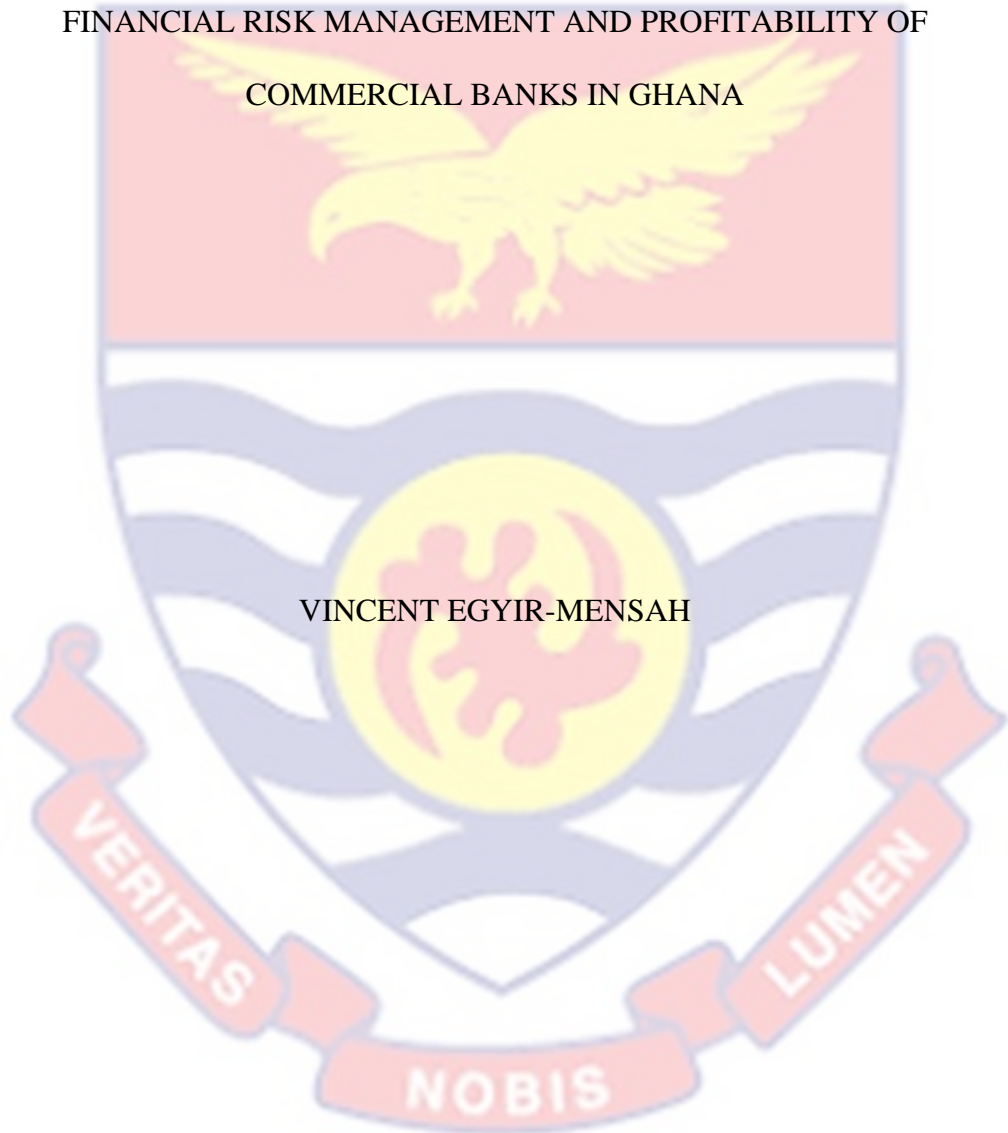


UNIVERSITY OF CAPE COAST

FINANCIAL RISK MANAGEMENT AND PROFITABILITY OF  
COMMERCIAL BANKS IN GHANA



VINCENT EGYIR-MENSAH

2022

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BY  
VINCENT EGYIR-MENSAH

Dissertation submitted to the Department of Finance of the School of  
Business, College of Humanities and Legal Studies, University of Cape Coast,  
in partial fulfillment of the requirements for the award of Master of Business  
Administration Degree in Finance

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## DECLARATION

### Candidate's Declaration

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

Candidate's Signature..... Date.....

Name: Vincent Egyir-Mensah

### Supervisor's Declaration

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

Supervisor's Signature ..... Date.....

Name: Dr. Mohammed Zanginah Isshaq

## ABSTRACT

This study examines the effect of financial risk management on the profitability of commercial banks in Ghana using a balance panel of twenty (20) commercial banks over ten time periods, spanning from 2011 to 2020 within a causal research design. The study considered net interest margin, credit risk, liquidity risk, operational risk, bank size and leverage as variables of interest. The study reveals that credit risk, liquidity risk and operational risk as the independent variable of interest and leverage as a control variable have negative and statistically significant effects on net interest margin. However, company size has positive and statistically significant effects on net interest margin. Therefore, the study recommends that Management of commercial banks must take proper steps in managing financial risk indicators in order to avoid its effects on their operations, sustenance, profits and growth due to the turbulent competition in the industry. Management of commercial banks should expand their size or operations to take advantage of economies of scale for the purpose of achieving high profits. Finally, Management of commercial banks should try to reduce leverage since it has a negative effect on profitability.

## KEYWORDS

Financial Risk

Profitability

Commercial Banks

Ghana



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## DEDICATION

To my family members.



## TABLE OF CONTENTS

	Page
DECLARATION	ii
ABSTRACT	iii
KEYWORDS	iv
ACKNOWLEDGEMENTS	v
DEDICATION	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ACRONYMS	xii
CHAPTER ONE: INTRODUCTION	
Background to the Study	1
Statement of the Problem	5
Purpose of the Study	6
Research Objectives	6
Research Hypotheses	6
Significance of the Study	7
Delimitations	8
Limitations	8
Definition of key terms	8
Organisation of the Study	9
CHAPTER TWO: LITERATURE REVIEW	
Introduction	10
Theoretical Review	10



Modern Portfolio Theory	10
Enterprise Risk Management Theory	12
Financial Economic Theory	13
Conceptual Review	14
Credit Risk	14
Liquidity Risks	15
Operational Risks	17
Profitability	18
Financial Risk Management and Profitability	18
Liquidity Risk and Profitability	19
Credit Risk and Profitability	21
Operational Risk and Profitability	25
Conceptual Framework	27
Chapter Summary	28
<b>CHAPTER THREE: RESEARCH METHODS</b>	
Introduction	29
Research Paradigm	29
Research Design	29
Research Approach	30
Model Specification	30
Definition and Measurement of Variables	31
Data Sources	32
Estimation Procedure	33
Data Processing and Analysis	33
Chapter Summary	33

CHAPTER FOUR: RESULTS AND DISCUSSION

Introduction	35
Descriptive Statistics of the Variables	35
Correlation Analysis	36
Effect of Credit Risk on Net Interest Margin	37
Hausman Test for Objective One (1)	38
Effect of Liquidity Risk on Net Interest Margin	40
Hausman Test for Objective Two (2)	40
Effect of Operational Risk on Net Interest Margin	43
Hausman Test for Objective Three (3)	43
Chapter Summary	46

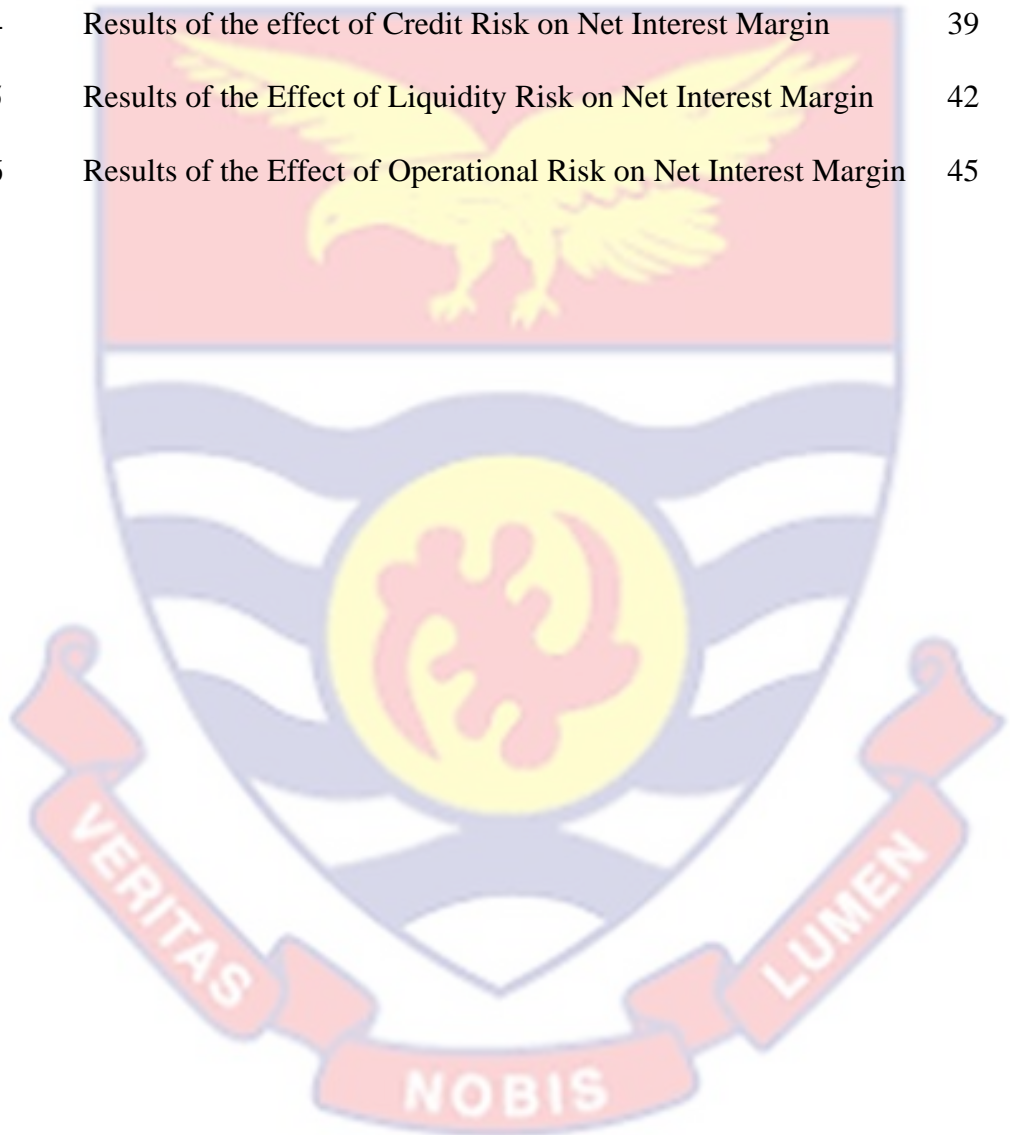
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND

