

**OPERATIONAL RISK, LIQUIDITY RISK AND DEPOSIT MOBILIZATION BY**

**EMERGING BANKS IN GHANA**

**KNUST**

**BY**

**BRIGHT OPPONG YEBOAH**

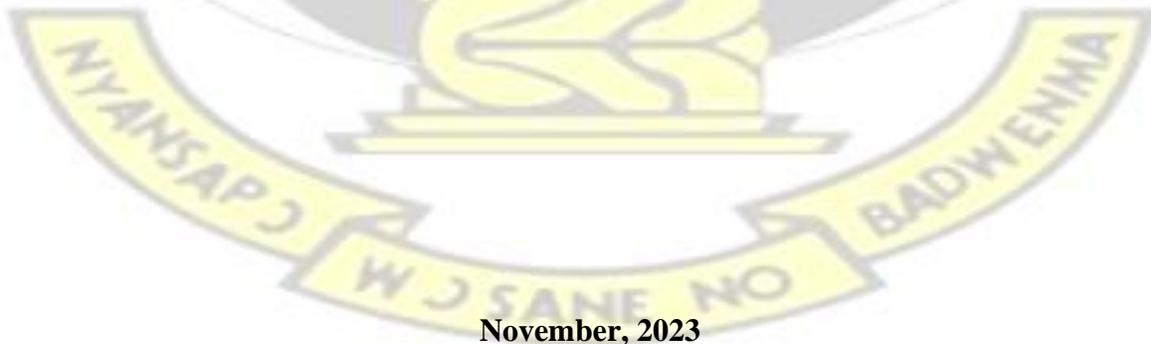
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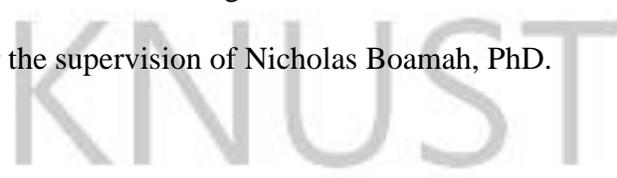
**(MBA FINANCE)**



**November, 2023**

**DECLARATION**

I, Bright Oppong Yeboah, certify that this is my research study carried out towards the award of MBA Finance at the Department of Accounting and Finance, Kwame Nkrumah University of Science and Technology under the supervision of Nicholas Boamah, PhD.



**STUDENT NAME**

**BRIGHT OPPONG YEBOAH** .....

**(PG 3981520)**

**SIGNATURE**

**DATE**

**CERTIFIED BY:**

**DR. NICHOLAS BOAMAH** .....

**(SUPERVISOR)**

**SIGNATURE**

**DATE**

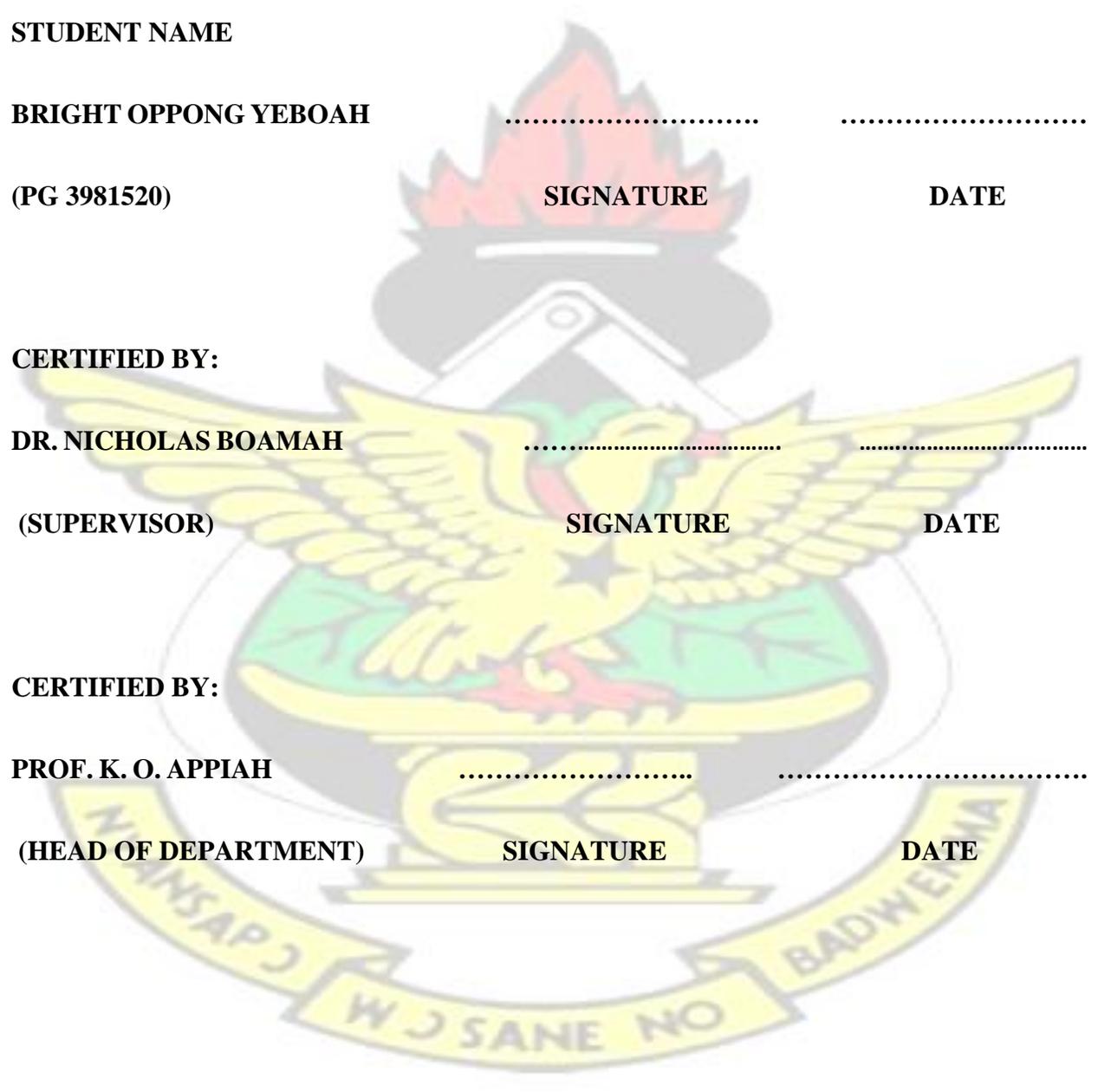
**CERTIFIED BY:**

**PROF. K. O. APPIAH** .....

**(HEAD OF DEPARTMENT)**

**SIGNATURE**

**DATE**



## ABSTRACT

Liquidity and operation risks are two of the major risks that financial institutions specifically banks are exposed to. These financial risks undermine the financial intermediation functions of emerging banks and, as a result, affect their ability to mobilize deposits. The study employs a dynamic panel data model on 15 banks from 2017 to 2021 to assess the effect of OR and LR on the deposit mobilization of emerging banks in Ghana. The results indicate that liquidity risk has a significant positive impact on the total number of deposits mobilized by the emerging banks in Ghana. The study also reports that OR reduces deposit mobilization of emerging banks in Ghana. I recommend that banks improve upon their risk management decisions and strategies to minimize the occurrence and the financial severity of these risks in banking operations.



## DEDICATION

I dedicate this work to the Almighty God, and to my children, Audrey Konadu Oppong Yeboah, Jayden, and Jaysen Oppong Yeboah.

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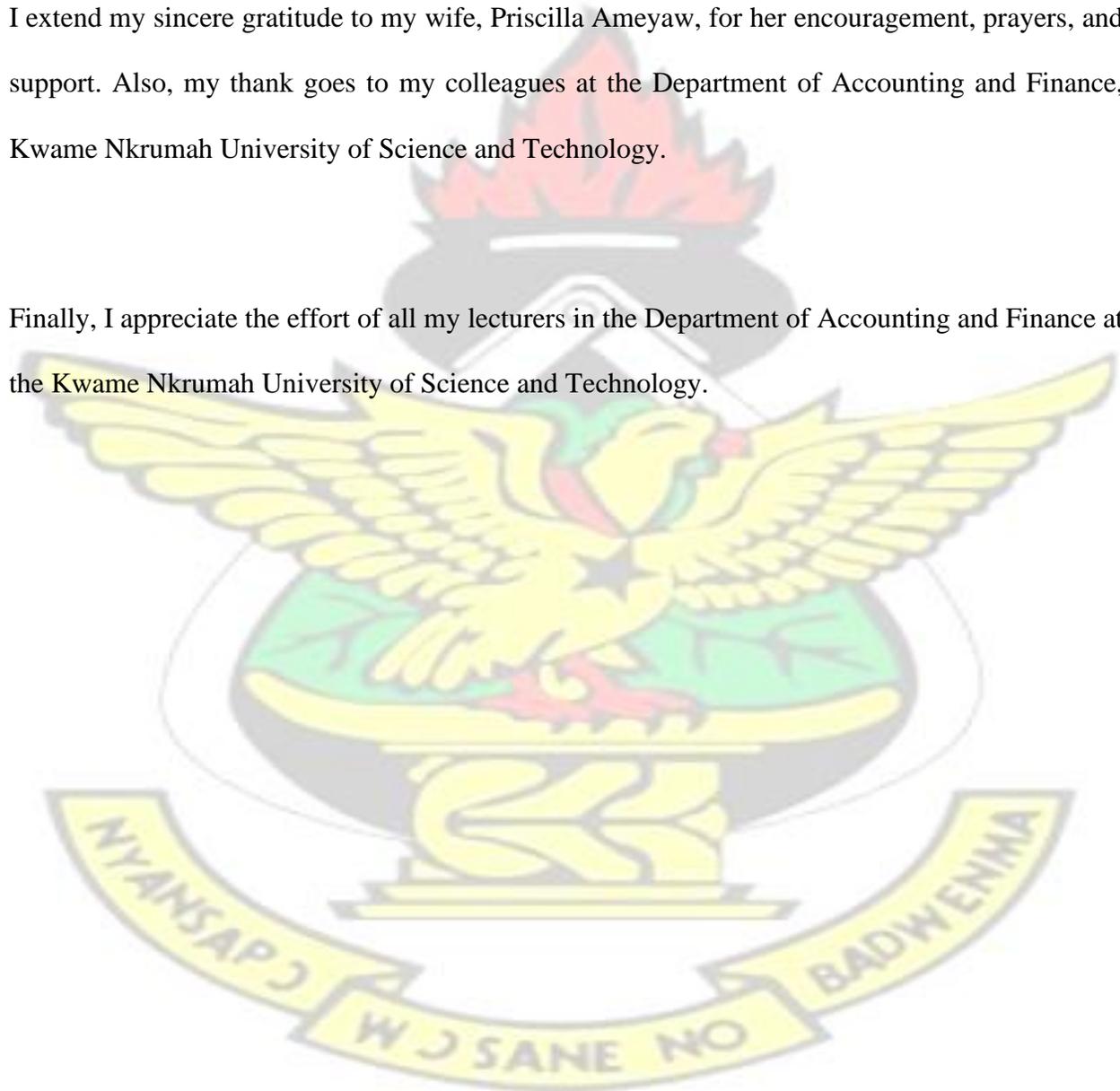


