and facilitate the continued growth and stability of the Ghanaian economy.

Statistics after Covid-19 shows that GDP growth rate experienced a decline, dropping from 5.1% in 2021 to 3.1% in 2022. The fiscal deficit for 2022 surpassed the target significantly, reaching 11.8%. Public debt exhibited an increase from 79.6% in 2021 to exceeding 90% of GDP in 2022, with the debt service-to-revenue ratio reaching 117.6% (The World Bank, 2023). In response to these economic intricacies, Ghana proactively sought solutions to restore macroeconomic stability. One notable initiative was securing a three-year International Monetary Fund (IMF) Extended Credit Facility (ECF) program amounting to approximately $3 billion. This financial arrangement was designed to provide a crucial injection of funds and support to help mitigate the economic challenges. Furthermore, recognizing the need

for a comprehensive overhaul of the debt structure, Ghana embarked on a debt restructuring process. These involved renegotiating terms, potentially refinancing, and exploring avenues to enhance debt sustainability. The goal of these efforts was to create a more manageable and sustainable debt profile, aligning with the broader objective of restoring economic stability.

In summary, Ghana navigated a complex economic landscape in 2022, grappling with challenges in GDP growth, fiscal deficit, and escalating public debt. The strategic pursuit of an IMF ECF program and proactive steps in debt restructuring reflected the government's commitment to addressing these challenges and laying the groundwork for a more resilient and sustainable economic future.

1.2 Problem Statement

Despite efforts made by the Bank of Ghana to clean the banking sector during previous political and military regimes after its independence, in 2020 the coronavirus pandemic caused another economic downturn. The industry's asset quality remains a source of concern as Non-Performing Loans (NPLs) ratio remain as high as 18% (Bank's Sector Report, 2019). According to the Bank of Ghana report (2018), the stock of NPLs increased from GHc7.1 billion as at April 2017 to GHc8.63 billion in April 2018.

Non-Performing Loans continue to increase in the books of financial institutions despite the efforts the central bank has made to curb this situation; the Banking Sector Stability Index (BSSI) was at a 15-year high as at April 2021. The industry's Non-Performing Loans (NPLs) ratio, however, continued to inch up due to the pandemic-induced loan repayment challenges and sluggish credit growth (Bank of Ghana report, 2021). Increasing non-performing loans in some parts of the banking

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sector has threatened the financial stability of the sector and the economy at large. Ghana confirmed its first two cases of the Coronavirus on 12th March, 2020 which was announced by the Ministry of Health (Kenu et al., 2020) after which ultimately resulted in a lock down that disrupted normal business activities. The coronavirus brought a halt in normal economic activities, changing social norms where several businesses had to adapt to working from home.

The study focuses on the impact of Covid-19 pandemic on the banking sector, specifically how non loan payments have affected commercial bank operations in Ghana. The study is to investigate the extent to which Covid-19 and interest rate have both impacted non-performing loan payment of some Ghanaian commercial banks listed on the Ghana Stock Exchange. Therefore, it will introduce Covid-19 as a moderating variable to help one understand the impact that the pandemic had on Non-Performing Loan payments. It is crucial to understand the factors that have contributed to the rise in NPLs during the Covid-19 period and identify possible solutions to reduce their impact in subsequent years.

1.3 Research Objectives

The primary aim of this study is to thoroughly investigate the impact of the Covid-19 pandemic on Non-Performing Loans. To achieve this goal, the following specific research objectives will be addressed, guiding the exploration and analysis within the context of the study.

I.   To examine the impact of macroeconomic factors on NPLs

II.   To analyze the moderating role of Covid-19

III. To identify amongst the macroeconomic variables, which factor(s) contribute the most significantly to NPLs

1.4 Research Questions

These specified objectives will be addressed by answering the following research questions;

I.   How do changes in macroeconomic variables affect the NPL levels in selected commercial banks over time?

II.   Does Covid-19 moderate the relationship between macroeconomic factors and NPLs in commercial banks?

III.   Which of the independent variables has the highest quantitative impact on NPL levels in selected commercial banks during both stable economic conditions and periods influenced by Covid-19?

1.5 Significance of the Study

The significance of the study is to focus on Covid-19's impact on Non-Performing Loans of some commercial banks in Ghana. The findings of this study will be beneficial to policy makers, regulators and banks in Ghana. Additionally, this study will be useful to researchers interested in NPL ratios and the impact of Covid-19 on the banking sector in Ghana. The study aims to investigate the impact of Unemployment rates, GDP Growth rates, Inflation rates, and Exchange rates on Non-Performing Loans while controlling for the dummy variable in order to analyze the economic factors contributing to changes in Non-Performing Loan rates during and after the Covid-19 pandemic. Lastly, this research serves as the culmination of the student's academic journey, as it forms a pivotal component of this MBA dissertation for the academic year 2023, demonstrating their dedication to scholarly pursuits and contributing to the body of knowledge in the field of Finance.

1.6 Scope and Limitation of the Study

The scope of the study makes use of available data from 2010 through to 2022. The study is limited to factors contributing to the increase in NPL rates, the impact of the Covid-19 pandemic on banks' financial performance, and the measures taken by banks to manage NPLs during the Covid-19 period. Notably, this research is constrained by both time limitations and the availability of relevant data, which may impact the comprehensiveness of the study's findings.

1.7 Chapter Disposition

This dissertation is structured into five chapters, with each chapter serving a distinct purpose in the overall research endeavor. Chapter 1 serves as the opening curtain, introducing the study to the reader. Here, the background and context of the research are provided, offering a glimpse into what prompted this investigation. The chapter also sets the stage by articulating the study's objectives and research questions, making it clear what the research aims to achieve. Additionally, it emphasizes the significance of the study within its field while candidly acknowledging the limitations inherent in any research endeavor.

In Chapter 2, we delve into an exploration of existing knowledge on the subjects that form the core of our research. This comprehensive review of the literature covers non-performing loans, providing insights into their characteristics and implications. We also scrutinize the structure and dynamics of Ghana's banking sector, shedding light on its unique features. Moreover, the chapter examines the widespread repercussions of the Covid-19 pandemic on Ghana's economy, offering valuable contextual insights for our study.

Chapter 3 provides a detailed account of the methodology employed in this study, explaining the techniques used for data collection and the methodologies for data analysis. This chapter essentially unveils the research toolkit that enables us to answer our research questions. Proceeding to Chapter 4, it unveils the empirical results obtained from our research efforts. Finally, Chapter 5 brings the research journey to a close. This concluding chapter serves as a synthesis of the entire study, encapsulating the key takeaways from the findings. It draws meaningful conclusions based on what is uncovered. Additionally, it lays the groundwork for future exploration in this field, offering valuable directions for subsequent research endeavors.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Chapter Two (2) comprises a comprehensive review of theoretical, empirical and conceptual literature surrounding Non-Performing Loan (NPL) rates of commercial banks in Ghana over the years. Understanding factors that contribute to NPLs is important to policy makers, bank managers, and regulators. This is because NPLs affect the stability and profitability of banks, and the financial economy at large. This chapter begins with understanding the theory of Agency Problem, a fundamental concept that forms bedrock of our understanding of NPLs; after which is continued with the conceptual framework of the study in order to provide a systematic and coherent roadmap for investigation; as well as a look into some related empirical studies that have been conducted by some scholars surrounding the topic. This is to offer valuable insights and perspectives gathered from empirical evidence.

2.1 Agency Theory Discussion

The agency problem in finance refers to the conflict of interest that exists between company management and its stockholders (Chen, 2022). The agency theory provides a framework that allows us to understand the dynamics between lenders and borrowers and the underlying factors that contribute to defaults in loan repayment. According to this theory, borrowers may have incentives, such as possessing relevant information, which allows them to act in their own self-interest, which may not align with the interests of the lenders, i.e., commercial banks. This misalignment of interests can lead to deviations from the contractual obligations that borrowers should fulfill.

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Key elements of the theory of agency include:

1. **Principal-Agent Relationship**: This refers to the relationship between the principal (who delegates authority) and the agent (who acts on behalf of the principal). The principal may not have perfect information about the actions or decisions of the agent.

2. **Moral Hazard:** Moral hazard arises when the agent has the incentive to take actions that benefit themselves at the expense of the principal because the agent bears only a fraction of the consequences. For example, managers may pursue risky strategies that maximize their own short-term gains while exposing the company to potential losses.

3. **Adverse Selection**: Adverse selection occurs when the principal lacks information about the agent's characteristics or abilities at the time of contracting. For instance, an employer may struggle to assess the work ethic of a potential employee during the hiring process.

4. **Incentive Alignment**: Principals can use various mechanisms, such as contracts, performance-based compensation, monitoring, and information-sharing, to align the interests of agents with their own. By designing appropriate incentives, principals can motivate agents to act in ways that maximize the principal's welfare.

5. **Monitoring and Control**: Principals can employ monitoring and control mechanisms to reduce the impact of information asymmetry. This can involve regular reporting, audits, performance evaluations, or direct oversight of the agent's activities.

The agency theory helps us understand the underlying factors that contribute to situations that cause defaults in loans by borrowers. For instance, information asymmetry occurs when borrowers have access to more information about the purpose of the loan application and their financial situation than the banks have at their disposal. Loan defaults can occur when the borrower's actual financial position

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and project viability significantly differ from the information provided to the lender during the loan application and approval processes.

Deposit-taking financial institutions like banks maximize their profitability through the issuance of loans, with the expectation of loan repayment. Therefore, the quality of credit risk assessment practices within banks is crucial. Practices such as loan underwriting standards, collateral valuation, assessment of the borrower's creditworthiness, and loan approval processes can significantly influence individuals' ability to pay off loans in the future.

The impact of the COVID-19 pandemic on NPLs of commercial banks in Ghana can be understood within the context of agency theory. The economic disruptions caused by the pandemic have led to income loss, unemployment, and business closures, affecting borrowers' ability to fulfill their loan obligations. The pandemic has also introduced new risk factors, such as increased uncertainty and volatility in various sectors of the economy, making accurate credit risk assessment more challenging for banks. Consequently, understanding the relationship between the pandemic and NPLs can provide insights into the effectiveness of banks' credit risk management practices in mitigating the agency problem.