RECOMMENDATIONS

Introduction	47
Summary	47
Conclusions	48
Recommendations	50
Suggestions for Further Research	51
REFERENCES	52

## LIST OF TABLES

Table		Page
1	Definition and Measurement of Variables	32
2	Descriptive Statistics of the Variables	36
3	Pair-wise Correlation among Variables	37
4	Results of the effect of Credit Risk on Net Interest Margin	39
5	Results of the Effect of Liquidity Risk on Net Interest Margin	42
6	Results of the Effect of Operational Risk on Net Interest Margin	45



## LIST OF FIGURES

Figure		Page
1	Relationship between Financial risk management and profitability commercial banks in Ghana	28



## LIST OF ACRONYMS

CR	Credit Risk
CS	Company Size
LEV	Leverage
LR	Liquidity Risk
NIM	Net Interest Margin
OPR	Operational Risks



## CHAPTER ONE

### INTRODUCTION

Banking system is the heart beat of every economic system, and many factors affect and determine its performance. Financial risk management is necessary for all commercial Banks and Microfinance banks (MFBs). Al-Tamimi and Al-Mazrooei (2007) stressed that financial risk arises from possible losses in financial markets due to movements in financial variables. It is usually associated with leverage with the risk that obligations and liabilities cannot be met with current assets. Financial risk may be caused by variation in interest rates, currency exchange rates, variation in market prices, default risk and liquidity gap that affect the cash flows and, therefore its financial performance and competitive position in product markets. Nevertheless, this is not an effortless task because managers must ensure that the bank is running in an efficient and profitable manner and in most cases, there are high possibilities of mismatch of current assets and current liabilities during this process. Financial risk as one of these determinants performs a crucial function in the successful operation of a business firm and it is mostly important to make it known that a bank is liquid when it has the ability to settle obligations instantly.

#### **Background to the Study**

The banking sector is considered to be an important means of financing for most infant businesses. By its nature, banks face numerous risks which arises as a result of its dynamic operations, and the complexity of the economic environment in which it operates. Thus, since the inception of financial institutions in the early decades in a couple of developing countries,

the studies on the effect of financial risk management on financial performance of commercial banks and financial institutions have been very active (Olalere & Omar, 2015). As a matter of fact, the adequate management of risks in banks and other financial institutions is critical for their survival and growth. Risk management is important for sustainable profitability of banks and other financial institutions (Alshatti, 2015). Among the risk's banks face in their operations, financial risks are the most critical ones and they are also some of the important determinants of bank performance. Thus, financial risk management capability of a bank remains a life academic discourse in finance and economics.

Financial Risk management can therefore be defined as a set of financial activities that maximizes the performance of a bank by reducing costs associated with the cash flow volatility (Wanjohi, Wanjohi & Ndambiri, 2017). The manager's behavior toward risk (risk appetite and risk aversion) and corporate governance can affect the choice of risk management activities. Most of these definitions agree with Basel I (1999), which views particularly credit risk as the potential that debtor or counter party defaults in satisfying contractually pre-determined obligation according to the agreed upon terms. Simply, a debtor might fail to pay back his obligation as agreed on paper. When debts are not paid in full it has ill effect on financial institutions. According to Achou and Tenguh (2008), failure of trading partner to repay its debt in full can seriously damage the affair of the other partner; financial risk always has been the vicinity of concern throughout the world.

The process of risk management is very much important to the banking industry since most of their clients are susceptible to co-variant risk, market

risk and credit risk. Hence, it is extremely vital that a good financial risk management is put together by every financial institution in order to enhance collection of all or most of the debt. The importance of strong financial risk management for building quality loan portfolio is of paramount importance to robust performance of commercial banks as well as overall economy (Charles & Kenneth, 2013). Through effective management of credit risk exposure, banks do not only support the viability and profitability of their own business but also contribute to systemic stability and to an efficient allocation of capital in the economy (Psillaki, Tsolas & Margaritis, 2010). The default of a small number of customers may result in a very large loss for the bank (Gestel & Baeseems, 2008).

Based on the lessons from the global financial crisis, financial regulators pay more attention to the stability of the banking system and soundness of banking development. However, bank management has to focus on ways to improve business performance. Recently, Basel Committee's Basel III regulatory standards revised require banks to raise the minimum capital adequacy, including raising the minimum common equity capital, from 2% to 4.5%; capital protection buffer of 2.5%; to promote the establishment of buffer capital (protective buffer capital and counter-cyclical capital buffers); leverage an initial period of 3%; the introduction of minimum standards of global liquidity, including short-term structural Liquidity Coverage Ratio (LCR) and the net Long-Term Structural Stability of Financing Ratio (NSFR) (Zaky & Soliman, 2017). The financial regulatory standards lead to changes in bank risk-taking that affected bank system performance, but capital regulation may not reduce bank risk-taking (Laeven & Levin, 2009).



Failure in risk management is the main cause of banking sector crises which probably leads to economic failure experienced in the past years including 2008 global financial crises and as some banks in Ghana have experienced recently (Zaky & Soliman, 2017). Any financial institution that does not pay much attention to risk management is bound to eventually collapse. According to Shubbasis (2005), risk management is important to bank management because banks are “risk machines,” they take risks; they transform them and embed them in banking products and services. This necessitates strong financial risk management to be engaged, in order reduce its effect on the profitability of the commercial banks. In the review of Sinkey (2002), modern risk management in the banking industry can be highlighted by five verbs and these are: identify, measure, price, monitor and control.

Profitability in the banking sector has been mixed. Net interest margin (NIM) dropped from 9.6% to 6.5% by end of 2005. By the close of 2009, the profitability ratios of the DMBs as measured by the Return On Assets (ROA), Return On Earnings (ROE) and Return On Equity (ROE) had seen some continuous decline since 2007. The banking industry in over some time ago remained liquid, solvent and profitable over some time (BoG, 2012). However, the situation has quite changed recently. The banking sector in Ghana continues to enjoy stability in its operations making it one of the drivers of economic growth. The key challenges for the sector in 2015-2018 included the declines in profitability due to high operational cost mainly as a result of the energy crisis and some financial malpractices which have since seen some improvement, and rising Non-Performing Loans (NPLs). Banks were cautious in lending due to the challenging economic conditions and the

implications for loan recoveries. The level of NPLs and its impact on the general solvency of banks and the economy at large was of such concern to BoG that with the help of the International Monetary Fund (IMF), BoG requested a diagnostic review of the loans as well as advances and investments held by commercial banks as at 31 May 2017. The aim among others was to ensure that adequate impairment allowances are made for NPLs and to provide the Regulator with an informed view on the capital adequacy of banks to inform appropriate intervention, if required (Banking Survey, 2017). In Ghana, the issue of financial risk management is of greater concern because of the higher levels of perceived risk resulting from some of the characteristics of clients and business conditions that they find themselves in. Therefore, the aim of this study is to investigate the relation between financial risk management and profitability of commercial banks in Ghana over a period.

### **Statement of the Problem**

As risk is inevitable in any business venture, financial institutions with specific reference to banks are faced with issues of how to manage risks in their operations. Ghana's banking sector is exposed to various risks which originate from both the internal and external environments. Banks' financial viability and long-term sustainability are mostly threatened by financial risk. It is therefore imperative that a critical look is taken at risk management and its implication on financial performance. Despite the well-established literature on financial institutions across the globe, studies on the relationship between financial risk management and the profitability commercial of banks remain scanty. Within the African setting, a number of studies have been conducted in an attempt to address the issues of financial risk which have been studied in

piece meal manner. However, such studies are limited in the Ghanaian setting (Afriyie & Akotey, 2012; Sinkey, Lacevic, Reljic, Hozo, Gibson, Odibo, & Lockwood, 2018; Saksonova, 2013; Ackermann & Meyer, 2007; Kaaya & Pastory, 2013; Wijayanti, Ariani, & Suyatmin, 2022). This therefore prompted this study to fill this gap and contribute to the extant literature by using panel data methodology to investigate the effect of financial risk management on profitability of commercial banks in Ghana covering the period 2011-2020.

### **Purpose of the Study**

The purpose of the study is to examine the effect of financial risk management on profitability of commercial banks in Ghana over the period 2011-2020.

### **Research Objectives**

Specifically, the study seeks to:

1. examine the effect of credit risk on net interest margin of commercial banks in Ghana.
2. examine the effect of liquidity risk on net interest margin of commercial banks in Ghana.
3. analyse the effect of operational risk on net interest margin of commercial banks in Ghana.

### **Research Hypotheses**

1.  $H_0$ : Credit risk has no significant effect on net interest margin of commercial banks in Ghana.

$H_1$ : Credit risk has a significant effect on net interest margin of commercial banks in Ghana.

2.  $H_0$ : Liquidity risk has no significant effect on net interest margin of commercial banks in Ghana.

$H_1$ : Liquidity risk has a significant effect on net interest margin of commercial banks in Ghana.