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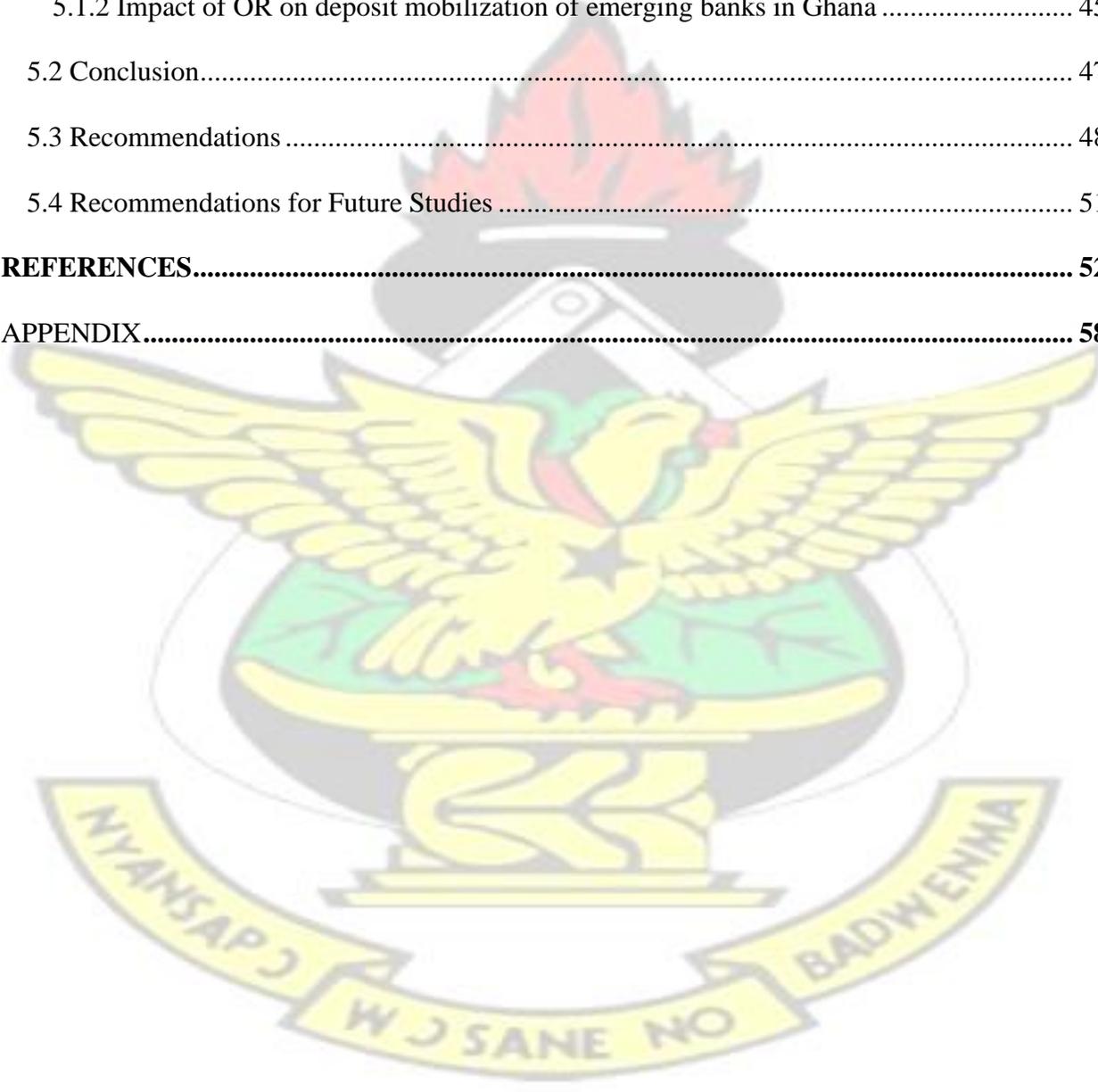


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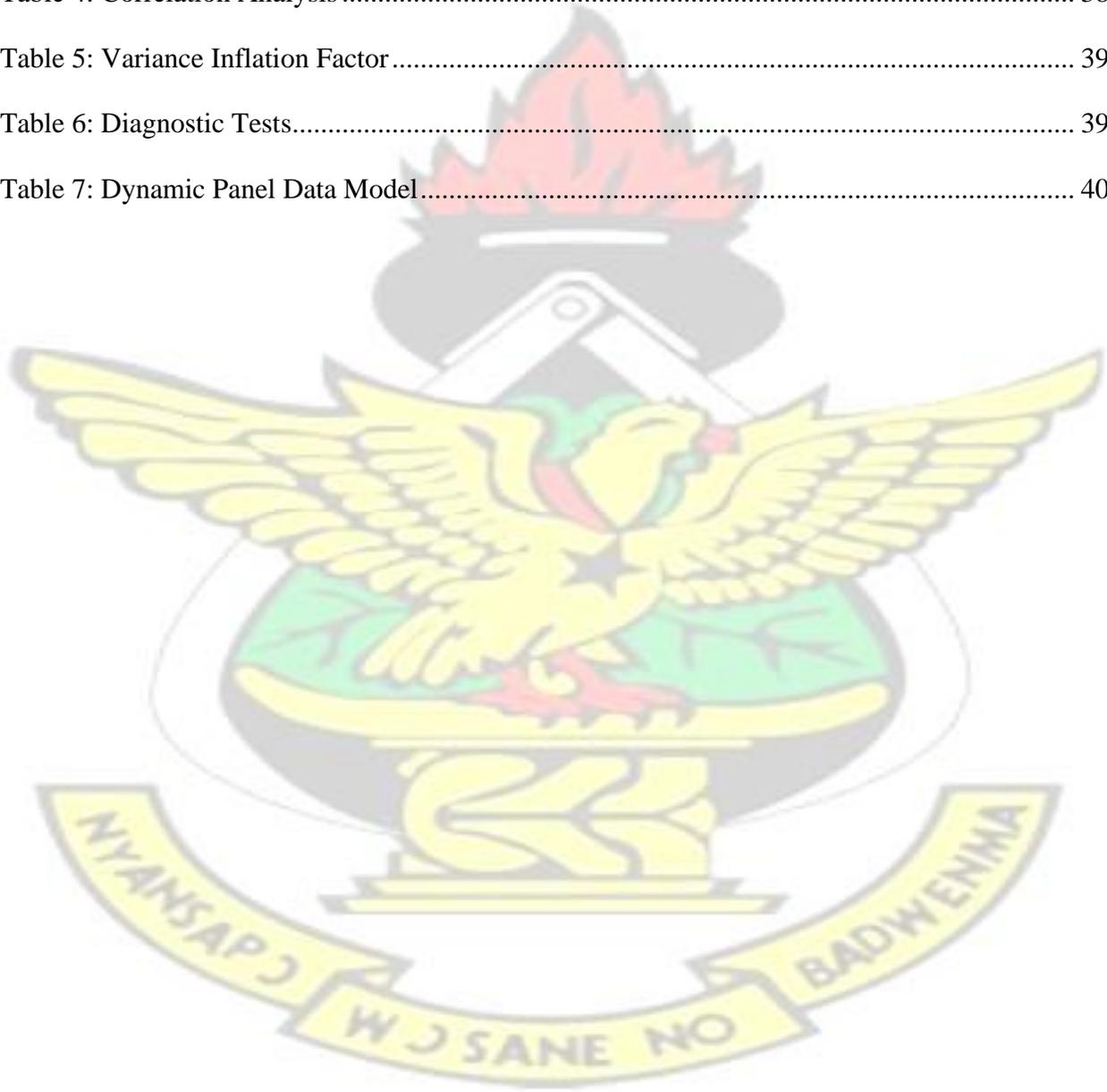
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## CHAPTER ONE

### 1.0 Introduction

I present background of the study, problem statements, justifications, objectives, and research questions of the study. In appendage, this chapter consists of the scope and the relevance of the study.

### 1.1 Background of the Study

The study assesses the effect of Operational risk (OR) and Liquidity risk (LR) on deposit mobilization (DM) of emerging banks in Ghana. Deposit mobilization serves as an important source of funds for investments through credit facilities made available by the banks to borrowers (investors). For example, Kumar and Selvaraj (2015) have argued that the sustenance of banks largely depends on the DM. Deposits determine the profitability of the banks because deposits are often regarded as a source of working fund. Deposits help to increase the amount of operations banks can undertake.