2.2 Definition and Measurement of Non-Performing Loans

Non-Performing bank Loans are also known as non-performing assets (NPAs) or bad loans. They are loans that borrowers have failed to repay according to the agreed terms. These loans can have significant negative impacts on banks, leading to financial instability and affecting overall economic health. Loans primarily make up maximum share of bank assets with its corresponding risk exposure to their capital. Due to this, maximum attention and efforts are employed by regulators, management

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and investors to effectively manage loan portfolios in most banking institutions (Adjei-Mensah, et al, 2015). With respect to banks' primary role as financial intermediaries, one of the risks that banking institutions face is the risk of defaulting in the repayment of either or both principal amount and interest amount on the loans they provide to deficit units (borrowers); known as credit risk. Non-Performing Loans is therefore a subset of credit risk. NPLs are defined as loans that experience repayment difficulties due to gaps and / or external factors beyond the control of the debtor, such as bad economic conditions or liaison with parties who have excess funds and need funds (Labondance, 2020). Other research papers define NPLs as the credit advances or loans whose payment has been defaulted upon by the borrower and therefore the issuing bank cannot derive a profit from (Richard, 2011); NPLs are loans against which the borrower has failed to pay within the stipulated time as governed by the laws of the country (Karim, et al., 2010).

2.2.1 Measurement of Non-Performing Loans:

Non-Performing Loans (NPLs) are a key indicator of a bank's asset quality and credit risk. The measurement and classification of NPLs are essential for assessing the health of a bank's loan portfolio and determining the adequacy of provisions and capital reserves. Accurately measuring and monitoring non-performing bank loans is crucial for banks' risk management and decision-making processes.

Several methods and indicators are commonly used to measure non-performing bank loans. One of the primary metrics is the Non-Performing Loan ratio (NPL ratio), which calculates the total amount of Non-Performing Loans divided by the total loan portfolio. This ratio provides an overall assessment of the quality of a

bank's loan portfolio and is widely used as an indicator of asset quality (Bremus et al., 2018).

In addition to the NPL ratio, the provision coverage ratio (PCR) is used to measure the adequacy of provisions made by banks to cover potential losses from non-performing loans. The PCR is calculated by dividing the total provisions held by the bank by the total value of non-performing loans. A higher PCR indicates a greater level of protection against potential loan losses (Bremus et al., 2018).

Furthermore, banks often analyze the age classification of non-performing loans to gain insights into their severity and potential for recovery. Loans are categorized into different time ranges, such as 30 days past due, 60 days post due, and 90 days post due. This classification helps identify loans that are at higher risk of default and allows banks to take appropriate actions for recovery or provisioning (Cai et al., 2018).

The measurement of non-performing bank loans has been extensively studied in the literature. For example, a study by Cai et al. (2018) explored the measurement of non-performing loans in the Chinese banking sector and emphasized the importance of considering the specific loan classification systems used in different countries. The research highlighted the need for consistent and standardized measurement practices to facilitate international comparisons and policy evaluations.

Another study by Bremus et al. (2018) examined the macroeconomic drivers of non-performing loans in European countries and highlighted the significance of economic conditions and bank-specific factors. The findings of this research helped banks and policymakers understand the factors influencing the occurrence of non-

performing loans and develop effective strategies for risk management and improving loan portfolio quality.

2.3 Determinants of Non-Performing Loans of Commercial Banks in Ghana:

The determinants of non-performing loans (NPLs) in commercial banks have been the subject of study by researchers such as Khan et al. (2020), Kumar et al. (2018), Wood & Skinner (2018), among others. NPLs are a significant factor used by regulators to determine the financial stability and asset quality of banks. Several factors have been identified as affecting NPLs, including macroeconomic factors, credit risk assessment practices, bank-specific factors, and regulatory frameworks.

Macroeconomic conditions play a significant role in determining NPLs. Factors such as GDP growth, inflation rate, exchange rate volatility, and unemployment rate have been identified as influential factors (Nsieku, 2014). For example, empirical findings by Murumba (2013) showed a significant positive correlation between real GDP and non-performing loans. Additionally, research by Nkusu (2011) and Guy (2011) found a positive relationship between the unemployment rate and NPLs, indicating that individuals without means of earning income or wages are unable to settle their loan debts with banks.

Bank-specific factors also play a crucial role in determining NPL levels. Variables such as bank size, capital adequacy, profitability, and liquidity have been found to influence NPL ratios. Studies by Mlambo and Biekpe (2013) and Agyei-Mensah and Amankwah-Amoah (2017) examined the impact of bank-specific factors on NPLs in Ghana and emphasized the significance of these variables in explaining variations in NPL ratios among commercial banks.

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Credit risk management practices and loan portfolio characteristics also affect NPLs. The quality of credit assessment, loan monitoring, and collection processes significantly impact the likelihood of loan default. Additionally, the composition and concentration of loan portfolios, such as exposure to specific sectors or types of borrowers, can influence NPL levels. The research by Agyei-Mensah and Amankwah-Amoah (2017) emphasized the importance of credit risk management practices and loan portfolio characteristics in explaining NPL variations among Ghanaian commercial banks.

The regulatory framework and legal environment can also shape NPLs. Factors such as prudential regulations, loan recovery mechanisms, bankruptcy laws, and the enforcement of collateral rights can affect banks' ability to manage and recover NPLs. The effectiveness of prudential regulations, supervision, and governance frameworks in the banking sector plays a critical role in mitigating NPL risks. Research by Aidoo et al. (2018) examined the impact of regulatory factors on NPLs in Ghana and emphasized the need for robust regulatory frameworks to address NPL challenges.

These studies and others provide valuable insights into the determinants of NPLs in Ghana's commercial banking sector. By understanding these factors, banks and policymakers can develop appropriate measures to mitigate NPL risks, enhance credit risk management practices, and promote financial stability.

2.4 Impact of the COVID-19 pandemic on the Financial Performance of Commercial Banks

The Covid-19 pandemic has had a significant impact on the financial performance of commercial banks in Ghana. The outbreak of the Covid-19 virus

brought about unprecedented challenges for economies and sectors globally, its effect on the banking sector cannot be overemphasized. Commercial banks have experienced significant disruptions to their operations, as the pandemic has resulted in economic slowdowns, market volatility, and changes in consumer behavior. These factors have had a substantial impact on the financial performance of commercial banks.

One of the key areas affected by the pandemic is asset quality. The economic downturn resulting from lockdown measures and reduced economic activities increased the risk of loan defaults. With several businesses that dealt with financial difficulties and individuals who lost their jobs or earned reduced income, the repayment capacity of borrowers was severely impacted. This led to a rise in non-performing loans (NPLs) and deterioration in banks' loan portfolios. Research by Lee, Seo & Ahn (2020), and Tsai & Kuo (2021) examined the impact of the Covid-19 pandemic on NPLs and highlighted the significant increase in NPL ratios during this period.

Furthermore, the pandemic affected banks' profitability. The decline in economic activity led to reduced loan demand and decreased interest income. Additionally, central banks' measures to mitigate the economic impact of the pandemic, such as lowering interest rates, put pressure on net interest margins. The closure of physical branches and the shift towards digital banking channels also incurred additional costs for banks. Research by Afzal et al. (2020) and Altunbas, Manganelli, and Marques-Ibanez (2021) investigated the impact of the pandemic on banks' profitability and highlighted the adverse effects on net interest income and return on assets.

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Moreover, market volatility during the pandemic affected banks' trading and investment portfolios. Fluctuations in stock markets and changes in interest rates influenced banks' trading revenues and mark-to-market valuations of their investment securities. The increased uncertainty and risk aversion in financial markets also impacted banks' ability to generate non-interest income. Research by Antón-Rodríguez et al. (2020) and Casalin, et al (2021) explored the impact of market volatility on banks' financial performance during the pandemic.

2.5 Empirical Studies

Several empirical studies have examined the relationship between NPLs and macroeconomic factors. These studies, conducted by scholars and researchers from diverse academic backgrounds and regions, have collectively contributed to a comprehensive body of knowledge.

Emmanuel Ebo Arhin conducted a research study in 2016 focusing on NPLs in Ghanaian banks. This study analyzed data from nine major banks in Ghana and used statistical methods to uncover insights into NPLs. The study's findings revealed that several factors influenced NPLs in Ghana. Notably, when the country's economy experienced slower growth, there were more NPLs in these banks, showing that economic health played a crucial role. Additionally, the availability of domestic credit to businesses also affected NPLs. When banks provided fewer loans to businesses, NPL rates increased. Surprisingly, issues with the supply of electricity in Ghana were found to be associated with higher NPL rates, highlighting the unexpected connection between infrastructures and banking stability. Emmanuel Ebo Arhin's research has implications for policymakers and banks in Ghana, helping them make informed decisions to promote financial stability in the country. This study demonstrates the

importance of empirical research in understanding the complex relationship between economic factors and banking performance.

Curat et al. (2013) and Farhan et al. (2012) independently conducted noteworthy investigations. These two independent investigations have yielded consistent and crucial findings, shedding light on the relationship between interest rates and the prevalence of non-performing loans (NPLs) within the banking and financial sectors. Both Curat et al. and Farhan et al. examined the dynamics at play and both arrived at a consistent and pivotal conclusion: a positive relationship between interest rates and NPLs. In essence, their research findings underscored that when the cost of borrowing becomes more expensive due to higher interest rates, borrowers often encounter heightened difficulties in meeting their loan obligations. This, in turn, contributes to an increase in the number of non-performing loans within the financial system. Conversely, when interest rates are on the lower end of the spectrum, Curat et al. and Farhan et al. noted a corresponding decline in the occurrence of NPLs. This phenomenon can be attributed to the fact that borrowers find it more economically feasible and manageable to fulfill their loan commitments when interest rates are at a more affordable level.

The significance of these findings underscores the sensitivity of loan performance to the prevailing interest rate environment, highlighting the need for a cautious approach to interest rate management. By recognizing this delicate balance between interest rates and NPLs, stakeholders can make more informed decisions in a financial landscape where interest rates play a pivotal role in shaping economic outcomes.