3.  $H_0$ : Operational risk has no significant effect on net interest margin of commercial banks in Ghana.

$H_1$ : Operational risk has a significant effect on net interest margin of commercial banks in Ghana.

### **Significance of the Study**

This study is important for the finance managers in making tradeoff decision between their liquidity and bank's financial performance. The study gives the direction to make the performance up to the mark that at what extent they should increase their profitability. The study will provide useful information to policy makers and regulators to design targeted policies and programs that will actively stimulate the growth and sustainability of the banks in the country. Regulatory bodies such as the Bank of Ghana, Ghana Banking Association, can use the study findings to improve on the framework for risk management.

Moreover, the study findings will also benefit management and staff of commercial banks as it will give them an insight into the importance of financial risk management adherence and its impact on risk mitigation in the operation of bank. Other emerging banks in the country may take clues from this and improve their alternative ways of financial risk management in order to gear policies towards them. Other stakeholders are also expected to benefit from the output of this study since this will serve as an information base which

adds up to the existing body of knowledge in the Ghanaian banking industry. The academic world will also benefit from this study in terms of serving as a basis for more research in this area, the banking sector, as well as the rest of the other sub sectors. The study is expected to add value to researchers and scholars as it will contribute to existing literature on the relationship between financial risk management and financial performance of banks in Ghana.

### **Delimitations**

The scope of the study is commercial banks in Ghana. The choice of these banks is due to the contributions of these banks in the Ghanaian economy and the recent financial crisis in the country. However, this study did not include non-financial institutions and also only credit risk, liquidity risk and operational risk aspects of financial risk management and net interest margin as a measure of profitability were used.

### **Limitations**

The main limitation of the study has to do with unavailability of panel data for critical variables such as measurement of financial risk management. Due to data unavailability for most of the variables, years preceding 2011 could not be included in the study.

### **Definition of key terms**

**Financial Risk:** Financial risk is the possibility of losing money on an investment or business venture. Some more common and distinct financial risks include credit risk, liquidity risk, and operational risk. Financial risk is a type of danger that can result in the loss of capital to interested parties.

**Profitability:** Profitability is a measure of an organization's profit relative to its expenses. Organizations that are more efficient will realize more

profit as a percentage of its expenses than a less-efficient organization, which must spend more to generate the same profit.

**Commercial Banks:** A commercial bank is a kind of financial institution that carries all the operations related to deposit and withdrawal of money for the general public, providing loans for investment, and other such activities. These banks are profit-making institutions and do business only to make a profit.

### **Organisation of the Study**

This study was organised into five chapters. Chapter one was the introduction of the study consisted of the background to the study, statement of the problem, purpose of the study, research objectives, research hypotheses, significance of the study, delimitations, limitations, and organisation of the study. Chapter two reviewed theoretical and empirical literature which was done with reference to the objectives of the study. Key concepts on the existing studies were reviewed and presented for readers understanding. Chapter also focused on research methods including the research approach, research design, model specification, definition and measurement of variables, sources of data, estimation procedure and the method of data processing and analysis. The fourth chapter depicted and discussed the findings of results. Chapter five provided summary, conclusions, and appropriate recommendations as well as suggestions for further research.

## CHAPTER TWO

### LITERATURE REVIEW

#### Introduction

This chapter presents the theoretical underpinning of the study to give a solid foundation for the achievement of the study's stated objectives. Thus, this chapter presents the relevant theoretical and empirical literature on the relationship between financial risk management and profitability of commercial banks in Ghana. The first section explores the theoretical underpinning of the study including theories, meaning of financial risk management and profitability. The second section examines empirical literature of interest to the topic, and the last section draws conclusions from both the theoretical and empirical literature.

#### Theoretical Review

The theoretical review in this study is based on the modern portfolio theory, enterprise risk management theory and the financial economic theory as both theories seek to shed more light on the issues relating to financial risk management.

#### Modern Portfolio Theory

According to Markowitz (1952), investors focused on assessing the risks and rewards of individual securities in constructing their portfolios. Since the 1980s, companies have successfully applied modern portfolio theory to market risk. Many companies are now using value at risk models to manage their interest rate and market risk exposures. While each company's method varies, this approach involves periodically evaluating the quality of credit exposures, applying a credit risk rating, and aggregating the results of this

analysis to identify a portfolio's expected losses. The foundation of the asset-by-asset approach is a sound credit review and internal credit risk rating system. This system enables management to identify changes in individual credits, or portfolio trends in a timely manner. Based on the changes identified, credit identification, credit review, and credit risk rating system management can make necessary modifications to portfolio strategies or increase the supervision of credits in a timely manner.

While the asset-by-asset approach is a critical component to managing credit risk, it does not provide a complete view of portfolio credit risk, where the term risk refers to the possibility that actual losses exceed expected losses. Therefore, to gain greater insight into credit risk, companies increasingly look to complement the asset-by-asset approach with a quantitative portfolio review using a credit model (Mason & Roger, 1998). Companies increasingly attempt to address the inability of the asset-by-asset approach to measure unexpected losses sufficiently by pursuing a portfolio approach. One weakness with the asset-by-asset approach is that it has difficulty identifying and measuring concentration. Further, concentration risk refers to additional portfolio risk resulting from increased exposure to credit extension, or to a group of correlated creditors (Richardson, 2002). This theory is of relevance to study, particularly, it explains the objectives one and two. Thus, it gives understanding of how failure on the part of management to monitor credit and liquidity risks can impact negatively on the profitability of commercial banks. From this, a hypothesis can be developed as:



$H_1$ : Financial risk management indicators (credit risk, liquidity risk and operational risk) have significant effect on profitability of commercial banks in Ghana.

### **Enterprise Risk Management Theory**

Gordon, Loeb and Tseng (2009) define enterprise risk management ERM as the overall process of managing an organization's exposure to uncertainty with particular emphasis on identifying and managing the events that could potentially prevent the organization from achieving its objective. ERM is an organizational concept that applies to all levels of the organization. According to Moeller (2007) on Committee of Sponsoring Organizations (COSO), enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.

In conducting ERM, the following are listed as some of the areas or aspects of the organization that a risk manager needs to look into namely: the people, intellectual assets, brand values, business expertise and skills, principle source of profit stream and the regulatory environment (Searle, 2008). This will help organization to balance the two most significant business pressures; the responsibility to deliver succeed to stakeholders and the risks associated with and generated by the business itself in a commercially achievable way. By doing so, the risk manager is constantly aware of the risks it faces and therefore constantly monitors its exposure and be positioned to change strategy or direction to ensure the level of risks it takes is acceptable.

This theory helps to explain the objectives one, two and three of the study. Thus, in the world of uncertainty, profit objective of a company can be jeopardized if risks associated with firm's operations are not managed properly. Therefore, financial risk management is very important for commercial banks.

### **Financial Economic Theory**

Nocco and Stulz (2006) suggested that organizations' risk management is apt to increase firm value in the presence of capital market imperfections such as bankruptcy costs, a convex tax schedule, or underinvestment problems. Furthermore, Nocco and Stulz further asserted that risk management can increase shareholder value by harmonizing financing and investment policies. When raising external capital, firms may under invest. Derivatives can be used to increase shareholder value by coordinating the need for and availability of internal funds. Yet, conflicts of interest between the shareholders and debt holders can also lead to underinvestment. Problem with underinvestment can occur when leverage is high and shareholders only have a small residual claim on a firm's assets, thus the benefits of safe but profitable investment projects accrue primarily to bondholders and may be rejected (Bessembinder, 1991).

Moreover, a credible risk management can mitigate underinvestment costs by reducing the volatility of firm value. As the underinvestment problem is likely to be more severe for firms with significant growth and investment opportunities, various measures such as the market-to-book ratio, research and development to sales ratio, capital expenditure to sales, net assets from

acquisitions to size are used for testing the underinvestment hypothesis. This theory helps to explain the third objective of the study.

### **Conceptual Review**

This section analyses and examines the concepts underpinning the study.

#### **Credit Risk**

Credit risk management is the part of the comprehensive management and also the part of the control system. Credit risk can be considered as one of the major risk because it is associated with every active trade. Banks generally handled risk management strategy that incorporates the principles of risk management processes including risk identification, monitoring and measurement. The aim of the credit risk management is to maintain the efficiency of the business activities and the continuity of the business.

Credit risk is the risk of loss given default that does not meet its obligation under the conditions of the contract and thus causes the holders of creditor's loss. These obligations arise from lending activities, trade and investment activities, payment and settlement of securities trading on its own and foreign account. (Jílek, 2000) There may be cases if a counterparty fails to honour its undertaking and repay fully or partially due principal and interest, have not repaid on time. Credit risk is part of most balance sheet assets and off-balance sheet transactions series (bank acceptances or bank guarantee). (Kašparovská, 2006).

Credit risk includes credit risk default, risk of the guarantor or counterparties of the derivatives. This risk is present in all sector of the financial market, but most important is in banks, mainly from credit activities

and offbalance sheet activities, such as guarantees. Credit risk also arises by entering into derivative transactions, securities lending, repurchase transactions and negotiation. For derivative transactions conducted an analysis of the creditworthiness of counterparties and watching its changes.

### **Liquidity Risks**

Liquidity risk is one of the most critical risks that banks run. Adequate management of liquidity may minimise the probability that serious problems will arise in future. In fact, the issue of liquidity is not limited to just one bank. A low liquidity ratio in one financial institution could affect the entire system. It is liquidity risk that may play the definitive role in the case of a bankruptcy of a bank. At a time of economic recession, the liquidity of a bank is a guarantee for the bank's financial stability (Brunnermeier, Lasse 2009).

Liquidity is the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses (BIS 2008). The fundamental role of banks in the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk, both of an institution-specific nature and that which affects markets as a whole. Virtually every financial transaction or commitment has implications for a bank's liquidity. Effective liquidity risk management helps ensure a bank's ability to meet cash flow obligations, which are uncertain as they are affected by external events and other agents' behaviour (CEBS 2009).