Similarly, Garo (2015) also argued that deposits are the oxygen of banks. The author further argued that banks cannot exist without deposits. Bank deposits facilitate investment and capital formation to stimulate economic growth. This is possible provided the banks are able to mobilize an optimal amount of deposits. They serve as the working capital of every economy and, without deposits, the efficiency of banks would not be possible. Hence, the mobilization of deposits is considered the basic function of banks (Mohan, 2012).

This study assesses the effect of LR and OR on the deposit mobilization of emerging banks in Ghana. Banks' deposits are essential sources of funds for investment and productive activities. However, risk exposures of banks are including liquidity and operational risks that undermine their

capacity to meet unexpected withdrawals of deposits to avoid bank panics and runs and, ultimately, reduction in deposits mobilization.

In developing economies, domestic funds have served as a means of providing a reliable and almost costless source of funds for development. This helps developing countries with difficulties to source funds from international support. Banks play a very instrumental role to economic development since a larger proportion of the global economies is controlled by the banking system (Mendoza and Rivera, 2017). As a result, deposit mobilization by banks would be very instrumental to growth and development of less developed countries, including Ghana (Pinchawawee, 2011). The deposits size indicates the bank's lending potential (Rajeshwari, 2014).

However, the mobilization of deposits is undermined by the various financial risks that firms encounter such as operational, credit, liquidity, market risk, bank-specific and, interest rate risks among others. The banks are supposed to assume these risk exposures and manage them (Rivera and Mendoza, 2017). The most critical risk among the various risks that the bank faces is the credit risk as the greatest proportion of bank earnings emanate from the interest income on the credit (Almekhlafi, et al., 2016). Both liquidity and operational risks have played crucial role in the global financial crises in recent years (Ly, 2015; Iqbal and Molyneux, 2016).

Liquidity management is the main priority of banks since inadequate cash to match incessant withdrawals could cause bank panic and bank run. As a result, banks are required to make available enough cash and cash equivalent. However, liquidity risk or inadequate cash available can discourage savings and, hence, deposit mobilization.

Traditionally, financial risks have bedeviled the operations of banks mostly due to their kind of business. It is interesting to note that liquidity and operation risks are the two major risk exposures of financial institutions. Liquidity risk arises when firms fail to meet their financial obligations due to the inadequacy of cash (Drehmann & Nikolaou, 2013). In banking, liquidity risk arises when depositors make unexpected withdrawals of deposits compelling banks to stimulate the disposal of assets in order to satisfy the obligation, and, therefore, leading to losses or collapse of banks (Crowe, 2009). Operational risk refers to the losses emanating from disruptions of ailed internal processes, systems and personnel and/ or external phenomena (Basel Committee, 2003). Recently, operational risk has become more complex and rampant in the banking sector due to environmental and institutional factors (Akinyele & Willy, 2015). Hence, depository institutions especially banks need to improve their liquidity management and operational risk management framework to be able to play their intermediation role more effectively (Sylvester, 2010; Olukotun et al., 2013; Elliott, 2014).

There have been several studies undertaken to investigate financial risks and performance of banks nexus as well as deposit mobilization with contrasting findings. From the empirical literature, LR affects deposits and profitability of deposit-taking banking firms (Ruziqa, 2013; Li and Zou, 2014; Ndoka and Islami, 2016; Ishak, et al., 2016; Tan, Floros and Anchor, 2017). For instance, Ibrahim and Umvan, (2020) have reported that LR significantly affects banks deposits. In appendage, there are evidence that LR enhances banks performance (Boadi et. al., 2013; Chioma et. al., 2021 Isedu and Erhabor, 2021; Cheng et. al., 2020). However, Getachew (2017) argued that the growth of deposits is significantly negatively affected by liquidity risk. The author shows that an increased proportion of loans with respect to deposits influences the amount of deposits mobilized to grow. He further argued that credit risk enhances deposit growth. Similarly, available literature has

suggested that banks must prudently manage operational risk as this risk is critical to banks performance (Aruwa et al., 2014; Muriithi, 2017; Samuel et al., 2018; Peter et. al., 2019; Gadzo, et al., 2019). There have been contrasting effects of OR on deposits and profitability of deposit-taking banks profitability. The author argued that the concentration of portfolio, lawsuit, bank leverage and resignation of key directors will affect the profitability of banks to decline. In appendage, for instance, Kamau et. al., (2018) argued that operational risk reduces commercial banks performance.

## **1.2 Problem Statement**

From the literature reviewed around the world and on the African continent, most of the studies investigated the determinants of deposit mobilization (DM) (Getachew, 2017; Andenet, 2018; Kumari and Gunasekara, 2018). For example, Getachew (2017) revealed that deposit rate have no serious effect on growth of banks deposit. Also, Andenet, 2018 reported that the BOA is registering a continuous growth in deposit over the study period. Specifically, savings account contributes more than 50% of the BOA's total deposits. Moreover, Kumari and Gunasekara, (2018) reported that deposit rate, services, branch expansion, awareness and technology improve DM. The authors also argued that significant relationship between living area, demographic factors and deposits. Moreover, income was reported to improve on deposit mobilization.

Similarly, other studies investigated the association between various financial risks, deposit mobilization, and banks performance on the African continent (Mbera et. al., 2015; Nisah et. al., 2020; Ebenezer et. al., 2018; Chioma et. al., 2021; Sylvester and Ogagaoghene 2022; Isedu and Erhabor, 2021; Maina and Otwoko, 2021; Cheng et. al., 2020). For example, Chioma et. al., 2021 reported that capital adequacy risk improves DM and banks' performance. However, LR has no effect on banks' value. In appendage, Cheng et. al., 2020 credit risk enhances banks profitability.

In appendage, LR enhances bank profitability. The authors also argued that operational risk reduces bank profitability.

In Ghana, there have been lots of studies undertaken to investigate relationship between the performances of banks and OR, CR and LR (Oboubi et. al., 2020; Mensah et. al., 2021). For example, Oboubi et. al., (2019) found out that banking recapitalization has the potential to promote the performance of banks in the industry. Similarly, Mensah et. al., 2021 argued that an increase in bank branches promotes financial stability but financial stability worsens when bank branches increase beyond 191. The authors further revealed that branches of the bank improve the positive impact of deposits on the stability of banks whereas reducing the adverse impacts of bank lending on the stability of banks. In appendage, there have also been studies undertaken to assess the determinants of bank deposits as well as the relationship between bank deposits and performance in Ghana (Ustarz and Nkegbe, 2015; Baidoo et. al., 2018; Siaw and Peter, 2015). For example, Baidoo et. al., (2018) revealed that non-performing loans reduce financial performance. The authors further suggested that the bank size, bank age, and GDP enhance financial performance.

Empirical research of recent studies employs a number of financial and macroeconomic variables that affect the banking sector (Getachew, 2017; Andenet, 2018; Kumari and Gunasekara, 2018; Nisah et. al., 2020; Ebenezer et. al., 2018; Chioma et. al., 2021; Sylvester and Ogagaoghene 2022; Isedu and Erhabor, 2021; Maina and Otwoko, 2021; Cheng et. al., 2020). Most of these variables that have been mostly used in these studies include inflation rate, Gross Domestic Product (GDP), total amount of deposits, deposit interest rate, capital adequacy ratio, liquidity ratio, liquidity risk, operational risk, credit risk, deposits among others. In appendage, there have been lots of methodologies adopted to undertake these studies. However, to the best of my knowledge and based on the empirical literature reviewed so far, no research has been conducted to assess the

relationship among the OR, LR and mobilization of deposits of emerging banks in Ghana. The current study attempts to assess the effect of liquidity and operational risks on DM of emerging banks in Ghana. The study employs the cash ratio and ratio of operating expenses and operating earnings as measures of liquidity risk and operational risk. This study employs the Panel Cointegration technique and FMOLS estimation approach to assess the effect of LR and OR on DM.

### **1.3 Research Questions**

The research problem poses two questions that need to be addressed:

- 1) What is the effect of liquidity risk on DM of emerging banks in Ghana?
- 2) What is the effect of operational risk on DM of emerging banks in Ghana?

### **1.4 Objectives of the Study**

#### **General Objectives**

The study attempts to investigate impact of financial risks on the mobilization of deposits of emerging banks in Ghana.

#### **1.5 Specific Objectives**

Specifically, the study seeks to investigate:

- 1) To investigate the effect of liquidity risk on the DM of emerging banks
- 2) To investigate the effect of operational risk on the DM of emerging banks

## **1.6 Scope of the Study**

To keep the scope manageable, the study focused on emerging banks in the banking industry. The banks under question have been enlisted in the Appendix. Emerging banks are those that play integral role in the financial intermediation functions of the financial system and the economy. Similarly, these banks often leverage technological advancements to enhance their services. The adoption of digital banking, mobile payments, and other financial technologies may be more prominent in emerging banks as they seek to leapfrog traditional banking models. These particular financial institutions fulfilled the study's requirements. The study further adopted only two measures of financial risks such as LR and OR.

## **1.7 Methodology Overview**

This study empirically examines LR and OR and DM relationship of emerging banks in Ghana. To this end, the study shall use 15 banks that would be selected using a purposive sampling method for a period from 2017 to 2021. Moreover, the quantitative method is used to examine variables relationship.

The study employs indicators for the variables in the study. For instance, the study employs the cash ratio as an indicator for liquidity risk. Similarly, the study employs the ratio of operating expenses to operating earnings as an indicator for the operational risk and the deposit mobilization represents the ratio of total bank deposits to nominal GDP. The data for these variables are obtained from yearly reports of the selected banks for this study. The data for GDP, and inflation are obtained from the Ghana Statistical Service Reports.