Building upon this foundation, Matej Maivald and Petr Teply (2019) conducted further research, this time focusing on the effects of prolonged periods of low interest rates on NPLs within the banking sector. Their findings were intriguing. They observed that after a year of persistently low interest rates, there was an increase in the NPL ratio. This result challenges the conventional wisdom that low interest rates always lead to reduced NPLs. They underscore that while lower interest rates can ease NPL burdens for borrowers, prolonged periods of such low rates might introduce other complexities that influence NPLs on a larger scale.

In a research study conducted by T. Nsobilla in 2015, the focus was on understanding how Non-Performing Loans (NPLs) affect the financial performance of specific rural banks situated in the Western and Ashanti regions of Ghana. The study employed a statistical method known as ordinary least square regression (OLS) to estimate the impact of NPLs on the financial performance of these banks. The study's findings revealed that several key factors were statistically significant at a 1% significance level, signifying their significant influence on the financial performance of these rural banks. These influential factors included non-performing loans (NPLs) themselves, the cost-income ratio, loan recovery rates, and total revenue generated by these banks. In other words, the study's results indicated that higher NPLs, a less favorable cost-income ratio, lower loan recovery rates, and lower total revenue all had a noteworthy negative impact on the financial performance of these rural banks.

Conversely, the study also investigated the impact of liquidity risk on financial performance but did not find a statistically significant relationship. This suggests that, in the context of these specific rural banks in Ghana's Western and Ashanti regions, liquidity risk did not play a statistically significant role in

determining their financial performance. These findings are of significant importance to the banking industry, particularly for rural banks in Ghana, as they provide valuable insights into the factors that influence financial performance. Understanding the relationships between NPLs, cost-income ratios, loan recovery rates, and revenue can help these institutions make informed decisions and implement strategies to enhance their financial stability and profitability.

Adusei and Bannerman (2022) conducted a retrospective analysis of non-performing loans (NPLs) within the Ghanaian banking sector, examining data from 1998 to 2019. They utilized a combination of the seemingly unrelated regression model and principal component analysis, leveraging historical annual time series data. Specifically, the study revealed that factors such as money supply, financial development, and various macroeconomic variables played significant roles in influencing NPLs within the sector. Notably, these factors exhibited statistically significant relationships with NPLs, highlighting their importance in understanding the dynamics of non-performing loans in the Ghanaian banking landscape. However, it was noted that real income was not found to be a statistically significant determinant of NPLs according to their findings.

These empirical studies provide valuable insights into the relationship between NPLs and various economic and financial factors in the context of Ghanaian commercial banks. The findings highlight the importance of economic growth, interest rates, financial development, and other macroeconomic variables in understanding and managing NPLs.

2.6 Conceptual Framework

A conceptual framework provides a roadmap for research by identifying the key variables, relationships, and assumptions that need to be considered. Therefore the conceptual framework for this research, expressed in the form of a diagram, illustrates a visual representation of the relationships that exist between the independent variables and the dependent variable (NPLs).

The diagram in the conceptual framework depicts how the independent, control and moderating variables interact or influence the dependent variable. The arrows or pathways indicate the direction of the relationships. The conceptual framework also incorporates moderating variable (Covid-19) for the research design.

Independent variables:

GDP growth rates
Inflation Rates
Exchange Rates
Unemployment rates

Dependent variable:
Non-Performing Loan rates

Moderator:

Covid-19 dummy variable

Control variable:

Interest Rates
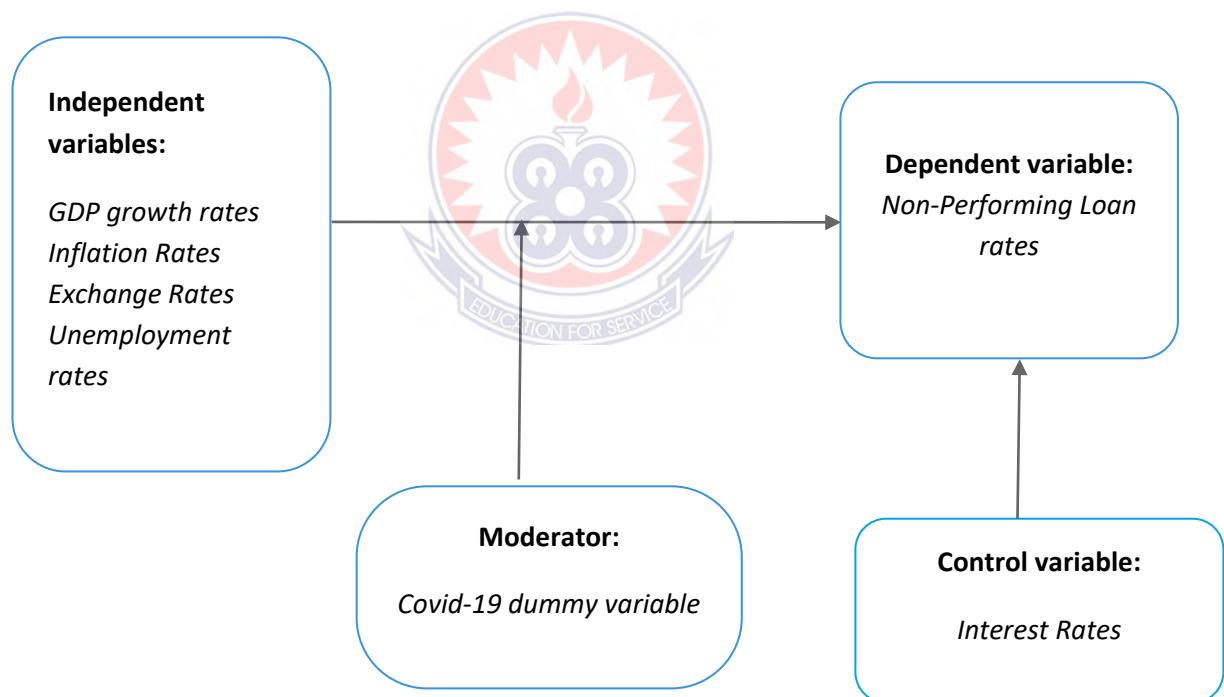
Figure 1 Conceptual Framework

The conceptual framework of this study revolves around understanding the dynamics of Non-Performing Loans (NPLs) within the context of various economic factors. NPLs serve as the dependent variable under study, reflecting the extent of loan defaults in financial institutions. The following independent variables—GDP

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Growth rates, Inflation rates, Exchange rates and Unemployment rates—take center stage in this framework. These economic indicators are examined for their potential impact on NPLs, aiming to discern the relationships between economic conditions and the health of financial institutions. The framework employs Interest rate as a control variable and analyses its direct effects on NPL rates, hence the direction of the arrow. Moreover, the framework incorporates a moderating variable, the Covid-19 pandemic, which is essential in assessing how this unprecedented global event might influence or interact with the relationships between the independent variables and NPLs. Through this conceptual framework, the study endeavors to provide valuable insights into the complex interplay of economic factors and external shocks in the context of NPLs.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter seeks to discuss the study strategy and procedures used to accomplish the research objectives. The research design, theoretical and empirical model specifications, variable measurement and justification, data source and estimating procedures are all explained. The methodology employed in this research was designed to provide a comprehensive understanding of the relationship between the pandemic and NPLs, contributing to existing literature and informing policymakers and bank management.

3.1 Research Approach

This study adopted a quantitative research approach. Quantitative research is defined as a systematic empirical research method that aims to collect and analyze numerical data to answer research questions or test hypotheses (Creswell & Creswell, 2017). It involves the use of statistical techniques to analyze data and draw objective conclusions about a population or phenomenon.

The quantitative research approach involved the collection of existing financial data sets from relevant sources to establish statistical relationships and trends. The data was then analyzed using statistical methods such as descriptive statistics, inferential statistics, correlation analysis, regression analysis, hypothesis testing. This research approach allowed researcher to quantify variables, measure relationships between variables, and made statistical inferences about the population being studied.

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3.2 Research Design

This research adopted the Quasi-experimental research design which is a research method that involves the manipulation of one or more variables under controlled conditions to observe the effects on other variables. It is characterized by the use of random assignment of participants to different conditions or groups, control over extraneous variables, and the ability to draw causal inferences (Trochim & Donnelly, 2008) This research design allowed researcher establish cause-and-effect relationships between the dependent and independent variables and used statistical analysis to assess the significance of observed effects.

The experimental research design is a scientific approach used to investigate cause-and-effect relationships between variables. It involves manipulating independent variables and measuring the effect on dependent variables while controlling for extraneous factors. The purpose of an experimental design is to establish a causal relationship between variables by systematically controlling the conditions under which the study is conducted.

3.3 Research Population

Population, in the context of research, refers to the entire group of individuals, objects, or events that share common characteristics and from which a sample is drawn or about which conclusions are made. It represents the larger group to which the research findings are intended to be generalized [Cooper & Schindler (2019)]. The population therefore for the study included all foreign and Indigenous commercial banking institutions licensed by the Bank of Ghana and is operating in Ghana.

3.4 Research Sample

The research sample is based on a time series annual data. It employed annual data for all the macroeconomic variables for both independent and control variables in the model; that is, GDP growth rates, Inflation rates, unemployment rates, exchange rates and interest rates from the years 2010 to 2022, and employed annual data for the dependent variable NPL rates in the model from the years 2010 to 2022. The research sampled commercial banks that have been operating in Ghana within the last 7 years. Out of all registered twenty-three (23) banking institutions in the country (Banking Supervision, Bank of Ghana, 2023), the research captures commercial banks that are only listed on the Ghana Stock Exchange as its sample. These banks therefore are Ghana Commercial Bank (GCB), Republic Bank, Calbank, Agricultural Development Bank (ADB), Standard Chartered Bank, Universal Merchant Bank (UMB), Access Bank, Ecobank, and Société Generale, making up nine (9) in total as at September, 2023 (Ghana Stock Exchange Listed Companies, http://www.gse.com.gh) Additionally, data gathered on these sampled banks are data on the NPL ratios of each of the banks. Data was collated from the Pricewaterhouse Coopers (PwC) Ghana Banking Survey Reports primarily from 2016 to 2022.