The European Central Bank (ECB 2009) defines liquidity risk as the ability of a bank to finance increases in assets and meet payment obligations when due. However, this definition does not reflect the extent of liquidity quite correctly. This extent is important when it comes to unforeseen

utilisation of credit facilities, withdrawal of deposits, premature repayments of loans and/or payments of interest.

The rules for estimating the liquidity ratio as approved by the Bank of Lithuania describe the liquidity of a bank as the bank's ability to honour its obligations on time, fully and without interruptions. T. P. Fitch (2006) defined liquidity in his dictionary of banking terms as the ability of an institution to meet its obligations. In banking, this term stands to include the ability of a bank to meet the demands of deposit holders who wish to withdraw their funds and to satisfy the needs of willing borrowers. Banks are a vital part of the global economy, and the essence of banking is assetliability management, liquidity, gap and funding risk management as well (Choudry 2007, 2009, 2010, 2012).

Liquidity risk is the risk that a banking business will have insufficient funds to meet its financial commitments in a timely manner. The two key elements of liquidity risk are short-term cash flow risk and long-term funding risk. The long-term funding risk includes the risk that loans may be available when the business requires them or at acceptable cost. All banking businesses need to manage liquidity risk to ensure that they remain solvent.

Market and funding liquidity risks compound each other as it is difficult to sell when other investors face funding problems and it is difficult to get funding when the collateral is hard to sell. Liquidity risk also tends to compound other risks. If a trading organization has a position in an illiquid asset, its limited ability to liquidate that position at short notice will compound its market risk. Suppose a firm has offsetting cash flows with two different counterparties on a given day. If the counterparty that owes it a payment

defaults, the firm will have to raise cash from other sources to make its payment. Should it be unable to do so, it too will default. Here, liquidity risk is compounding credit risk.

Accordingly, liquidity risk has to be managed in addition to market, credit and other risks. Because of its tendency to compound other risks, it is difficult or impossible to isolate liquidity risk. In all but the simplest of circumstances, comprehensive metrics of liquidity risk do not exist. Certain techniques of asset-liability management can be applied to assessing liquidity risk. A simple test for liquidity risk is to look at future net cash flows on a day-by-day basis. Any day that has a sizeable negative net cash flow is of concern. Such an analysis can be supplemented with stress testing. Look at net cash flows on a day-to-day basis assuming that an important counterparty defaults.

### **Operational Risks**

According to (Basel II committee, 2017), Operational risks result from failed procedures, systems or policies such as employee errors, systems failures, fraud or other criminal activity and any event that disrupts business processes. This definition includes legal risk, but excludes strategic and reputational risk. For internal purposes, banks are permitted to contextualize the definition of operational risk, but must take into account the minimum elements as prescribed by Basel Committee's definition. Different from credit risk, market risk, and insurance risk; operational risks are usually not freely incurred. Moreover, they are not diversifiable and cannot be laid off. As long as people, systems, and processes remain imperfect; operational risk cannot be completely eliminated. Operational risk is manageable within some level of

risk tolerance. It is natural for organizations to acknowledge that people and processes are likely to incur errors and contribute to ineffective operations.

### **Profitability**

Profit is the ultimate goal of any business. However, there are variety of performance indicators used such as; Return on Asset (ROA) and Return on Equity (ROE) (Alexandru, 2008). ROE is a financial ratio that refers to how much profit a company earned compared to the total amount of shareholder equity invested. It is equally referred too as shareholders rewards. A business with high return on equity is more likely to generating cash. ROE reflects the effectiveness and efficacy of bank management (Khrawish, 2011). In addition, return on asset (ROA), also indicates the profitability of a bank. It measures the amount of income generated from the utilisation of assets (Khrawish, 2011). It shows how efficiently resources of the company are used to generate income. Higher ROA indicates efficient utilisation of asset by management Wen (2010).

### **Financial Risk Management and Profitability**

The main aim of management of banks is to maximize expected profits taking into account its volatility (risk). This calls for an active management of the volatility (risk) in order to get the desired results. Financial risk management therefore attempts to reduce the volatility of profit which has the potential of lowering the value of shareholders wealth. Various authors including Stulz (1984), Smith and Watts (1990) and Froot, Scharfstein and Stein (1993) have offered reasons why managers should concern themselves with the active management of risks in their organizations. Financial risk management also ensures the desire to shoulder lower tax burden to seek for

reduced volatility of profits. With progressive tax schedules, the expected tax burden are reduced when income smoothens therefore activities which reduce the volatility of reported taxable income are pursued as they help enhance shareholders „value. Perhaps the most compelling reason for managers to engage in risk management with the aim of reducing the variability of profits is the cost of possible financial distress.

Significant loss of earnings can lead to stakeholders losing confidence in the firm’s operations, loss of strategic position in the industry, withdrawal of license or charter and even bankruptcy (Froot, Scharfstein& Stein, 1993). The costs associated with these will cause managers to avoid them by embarking on activities that will help avoid low realizations. Finally, risk management helps firms to avoid low profits which force them to seek external investment opportunities. When this happens, it results in suboptimal investments and hence lower shareholders“ value since the cost of such external finance is higher than the internal funds due to capital market imperfections (Chen, Shen, Kao &Yeh, 2018).

On the empirical side, some related studies relating this current study are reviewed to give a foundation to the study particularly the statement of the problem.

### **Liquidity Risk and Profitability**

Chen, Shen, Kao and Yeh (2018) examined the factors influencing liquidity risk and the connection between liquidity risk and bank profitability. They used panel data of 12 developed economies over the years 1994-2006. The outcomes demonstrated that liquidity risk, estimated by financing gap, is essentially connected with ROA and NIM. Higher financing gap (higher



liquidity creation) will diminish bank profitability estimated by NIM and ROA. Mohammad (2014) used a sample of 58 banks from Gulf Cooperation Council (GCC) countries over the period 1992-2011. The study investigated and compared the amount of liquidity created by Islamic, conventional and hybrid banks of these countries.

Ongore and Kusa (2013) conducted a similar study in Kenya which may be a support to this current study. Thus, they study the determinants of financial performance of commercial banks based on the moderating effect of ownership structure. To fill this glaring gap in this vital area of study, the authors used linear multiple regression model and Generalized Least Square on panel data to estimate the parameters. The findings showed that bank specific factors such as credit risk, operational risk, leverage etc. significantly affect the performance of commercial banks in Kenya, except for liquidity variable. Thus, they concluded that the financial performance of commercial banks in Kenya was driven mainly by board and management decisions, while macroeconomic factors have insignificant contribution.

Ogilo (2012) provided a comparative study of credit risk management on financial performance of commercial banks in Kenya. A causal research design was undertaken in this study and this was facilitated by the use of secondary data which was obtained from the Central Bank of Kenya publications on banking sector survey. The study used multiple regression analysis in the analysis of data and the findings were presented in the form of tables and regression equations. The study found out that there was a strong impact between the CAMEL components on the financial performance of commercial banks. The study also established that capital adequacy, asset

quality, management efficiency and liquidity (CAMEL) had weak relationship with financial performance (ROE), however, earnings had a strong relationship with financial performance (ROE). The study concluded that CAMEL model can be used as a proxy for credit risk management.

Al-Khouri (2011) studied the Risk Performance of the GCC Banking and assessed the impact of bank's specific risk characteristics, and the overall banking environment on the performance of 43 commercial banks operating in 6 of the Gulf Cooperation Council (GCC) countries over the period 1998-2008. Using fixed effect regression analysis, results showed that liquidity risk and capital risk are the major factors that affect bank performance when profitability is measured by net interest margin while the only risk that affects profitability when measured by return on equity is liquidity risk.

### **Credit Risk and Profitability**

Ariffin and Tafri (2014) did a study on financial risks on profitability of banks for Islamic religion. The study sought to access the impacts of financial risk on the profitability of Islamic banks worldwide. The study adopted Generalized Least Square (GLS) panel data analysis. A sample of 65 Islamic commercial banks was selected for data analysis. The result of the study was that the combination of credit risk and interest rate risk has statistically negative significant effect on net interest margin which is a major determinant on Islamic commercial banks profitability. This indicates that interest rates volatility affected performance of banks in a negative way.

Wanjohi (2013) assessed the effect of financial risk management on the financial performance of commercial banks in Kenya. In achieving this objective, the study assessed the current risk management practices of the

commercial banks and linked them with the banks' financial performance. Net interest margin was averaged for five years (2008-2012) to proxy the banks' financial performance. To assess the financial risk management practices, a self-administered survey questionnaire was used across the banks. The study used multiple regression analysis in the analysis of data and the findings were presented in the form of tables and regression equations. The study found out that majority of the Kenyan banks were practicing good financial risk management and as a result the financial risk management practices mentioned herein have a positive correlation to the financial performance of commercial banks in Kenya. Although there was a general understanding about risk and its management among the banks, the study recommends that banks should devise modern risk measurement techniques such as value at risk, simulation techniques and risk-adjusted return on capital. The study also recommends use of derivatives to mitigate financial risk as well as develop training courses tailored to the needs of banking personnel in risk management.

Mwangi (2012) assessed the effect of credit risk management on the financial performance of commercial banks in Kenya through secondary data collected from the commercial banks' annual reports for the period 2007-2011. Out of the 43 banks, the study concentrated on full data collected from 26 banks. The data was analyzed using multiple regression analysis by using the Statistical Package for Social Sciences (SPSS). The study showed that there is a significant relationship between performance in terms of profitability and credit risk management in terms of loan performance and capital adequacy.