The study employs the panel data model (PDM) to investigate the effect of the LR and OR on DM. The study further employs control variables due to their significant impact on deposits in the literature. The model is specified as follow:

$$DM_{it} = \beta_{1i} + \beta_2 LR_{it} + \beta_3 OR_{it} + \beta_4 INF_{it} + \beta_5 GDP_{it} + \varepsilon_{it}$$

DM= deposit mobilization measured by the ratio of total bank deposits to nominal GDP

LR= Liquidity risk represented by cash ratio

OR= operational risk represented by operating expenses divided by operating earnings

INF= annual inflation rate

GDP= GDP per capita as a measure of national income

$\beta_{1i}$  is the intercept whereas  $\beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7,$  and  $\beta_8$  are assumed to be the coefficients of the independent variables. The subscripts attached to the variables such as  $i$  denotes the individual banks (.....) and  $t$  denotes the time period adopted for the study (.....).

### 1.7 Significance of the Study

The study could inform

- 1) Banks about the need to keep more short-term assets to meet deposit withdrawals. Adequate liquidity ensures that a financial institution can meet its financial obligations as they arise. Failing to manage liquidity risk may lead to insolvency, jeopardizing the financial stability of the institution.
- 2) Policymakers and bank managers to undertake prudent management of the risk exposures of the bank. Prudent management of risk exposures is critical for the stability and success

of banks. Prudent risk management involves a holistic and integrated approach that considers the interplay of various risks. By adopting these principles and practices, banks can enhance their resilience, protect their financial health, and maintain the trust of stakeholders in the face of a dynamic and challenging risk landscape.

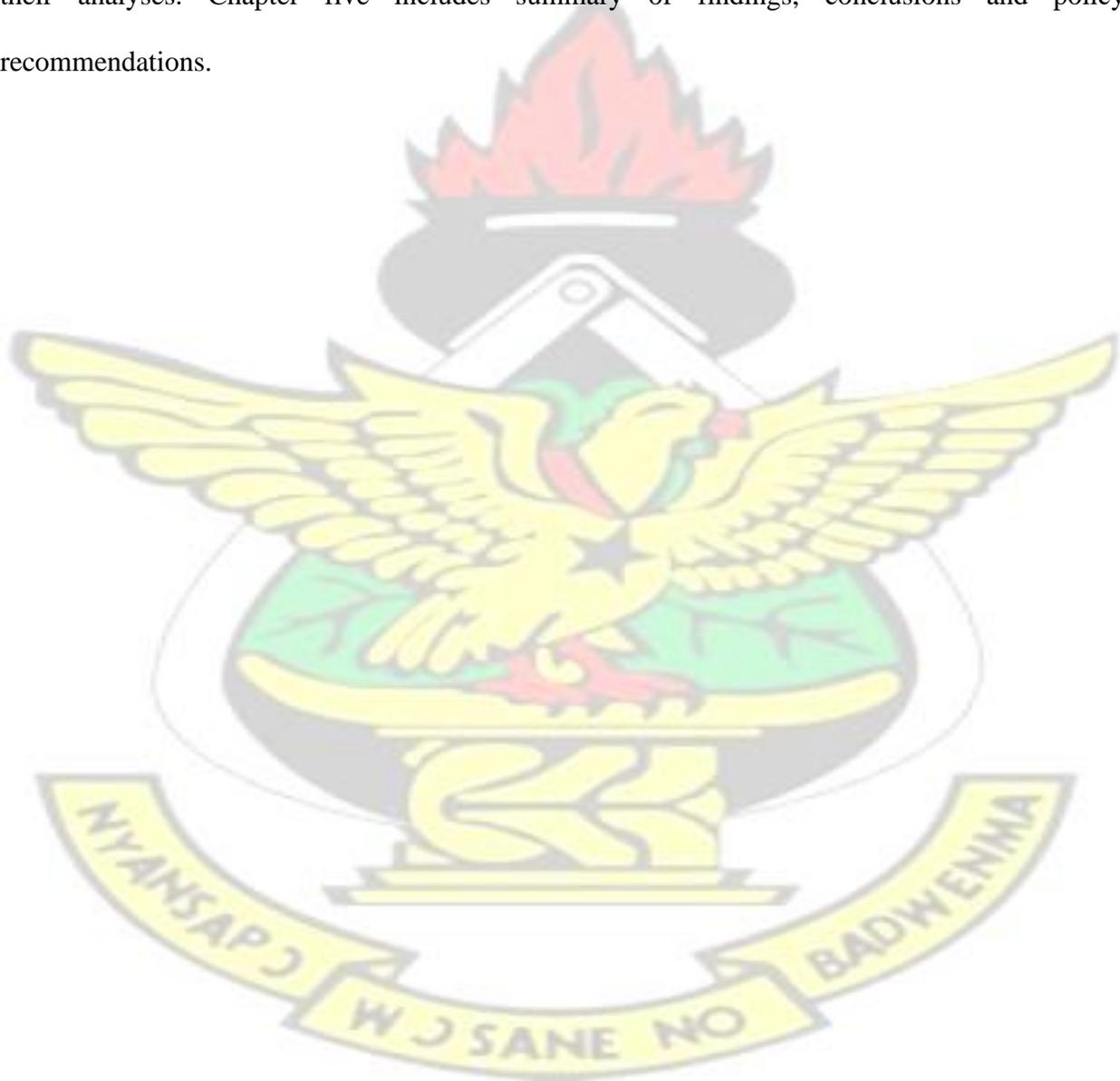
- 3) Banks to focus more on liability management in order to mobilize more deposits. Liability management is a financial strategy employed by businesses and financial institutions to effectively manage their liabilities, including debts and obligations. This strategy involves optimizing the structure and composition of liabilities to achieve specific financial goals, such as reducing costs, managing risks, and improving overall financial performance.

### **1.8 Limitations of the Study**

It's important to keep in mind that there are certain limitations to the study. The enumerated variables are not all there is to consider, but they are an excellent place to begin. If additional variables measures of financial risks affecting DM are found an examined, it may be feasible to get a deeper understanding. The researcher intended to perform a study including several variables and more banks, but was constrained by time, money and other factors. The study encounters challenges of data availability. In appendage, time constraint is a major challenge for carrying out the study. Because of the high levels of uncertainty and competition in this sector, the study was restricted to only those details that could be disclosed without jeopardizing the competitiveness of the companies involved. All these caveats notwithstanding, the study's findings remained unaffected.

## 1.9 Organization of Chapters

The study comprises five chapters. The chapter one consists of the introduction, problem statement, research questions, objectives of the study, methodology overview, and significance of the study, scope, and limitations of the study. Chapter two presents the literature review. Chapter three explains the methodology employed for the study. Chapter four presents the findings and their analyses. Chapter five includes summary of findings, conclusions and policy recommendations.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter summarizes the research and hypotheses developed over time in the fields of LR, OR and DM. By analyzing important data from earlier studies, this chapter constructs a theoretical basis for the research that will be carried out in the following chapters. This chapter covers the conceptual review explaining key concepts of the study. In addition, the chapter presents the theoretical review of the literature on the topic. The researcher discussed theories on LR, OR and DM. Furthermore, the researcher presents the empirical review of literature covering topics treated by scholars and researchers. Finally, I present the conceptual framework of the study that seeks to establish relationship between the dependent variable (DM) and the independent variables (OR and LR).

#### **2.1 Conceptual Review**

##### **2.1.1 Deposit Mobilization (DM)**

DM is one of the important functions of the banking business. DM is the act of soliciting for deposits by banks from depositors to borrowers to facilitate productive investments in an economy (Banke and Yitayaw, 2022). Deposits are regarded as the oxygen of banks (Garo, 2015). The intermediation function that banks plays is an important role in ensuring funds are allocated efficiently to investors for productive activities (Kasim, 2016). Banks allocate funds to the deficit agents by soliciting funds in terms of deposits from the surplus agents (depositors) (Nwanko, Ewuim, & Asoya, 2013). The banking sector success greatly depends on the amount of deposits mobilized (Shettar & Sheshgiri, 2014; Kumar and Selvaraj, 2015). By advancing deposits mobilized to borrowers in return for interest payments, banks enhance their profitability

(Tuyishime et. al., 2015). The survival of banks depends on their ability to generate an adequate amount of deposits for lending.

Banks provide services to their customers by accepting of deposits from depositors and giving loans to borrowers making them one of the most profitable financial institutions (Islam et al. 2019). Deposits are the most important financial resource for banks to meet their customers' financial obligations and hence the mobilization and accumulation of the sufficient amount of deposits are necessary (Namazi et al., (2010). Hence, commercial banks heavily relies on mobilization and accumulation of deposits. The lending capacity of banks is largely dependent on their ability to mobilize deposits and, hence important determinant of bank growth and profit (Ayene, 2020). Nevertheless, DM should incentivize more cash deposits from customers and attract new customers to open accounts banks (Turhani et al., 2016). A bank's proportion of deposit in the banking industry is an indication of its competitive level. Determinants of DM needs to be identified and controlled to improve its effectiveness. As a result, it is important to examine the determinants of DM.

### **2.1.2 Liquidity Risk**

Liquidity is very important in the performance of depository in financial institutions (Adusei, 2021). Liquidity is the cash and its equivalents to meet financial obligations. LR has contributed immensely to the recent financial crisis both globally and domestically (Rogoff, 2022; Jo, 2022). LR is said to be the cause and driver of any serious crises in the market (Adusei, 2021). LR is the inability of banks to meet financial obligations when they become due (Dahir et al., 2018). Banks face liquidity difficulties when there is a large number withdrawals of deposits (Adusei, 2021).