3.5 Regression Model Specification

To comprehensively understand the dynamics between Non-Performing Loan (NPL) ratios and key macroeconomic indicators, a robust regression model was deemed necessary. The selected independent and control variables for this model were GDP growth rates, inflation rates, exchange rates, unemployment rates, and interest rates. These variables were carefully chosen as they represent crucial aspects of the overall economic landscape and are known to have significant potential to influence NPL ratios.

The regression model incorporated COVID-19 as a moderating variable, recognizing its potential influence on the relationship between other independent variables and NPLs. By introducing COVID-19 as a moderating variable, the research sought to examine how the pandemic might have interacted with other factors impacting NPLs.

Furthermore, a dummy variable for COVID-19 was introduced into the regression model. This dummy variable served as a binary representation of whether a specific observation was before or after the onset of the pandemic. It allowed for the observation of the change in NPLs before and after the outbreak of COVID-19 and estimated the immediate impact of the pandemic on the dependent variable.

The time series regression models are represented as follows:

Model 1: $NPL_t = \beta 0 + \beta 1 GDP_t + \beta 2 logInf_t + \beta 3 Unempl_t + \beta 4 Exch_t + \beta 5 Interest_t$ $\beta 6 Covid_t + \epsilon_t$ .... …………………………… *equation 1*

The second equation where Covid-19 acts as the moderator is given as;

Model 2: $NPL_t = \beta 0 + \beta 1 GDP_t + \beta 2 logInf_t + \beta 3 Unempl_t + \beta 4 Covid_t + \beta 5(GDP.Covid)_t + \beta 6(logInfl.Covid)_t + \beta 7(Unempl.Covid)_t + \beta 8(Exch.Covid)_t + \beta 9 Interest_t + \epsilon_t$ ……..................................... *equation 2*

Where:

- NPL_t represents the Non-Performing loan rate at time t.

- GDP_t represents the GDP growth rate at time t.

- $logInf_t$ represents the log of inflation rate at time t.

- $Unempl_t$ represents the unemployment rate at time t.

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-Exch$t$ represents the exchange rates at time t.

-Interest$t$ represents the interest rates at time t.

-Covid$t$ represents covid rates at time t.

- $\beta 0$ represents the intercept.

- $\beta 1$, $\beta 2$, $\beta 3$, $\beta 4$, $\beta 5$, $\beta 6$, $\beta 7$, $\beta 8$, and $\beta 9$ are the coefficients for the respective variables.

- ϵt represents the error term at time t.

To conclude, all other variables that have the ability to impact the performance of NPL rates, but have not been stated for the purpose of the intended research, are assumed to be captured by the error term also referred to as residuals.

3.6 Measurement of the Model Variables

3.6.1 Non-Performing Loans

Non-performing loans (NPLs), often referred to as bad loans, are loans that borrowers have failed to repay according to the agreed terms. In essence, these are loans on which the borrower has stopped making interest or principal payments, typically for an extended period. A high NPL rate can indicate credit risk and potential financial instability for lenders, while a low rate is generally preferable for a healthy loan portfolio. The impact of non-performing loans on macroeconomic factors is studied in literature, as motivated by research authors like Aidoo et al., (2018); Nasieku (2014); and Matteo (2022).

3.6.2 Gross Domestic Product (GDP)

Gross Domestic Product refers to the measure of the monetary value of goods and services produced in a country within a defined fiscal period, usually a year or a quarter. It is used to assess the economic health and the size of a nation's economy. The variable is measured by summing the production of goods and services during the accounting period under consideration. GDP is included in the model as motivated by literature such as Tanasković & Jandrić (2015); Murumba (2013).

3.6.3 Inflation

Inflation is the rate at which the general price level of goods and services in an economy rise over time, resulting in a decrease in the purchasing power of a currency. Inflation can impact consumers' purchasing power, savings, and the overall cost of living. The inflation rate is the percentage increase in the general level of prices for goods and services in an economy over a specified period. Inflation rates are measured by the Consumer Price Index of Ghana. The inclusion of this variable is supported by literature as used by Curat et al (2013);

3.6.4 Unemployment rate

Unemployment is a state where individuals who are willing and able to work are unable to find suitable job opportunities. Unemployment rate is a percentage that represents the proportion of the labor force (those actively seeking employment) that is currently without a job. A lower unemployment rate generally indicates a healthier job market and greater economic stability, while a higher rate can signify economic challenges.

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3.6.5 Exchange rates

Exchange rate refers to the rate at which one currency can be exchanged or converted into another currency. It represents the value of one currency in terms of another. Exchange rates can be either fixed or floating.

3.6.6 Interest rates

Interest rates represent the cost of borrowing money or the return on investment for lending money. They are typically expressed as a percentage and are used in various financial transactions, including loans, bonds, savings accounts, and investments.

3.6.7 Covid-19 (dummy variable)

In research, a "dummy variable" is a binary variable used to represent categorical data. In the context of Covid-19, a dummy variable is being used to represent the presence or absence of the Covid-19 pandemic as a categorical moderating variable. It is proxied by Covid-19 confirmed cases in Ghana from the periods 2020 to 2022.

3.7 Data Collection

Secondary data were collected from various sources, including financial statements, reports from regulatory authorities, and published studies. These data sources will provide historical NPL trends, macroeconomic indicators, and contextual information necessary for analysis.

3.7.1 Sources of Data

With respect to the independent variables, data on GDP growth percentages, inflation rates, exchange rates and interest rates were obtained from the World Bank IMF Financial Soundness Indicators database. Data on unemployment rates were gathered from the International Labour Organization reports website on annual basis. Data on Covid-19 were gathered from the World Health Organisation Coronavirus Statistics dashboard specifically on Ghana. The rates of confirmed cases in Ghana from 2020 till date were reported on a week by week basis. Hence, simple average was used to converts these rates to yearly rates for the years 2020 to 2022 that coronavirus existed in the country.

Concerning data collection of NPL rates of the commercial banks selected for the analysis, secondary data for NPL ratios were obtained per reports from the Pricewaterhouse Coopers Ghana Banking Survey Reports from 2016 to 2020 on each bank. For the remaining years (2010-2015; 2021-2022), NPL rates were collected from the individual published financial reports. These observations made up a total of a hundred and seventeen (117) data points.

To create a single NPL ratio which would represent the dependent variable for the model, weighted average of the NPL rates was calculated. The weights for each bank were calculated on the basis of total NPL rates of Bank A relative to the NPL rates of the entire sample. Therefore (Total NPL rates for Bank A)÷(Sum total of NPL rates of all 9 banks). The total weights were equal to 1. Weighted Average NPL rates were obtained from multiplying individual weights of the banks with NPL ratios for the respective banks. The resulting weighted average NPL rates were ultimately averaged for the total years in question (2016-2022). This approach was employed to

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ensure that the significance of each bank in terms of its size and impact were proportionately reflected in the dependent variable.

3.8 Method of Data Analysis

Descriptive statistics was used to examine the changes in NPLs and loan repayment behavior. The analysis included calculations of mean, median, standard deviation, and other relevant measures such as skewness and kurtosis to summarize the data. A normal distribution table and curve was also provided in graph.

Ordinary Least Square (OLS) regression estimation was applied to identify the relationship between independent variables (e.g., economic indicators) and dependent variables (NPL ratios). The analysis also explored potential moderating factors that influenced the relationship. Time series regression was well-suited to capture variations across various time points, providing more robust results.

3.9 Ethical Considerations

This research will adhere to ethical guidelines, ensuring that all collected data remains accurate, timely, and transparent. The study will guarantee that findings are reported in an unbiased and transparent manner. In conclusion, the methodology employed in this research will use a quantitative approach, involving data collection, sample selection, statistical analysis, and ethical considerations. By investigating the impact of the Covid-19 pandemic on NPLs this study aims to provide valuable insights and contribute to the broader understanding of the relationship between pandemics and banking sector performance.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.0 Introduction

This chapter presents results from the various statistical tests, data analyses, and uses the information gathered to compare findings of the study, in conjunction with existing literature knowledge.

4.1 Descriptives

The research approach as stated employed quantitative data analysis; for this reason, it is deemed important to run the descriptive statistics of the data used for the research. Descriptives is important in quantitative analysis for important reasons such as helping researchers understand the distribution, central tendencies and variability of variables used for the research. It also provides a clear and concise summary of the data. Table 4.1 below provides the descriptive statistics of the time series data for the research.

To discuss the measure of central tendency, mean of the research data, the highest mean was recorded by Interest rate, followed by GDP growth rates, unemployment rates and exchange rates. The lowest mean was recorded by the Covid variable. Moving on to the variability measures, the maximum and minimum values of the data were captured. The maximum statistic was recorded under Interest Rates proxied by Average Commercial Banks' Lending rates. However the minimum value was recorded under Covid. Nonetheless, the highest range of the data set was recorded under GDP growth rates, whiles Covid again recorded the lowest range of the data set. On the measure of data dispersion, GDP growth rates dispersed the most from the mean, which was followed by Interest rates and exchange rates in that

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regard. On the other hand, log of Inflation recorded the least dispersed Variable from the centre of the data.

The Skewness of a given data is defined as the measure of data asymmetry. Therefore the skewness of the data demonstrated that with the exception of NPL ratios and Interest rates which were both negatively skewed, the other variables portrayed positive skewness implying that the remainder of the data was concentrated to the left side of the distribution. Non-Performing Loan rates and Interest rates indicated a negative skewness, implying that the data points fell to the right side of the distribution. Kurtosis which is the measure of peakness or otherwise the measure of flatness of a data distribution showed that GDP growth rates, Unemployment rates, Exchange rates, Covid rates and log of Inflation rates are leptokurtic, indicated by positive values are more peaked. On the other hand, Non-Performing loan rates and Interest rates are platykurtic indicating a more flat distribution from the normal.

The dataset was found to be well-prepared with no missing values or outliers. All data points were accounted for, and there were no gaps detected within the dataset. This ensured the completeness of the data, allowing for a reliable and comprehensive analysis.