William (2012) studied the influence of financial risk management on the financial performance of commercial banks in Kenya. A descriptive survey of the credit and management staff of the forty two commercial banks and one mortgage company formed the target population with a sample size of one hundred and seven staff randomly chosen for the study. Primary data for the period 2008-2012 through close ended questions was collected in this study on the financial risk management practices employed and their influence on the financial performance of the commercial banks. Data was analyzed using correlation analysis and regression models with the strength of the model being tested using Cronbach's Co-efficient Alpha. The study found that most commercial banks had highly adopted financial risk management practices to manage financial and credit risk and as a result the financial risk management practices mentioned herein have a positive correlation to the financial performance of commercial banks of Kenya. The study recommends that commercial banks should seek and obtain information consistently so as to permit them to detect potential problems at an early stage and identify trends not only for particular institutions, but also for the banking system as a whole, while also ensuring transparency of banking activities and the risks inherent in those activities, including credit risk.

Boahene, Dasah and Agyei (2012) used regression analysis to determine whether there is a significant relationship between credit risk and profitability of Ghanaian banks. They followed the line of Hosna, Manzura and Juanjuan (2009) by using net interest margin as a measure of bank's performance and a ratio of non-performing loans to total asset as proxy for credit risk management. They found empirically that there is an effect of credit

risk management on profitability level of Ghanaian banks. The study also suggests that higher capital requirement contributes positively to bank's profitability.

Kolapo (2012) on his study on Credit Risk and Commercial Banks' Performance in Nigeria carried out an empirical investigation into the quantitative effect of credit risk on the performance of commercial banks in Nigeria over the period of 11 years (2000 - 2010). Five Commercial banking firms were selected on a cross sectional basis for eleven years. The traditional profit theory was employed to 24 formulate profit, measured by Return on Asset (ROA), as a function of the ratio of Non - performing loan to loan & Advances (NPL/LA), ratio of Total loan & Advances to Total deposit (LA/TD) and the ratio of loan provision to classified loans (LLP/CL) as measures of credit risk.

Kargi (2011) conducted a study on credit risk and the performance of Nigerian banks. Kargi used non-performing credit portfolios and these significantly contributed to financial distress in the banking sector. Financial ratios as measures of bank performance and credit risk were the data collected from secondary sources mainly the annual reports and accounts of sampled banks from 2004 - 2008. The author concluded that credit risk management has a significant impact on the profitability of Nigeria banks. Therefore, management need to be cautious in setting up a credit policy that might not negatively affects profitability and also they need to know how credit policy affects the operation of their banks to ensure judicious utilization of deposits.

Kithinji (2010) did a study on Credit Risk Management and Profitability of Commercial Banks in Kenya. This study aimed at assessing the

degree to which the credit risk management in practice had contributed to profitability of Kenyan commercial banks. Data on the credit, levels of loans and profits were collected and tested for the period 2004 - 2008. The results of regression and the study showed that, there was no relationship between the variables under study such as profits, measure of credit and the level of advances. The study therefore concluded that Commercial banks that need high profits need to focus on different variables other than concentrating on measure of credit and advances. The relapse model used to show the outcome showed that there was no significance relationship between the variables under study. The study depicts a knowledge gap since the study focused only on the credit risk administration in commercial and financial performance.

### **Operational Risk and Profitability**

Hodge (2017) examined the determinants of commercial bank profitability in the Eastern Caribbean Currency Union (ECCU) over the 1998 to 2016 period. Bank profitability was proxied by net interest margin and return on assets. The results indicated that operational risk, bank size and non-performing loans have significant negative impact on net interest margin, while GDP growth has a significant positive influence. There was also evidence of persistence of profitability with the net interest margin measure. When the return on assets is considered, non-performing loans, operational risk, cost efficiency and liquidity have significant negative influence on profitability.

Augustin and Prophète (2016) investigated the bank-specific, market structure and macroeconomic determinants of bank profitability in Haiti. A Generalized Method of Moments approach was employed on a panel of nine banks using

quarterly data for the 2001 to 2015 period. The findings showed that bank-specific factors, size and equity, have significant positive impact on profitability measured as NIM, while the influence of operating expenses and activity mix was negative and significant. With respect to market structure, banking system concentration has a relatively minor positive impact on NIM. For the macroeconomic variables, the growth in commercial activity and the main monetary policy rate have significant positive influence on bank profitability. The results also indicated evidence of profitability persistence, and that foreign ownership of banks and the January 2010 earthquake both exerted a significant negative impact on the profitability of banks.

Al-Tamimi and Al-Mazrooei (2015) examined the influence of operational and capital risks on financial performance for eleven Islamic banks in the Gulf Cooperation Council (GCC) from 2000 to 2012. The results indicated a significant negative relationship between capital risk and operational risk when tested against NIM as the financial performance variable. In addition, capital risk was found to be the most important risk to banks in the region followed by operational risk.

Haque and Wani (2015) investigated the relationship between operational risk and financial performance of ten public and private sector banks in India from 2009 to 2013. Employing a Linear Multiple Regression model, the authors found that capital risk and insolvency risk exerted a significant positive influence on financial performance, whilst the impact of operational risk was significantly negative. Further, interest rate risk showed an insignificant positive impact on financial performance.

Al-Wesabi and Ahmad (2013) conducted a study on risk management practices and Islamic Banks. The authors' aim was to determine the firm's level factors which have significantly influenced the risk management practices of Islamic banks in Pakistan. The study used credit, operational and liquidity risks as dependent variables while size, leverage, NPLs ratio, capital adequacy and asset management are utilize as explanatory variable for the period of four years from 2006 to 2009. The study concluded that size of Islamic banks have a positive and statistically significant relationship with financial risks (credit and liquidity risk), whereas its relation with operational risk is found to be negative and insignificant.

The asset management establishes a positive and significant relationship with liquidity and operational risk. The debt equity ratio and non-performing loans (NPLs) ratio have a negative and significant relationship with liquidity and operational risk. In addition, capital adequacy has negative and significant relationship with credit and operational risk, whereas it is found to be positive and with liquidity risk. The study differs from this study since their study concentrated on the Asian market while this study will focus on the Kenyan market.

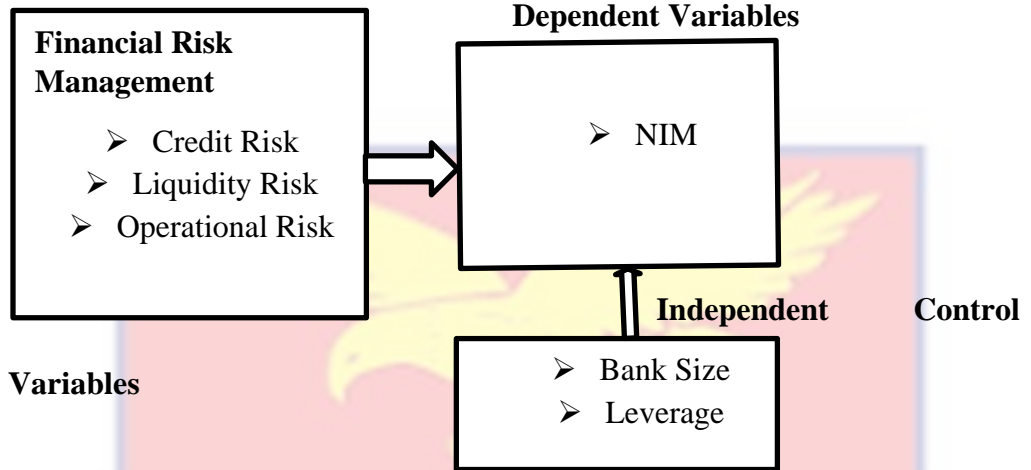
### **Conceptual Framework**

Figure 1 presents a graphical relationship between financial risk management indicators and profitability of commercial banks in Ghana. From Figure 1, profitability is the dependent variable proxied using NIM and the independent variables are the credit risk (CR), liquidity risk (LR), operational risk (OPR), bank size (BSIZE) and leverage (LEV). Thus, from Figure 1, it



can be said that, profitability (net interest margin (NIM)) is influenced by the above independent variables.

### Focused Independent Variable



*Figure 1:* Relationship between Financial risk management and profitability commercial banks in Ghana

Source: Author's Construct (2022)

### Chapter Summary

The reviewed literature suggests that financial risk management has a certain effect on the profitability of commercial banks. However, from the review, it was found that limited studies have been in the area particularly in Ghana and results have been mixed. Therefore, the current study aims at examine the relationship between financial risk management and profitability of commercial banks in Ghana.

## CHAPTER THREE

### RESEARCH METHODS

#### Introduction

This chapter presents the methodology to be employed in the study. Specifically, it gives a detailed description of the research approach, research design, specification of the model, definition and measurement of variables in the model, estimation techniques, sources of the data in the study, and tools for data processing and analysis.

#### Research Paradigm

This study used Positivist research paradigm. Positivism posits that scientific method is the only way to establish truth or reality. Thus, from positivists point of view, every research should be scientific. According to Bogdan and Biklen (2003), positivist research paradigm fits well for establishing causes of a phenomena or to test theory.

#### Research Design

A causal research design was used to investigate the associations between variables. This research focused on an investigation of the relationship between financial risk management and profitability of commercial banks understudy. The causal research design was chosen because it is appropriate for determining the significance of the financial risk management indicators on the profitability measure. The study also employed the deductive approach as result of the nature of the study. This study follows the positivist philosophy. The positivist philosophy favours the use of quantitative approach to research used in this study.

## **Research Approach**

Saunders, et al (2012) indicated that, research approach consists of quantitative and qualitative research approach. In qualitative research approach, data is gathered by spoken language or written procedure. In qualitative research numbers are not used to describe the data (Polkinghorne, 2005). Hence, such data can be gathered through observations, and interviews with participants. This makes it not appropriate for this study.

With respect to the quantitative research approach, hypothesis is tested by comparing the data collected with what is expected to occur theoretically. Quantitative research approach has the ability of enhancing the speed of the research. In addition, it gives large exposure to series of events which allows the combination of statistics in a large sample (Amarantunga & Baldry, 2002). More so, quantitative approaches enable the application of statistical method, hence, it makes it easy for generalising the results from the research. Also, quantitative approach takes the guesswork to a more concrete conclusion. This is because the results are usually based on quantitative measures instead of mere interpretation and hence enables future applications and comparisons with other studies.