The ideal yardstick for examining competency of banks in meeting the demands of their depositors at a reasonably minimum cost is their liquidity positions.

High LR in the banking sector occurs when customers unexpectedly withdraw their deposits from the banks. High LR in banks undermines provision of credit and hence, undermines stability of financial system. Nevertheless, Bakoush et al., (2018) argue that reduction in profitability of banks is associated with holdings of high-liquid assets. Hence, it is required that banks ensure efficient management of liquidity. Management of LR is necessary of all banks due to the untimely withdrawals of deposits. This involves matching current assets to current liabilities to minimize the inability of banks to meet short-term financial obligations and avoid excessive holdings of cash (Adusei, 2021). For banks to be promised deposits from their customers, they should be able to make available enough cash for emergency and normal withdrawals. In literature, liquidity risk has been variously measured as current, quick, and cash ratios (Tan, Floros and Anchor, 2017).

### **2.1.3 Operational Risk (OR)**

OR has been defined by the Basel Banking Supervision Committee (BCBS) to refer to the losses emanating from failed internal processes or external events. OR has been suggested to be considered a critical risk and an integral part of the bank's financial risks in the Basel II accord provisions (Hsu et. al., 2014). A reliable efficient bank attracts more clients including depositors and stabilizes the country's economic situation (Iqbal and Molyneux, 2016). Since 1990 and the recent 2007/2008 global financial crises as well as the 2017/2018 banking crises in Ghana, ORs have caused huge financial losses. Though external events such as fraud are caused by third parties, the detection systems of fraud have contributed immensely in mitigating ORs (Njeri, 2022).

## **2.3 Theoretical Review**

### **2.3.1 Shiftability Theory**

The shiftability theory propounded by Mouton (1918) is based on the assumption that banks' cash holdings could be sold to investors or lenders or could be taken to the central bank. The theory emphasizes that banks must construct a portfolio in order to have desired liquidity, invest mostly in secondary market to build less costly liquidity, invest in money market instruments, and also resort to the central bank in times of liquidity shortages (Gweyi, 2018).

The shift-ability theory states that there would be no need to invest in securities and await for maturities if banks can access funds from each other in liquidity challenging times at virtually no loss in value. Better still, the banks can acquire money market instruments that can easily and quickly be converted to cash. However, in periods when all banks are in liquidity crises, the central bank would become the last lender to resort to.

This theory is justified in that banks are able to shift sound acceptable assets such as shares, treasury bills and debentures, onto other banks fostering term lending among banks. The Shiftability theory has reduced the need to keep large amount of reserves by banks. Contrary to real bill doctrine, the shiftability theory minimizes the risk involved in times of economic depression (Gweyi, 2018).

The possibility of loans and securities being resold in the secondary market could help banks to obtain cash. The liquidity needs of the commercial bank could be met provided it had available assets for sale in the secondary market (Oluwayinka, 2011). Waldo (2003) proposes some assumptions of the shiftability theory- banks could meet deposit withdrawals provided the banks put themselves in good condition and banks should make loans in short-term maturity to provide

funds to meet untimely deposit withdrawals. The shiftability theory has influenced the banking industry and its practices by refocusing more on investments rather than loans as a source of liquidity. Investment in bills, for instance, positions the bank better to direct its assets than giving customer loans.

### **2.3.2 The Real Bills Doctrine**

According to Roy Green (1989), the 'real bills doctrine' originated from developments in the banking sector in the 17th and 18th centuries. Basically, the real bills doctrine is a rule purporting to direct money to production through short-term commercial bill of exchange, and hence, ensuring that output generates its own means of purchase and money adapts passively to the legitimate needs of trade. The doctrine suggests that money can never be excessive when issued against short-term commercial bills from real transactions in goods and services (Thomas, 1982). Specifically, the doctrine suggests the stock of money of banks will be secured provided banks purchase commercial paper and bills.

There are various reasons for criticizing the real bills doctrine. Over issue of bills though inevitable, is merely impossible. Therefore, commercial wants are insatiable and, hence, surplus cash would depreciate in value and not return to the issuer. The real bills doctrine assumes that banks should hold short-term loans as that would minimize the liquidity problems of commercial banks (Yusuf, 2015). Furthermore, the theory assumes that banks should engage only in short term securities. This theory is consistent with modern inventory or working capital loans. That is, loans to borrowers should not be for speculative purposes but for “real” goods (Machiraju, 2008). The theory bars the provision of long-term loans since they are not liquid (Lockett (1984). In appendage, the real bills doctrine is believed to have disregarded the economic needs

## 2.4 Empirical Review

Cheng et. al., (2020) examine the effect of OR, CR, and LR on banks' profitability in South Africa. They employed the PLS-SEM model for the study. The study reported that CR and LR improve banks' profitability. Nevertheless, operational risk reduces bank profitability.

Siaw and Peter (2015) ascertain the factors affecting of bank deposits in the Ghanaian economy. Specifically, the study assesses the effect of financial levels and macroeconomic variables on bank deposits. Specifically, the study ascertains the impact of inflation, deposit interest rate, money supply growth, monetary policy rate, and stock prices on the quantity of the deposits of banks. The study employed the cointegration method of analysis and FMOLS to examine the objectives employing quarterly data spanning from 2003 to 2013. The study reported a negative short-run effect of money supply growth and inflation on bank deposits in Ghana.

Getachew (2017) investigates the determinants of the mobilization of deposits of banks in Ethiopia from 2000 to 2015. Employing the quantitative research method, the study findings reported that deposit interest rates have no significant positive effect on growth of bank deposits. However, the study found that exchange rate, credit risk, and bank profitability enhance growth of bank deposits. Moreover, money supply and loan-to-deposit ratio impedes growth of bank deposits. Government expenditure and inflation do not affect growth of bank deposits.

Isedu and Erhabor (2021) employ panel data analysis to assess the effects of financial risks on the profitability of eighteen (18) banks in Nigeria for a period of nineteen (19) years. Specifically, OR, LR, CR, market risk, and bank size were employed to examine their effect on the banks performance. The outcome of the study revealed that combined financial risks have insignificant negative effect on banks performance. Individually, liquidity risk affects banks performance whereas CR, market risk, OR and interest rate do not affect banks performance.

Mensah et. al., 2021 employ a panel two-step dynamic GMM model to assess bank branches financial intermediation, and financial stability relationship of thirty-five (35) banks for a period spanning between 2009 and 2017 in Ghana. The study findings indicated that expansion in bank branches initially promote stability of the financial sector, but increase in branches of banks beyond 191 worsens banks financial stability. In appendage, the study revealed that branches of the bank improve the positive impact of deposits on banks stability whereas reducing the adverse impacts of lending of bank on banks stability.

Andenet (2018) assesses the practice of deposit mobilization of Bank of Abyssinia S.C. The study adopted the stratified sampling method on the primary data of more experienced employees of city branches and head offices of banks for a five-year period annual report. The study reported that the BOA is registering a continuous growth in deposit over the study period. Specifically, savings account contributes more than 50% of the BOA's total deposits.

Shamsudeen et. al., (2018) employ a panel data method to assess impact of OR on commercial banks profitability in Nigeria. The authors argued that operational expense enhances banks' performance. However, the study reported that efficiency ratio of the bank reduces banks performance.

Sylvester and Ogagaoghene (2022) employ Ordinary Least Squares method to assess effect of CR on performance of deposit-taking banks. The study reported that loss provision of loans, loans and advances affect banks performance. However, non-performing and loans do not affect banks profitability.

Inyang and Ejoh (2014) analyze the effect of CR and LR on default risk of banks in Nigeria. Employing the experimental research design and simple percentage analysis, the study reported a direct LR and CR relationship. In appendage, the LR and CR jointly caused default risk to occur.

Boadi et. al., (2013) adopt the panel model to assess the association between liquidity and the performance of listed banks in Ghana for the period of 2005 to 2010. The findings of the study reported that between 2005 and 2010, both the profitability ratio and liquidity ratio of the banks were falling. In addition, the study reported that liquidity ratio and profitability ratio of the banks relationship was weak though positive.

Maina and Otwoko (2021) investigate the impact of LR on the profitability of deposit-taking and credit union organizations in Kenya. The study findings reported that LR significantly affects the profitability of the deposit-taking and credit union organizations.

Mbera et. al., (2015) ascertain the impact of the mobilization of deposits on banks' performance in Rwanda. The authors employed Pearson and Spearman's analysis of correlation to assess the relationship. The study suggested that about 85% of the respondents supported that brand name of Equity Bank in the public has given them a competitive edge over other banks. That is, the bank's customer base and, hence, deposits increased due to the market strategy adopted. In appendage, the study suggested that deposit interest rate has a positive impact on the level of deposits and banks' profitability. In sum, the study reported that deposit mobilization enhances banks profitability in Rwanda.