Table 4.1 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
NPLRATES	13	.43377	2.37631	1.4772521	.75589791	.571	-.180	.616	-1.657	1.191
GDP RATES	13	.514	14.047	5.91114	3.601442	12.970	.681	.616	.819	1.191
logINFL	13	1.966	3.462	2.51350	.384922	.148	1.210	.616	2.045	1.191
UNEMPL	13	2.200	6.810	4.45462	1.111752	1.236	.110	.616	1.609	1.191
EXCHANGE	13	1.430	9.625	4.03519	2.277506	5.187	1.095	.616	1.830	1.191
INTEREST	13	20.608	30.033	26.13821	2.794014	7.807	-.701	.616	-.168	1.191
COVID	13	0	1	.23	.439	.192	1.451	.616	.095	1.191
Valid N (listwise)	13									

Source: Author's estimate, 2023

4.2 Correlations

Correlation, propounded by Sir Francis Galton in the late 19th century, is a statistical measure that quantifies the degree to which two variables are related or associated. It indicates the strength and direction of a relationship between two variables. Galton's works paved the way for the development of various correlation coefficients and statistical techniques to measure and analyze the correlation between variables, such as the Pearson correlation coefficient and the Spearman rank correlation coefficient. Table 4.2 below is a Pearson's correlation matrix of the variables under study. The matrix shows that the strongest correlation exists between exchange rates and Covid with 0.74. This is followed by the correlation between Exchange rates and NPL ratios with a strong correlation of 0.68. Additionally, the study observed positive correlations between variables such as unemployment rates and NPL ratios, log of Inflation rates and NPL rates, unemployment rates and log of Inflation rates, as well as interest rates and GDP growth rates (weak positive correlations). Negative correlations were recorded between unemployment and GDP growth rates, Interest rates and Exchange rates, log of Inflation rates and GDP growth rates. Overall, the weakest positive correction was recorded between Exchange rates and Unemployment rates (0.064), indicating a weak positive relationship between the variables. Covid and Unemployment rates show a weakest negative relationship between the variables on the matrix table with a correlation of -0.019.

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Table 4.2 Correlation Matrix

	GDP RATES	UNEMPL	EXCHANGE	INTEREST	COVID	logINFL
GDP RATES	1					
UNEMPL	-.411	1				
EXCHANGE	-.546	.064	1			
INTEREST	.192	.255	-.496	1		
COVID	-.455	-.019	.744[**]	-.654[*]	1	
logINFL	-.477	.167	.473	.392	.254	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: Author's estimate, 2023

4.3 Test Diagnostics of the Study

Diagnostics in statistical analysis serve as a crucial step in verifying the suitability of both the dataset and the chosen model for accurate research outcomes. These diagnostic tests aim to confirm the data's adequacy and the time series model's appropriateness, ensuring the reliability of findings and conclusions. Consequently, the study undertakes a series of diagnostic tests to assess the data's fitness and the model's suitability.

4.3.1 Test for Normality of Residuals

Table 4.3 below presents the Normality tests using both Kolmogorov-Smirnov (KS) and Shapiro-Wilk (SW) tests to assess whether the data set is normally distributed. The null hypothesis for Normality is that the data set is normally distributed; the alternative hypothesis states that the data set is not normally distributed. At a significance level of 0.05 the KS test shows that a p-value of 0.200 is

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higher than significance level. Also, given the same significance level of 0.05, the SW test shows a p-value of 0.094 higher than the significance level. Both tests therefore suggest that since the p-values are greater than 0.05 (the 5% significance level), there is no sufficient evidence to reject the hypothesis, and concludes that the data follows a normal distribution. Also provided in Figure 2 below is the graph showing normal distribution curve.

Table 4.3 Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
NPLRATES	.161	13	.200*	.889	13	.094

*. This is a lower bound of the true significance.

Figure 2: Histogram and Normality curve
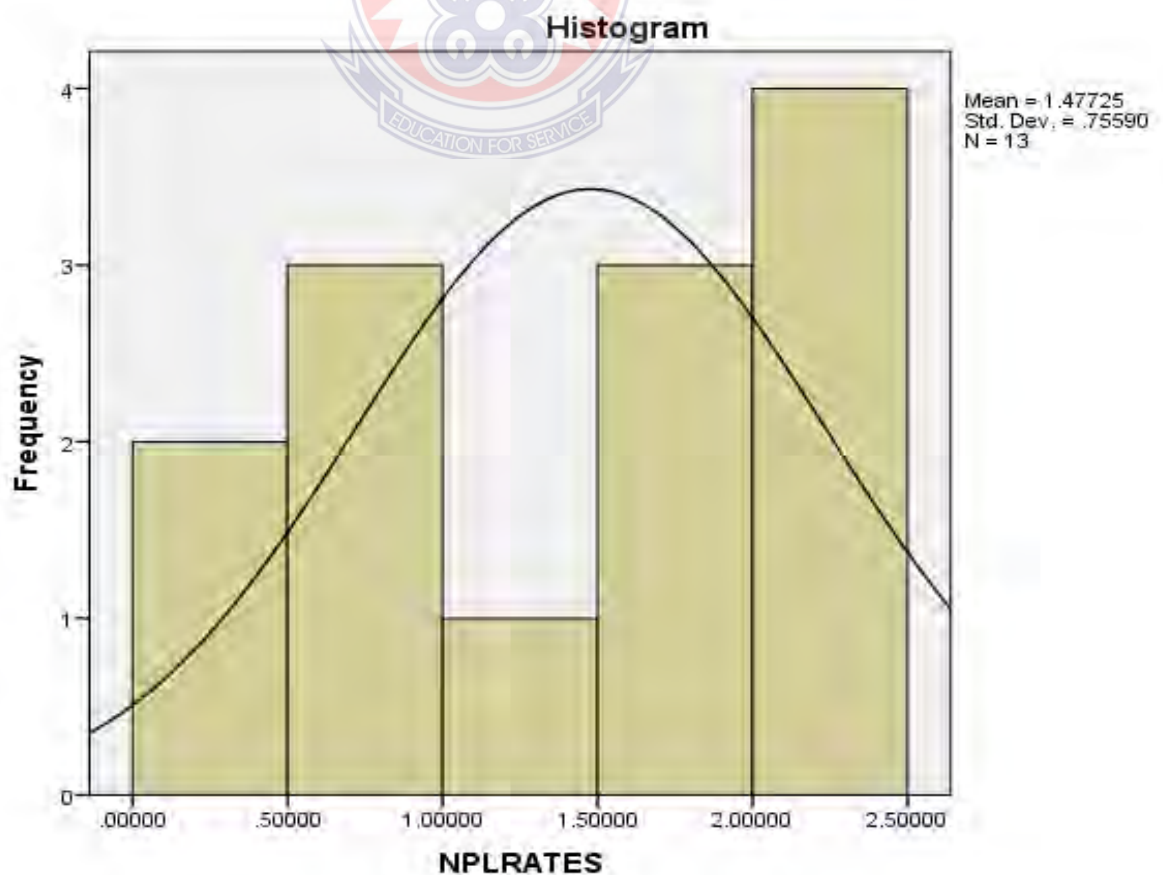
4.3.2 Homoscedasticity: Breusch-Pagan Test

Homoscedasticity in econometrics refers to the assumption that the variance of the residuals or errors is the same for all data points in a regression model. This is an important assumption in linear regression and other statistical models because violations of homoscedasticity that is heteroscedasticity, can lead to biased parameter estimates and inaccurate hypothesis tests. Therefore the null hypothesis of homoscedaticity states that there is homoscedasticity in the data. In other words, it assumes that the variability or spread of the residuals is constant across all values of the independent variables. The alternative hypothesis, in contrast, suggests that there is heteroscedasticity in the data. This implies that the variability of the errors differs at different points along the regression line.

To address the assumption of homoscedasticity in the time series data set, the Breusch-Pagan Test was employed. The Breusch-Pagan Test is a statistical test used in regression analysis to assess the presence of heteroscedasticity I linear regression models. Table 4.4 below presents the Residual output of the dataset showing the observations, predicted NPL rates, residuals and the Square of the error terms in the model. The residuals were squared to enhance the sensitivity of the test to detect patterns of different residual variances. The test also relies on regressing the squared residuals against the independent variables. Squaring the error term ensures that the test remains consistent across different datasets.

Table 4.4 Residual Output

Observation	Predicted NPL Ratios	Residuals	e square (e²)
1	0.670376223	0.146233777	0.021384318
2	0.777158631	-0.179828631	0.032338336
3	0.843114629	-0.401564629	0.161254151
4	0.380063746	0.053706254	0.002884362
5	1.227278229	-0.281538229	0.079263775
6	1.876051087	-0.516911087	0.267197072
7	1.775071577	0.596888423	0.356275789
8	1.565874975	0.800165025	0.640264068
9	1.995161714	0.381148286	0.145274016
10	2.177299189	-0.598299189	0.35796192
11	1.684063614	0.189196386	0.035795272
12	2.075174249	0.066885751	0.004473704
13	2.157582136	-0.256082136	0.065578061

Table 4.5 Summary Output

Regression Statistics	
Multiple R	0.721318864
R Square	0.520300903
Adjusted R Square	0.040601807
Standard Error	0.186424831
Observations	13

Chi.Sq.	6.76391
Df = k-1= 7-1	6
Critical Value	**12.592**

In Table 4.5 above is the summary output of the multiple linear regression model. From the table, the R Square is used to calculate for Chi Square (referred to as Lagrange Multiplier statistic). This is given as R Square × No. of Observations, which is derived, with a degree of freedom of 6, and k is the number of regressors. The critical value 12.592 was derived from the Chi Square distribution table. To conclude, with a calculated chi-square of 6.76391 and a critical value of 12.592, the calculated chi-square is less than the critical value. Therefore, we fail to reject the null hypothesis indicating that there is no strong evidence of heteroscedasticity. This suggests that the assumption of homoscedasticity is met for the regression model.

4.3.3 Autocorrelation: Durbin-Watson test

Another assumption conducted under tine series analysis is the assumption of autocorrelation. Autocorrelation, also known as the independence of errors, assumes that the residuals are independent of each other and do not exhibit any systematic patterns of dependence across observations or across time. In other words, the assumption implies that the error terms at one time or for one observation do not influence the error terms at other times or for other observations. It also assumes that there are no systematic patterns or trends in the residuals. Therefore the Durbin-Watson test for autocorrelation in Table 4.6 below shows a d-value of 1.768. We conclude that the Durbin-Watson statistic (d-value) is close to 2, and suggests little to no significant autocorrelation in the residuals.