## **Model Specification**

As the study used panel data, it is important to consider whether to use fixed or random effects models for the analysis. According to Torres-Reyna (2007), the fixed effects model explores the relationship between predictor and outcome variables within a firm with each firm having its own individual characteristics that may or may not influence the predictor variables. On the other hand, random effects have the rationale that the variation across entities

is assumed to be random and uncorrelated with the predictor or independent variables included in the model (Torres-Reyna, 2007). Thus, the following static panel models were developed for the banks:

Fixed Effects Model

$$NIM_{it} = \alpha + \beta_1 CR_{it} + \beta_2 LR_{it} + \beta_3 OPR_{it} + \beta_4 BSIZE_{it} + \beta_5 LEV_{it} + \varepsilon_{it}(1)$$

Where  $\varepsilon_{i,t} \sim iid(0, \sigma_\varepsilon^2)$

and

$NIM_{it}$  = Net interest margin for individual commercial bank at time t.

$CR_{it}$  = Credit risk for individual commercial bank at time t.

$LR_{it}$  = Liquidity risk for individual commercial bank at time t.

$OPR_{it}$  = Operational risk for individual commercial bank at time t.

$BSIZE_{i,t}$  = Bank size at time t for each listed commercial bank.

$LEV_{it}$  = Leverage at time t for each listed commercial bank.

$\alpha$  = Constant (the intercept, or point where the line cuts the Y axis when X= 0)

$\beta$  = Regression coefficient (the slope, or the change in Y for any corresponding change in one unit of X)

$\varepsilon$  = Within-Bank error

i = Bank

t = time.

### Definition and Measurement of Variables

For the purpose of this study, the following measurement and operational definitions will be used for the variables being examined.

**Table 1: Definition and Measurement of Variables**

<b>Variable</b>	<b>Measurement</b>	<b>Expected Sign</b>
Net Interest Margin (NIM)	$\frac{\text{Net Interest Income}}{\text{Total Assets}}$	NA
Credit Risk (CR)	Measured as the ratio of nonperforming loans to total loans	-
Liquidity Risk (LR)	Measured as the ratio of loans to deposits	-
Operational Risk (OPR)	Measured as three-year average of the sum of capital charges (Basel II, 2002)	-
Bank size (BSIZE)	InLog (Total Assets)	+
Leverage (LEV)	Measured as the long-term debt to assets ratio	-

Source: Author's Construct (2022)

### Data Sources

In this study, bank's profitability (NIM) is the dependent variable while all the other bank-specific variables discussed above are the independent variables. The study used annual series data from 2011 to 2020. The choice of this period is informed by the data availability and the current situation prevailing in the economy. The series on NIM (proxy for bank's profitability) were sourced from the data set of the banks while the series on the financial risk management (liquidity risk, credit risk and operational risk) were obtained from the annual reports of the banks. Finally, series on bank size and leverage were obtained from the annual financial statements of the bank under consideration.

### **Estimation Procedure**

The fixed effects model was estimated using the Least Squared Dummy Variable (LSDV) estimator. This test was used because of the nature of the variables used in the study and also appropriate for the method employed for robust estimates.

### **Data Processing and Analysis**

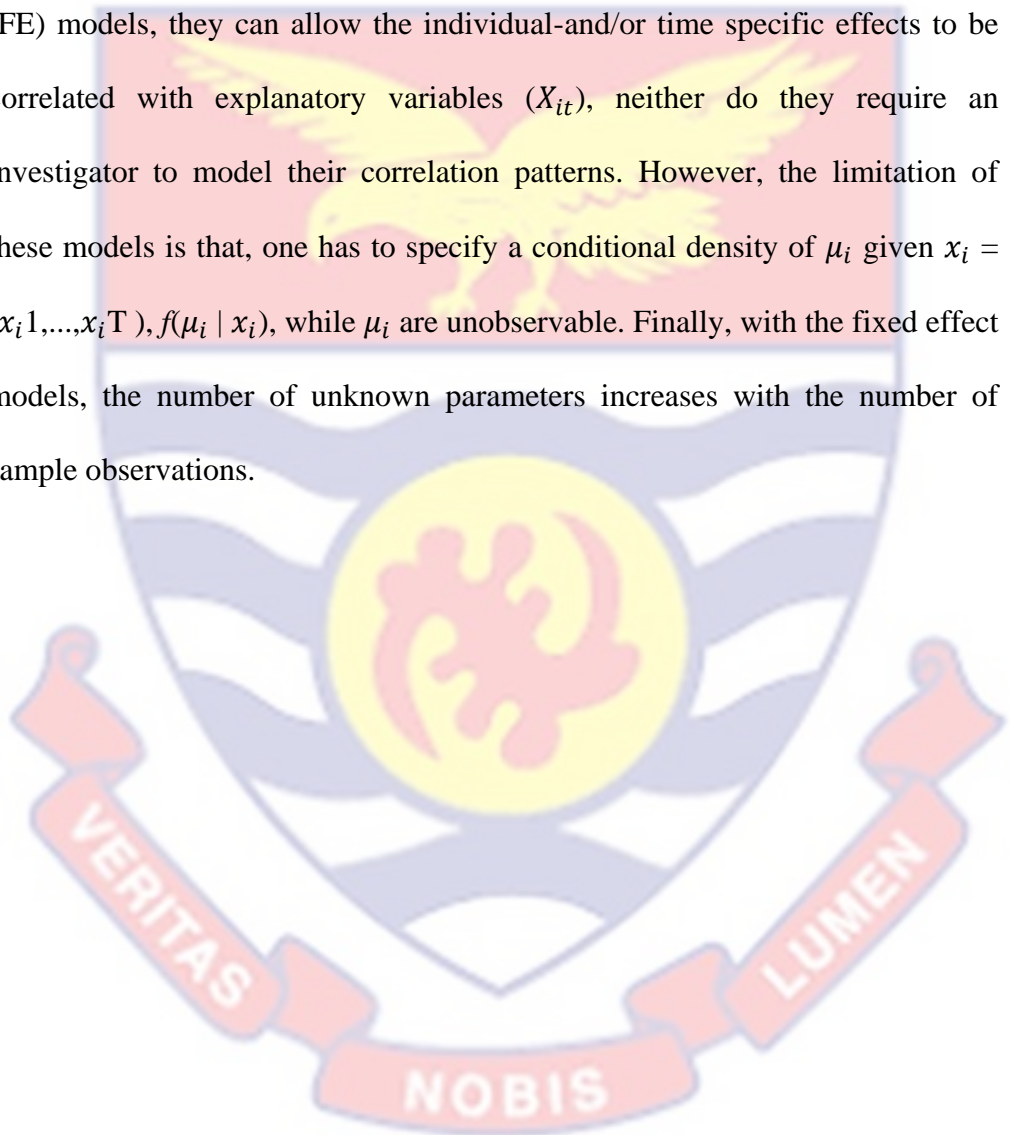
This study employed both descriptive and quantitative analysis. Here, tables were presented to aid in the descriptive analysis. Furthermore, the fixed effects models were estimated using the Least Squared Dummy Variable (LSDV) estimator. All estimations were carried out using STATA 14 and Eviews 9.0 software packages. The choice of these software packages is that, they help to process the available data to suit the required analyses towards the achievement of the stated objectives. These software packages are appropriate when dealing with cross-sectional and time series data.

### **Chapter Summary**

Chapter three mainly dealt with the appropriateness of the research methods and research design. It also dealt with the research approach, research design, how the variables are to be measured, the sources of data as well as estimation procedure to be adopted for analysis of the data. It again discussed the apriori expected signs as well as how data were analysed. The study adopted the static panel approach to achieve the objective of the study. The strengths of this approach are that, it models make more accurate inference of model parameters. Thus, they usually contain more degrees of freedom and more sample variability than cross-sectional data or time series data, hence improving the efficiency of econometric estimates. For example, random

effects (RE) models make room for the number of parameters to stay constant when sample size increases.

Also, they allow the derivation of efficient estimators that make use of both within and between (group) variation as well as allowing the estimation of the impact of time-invariant variables. In case of fixed effects (FE) models, they can allow the individual-and/or time specific effects to be correlated with explanatory variables ( $X_{it}$ ), neither do they require an investigator to model their correlation patterns. However, the limitation of these models is that, one has to specify a conditional density of  $\mu_i$  given  $x_i = (x_{i1}, \dots, x_{iT})$ ,  $f(\mu_i | x_i)$ , while  $\mu_i$  are unobservable. Finally, with the fixed effect models, the number of unknown parameters increases with the number of sample observations.



## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### Introduction

This chapter presented the results and discussion of the study. The results are presented in the form of tables and regression analysis showing the effect of financial risk management indicators and control independent variables on profitability (the dependent variable) used in the study. The chapter is outlined as follows: The first section indicated the descriptive statistics and correlation analysis, the second, third and fourth sections presented the results of the static panel regression analysis based on the three objectives, discussion of results and summary of the chapter.

#### Descriptive Statistics of the Variables

This section presents the analysis of the data collected in relation to the stated objectives. The section first presents the descriptive statistics and correlation analysis. The descriptive statistics of the relevant variables involved in the study are presented in Table 2. Here, the results involved the mean, standard deviation, minimum and maximum. The study considered 20 commercial banks due to data unavailability with the total observations of 200. The mean measures the average values of a group of values while the standard deviation measures how the values are spread around the mean.

The minimum and maximum values capture the range of variables. It can be seen from Table 2 that, all the variables have positive average values (means). The dependent variable-net interest margin (NIM) has a mean value of 9.655 that is greater than its standard deviation (1.008) which means there is less variability around the mean. The mean values of the variables of



interest, credit risk (CR) (6.349), liquidity risk (CD) (8.230) and operational risk (OPR) (9.112) over the sample period, with standard deviations of (1.883, 2.054 and 2.443) and minimum values of (2.554, 3.668 and 2.460) and maximum values of (9.661, 10.321 and 8.654) respectively indicating the range of the variables of interest. Additionally, Bank size (BSIZE) and leverage (LEV) have their means 5.446, 7.241 respectively higher than their associated standard deviations (2.003 and 3.114) indicating their variability around their means. The associated minimum and maximum values are 9.865 and 13.235 respectively.