Chioma et. al., (2021) ascertain the effect of L Risk and capital adequacy risk on the performance of listed deposit banks from 2010 to 2019. Employing ex-post facto research method and sourcing

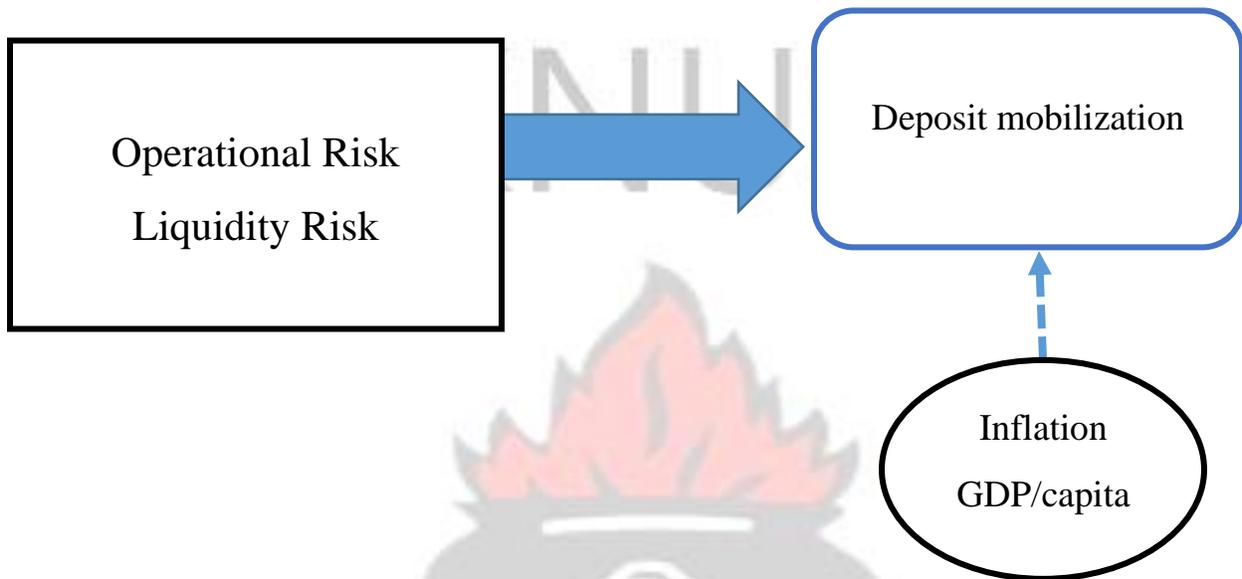
secondary data, the study reported that capital adequacy risk improves deposit money banks' performance. However, LR had insignificant positive impact on banks value.

Kumari and Gunasekara (2018) investigate determinants of DM of banks in Sri Lanka. Specifically, the study investigated the most effective determinants of DM in Sri Lanka. Employing a random sampling method to collect responses of 120 deposit account holders, the study reported that deposit interest rate, services, branch expansion, awareness, and technology enhance DM. Similarly, the study reported a significant relationship between living areas, demographic factors, and deposits. Moreover, income was reported to affect deposit mobilization.

Ibrahim and Umvan (2020) employ the random effects method to analyze effect of bank-specific factors on deposits of banks in Ghana. The study revealed that profitability, liquidity and bank size affect bank deposits. The study findings, also, reported that capital adequacy level does not affect bank deposits.

### **2.3 Conceptual Framework**

Based on the theoretical review, the study employed cash ratio as the indicator of LR and the ratio of operating expenses to total earnings as an indicator of operational risk. Total bank deposits as a ratio of nominal GDP are used as an indicator for deposit mobilization. The study examines OR, LR and DM relationship. Inflation and the growth rate of GDP would be used as control variables. Figure 1 presents the conceptual framework for the study.



**Figure 1: The Conceptual Framework of the Study**

### **2.3.1 Relationship between OR, LR, and DM of banks**

#### **2.3.1.1. Relationship Between LR and DM of banks**

Liquidity is the cash and its equivalents to meet financial obligations. Liquidity risk has contributed immensely to the recent financial crisis both globally and domestically (Kim Cuong Ly, 2015). It is imperative to understand LR and DM of banks relationship so as to develop appropriate management mechanisms to improve the banks' financial intermediation role. Theoretically and empirically, only a scanty number of literature have investigated the relationship between LR and DM of banks. However, there are several studies that have been undertaken to examine the relationship between LR and the performance of deposit-taking banks.

In literature, liquidity risk has been variously measured as current, quick and cash ratios (Ruziqa, 2013; Kolapo, et al., 2012; Li and Zou, 2014; Menicucci and Paolucci, 2016; Ndoka, Islami, and Shima, 2016; Ishak, et al., 2016; Tan, Floros and Anchor, 2017). I employ the cash ratio in this study since it measures the greatest degree of liquidity of banks. And since liquidity is very important for banks because of their payment mechanism operations, it is important that I choose the most liquid measure (cash ratio).

*H<sub>1</sub>=LR is positively related to DM of banks*

### **2.3.1.2. Relationship Between OR and DM of banks**

Operation risk, according to Basel Banking Supervision Committee (BCBS), refers to the losses emanating from failed internal processes or external events. Power (2005) suggests that changes should be made to the Basel II provisions for operational risk to be a critical risk and an integral part of the banks' financial risks. A reliable efficient bank attracts more clients including depositors and stabilizes the country's economic situation (Iqbal and Molyneux, 2016). Since 1990 and the recent 2007/2008 global financial crises as well as the 2017/2018 banking crises in Ghana, operational risks have caused huge financial losses. Though external events such as fraud are caused by third parties, the detection systems of fraud have contributed immensely to mitigating operational risks (Bolancé et. al., 2012). By managing OR, banks maximize targeted cash flows. This further reduces the bank panic and runs by customers (Saeed, 2015).

In the literature, various measures have been used to indicate operational risk (Gadzo and Kportorgbi et. al., 2019; Samuel and Samuel, 2018; Cheng and Nsiah et. al., 2020; Saeed, 2015). For instance, Gadzo and Kportorgbi et. al. (2019), Aruwa and Musa (2014), Cheng and Nsiah et. al., 2020 and Samuel and Samuel (2018) measured operational risk using four indicators. Similarly, Saeed (2015), Ali, Akhtar et. al., (2011), and Ishaq and Bokpin (2009) measure OR as

the ratio of earnings before interest and taxes to total assets. This ratio describes how better a firm uses its assets to achieving earnings. Moreover, Kenny et al., (2014); Adnan et al., (2011); Ponce, (2012); used the ratio of operating expenses to total earnings as a proxy for operational risk. This study adopts the same measure as a proxy for operational risk as it is a measure of bank efficiency.

*H<sub>2</sub> = OR is negatively related to DM of banks*



## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

The study seeks to examine the impact of OR and LR on the deposit mobilization of emerging banks in Ghana. This chapter presents the methods used in analyzing the study. This chapter explains the justification of the study by employing the necessary and appropriate methods for estimation and analysis.

#### **3.1 Research Strategy and Design**

The study employed an explanatory research design to investigate variables relationship. In explanatory research design, the changes in one variable are explained by changes in another variable. In addition, the explanatory research design helps to address research questions through the formulation of a hypothesis based on literature or the researcher's instincts.

The study employs a quantitative research method. The study specifically adopted the causal-comparative/Quasi-Experimental research design to establish the cause and effect of independent variables on the dependent variables. To examine the impact of a variable (independent variable) on another variable (dependent), quantitative analysis is the most appropriate method. The study seeks to investigate the effect of operational risk and liquidity risk on the deposit mobilization of emerging banks in Ghana. A quantitative research method permits the investigation of both the direction and magnitude of independent variables and dependent variables nexus. The advantages of adopting a quantitative research method include; that it is the most powerful tool for gathering empirical data for a study. Researchers are able to evaluate their hypothesis with a quantitative research design. However, results obtained from the quantitative research method are only

numerical responses with little insight into the thoughts, emotions, motivations, and drivers of the group.

Moreover, the study adopted a case study method to analyze the role of banks in financial intermediation. The study seeks to investigate the effect of LR and operational risk on the deposit mobilization of banks. The study focuses on emerging banks in the banking industry. However, the detailed analysis of these selected emerging banks can be used to make an inference on the overall banking sector and all depository institutions.

### **3.2 Data and Data Sources**

Data for the study were obtained from the Bank of Ghana (BOG) database. The data covered the period 2017-2021 and 15 banks. The total number of licensed universal banks in Ghana is 23. To achieve the study objectives, I used 15 banks that were selected using a purposive sampling method for an annual period from 2017 to 2021. The sample size in the study is 75. The 15 banks chosen are those with the largest market share (deposits) in the banking industry over the study period (PWC, 2022). In addition, the banks must have been in active business before, during, and after the 2018/2019 financial crisis. This would help understand the dynamic risk exposures of the banks in the mobilization of deposits. Also, the availability of the required data throughout the sample period informed the choice of the number of banks as the sample in order to minimize the possibility of biased results.

The time period is chosen as a result of the recent turbulence in the banking sector. Therefore, it is important to appreciate and understand the possible dynamic effects of financial risks on financial intermediation role of banks. Specifically, I went through the annual reports of the various banking firms from 2017 to 2021. The documents provide valuable information about the firms and helped us to sort out the variables relevant to this study.

The study employs indicators for the variables. For instance, the study employs the cash ratio as an indicator of liquidity risk. The indicators for the operational risk in the literature include bank leverage, retirement or resignation of a key director and the deposit mobilization is the aggregate accumulated amount of commercial banks savings. The study employs secondary sources of data Bank of Ghana (BOG). Specifically, I went through the annual reports of the various banking firms from 2017 to 2021. The documents provide valuable information about the firms and helped us to sort out the variables relevant for this study.

**Table 1: Summary of variables, their measurements, expected relationship with the dependent variable(s), and data source**

Variable	Proxy/Measurement	Notation	Expected effect	Data Source
<b>DEPENDENT VARIABLE</b>				
Deposit Mobilization	The ratio of total bank deposits to nominal GDP	DM		BOG
<b>INDEPENDENT VARIABLES</b>				
Liquidity Risk	Cash ratio	LR	+/-	BOG
Operational Risk	The ratio of operating expenses to operating earnings.	OR	-/+	BOG
<b>CONTROL VARIABLES</b>				
Size of the economy (GDP)	GDP is yearly value of GDP	GDP	+	BOG
Inflation	Yearly porcentaje of inflación.	INF	-	BOG

### 3.3 Methodology

#### 3.3.1. Econometric Specification

There have been lots of models employed in the literature to examine the association between financial risks and deposit mobilization of emerging banks. This study, furthermore, emphasizes

mainly the assessment of the relationship between OR, LR, and DM of emerging banks in Ghana. This study employs a panel data model of analysis due to existence of cross-section units (banks) and time series (2017-2021). Specifically, the study employs a panel cointegration methodology to test presence of a long-run association among the variables. Moreover, the study employs the FMOLS method of analysis to assess the long-run impact of LR and OR on DM of banks.