Table 4.6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.827	.685	.369	.60031336	1.768

a. Predictors: (Constant), GDP RATES, logINFL, UNEMPLOYMENT, INTEREST, COVID, EXCHANGE

b. Dependent Variable: NPLRATES

Source: Author's estimate, 2023

4.3.4 Multicollinearity test

Multicollinearity tests are conducted to detect and assess the presence and severity of high correlation. Common multicollinearity tests include correlation matrices, Variance Inflation Factor (VIF) analysis, and condition indices. Table 4.7 projects the collinearity statistics of the regression model under study. It is observed that the variables with the model have a VIF of less than 10 indicating no multicollinearity. While high VIF values are typically a cause for concern and may suggest that the variable is redundant due to its correlation with other predictors. The variables used in the model align with research objectives, since it is taking a broader look at macroeconomic indicators on the rate at which Ghanaians are able to pay off loans collected from commercial banks.

Table 4.7 Coefficients

Model		Collinearity Statistics	
		Tolerance	VIF
1	GDP RATES	.395	2.533
	UNEMPLOYMENT	.532	1.880
	EXCHANGE	.201	4.965
	COVID	.246	4.066
	logINFL	.132	7.588

a. Dependent Variable: NPLRATES

Source: Author's estimate, 2023

4.4 Ordinary Least Square Regression Analysis

Ordinary Least Square (OLS) Regression analysis is a statistical technique used to model the relationship between one or more independent variables and a dependent variable. OLS Regression assumes a linear relationship. It also relies on assumptions, including linearity, independence of errors, constant variance of errors (homoscedasticity), and normality of errors which have been duly addressed above. The OLS regression tables for analysis for the first objective of the study are presented in Tables 4.8 to 4.10.

Table 4.8 introduces the Model Summary of the regression output. The Model Summary provides an quick overview of the regression model's performance and fit. The correlation coefficient (R) indicates a strong positive linear relationship between the dependent variable and the independent variables of the model. R-squared measures the proportion of the variance in the dependent variable that is explained by the independent variables in the model. An R-squared of 0.889 means that approximately 89% of the variation in the dependent variable is explained by the

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independent variables; this is a substantial amount and indicates a good fit of the model to the data. Moving on the Adjusted R Square, it suggests that the model still explains a significant portion of the variance even after adjusting for the number of predictors. This is a positive sign. The value of the standard error of the estimate represents the average amount by which the predicted values from the model may differ from the actual observed values. In other words, it quantifies the typical error or residual in the predictions made by the model. The lower standard error of the estimate indicates that the model's predictions are generally closer to the actual values, which is desirable.

The Analysis of Variance (ANOVA) table is used to assess the significance of regression models and how much of the variation in the dependent variable can be explained by the independent variables. With a p-value of 0.032, it indicates that this probability is relatively low; less than 0.05 significance level and suggests that there is evidence to reject the null hypothesis and conclude that at least one of the independent variables in the model has a statistically significant effect on the dependent variable. Additionally, F-statistic is a ratio of two mean squares and is used to test the significance of the regression component. Given a high F-statistic this suggests that the regression component is significant. The coefficients regression table shows that at significance level of 0.05, the following variables are statically significant; log of Inflation rates and exchange rates of the model.

Table 4.8 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.943	.889	.734	.39020620

a. Predictors: (Constant), logINFL, UNEMPLOYMENT , COVID, GDP RATES , EXCHANGE, INTEREST

Table 4.9 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.095	7	.871	5.719	.036
	Residual	.761	5	.152		
	Total	**6.857**	**12**			

a. Dependent Variable: NPLRATES

b. Predictors: (Constant), logINFL, UNEMPLOYMENT , COVID, GDP RATES , EXCHANGE, INTEREST

Source: Author's estimate, 2023

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Table 4.10 Coefficients

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-14.077	5.882		-2.393	.062
GDP RATES	.085	.055	.405	1.549	.182
logINFL	6.634	2.187	3.378	3.033	.029
UNEMPLOYMENT	.117	.153	.172	.763	.480
EXCHANGE	.704	.191	2.122	3.681	.014
INTEREST	.066	.152	.244	.435	.682
COVID	-.445	.551	-.258	-.807	.456

Source: Author's estimate, 2023

4.5 Discussion of Findings

A detail of the model's results, analyses and findings are discussed further in this section of the study. To assess the possibility of causality between Non-Performing Loan rates and the independent variables, the Ordinary Least Square Regression was employed. This technique was selected over Autoregressive Integrated Moving Average (ARIMA) for the time series analysis because OLS primarily allows researchers to assess the impact of predictor variables on the dependent variable directly, which serves to answer the objectives of the study. OLS does not require for stationarity of data; while also taking into consideration the size of the data hence OLS was selected over ARIMA.

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4.5.1 Relationship between NPL rates and the predictor variables

In the initial analysis, the results in Table 4.10 presented a compelling picture, given that the beta coefficient for the logged Inflation rate was calculated at a robust 3.38, revealing its significance at the 0.05 level. The significance of this coefficient was further underscored by the p-value, which clearly fell below 5%. This statistical figure demonstrates the existence of a substantial and noteworthy relationship between inflation and non-performing loan rates. The positive sign of the beta coefficient (+3.89) illuminates a pivotal insight: as inflation escalates or emerges as a key factor associated with rising levels of non-performing loans within the dataset under examination. This revelation is of considerable consequence, as it implies that fluctuations in inflation rates may directly influence the stability and performance of loans within the financial system. This finding deviates from previous studies by Saom et al. (2022) as they discovered an inverse relationship between inflation and NPLs. In summary, the findings revealed a statistically significant positive relationship between inflation and non-performing loan rates. The substantial beta coefficient of 3.38 underscores the significance of this association, indicating that as inflationary pressures mount, the incidence of non-performing loans is likely to increase. The impact of inflation on borrowing costs and the overall financial health of businesses and households potentially lead to reduced loan repayment capabilities, thereby increasing the likelihood of non-performing loans.

Moving next to the standardized beta coefficient associated with Exchange rates, which registers at an impressive 2.12, the analysis reveals a substantial coefficient which signifies a potent and noteworthy relationship between exchange rates and non-performing loan rates. It leaves no room for ambiguity that as exchange rates experience an increase within the economy, a substantial increase in non-

performing loan rates is to be expected. Delving further into the statistical rigor of this relationship, the significance level of 0.014 unambiguously asserts that the association between exchange rates and non-performing loan rates holds a position of statistical significance at the conventional 0.05 threshold. This robust statistical support the assertion that the impact of exchange rates on non-performing loan rates is a reliable and quantifiable phenomenon according to these findings. A strong and statistically significant positive relationship between exchange rates and non-performing loan rates implies that fluctuations in currency exchange rates possess the potential to exert a substantial influence on the stability and performance of loans. Reinforcing the idea that as exchange rates rises, non-performing loan rates are poised to increase significantly. Specifically, a positive coefficient suggests that an increase in exchange rates may lead to an amplified cost of imported goods and services. Consequently, this could place increased pressure on the citizens, impacting their capacity to settle their loans, particularly those denominated in foreign currencies. In terms of the broader implications for Ghana's economy, this situation may lead to heightened inflationary pressures due to the increased costs of imports. Additionally, businesses may face challenges in servicing foreign currency-denominated debts, potentially impacting their operations and financial stability.

Moreover, the analysis reveals an interesting dynamic between GDP growth rates and non-performing loans, as indicated by the coefficient of 0.41 and its associated significance level of 1.82. The positive coefficient of 0.41 suggests a positive association between GDP growth rates and non-performing loans, indicating that as the GDP grows, there is an anticipated increase in non-performing loan rates. This initially appears counterintuitive, as one might expect economic growth to be associated with lower non-performing loan rates. For example, in a research article by

Matteo (2022) found a negative relationship between GDP and an increase in NPLs and between public debt and NPLs. Similarly, Tanasković & Jandrić (2015) found a negative relationship between GDP growth and the rise in NPL ratio. The significance level of 1.82 suggests that the observed relationship between GDP growth rates and non-performing loans may not be statistically reliable. In statistical analysis, a significance level exceeding 1.0 is highly unusual and typically indicates that the relationship may be subject to chance variations or that there are other unaccounted-for factors influencing the results. In practical terms, the implications of this finding are inconclusive. The weak statistical support for the relationship between GDP growth rates and non-performing loans suggests that other factors, such as government policies, banking practices, or external economic conditions, may play more significant roles in determining non-performing loan rates. Further investigation and a larger dataset may be needed to obtain a clearer understanding of the complex interplay between economic growth and loan performance. Additional research and consideration of other influential factors are warranted to gain deeper insights into the dynamics between GDP growth and non-performing loans.

Under Unemployment rates and their potential impact on non-performing loan rates, an interesting picture emerges from the analysis. The standardized beta coefficient of 0.17 provides an initial insight, indicating a positive relationship between unemployment rates and non-performing loan rates. This implies that as unemployment rates increase, there is an expectation of a corresponding rise in non-performing loan rates. Such a relationship aligns with common intuition, as economic challenges often manifest in higher unemployment and financial strain. This finding also aligns with findings from Matteo's research article which found a corresponding negative relationship between unemployment rates and non-performing loans at a

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significant 1%. The significance level of 0.48 suggests that the observed relationship between unemployment rates and non-performing loans does not reach the level of statistical significance; hence there is an element of uncertainty in the statistical robustness of this connection. In practical terms, these results suggest that the link between unemployment rates and non-performing loans may be more complex than initially assumed. The results demonstrate the significant impact of the labor market on non-performing loans (NPLs). Specifically, a rise in unemployment leads to a decrease in effective demand, causing a notable decline in output. Consequently, both households and businesses experience a reduction in wealth, resulting in decreased income and, subsequently, reduced capacity to repay debts. As a result, this situation contributes to a surge in non-performing loans within the financial sector.