**Table 2: Descriptive Statistics of the Variables**

Variable	Mean	S. D.	Min.	Max.	No. of Obs.
NIM	9.655	1.008	7.443	13.840	200
BSIZE	5.446	2.003	4.224	9.865	200
LEV	7.241	3.114	6.339	13.235	200
CR	6.349	1.883	2.554	9.661	200
LR	8.230	2.054	3.668	10.321	200
OPR	9.112	2.443	2.460	8.654	200

Note: SD=Standard Deviation, Min=Minimum, Max=Maximum,  
No. of Obs. =Number of Observations  
Source: Field Survey (2022)

### Correlation Analysis

The pair-wise correlation among the variables used in this study is presented in Table 3. From Table 3, it can be said that, the results are consistent with theory. The correlation coefficients between NIM and that of CR, LR and OPR (-0.641, -0.811 and -0.556) respectively are significant indicating that the variables have negative relationships with NIM. This implied that financial risk management indicators (CR, LR, and OPR) move in the opposite directions with NIM. The correlation between BSIZE, LEV and

the measure of NIM is positive and negative respectively and significant with coefficients 0.754 and -0.762 respectively. This also means that bank size moves in the same direction with NIM while leverage moves in opposite direction with NIM. Further, the correlation between BSIZE and LEV is positive and significant with coefficient 0.053 while there are significant negative and positive correlations between CR, LR, OPR and BSIZE.

Finally, the correlations between LEV and CR, LR, OPR are positive and significant. It must be noted that the aim of the correlation analysis is to show the extent of degree of association among the variables used in the analysis and to prevent multi collinearity among the variables. The effect of the explanatory variables on NIM was obtained from the panel regression.

**Table 3: Pair-wise Correlation among Variables**

Variable	NIM	BSIZE	LEV	CR	LR	OPR
NIM	1.000					
BSIZE	0.754***	1.000				
LEV	-0.762***	0.053	1.000			
CR	-0.641***	-0.151*	0.082	1.000		
LR	-0.811***	-0.033	0.054	0.100*	1.000	
OPR	-0.556**	0.105*	0.055	0.020	0.021	1.000

Note: \*\*\*, \*\* and \* denote significance at 1%, 5% and 10% level respectively.  
Source: Field Survey (2022)

This section presents the fixed and random effects result based on the stated objectives.

### **Effect of Credit Risk on Net Interest Margin**

This section presents the fixed and random effects result based on the effect of credit risk net interest margin as a measure of profitability. This was begun with the Hausman test which is presented below.

### Hausman Test for Objective One (1)

The Hausman test is used to decide the more appropriate panel regression model to use in panel analysis of panel series data. The null hypothesis states that the random effect model is the preferred model whereas the alternative hypothesis asserts that the fixed effect model is preferred model. According to the results of the Hausman test, the fixed effect model is the preferred model because the p-value is less than 0.05.

Test: Ho: difference in coefficients not systematic

$$\chi^2(2) = (b-B)'[(V_b - V_B)^{-1}](b-B)$$

Prob > chi2 = 0.013

Table 4 presents the results of the fixed effects and random effects models with the NIM being the dependent variable and credit risk (CR) as well as other control independent variables which addressed the first objective of the study. Here, the null hypothesis of credit risk having no significant effect on profitability measure (NIM) stated early on was rejected as seen in the results in Table 4. Thus, the results in Table 4 have an adjusted R<sup>2</sup> of (76%) indicating that (76%) of the variations in NIM is explained the model.

Additionally, the result in Table 4 showed that, the coefficient of credit risk (CR) is negative and statistically significant at 1 percent significance level with -0.433 implying that, a unit increase in the credit risk leads to 0.433 units decrease in net interest margin of the commercial banks under consideration at 1 percent significance level, all other things being equal. This means that if the risks associated with credits or loans of commercial banks increase, it is potentially a disincentive to profitability objective of commercial banks, thereby reducing profits of the banks. Thus, credit risk being one of the

variables of interest of this study negatively affects net interest margin as a measure of profitability. The result confirmed the financial economic theory, modern portfolio theory and the findings by Ariffin and Tafri (2014), Nwangi (2012), Boahene et al. (2012) and Kargi (2011). However, data coverage and banks understudy in this study are different from those studies. Here, the results of this study contradict that of Wanjohi (2013) who indicated a positive relationship between credit risk and profitability. Also, data coverage and banks understudy in this study are different from those studies.

**Table 4: Results of the effect of Credit Risk on Net Interest Margin**  
**Dependent Variable: NIM**

Independent Variables	FE
CR	-0.433*** (-5.110)
BSIZE	0.361*** (4.644)
LEV	-0.166*** (-3.875)
R <sup>2</sup>	0.768
Adjusted R <sup>2</sup>	0.756
Wald Test	0.006
No. of observations	200
No. of Commercial Banks	20
Hausman Test (Prob>chi2) =	0.013

Note: t-statistics in parentheses,\*\*\* p < 0.01  
 Source: Field Survey (2020)

Further, with respect to bank size (BSIZE), the coefficient mimics the theorized sign which is positive and it is statistically significant at 1 percent significance level. This implies that one unit increase in the size of the bank leads to 0.361 percent increase in the net interest margin at one percent

significance level, all other things being equal. That is, increase in the bank size in terms of asset acquisition or internal and external expansion has a direct effect on the profitability of commercial banks in the country. The result confirmed that of Ongore and Kusa(2013) and Fatma and Anis(2013).

In relation to leverage (LEV), the coefficient (-0.166) is negative and it is statistically significant at 1 percent significance level which implies that, a unit increase in the leverage of the banks leads to -0.166 units decrease in the net interest margin of the banks at 1 percent significance level, all other things being equal. Thus, it can be stressed that, increases in leverage of commercial banks have negative consequences on their profitability motive. This expected is because, as the leverage of a bank increases it is likely to influence financial performance of the bank, hence a signal for many local and foreign investors. Here, the result confirmed the results of Ongore and Kusa (2013) and Kithinji (2010).

### **Effect of Liquidity Risk on Net Interest Margin**

#### **Hausman Test for Objective Two (2)**

Here too, the null hypothesis of the Hausman test states that the random effect models the preferred model whereas the alternative hypothesis asserts that the fixed effect model is preferred model. The Hausman test for objective 2 in Table 5 shows that the fixed effect model is the preferred model because the p-value is less than 0.05 as seen below.

Test: Ho: difference in coefficients not systematic

$$\chi^2(2) = (b-B)'[(V_b - V_B)^{-1}](b-B)$$

$$\text{Prob} > \chi^2 = 0.023$$

Table 5 presents the results of the fixed effects and random effects models with the NIM being the dependent variable and liquidity risk (LR) as well as other control independent variables which addressed the second objective of the study. Here too, the null hypothesis of the liquidity risk having no significant effect on profitability measure (NIM) stated early on was rejected as seen in the results in Table 5. Again, based on the Hausman test conducted, only fixed effects results were interpreted. The results in Table 5 have an adjusted  $R^2$  of (71%) indicating that (71%) of the variations in NIM is explained by the model.

From Table 5, the coefficient of liquidity risk (LR) is negative and statistically significant at 1 percent significance level with -0.372 implying that, a unit increase in the liquidity risk leads to 0.372 units decrease in the net interest margin of the commercial banks under consideration at 1 percent significance level, all other things being equal. However, the impact is not quite severe here as compared to that of credit risk in Table 4. The result means that liquidity risk negatively affects net interest margin as theorised early on. It can be emphasised that, if risks associated with liquidity of commercial banks are high, they have the tendency of reducing the profitability of these banks if other factors are held constant. Thus, liquidity risk potentially and negatively affects net interest margin. The result of this study confirmed the financial economic theory, modern portfolio theory and the findings by Chen et al. (2018), Ogilo (2012), and Al-Khouri (2011). However, the data coverage of this current study is different from these confirmed studies.

**Table 5: Results of the Effect of Liquidity Risk on Net Interest Margin  
Dependent Variable: NIM**

Independent Variables	FE
LR	-0.372*** (-4.773)
BFSIZE	0.219*** (6.412)
LEV	-0.164** (-2.810)
R <sup>2</sup>	0.722
Adjusted R <sup>2</sup>	0.710
Wald Test	0.014
No. of observations	200
No. of Commercial Banks	20
Hausman Test (Prob>chi2) =	0.023

Note: t-statistics in parentheses \*\* p < 0.05, \*\*\* p < 0.01  
Source: Field Surbey (2020)

Moreover, regarding the other variables, for bank size (BFSIZE), the coefficient is still positive and it is statistically significant at 1 percent significance level. The result implies that a unit increase in the size of the commercial banks leads to 0.219 percentage increase in the net interest margin at 1 percent significance level, all other things being equal. As seen early on, expansion in the size of the banks in terms of asset acquisition or increasing in market share has a profound positive effect on their profitability measures especially net interest margin. The result still confirmed that of Ongore and Kusa (2013), Fatma and Anis (2013).

Finally, in relation to leverage (LEV), the coefficient is still negative and but it is statistically significant at 5 percent significance level which also implies that a unit increase in the leverage of the commercial banks leads to -

0.164 units decrease in the net interest margin of the banks at 5 percent significance level, all other things being equal. Thus, it can be indicated that, increases in indebtedness of commercial banks have potential negative consequences on their profitability motive. Thus, increases in leverage of commercial banks negatively affect profitability if not checked. This result also confirmed the results of Ongore and Kusa (2013) and Kithinji (2010).