I employ the panel cointegration and unit root tests before running the FMOLS model to investigate the effect of the independent variables- LR and OR on deposit mobilization. The study further employs control variables due to their significant effect on DM in the literature. The model is specified as follows:

$$\ln DM_{it} = \beta_{1i} + \beta_2 LR_{it} + \beta_3 OR_{it} + \beta_4 INF_{it} + \beta_5 \ln GDP_{it} + \varepsilon_{it} \quad (1)$$

DM= deposit mobilization measured by the ratio of total bank deposits to nominal GDP

LR= Liquidity risk represented by cash ratio

OR= operational risk represented by the ratio of operating expenses to operating earnings

INF= annual inflation rate

GDP= GDP per capita as a measure of national income

$\beta_{1i}$  is the intercept whereas  $\beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7,$  and  $\beta_8$  are assumed to be the coefficients of the independent variables.  $\beta_{1i}$  is the intercept and is assumed to be an individual variant. In other words,  $\beta_{1i}$  is called individual fixed effects or individual heterogeneity. The individual intercepts incorporated into the model help to control for individual-specific and time-invariant.

$\beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$  and  $\beta_8$  are the slope parameters and they are assumed to be individually invariant. For panels that have features of unbalanced data (short and wide). Therefore, given that this study employs a feature of a panel that is short (2017-2021) and wide (15 firms), the FE model is the most suitable for the analysis.

### 3.3.1.2 Estimation Technique

#### 3.3.1.2.1 Dynamic Panel Data Model

Many economic issues are dynamic by nature and use the panel data structure to understand adjustment. For example, Demand (i.e. present demand depends on past demand), Dynamic wage equation (The macroeconomic empirical wage equation implies that the expected log real wage depends on the lagged log real wage), and employment models (costs of hiring and firing), Investment of firms.

In the context of panel data, we usually deal with unobserved heterogeneity by applying the within (demeaning) transformation, as in one-way fixed effects models, or by taking first differences. The ability of first differencing to remove unobserved heterogeneity also underlies the family of estimators that have been developed for dynamic panel data (DPD) models. A dynamic panel data incorporates a lagged dependent variable (with or without other exogenous variables), allowing for the modelling of a partial adjustment mechanism.

The inclusion of exogenous variables only brings minor complications with respect to the estimation of the parameters. These complications pertain to the number of instruments (in instrumental variable estimation) or the number of moment conditions (in GMM estimation).

There are also complications arising from the time dimensions of the panel datasets. Most of the panel estimation methods are designed for panel datasets with large N (the cross-section dimension) and large T (the time dimension). Panel datasets with small N and large T may require more specialized techniques (e.g. SUR) for estimation.

For simplicity, let us consider a one-way error component model:

$$y_{it} = \gamma y_{i,t-1} + \beta' x_{it} + \alpha_i + \varepsilon_{it} \quad (8)$$

for  $i = 1, \dots, n$  and  $t = 1, \dots, T$ .  $\alpha_i$  and  $\lambda_t$  are the (unobserved) individual and time-specific effects, and  $\varepsilon_{it}$  the error (idiosyncratic) term with  $E(\varepsilon_{it}) = 0$ , and  $E(\varepsilon_{it}\varepsilon_{js}) = \sigma^2$  if  $j = i$  and  $t = s$ , and  $E(\varepsilon_{it}\varepsilon_{js}) = 0$  otherwise. In a dynamic panel model, the choice between a fixed-effects formulation and a random-effects formulation has implications for estimation that are of a different nature than those associated with the static model.

The ability of first differencing to remove unobserved heterogeneity also underlies the family of estimators that have been developed for dynamic panel data (DPD) models. These models contain one or more lagged dependent variables, allowing for the modeling of a partial adjustment mechanism (Christopher, 2013). A serious difficulty arises with the one-way fixed effects model in the context of a dynamic panel data (DPD) model particularly in the “small T, large N” context. As Nickell (Econometrica, 1981) shows, this arises because the demeaning process which subtracts the individual’s mean value of  $y$  and each  $X$  from the respective variable creates a correlation between regressor and error.

The mean of the lagged dependent variable contains observations 0 through  $(T - 1)$  on  $y$ , and the mean error—which is being conceptually subtracted from each  $\varepsilon_{it}$ —contains contemporaneous values of  $\varepsilon$  for  $t = 1 \dots T$ . The resulting correlation creates a bias in the estimate of the coefficient of the lagged dependent variable which is not mitigated by increasing  $N$ , the number of individual units.

The demeaning operation creates a regressor which cannot be distributed independently of the error term. Nickell demonstrates that the inconsistency of  $\hat{\rho}$  as  $N \rightarrow \infty$  is of order  $1/T$ , which may be quite sizable in a “small T” context. If  $\rho > 0$ , the bias is invariably negative, so that the persistence of  $y$  will be underestimated.

For reasonably large values of  $T$ , the limit of  $(\hat{\rho} - \rho)$  as  $N \rightarrow \infty$  will be approximately  $-(1 + \rho)/(T - 1)$ : a sizable value, even if  $T = 10$ . With  $\rho = 0.5$ , the bias will be  $-0.167$ , or about  $1/3$  of the true value. The inclusion of additional regressors does not remove this bias. Indeed, if the regressors are correlated with the lagged dependent variable to some degree, their coefficients may be seriously biased as well.

Note also that this bias is not caused by an autocorrelated error process,  $\epsilon$ . The bias arises even if the error process is i.i.d. If the error process is autocorrelated, the problem is even more severe given the difficulty of deriving a consistent estimate of the AR parameters in that context. The same problem affects the one-way random effects model. The  $u_i$  error component enters every value of  $y_{it}$  by assumption, so that the lagged dependent variable cannot be independent of the composite error process.

One solution to this problem involves taking first differences of the original model. The first difference transformation removes both the constant term and the individual effect:

$$\Delta y_{it} = \rho \Delta y_{i,t-1} + \Delta X_{it} \beta_2 + \Delta \epsilon_{it} \quad (9)$$

There is still correlation between the differenced lagged dependent variable and the disturbance process (which is now a first-order moving average process, or MA(1)): the former contains  $y_{i,t-1}$  and the latter contains  $\epsilon_{i,t-1}$ .

But with the individual fixed effects swept out, a straightforward instrumental variables estimator is available. We may construct instruments for the lagged dependent variable from the second and third lags of  $y$ , either in the form of differences or lagged levels. If  $\epsilon$  is i.i.d., those lags of  $y$  will be highly correlated with the lagged dependent variable (and its difference) but uncorrelated with

the composite error process. Even if we had reason to believe that  $\epsilon$  might be following an AR(1) process, we could still follow this strategy, “backing off” one period and using the third and fourth lags of  $y$  (presuming that the timeseries for each unit is long enough to do so). This approach is the Anderson–Hsiao (AH) estimator.

The DPD (Dynamic Panel Data) approach is usually considered the work of Arellano and Bond (AB) (Rev. Ec. Stud., 1991), but they in fact popularized the work of Holtz-Eakin, Newey and Rosen (Econometrica, 1988). It is based on the notion that the instrumental variables approach noted above does not exploit all of the information available in the sample. By doing so in a Generalized Method of Moments (GMM) context, we may construct more efficient estimates of the dynamic panel data model.

Arellano and Bond argue that the Anderson–Hsiao estimator, while consistent, fails to take all of the potential orthogonality conditions into account. A key aspect of the AB strategy, echoing that of AH, is the assumption that the necessary instruments are ‘internal’: that is, based on lagged values of the instrumented variable(s). The estimators allow the inclusion of external instruments as well.

Consider the equations

$$\begin{aligned} y_{it} &= X_{it}\beta_1 + W_{it}\beta_2 + v_{it} \\ v_{it} &= u_i + \epsilon_{it} \end{aligned} \quad (10)$$

where  $X_{it}$  includes strictly exogenous regressors,  $W_{it}$  are predetermined regressors (which may include lags of  $y$ ) and endogenous regressors, all of which may be correlated with  $u_i$ , the unobserved individual effect. First-differencing the equation removes the  $u_i$  and its associated omitted-variable bias.

The AB approach, and its extension to the ‘System GMM’ context, is an estimator designed for situations with: ‘small T, large N’ panel- few time periods and many individual units; a linear functional relationship; one left-hand variable that is dynamic, depending on its own past realisations; right-hand variables that are not strictly exogenous: correlated with past and possibly current realisations of the error; fixed individual effects, implying unobserved heterogeneity; and heteroskedasticity and autocorrelation within individual units’ errors, but not across them.

The Arellano–Bond estimator sets up a generalized method of moments (GMM) problem in which the model is specified as a system of equations, one per time period, where the instruments applicable to each equation differ (for instance, in later time periods, additional lagged values of the instruments are available). In this setup, we have different numbers of instruments available for each time period: one for  $t = 2$ , two for  $t = 3$ , and so on. As we move to the later time periods in each panel’s time-series, additional orthogonality conditions become available, and taking these additional conditions into account improves the efficiency of the AB estimator. One disadvantage of this strategy should be apparent. The number of instruments produced will be quadratic in T, the length of the time-series available. If  $T < 10$ , that may be a manageable number, but for a longer time-series, it may be necessary to restrict the number of past lags used.

A potential weakness in the Arellano–Bond DPD estimator was revealed in later work by Arellano and Bover (1995) and Blundell and Bond (1998). The lagged levels are often rather poor instruments for first differenced variables, especially if the variables are close to a random walk. Their modification of the estimator includes lagged levels as well as lagged differences. The original estimator is often entitled difference GMM, while the expanded estimator is commonly termed System GMM. The cost of the System GMM estimator involves a set of additional restrictions on the initial conditions of the process generating  $y$ .