Based on the provided information in Table 4.10 above, the beta coefficient of -0.26 for Covid as a dummy variable suggests a negative relationship between the presence of Covid (as indicated by the dummy variable) and the outcome variable, Non-Performing loan rates. In other words, when the Covid dummy variable is "1" (indicating the presence of Covid), there is an expected decrease in the outcome variable. The negative sign of the beta coefficient implies that during periods when the Covid dummy variable is "1" (indicating the presence of Covid), there is a decrease in non-performing loan rates. However, since the significance level is relatively high, it indicates that this observed relationship is not statistically robust. Stated differently, the high significance level of 0.456 indicates that the relationship between the Covid variable and NPL ratios is not statistically significant at the conventional 0.05 significance level. This means that the observed relationship may not be statistically robust, and the effect of the Covid variable on the outcome variable may not be reliable or consistent. In summary, based on the provided beta

coefficient and significance level, there is a negative relationship between the presence of Covid (as represented by the dummy variable) and the outcome variable. However, the lack of statistical significance suggests that the relationship may not be statistically reliable or significant in practice. Further analysis or a larger dataset may be needed to determine the true impact of the Covid variable on the outcome variable. The research also notes that interest rate which is used as a control variable, found a positive coefficient beta of 0.244 in relation to NPL rates. A positive coefficient suggests that an increase in interest rates may lead to higher borrowing costs for individuals and businesses. This, in turn, could place added financial pressure on borrowers, potentially impacting their ability to meet debt obligations and increasing the likelihood of loans becoming non-performing. Elevated interest rates could discourage borrowing and investment, leading to a slowdown in economic activity. This might affect the overall economic growth and business expansion in Ghana, particularly for small and medium-sized enterprises (SMEs) heavily reliant on loans for growth and development. Previous research conducted independently by Curat et al (2013) and Farhan et al (2012) both examined the dynamics at play and both arrived at a consistent and pivotal conclusion that there is indeed a positive relationship between interest rates and NPLs, underlining the consistent and crucial association between interest rates and NPLs.

4.6 Moderation Analysis

Moderation analysis in multiple linear regression is a statistical technique used to examine whether the relationship between an independent variable (predictor) and a dependent variable (outcome) is influenced or moderated by the presence or interaction of another variable known as the moderator. This analysis helps researchers understand under what conditions, or for whom, the relationship between

the predictor and outcome is stronger, weaker, or different in some way, as applied for this research paper. Moderation Analysis tables illustrated in Tables 4.11 to 4.15 will be broken down in this analysis using COVID as a moderator on the independent variables of the study.

From Model Summary in Table 4.12, the provided details represent the summary statistics of an R of 0.929 indicates a very strong positive linear relationship between the variables suggesting that approximately 92.9% of the variance is explained. Comparatively, R in the previous model (model 1) is slightly higher at 0.943 indicating that the first model explains slightly more variance in the outcome. An R Square of 0.863 implies that approximately 86.3% of the variability in the dependent variable is accounted for by the independent variable(s) included in the model. This is a substantial amount suggesting that the model explains a significant portion of the variation in the outcome. The adjusted R Square takes into account the number of independent variables in the model and adjusts R Square accordingly. It penalizes the inclusion of unnecessary variables. An adjusted R Square of 0.59 suggests that after considering the complexity of the model, approximately 59% of the variability in the dependent variable is still explained. While this is lower than the unadjusted R Square, it indicates that the model remains reasonably effective in explaining the variation while avoiding overfitting. The standard error of the estimate (0.48) is a measure of the average difference between the observed values and the values predicted by the regression model. Smaller values indicate a better fit of the model to the data. In this case, a standard error of 0.48 suggests that, on average, the predicted values from the model are within 0.48 units of the actual observed values. The standard error in the second model is 0.480, while in the first model, it is lower at 0.390. A lower standard error indicates that the data points are closer to the regression

line in the first model, suggesting that it may provide better predictions or be a more precise model. Overall, these results indicate that the regression model has a very strong linear relationship (high R) and explains a substantial portion of the variability in the dependent variable (high R Square).

4.7 Discussion of Findings using Covid as a Moderating Variable

Covid-19, proxied by confirmed cases was used as a moderator on GDP growth rates, log of Inflation, exchange rate volatility and unemployment rates to understand under what conditions, the relationship between the predictor and outcome is stronger, weaker, or different in some way. The ANOVA table for model 2 reveals that based on the results the F-statistic of 3.154 suggests that the model's independent variables collectively have some influence on the dependent variable. The significance level of 0.141 is greater than the conventional significance level of 0.05. This suggests that we do not have strong evidence to reject the null hypothesis, which posits that the independent variables have no significant effect on the dependent variable. In other words, the model's explanatory power may not be statistically significant at the 0.05 threshold.

Beginning the analysis from Table 14 based on the results, the negative beta coefficient (-2.7) of Covid suggests that Covid is associated with a reduction in non-performing loans. This might be because of government interventions, economic stimulus, or changes in borrower behavior during the pandemic. The significance level of 0.053 is just slightly above the conventional significance threshold of 0.05.. In summary, based on these results, there is evidence to suggest that the presence of Covid may have had a negative impact on non-performing loans. However, the statistical significance is seen to be rather significant at 10%. The significant impact

of Covid, reflected by the negative beta coefficient, suggests that the pandemic has placed substantial pressure on borrowers, potentially leading to an increase in non-performing loans. The adverse effects of the pandemic on business operations and individuals' financial stability may have contributed to heightened difficulties in loan repayment, impacting the overall economic resilience of Ghana.

Next, looking at the moderation between Covid-19 and GDP growth rates, the beta coefficient of -2.15 represents the strength and direction of the moderating effect of Covid-19 on the relationship between GDP growth rates and the outcome variable, NPL ratios. The negative sign implies a negative moderation effect, indicating that the relationship between GDP growth rates and the outcome variable is weaker or even reversed in the presence of COVID-19. The significance level of 0.11 indicates the probability of obtaining a beta coefficient as extreme as -2.15 if there were no real moderating effect of Covid-19 on the relationship between GDP growth rates and the outcome variable. In this case, the significance level is above the conventional significance threshold of 0.05. Based on these results, the negative beta coefficient (-2.15) suggests that Covid-19 has a weakening influence on the relationship between GDP growth rates and the outcome variable. In practical terms, this implies that the positive effect of GDP growth on the outcome variable may be mitigated or even reversed during the Covid-19 pandemic. The significance level of 0.11 indicates that the moderating effect of Covid-19 is not statistically significant at either 0.05 or 0.1 significance level. While the result is not strongly significant, it is close to the threshold.

Continuing with the moderating effect between Covid and exchange rates, the analysis suggests that Covid is being tested as a moderator on the relationship

between exchange rates and non-performing loans. A positive beta coefficient (4.12) indicates that, under certain conditions moderated by Covid, the relationship between exchange rates and non-performing loans becomes stronger and positive. The positive beta coefficient of 4.12 suggests that when Covid moderates the relationship between exchange rates and non-performing loans, there is an increase in the strength of the relationship. In other words, exchange rates may have a more significant effect on non-performing loans during the presence of Covid, potentially leading to higher non-performing loan rates. The moderation of Covid on exchange rates indicates that the pandemic's influence on currency values significantly impacts the ability of businesses and individuals to repay loans. With a positive beta coefficient, an increase in Covid-related uncertainties might increase the effect of exchange rate fluctuations on NPL rates, potentially challenging the economic resilience of borrowers. However, the high significance level of 0.85 indicates that the observed effect of Covid as a moderator is statistically robust at 0.1 significance level.

4.7.1 Excluded Variables

The exclusion of certain variables from a regression model by SPSS can have several implications on the analysis. The statistical software identified some excluded variables from the regression model, labeled as Table 15.

1. Log of Inflation Moderated by Covid: The exclusion of the log of inflation moderated by Covid indicates that SPSS did not find a statistically significant relationship between this variable and the dependent variable (non-performing loan rates) when considering the moderation effect of Covid. It suggests that Covid may not significantly influence the relationship between the log of inflation and the outcome variable. This exclusion suggests that, in this specific

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context, Covid may not play a substantial moderating role in how inflation affects non-performing loans. The implications are that the log of inflation alone might be sufficient to explain changes in non-performing loans without the need to account for Covid as a moderator in this particular model.

2. Unemployment Rates Moderated by Covid: Similarly, the exclusion of unemployment rates moderated by Covid suggests that SPSS did not find a statistically significant relationship between this variable and the dependent variable (non-performing loan rates) when considering the moderation effect of Covid. It indicates that Covid may not significantly influence the relationship between unemployment rates and the outcome variable. Similar to the first case, this exclusion implies that Covid may not be a significant moderator in the context of how unemployment rates affect non-performing loans. The findings suggest that unemployment rates alone may sufficiently explain changes in non-performing loans, independent of Covid's moderating role. In both cases, the implications are that the moderating role of Covid on these specific relationships does not appear to be statistically significant in this particular model.

Table 4.11 Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
2	EXCH.COV, UNEMPLOYMENT , logINFL, EXCHANGE, GDP RATES ,	.	Enter

COVID,

INTEREST,

GDP.COV

a. Dependent Variable: NPLRATES
b. Tolerance = .000 limits reached.

Table 4.12 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.929[a]	.863	.590	.48428543

a. Predictors: (Constant), EXCH.COV, UNEMPLOYMENT , logINFL, EXCHANGE, GDP RATES , COVID, INTEREST, GDP.COV

Table 4.13 ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	5.918	8	.740	3.154	.141[b]
	Residual	.938	4	.235		
	Total	**6.857**	**12**			

a. Dependent Variable: NPLRATES

b. Predictors: (Constant), EXCH.COV, UNEMPLOYMENT , logINFL, EXCHANGE, GDP RATES , COVID, INTEREST, GDP.COV

Table 4.14 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	-7.230	5.094		-1.419	.229
	GDP RATES	.123	.089	.584	1.379	.240
	logINFL	1.129	1.222	.575	.924	.408
	UNEMPLOYMENT	.002	.246	.003	.007	.994
	EXCHANGE	.717	.261	2.161	2.743	.052
	COVID	-4.639	1.704	-2.691	-2.722	.053
	INTEREST	.099	.233	.366	.426	.692
	GDP.COV	-.028	.014	-2.147	-2.060	.108
	EXCH.COV	.047	.020	4.124	2.275	.085

a. Dependent Variable: NPLRATES

Table 4.15 Excluded Variables

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
2	logINFL.COV	.	.	.	.	.000
	UNEMP.COV	.	.	.	.	.000

a. Dependent Variable: NPLRATES

b. Predictors in the Model: (Constant), EXCH.COV, UNEMPLOYMENT , logINFL, EXCHANGE, GDP RATES , COVID, INTEREST, GDP.COV

Source: Author's estimate, 2023

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter serves as the final part of the study and presents the summary of the study, the conclusion drawn from the various empirical findings and the recommendation made by the study based on the drawn conclusion. It provides highlight on the methodologies used in exploring the topic under consideration which includes the data collection technique, the sample among others. The research aimed to find the impact of Covid as a moderating variable on the rates of Non-Performing Loans of selected commercial banks in Ghana, finding the effect of some macroeconomic variables on the Non-Performing Loan rates. Specifically, the study was built on three research questions as follows;

1. How do changes in GDP growth, inflation, exchange rates, and unemployment rates affect the NPL levels in selected commercial banks?