### **Effect of Operational Risk on Net Interest Margin**

#### **Hausman Test for Objective Three (3)**

In testing the Hausman model for this objective, the null hypothesis was that, the random effect model is the preferred model whereas the alternative hypothesis asserts that the fixed effect model is preferred model. Here too, the Hausman test for objective 3 in Table 6 shows that the fixed effect model is the preferred model because the p-value is less than 0.05 as seen below.

Test: Ho: difference in coefficients not systematic

$$\chi^2(2) = (b-B)'[(V_b - V_B)^{-1}](b-B)$$

$$\text{Prob} > \chi^2 = 0.015$$

Further, Table 6 presents the results of the fixed effects and random effects models with the NIM being the dependent variable and operational risk (OPR) as well as other control independent variables which addressed the third objective of the study. Here too, the null hypothesis of the operational risk having no significant effect on profitability measure (NIM) stated early on was rejected as seen in the results in Table 6. Again, based on the Hausman test conducted, only fixed effects results were interpreted. The results in Table



6 have an adjusted  $R^2$  of (77%) indicating that (77%) of the variations in NIM is explained by the model.

From Table 6, the coefficient of operational risk (OPR) is negative and statistically significant at 1 percent significance level with -0.217, this coefficient implies that, a unit increase in the operational risk leads to 0.217 units decrease in the net interest margin of the commercial banks under consideration at 1 percent significance level, all other things being equal. However, here too, the impact is not quite severe here as compared to that of credit risk and liquidity risk in Tables 4 and 5. The result implied that high operational risk negatively affects net interest margin as theorised. It can be seen that, if risks associated with the operations of commercial banks are high, they have the tendency of reducing the profitability of these banks if other factors are held constant. Thus, an increase in operational risk of commercial banks potentially and negatively affects net interest margin. The result of this study still confirmed the financial economic theory, modern portfolio theory and the findings by Hodge (2017), Augustin and Prophète (2016), Al-Tamimi and Al-Mazrooei (2015) and Haque and Wani (2015) who indicated a negative relationship between the variables. However, Al-Wesabi and Ahmad (2013) indicated otherwise.

**Table 6: Results of the Effect of Operational Risk on Net Interest Margin  
Dependent Variable: NIM**

Independent Variables	FE
OPR	-0.217*** (-5.314)
BSIZE	0.305*** (5.844)
LEV	-0.296*** (-3.645)
R <sup>2</sup>	0.780
Adjusted R <sup>2</sup>	0.771
Wald Test	0.008
No. of observations	200
No. of Commercial Banks	20
Hausman Test (Prob>chi2) =	0.015

Note: t-statistics in parentheses, \*\*\* p < 0.01

Source: Field Survey (2022)

Moreover, in relation to bank size (BSIZE), the coefficient is still positive and it is statistically significant at 1 percent significance level. The result still implies that a unit increase in the size of the commercial banks leads to 0.305 percentage increase in the net interest margin at 1 percent significance level, all other things being equal. As seen stressed early on, expansion in the size of the commercial banks in terms of asset acquisition or increasing in market share has a profound positive effect on their profitability measures especially net interest margin. Thereby, increases in bank size positively affect profitability of commercial banks. The result still confirmed that of Ongore and Kusa(2013),Fatma and Anis(2013).

Finally, regarding leverage (LEV), the coefficient is still negative and it is statistically significant at 1 percent significance level which also implies that a unit increase in the leverage of the commercial banks leads to -0.296 units decrease in the net interest margin of the banks at 1 percent significance level, all other things being equal. Thus, it can be indicated that, increases in

leverage of commercial banks have potential negative consequences on their profitability objective. Therefore, increases in leverage of commercial banks negatively affect net interest margin. This result still confirmed the results of Ongore and Kusa (2013) and Kithinji (2010).

### **Chapter Summary**

This chapter focused on the presentation and the discussion of the results of the study based on the stated objectives. The chapter started with the descriptive statistics of the variables and correlation analysis. From the results, regarding the correlation analysis, it showed that there are positive and negative relationships between explanatory variables and net interest margin (NIM) used in the study. However, the effects of the explanatory variables on net interest margin cannot be known from the correlation analysis. Therefore, the panel regression analysis was estimated. Panel estimation technique was adopted to examine the effects of explanatory variables on NIM. Fixed and Random Effects which account for heterogeneity across banks were applied to the panel data set. The study found a strong negative and significant relationship between credit risk, liquidity, operational risk and the profitability measure (NIM). The study also found a strong negative and significant relationship between leverage and the profitability measure (NIM). However, there was a strong and significant relationship between leverage and net interest margin of commercial banks.

## CHAPTER FIVE

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### Introduction

The purpose of this chapter is to present the summary, conclusions and recommendations of the study. The chapter is outlined as follows: The summary presents a brief overview of the study which consists of the statement of the problem, objectives, research methods, results and discussion. The conclusions encapsulate the overall outcomes regarding the results of the study in light of the stated hypotheses. Recommendations are made to inform policy regarding the effects of the explanatory variables on net interest margin based on the tested hypotheses.

#### Summary

The research studied on the financial risk management and profitability of commercial banks in Ghana. The three objectives were established in order to achieve the purpose of the study. The first objective was to examine the effect of credit risk on net interest margin of commercial banks in Ghana. The second objective was to examine the effect of liquidity risk on net interest margin of commercial banks in Ghana. The third objective was to analyse the effect of operational risk on net interest margin of commercial banks in Ghana.

The adequate management of financial risk in financial institutions is critical for the survival and growth of banks and other financial institutions. Thus, financial risk management is important for the sustainability and profitability of banks and other financial institutions. Therefore, the main purpose of this study was to examine the effect of financial risk management

on the profitability of commercial banks in Ghana using a balance panel of twenty (20) of commercial banks over ten time periods, from 2011 to 2020. The quantitative research approach was used in achieving the objective of the study. Also, the explanatory research design was employed in the analysis. The variables included in this study are: net interest margin, credit risk, liquidity risk, operational risk, bank size and leverage.

In relation to the stated objectives, from objective one, the study found that credit risk and leverage had negative and statistically significant effects on net interest margin after controlling for other variables. However, bank size (BSIZE) had positive and statistically significant effect on net interest margin after controlling for credit risk and leverage. Regarding the second objective, the study found that liquidity risk and leverage had negative and statistically significant effects on net interest margin after controlling for bank size. However, bank size (BSIZE) had positive and statistically significant effect on net interest margin after controlling for liquidity risk and leverage.

Finally, in relation to the third objective, the study found that operational risk and leverage had negative and statistically significant effects on net interest margin after controlling for bank size. However, bank size (BSIZE) still had positive and statistically significant effect on net interest margin after controlling for operational risk and leverage. Therefore, overall, financial risk management negatively affects profitability of commercial banks in Ghana.

### **Conclusions**

This study examined the effect of financial risk management on the profitability of commercial banks in Ghana. In the first objective, this study

tested the hypothesis that credit risk has a significant and statistical effect on net interest margin. The study found that, credit risk has a significant and statistically negative effect on net interest margin. The result implied that increases in the risks associated with credits of commercial banks are potentially a disincentive to profitability objective of commercial banks, thereby reducing profits of the banks. The study also found that leverage had a significant and statistically negative effect on net interest margin. Thus, the result implied that, increases indebtedness or leverage ratio decrease the profitability of the commercial banks. However, bank size had a significant and statistically positive effect on net interest margin. Thus, the results suggest that, if the commercial banks increase or expand their size in terms of assets, it will increase their profitability.

In relation to the second objective, where the study tested the hypothesis that liquidity risk has a significant and statistical effect on net interest margin, the study found that, liquidity risk has a significant and statistically negative effect on net interest margin. The result implied that increases in the risks associated with liquidity of commercial banks have potentially negative consequences on the profitability of commercial banks, thereby reducing profits of the banks. The study also found that leverage had a significant and statistically negative effect on net interest margin. Thereby, the result implied that, increases indebtedness or leverage ratio decrease the profitability of the commercial banks. Bank size however, had a significant and statistically positive effect on net interest margin, indicating that if the commercial banks increase or expand their size in terms of assets acquisition, it will increase their profitability.

Regarding the third objective, where the study also tested the hypothesis that operational risk has a significant and statistical effect on net interest margin, the study found that, operational risk has a significant and statistically negative effect on net interest margin. The result also implied that increases in the risks associated with day-to-day operations of commercial banks have potentially negative consequences on the profitability of commercial banks, trickling down to affecting their profits. Once again, the study also found that leverage had a significant and statistically negative effect on net interest margin. This result hereby implied that, increases in leverage ratio decrease the profitability of the commercial banks. Here too, bank size however, had a significant and statistically positive effect on net interest margin, indicating that if the commercial banks expand their size in terms of assets acquisition, it will increase their profitability.

### **Recommendations**

Based on the conclusions drawn from the study, the following recommendations are proposed.

Management of commercial banks must consider credit risk, liquidity risk, operational risk, leverage and bank size in their decisions concerning profitability since these variables affect profitability. Thus, Management of commercial banks should focus policy on reducing credit risk, liquidity risk and operational risk since they have negative influence on profitability.

Specifically, Management of commercial banks or financial institutions must establish more efficient and effective policy measures that will reduce credit risk, liquidity risk and operational risk which are important in influencing profitability. Thus, Management of commercial banks should

involve executive risk management policies in the process of credit risk management.

Also, Management of commercial banks should expand their size or operations to take advantage of economies of scale for the purpose of achieving high profits. This can be done through strategically open up branches to have markets for their products. This needs proper strategic policies or measures considering the competition in the banking industry.

Finally, Management of commercial banks should try to reduce leverage it has a negative effect on performance of the banks.

### **Suggestions for Further Research**

The study examined the effect of financial risk management by considering credit risk, liquidity risk and operational risk as measures on the profitability using net interest margin as a measure of commercial banks in Ghana. However, profitability of banks is also affected by other financial risk management indicators as well as other variables, therefore other studies must consider those ones. Also, other studies should consider interacting credit risk, liquidity risk and operational risk to establish their effect on profitability.



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