2. Does Covid-19 moderate the relationship between macroeconomic factors (GDP growth, inflation, exchange rates, unemployment rates) and NPLs in commercial banks?

3. Which of the independent variables has the highest quantitative impact on NPL levels in selected commercial banks during both stable economic conditions and periods influenced by Covid-19?

The study used NPL rates collated from nine (9) commercial banks operating in Ghana; macroeconomic data using a time frame of 2010 to 2022. It employed statistical tools for its testing for normality, multicollinearity, and autocorrelation tests

of its error terms to satisfy the assumptions of the dataset. It further used OLS Regression to assess the statistical significance, their practical and substantial meaning of the independent variables on the dependent variable using Covid-19 as a moderator within the dataset.

5.1 Summary of Findings

The following findings discovered by the statistical tests are summarized below;

5.1.1 Effect of GDP Growth rates on NPL levels

After series of statistical tests, the study observed an inverse moderating effect, suggesting that Covid-19 had a weakening influence on the relationship between GDP growth rates and the outcome variable. This finding to deviates from previous studies conducted by

5.1.2 Effect of Exchange rates on NPL levels

The study observed a more significant effect on non-performing loans during the presence of Covid, potentially leading to higher non-performing loan rates. The moderation of Covid on exchange rates indicates that the pandemic's influence on currency values significantly impacted the ability of businesses and individuals to repay loans.

5.1.3 Effect of Inflation rates on NPL levels

While the study did not find a statistically significant moderating effect of the Covid-19 pandemic on Inflation on NPL rates, it however observed a positive relationship between inflation rate effect on non-performing loan ratios of these commercial banks. This indicated that rise in inflation as a key factor were associated with rising levels of non-performing loans within the dataset under examination. This

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revelation was of considerable consequence, as it implied that fluctuations in inflation rates may directly influence the stability and performance of loans within the financial system.

5.2 Conclusion

To conclude, the study found that Covid was associated with a reduction in non-performing loans. This might be because of government interventions, economic stimulus, or changes in borrower behavior during the pandemic. Furthermore, due to the 2017 financial sector clean-up undertaken by the Bank of Ghana, one could argue that commercial banks in Ghana were more resilient explaining why these commercial banks were able to withstand the shock of the pandemic, reflected in their non-performing loan portfolios. The results suggest that commercial banks in Ghana were resilient and that the pandemic did not have a massive negative impact on their financial performance.

The mediating effect of the Covid-19 pandemic on the performance of commercial banks' non-performing loan portfolios in Ghana implies that the pandemic played a significant role in influencing the relationship between macroeconomic factors and NPLs. This suggests that the impact of Covid-19 on the economy contributed to changes in the relationship between variables such as GDP growth, inflation, exchange rates, and unemployment rates and the levels of non-performing loans in commercial banks. On the other hand, the moderating effect indicates that Covid-19 influenced the strength or direction of the relationship between macroeconomic factors and NPLs. This implies that the pandemic affected the magnitude or the conditions under which the relationship between these factors and non-performing loans occurred, which the study made its analysis from.

During the study the regression results revealed that amongst the independent variables employed, log of Inflation rates with the largest magnitude of coefficient (3.378) had the highest quantitative impact on NPL levels during stable economic conditions in Ghana. On the other hand, the study also revealed that during the periods of Covid-19 pandemic, exchange rates had the highest quantitative effect or impact on non-performing loan levels amongst commercial banks in Ghana given that it had the largest magnitude of coefficient.

5.3 Recommendation

The study suggests the Government of Ghana to keep implementing policies that support macroeconomic stability, including inflation control, sustainable GDP growth, and employment generation, to create a conducive environment for businesses and borrowers to thrive. They should also ensure the existence of a strong legal and regulatory framework that facilitates the timely resolution of disputes and the enforcement of contracts, promoting confidence in the financial system.

Moreover, these insights underscore the complex interplay between economic factors and financial stability, underscoring the need for strategies in managing loan portfolios in the face of changing economic conditions. Example, lending institutions and policymakers should factor this dynamic into their risk assessment and management strategies, recognizing that currency exchange rate movements can trigger significant shifts in non-performing loan portfolios. Lending institutions and policymakers must equally factor the dynamic into their risk assessment and management strategies, recognizing that currency exchange rate movements can trigger significant shifts in non-performing loan portfolios.

By implementing these measures, the Ghanaian government can help reduce the risks associated with Non-Performing Loans in commercial banks, contributing to the overall stability and resilience of the financial sector.

5.4 Recommendation for Further Studies

The study upon the diverse findings ascertained implores academic to collaborate with industry to explore the topic into detail emplacing importance on incorporating both bank-specific and macroeconomic indicators and increasing the sample base as well as data period.

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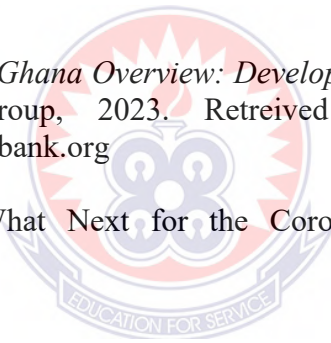
APPENDICES

APPENDIX A

YEARS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL	Post-Covid
2022	-35.24	1.587	-0.377	-8.812	75.5	52.772	-36.865	-6.846	37.38	-15.394	-41.41	-13.4	**-0.12917**	1
2021	87.275	-10.72	-28.9	7.7175	11.336	24.8275	20.5825	220.858	-16.49	-24.737	-4.708	175.2375	**38.5228**	1
2020	0	0	166.44	131.09	24	34.56	3.54	-142.95	-21.68	46.81	9.27	-12.19	**19.9083**	1

Source: Ghana Corona Virus Confirmed Case Rates, WHO COVID-19 Disease Dashboard

APPENDIX B

Source: PwC Ghana Banking Survey Reports; Annual Published Financial Statement Reports

Years	GCB Bank	Republic	Calbank	ADB	Standchart	UMB	Access	Ecobank	Societe Gen	
2010	0.073	0.044	0.114	0.109	0.049	0.055	0.057	0.058	0.078	
2011	0.049	0.042	0.1	0.0669	0.041	0.044	0.045	0.046	0.042	
2012	0.043	0.038	0.079	0.028	0.036	0.038	0.039	0.04	0.037	
2013	0.051	0.041	0.058	0.029	0.04	0.042	0.027	0.043	0.04	
2014	0.046	0.042	0.086	0.2329	0.041	0.043	0.022	0.044	0.041	
2015	0.147	0.043	0.055	0.3389	0.0611	0.063	0.044	0.045	0.042	
2016	0.17	0.14	0.09	0.35	0.37	0.106	0.13	0.16	0.2	
2017	0.09	0.18	0.11	0.32	0.22	0.17	0.32	0.15	0.14	
2018	0.04	0.2079	0.099	0.34	0.29	0.151	0.32	0.17	0	
2019	0.05	0.1816	0	0.305	0.03	0.143	0.22	0.07	0	
2020	0.12	0.139	0.135	0.29	0.15	0.1381	0.2	0.07	0.07	
2021	0.1598	0.1532	0.112	0.3121	0.2359	0.1868	0.17	0.12	0.0758	
2022	0.2059	0.1985	0.1175	0.2381	0.1204	0.1974	0.141	0.0947	0.1348	
Sum	1.2447	1.4502	1.1555	2.9599	1.6844	1.3773	1.735	1.1107	0.9006	
Weight	0.091399	0.106489	0.084849	0.217347	0.123687	0.101136	0.127402	0.081559	0.066132	**NPL Rates**
2010	0.00667	0.00469	0.00967	0.02369	0.00606	0.00556	0.00726	0.00473	0.00516	**0.817**
2011	0.00448	0.00447	0.00848	0.01454	0.00507	0.00445	0.00573	0.00375	0.00278	**0.597**

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2012	0.00393	0.00405	0.0067	0.00609	0.00445	0.00384	0.00497	0.00326	0.00245	**0.442**
2013	0.00466	0.00437	0.00492	0.0063	0.00495	0.00425	0.00344	0.00351	0.00265	**0.434**
2014	0.0042	0.00447	0.0073	0.05062	0.00507	0.00435	0.0028	0.00359	0.00271	**0.946**
2015	0.01344	0.00458	0.00467	0.07366	0.00756	0.00637	0.00561	0.00367	0.00278	**1.359**
2016	0.01554	0.01491	0.00764	0.07607	0.04576	0.01072	0.01656	0.01305	0.01323	**2.372**
2017	0.00823	0.01917	0.00933	0.06955	0.02721	0.01719	0.04077	0.01223	0.00926	**2.366**
2018	0.00366	0.02214	0.0084	0.0739	0.03587	0.01527	0.04077	0.01387	0	**2.376**
2019	0.00457	0.01934	0	0.06629	0.00371	0.01446	0.02803	0.00571	0	**1.579**
2020	0.01097	0.0148	0.01145	0.06303	0.01855	0.01397	0.02548	0.00571	0.00463	**1.873**
2021	0.01461	0.01631	0.0095	0.06783	0.02918	0.01889	0.02166	0.00979	0.00501	**2.142**
2022	0.01882	0.02114	0.00997	0.05175	0.01489	0.01996	0.01796	0.00772	0.00891	**1.902**

Source: Author's Weighted Average NPL rates