## Diagnostic tests

As the DPD estimators are instrumental variables methods, it is particularly important to evaluate the Sargan–Hansen test results when they are applied. In his routine, instruments can be either “GMM-style” or “IV-style”. The former are constructed per the Arellano–Bond logic, making use of multiple lags; the latter are included as is in the instrument matrix. For the system GMM estimator instruments may be specified as applying to the differenced equations, the level equations or both. Another important diagnostic in DPD estimation is the AR test for autocorrelation of the residuals. By construction, the residuals of the differenced equation should possess serial correlation, but if the assumption of serial independence in the original errors is warranted, the differenced residuals should not exhibit significant AR(2) behavior. If a significant AR (2) statistic is encountered, the second lags of endogenous variables will not be appropriate instruments for their current values. If T is fairly large an unrestricted set of lags will introduce a huge number of instruments, with a possible loss of efficiency. By using the lag limits options, you may specify, for instance, that only lags 2–5 are to be used in constructing the GMM instruments.

## Unit Root Tests

It is basic that a data with features of time series follow a particular stochastic and stationarity process. This is because of the fact that time series data establish historical relationships by using past data. In panel data model analysis, there are various methods for unit root tests. These methods include Im, Pesaran and Shin (2003), Levin, Lin and Chu (2002), Breitung (2000), Augmented Dickey-Fuller Chi-Square and Philips-Perron Fisher Chi-Square unit root tests. All these tests are employed in determining the stationarity of the variables.

The hypotheses for the various unit root tests are stated as follows:

Null Hypothesis: Panel data has a unit root (non-stationary)

Alternate Hypothesis: Panel data has no unit root (stationary)

However, some selected methods can be used for the tests depending on their availability and their convenience. For all methods, the tests should be statistically significant at 1%, 5% or 10% for the null hypothesis to be rejected. Nevertheless, when the probability value of the tests are greater than all the significance levels, then the null hypothesis cannot be rejected. Those methods with a greater number of statistical significance should be used to make the decision. For example, given that three methods were employed in the unit root tests and two methods proved that there is the statistical significance of the variable, then their results override the only one method that reports there is no statistical significance.

### **3.3.3 Variables Description and Justification**

#### **Deposit Mobilization (DM)**

DM is an important function of banking business. Deposits are regarded as the oxygen of banks (Garo, 2015). The intermediation function that banks play is an important role in ensuring funds are allocated efficiently to investors for productive activities (Ongore and Kusa, 2013). Banks allocate funds to the deficit agents by soliciting funds in terms of deposits from the surplus agents (depositors) (Nwanko and Ewuim et. al., 2013). Banking sector success greatly depends on the number of deposits mobilized (Shettar and Sheshgiri, 2014; Kumar and Selvaraj, 2015). By advancing deposits mobilized to borrowers in return for interest payments, banks enhance their profitability (Tuyishime et. al., 2015). The survival of banks depends on their ability to generate an adequate amount of deposits for lending.

In the literature, many indicators have been adopted to proxy deposit mobilization (Ngugi and Han, 2021; Gyasi and Adusei, 2018; Gockel and Fanara et. al., 2001; Benson, 2013; Yakubu and Abokor, 2020; Kumari and Gunasekara, 2018; Ayene, 2020; Unvan and Yakubu, 2020; Tun,

2019). For instance, Unvan and Yakubu (2020), and Yakubu and Abokor (2020) measured bank deposits as the aggregate value of time, demand, and saving deposits as ratio of GDP. This study adopts same measure as a proxy for deposit mobilization.

### **Liquidity Risk**

Liquidity is the cash and its equivalents to meet financial obligations. Liquidity risk has contributed immensely to the recent financial crisis both globally and domestically (Kim Cuong Ly, 2015). High liquidity risks in the banking sector occurs when customers unexpectedly withdraw their deposits from the banks. Management of LR is important risk of all banks due to the untimely withdrawals of deposits. For banks to be promised deposits from their customers, they should be able to make available enough cash for emergency and normal withdrawals. Hence, it is imperative to understand the LR and DM of banks relationship so as to develop appropriate management mechanisms to improve the banks' financial intermediation role.

In literature, liquidity risk has been variously measured as current, quick and cash ratios (Ruziqa, 2013; Kolapo, et al., 2012; Li and Zou, 2014; Menicucci and Paolucci, 2016; Ndoka, Islami, and Shima, 2016; Ishak, et al., 2016; Tan, Floros and Anchor, 2017). I employ the cash ratio in this study since it measures the greatest degree of liquidity of banks. And since liquidity is very important for banks because of their payment mechanism operations, it is important that I choose the most liquid measure (cash ratio).

### **Operational Risk (OR)**

Operation risk, according to Basel Banking Supervision Committee (BCBS), refers to the losses emanating from failed internal processes or external events. Power (2005) suggests that changes should be made to the Basel II provisions for operational risk to be a critical risk and an integral part of the banks' financial risks. A reliable efficient bank attracts more clients including depositors

and stabilizes the country's economic situation (Iqbal and Molyneux, 2016). Since 1990 and the recent 2007/2008 global financial crises as well as the 2017/2018 banking crises in Ghana, operational risks have caused huge financial losses. Though external events such as fraud are caused by third parties, the detection systems of fraud have contributed immensely to mitigating operational risks (Bolancé et. al., 2012). By managing OR, banks maximize targeted cash flows. This further reduces the bank panic and runs by customers (Saeed, 2015).

In the literature, various measures have been used to indicate operational risk (Gadzo and Kportorgbi et. al., 2019; Samuel and Samuel, 2018; Cheng and Nsiah et. al., 2020; Saeed, 2015). For instance, Gadzo and Kportorgbi et. al. (2019), Aruwa and Musa (2014), Cheng and Nsiah et. al., 2020 and Samuel and Samuel (2018) measured operational risk using four indicators. Similarly, Saeed (2015), Ali, Akhtar et. al., (2011), and Ishaq and Bokpin (2009) measure OR as the ratio of earnings before interest and taxes to total assets. This describes how better a firm uses its assets to achieving earnings. Moreover, Kenny et al., (2014); Adnan et al., (2011); Ponce, (2012); used the ratio of operating expenses to total earnings as a proxy for operational risk. This study adopts the same measure as a proxy for operational risk as it is a measure of bank efficiency.

## CHAPTER FOUR

### RESULTS AND DISCUSSIONS

#### 4.0 Introduction

This chapter presents the empirical results of the study. The results of the study are displayed in chronological order. Firstly, I presented the summary statistics followed by unit root tests to assess the stationarity of the variables. In addition, I presented the empirical results from the dynamic panel data model of analysis and the associated diagnostic tests.

#### 4.1 Descriptive statistics

Table 1 below presents the summary statistics of the variables employed in the study. A total sample of 75 was employed for the panel of 15 cross-section units (15 banks) and 5 time series units (2017-2021). From the results in table 1, deposit mobilization (DP) has the highest mean value of 6.03E+09 whereas liquidity risk (LR) has the least mean value of 0.948616. Deposit mobilization (DP) has the highest maximum value of 4.24E+09 whereas operational risk (OR) has the lowest minimum value of 0.570650. Similarly, DP has the highest minimum value of 4928210 whereas OR has the lowest minimum value of 0.021930. Moreover, gross domestic product (GDP) has the highest standard deviation of 35008024 whereas LR has the lowest standard deviation of 0.764900.

**Table 2: Descriptive statistics**

Variables	Observations	Mean	Median	Std. Dev.	Minimum	Maximum
LR	75	0.949	0.987	0.765	0.148	6.439
OR	75	1.454	0.571	2.638	0.022	14.237
INF	75	10.256	9.800	1.496	8.200	12.200
GDP	75	2.99E+08	3.09E+08	35008024	2.63E+08	3.57E+08
DP	75	6.03E+09	4.24E+09	7.13E+09	4928210	5.69E+10

*Note: LR denotes liquidity risk, OR denotes operational risk, INF denotes inflation rate, GDP denotes gross domestic product and DM denotes deposit mobilization*

*Source: Author's estimate*

## 4.2 Panel Unit Root Tests

To conduct efficient, consistent, and reliable econometric estimation and analysis, the stationarity of the variables employed in the study must be established. That is, stationary variables avoid spurious regression in econometric estimation. Therefore, unit root tests are applied to the variables to examine their stationarity. For a panel data model, the Levin, Lin and Chu t, ADF-Fisher Chi-square, Breitung t-stat, PP-Fisher Chi-square, and Im, Pesaran and Shin W-stat unit root tests were employed for the tests. From table 2, it is evident that at least four of the tests confirm the stationarity of all the variables. Hence, all the variables are stationary at the levels [I (0)].

## 4.3 Correlation

**Table 3: Panel Unit Root Tests**

Variables	LEVELS				
	Levin, Lin & Chu t	Breitung t-stat	ADF-Fisher Chi-square	PP-Fisher Chi-square	Im, Pesaran and Shin W-Stat
lnDP	-1377.05***	0.902	43.622**	60.082***	-125.520***
lnGDP	-1.475*	-29.046***	65.163**	-17.014***	1.7645
lnINF	-2.771***	3.097	51.686***	-10.312***	-2.390***
LR	-78.046***	1.080	44.820**	52.411**	-5.328***
OR	10.322***	-20.312***	17.704	37.597*	-2.715***

*Note: \*\*\*p<.00, \*\*p<.01, and \*p<.05*

Table 3 presents the correlation coefficient between the variables. The results show that there is a negative relationship ( $r = -0.140$ ) between operational risk and liquidity risk which are the two main independent variables. This implies that a fall in LR leads to lower OR. In addition, both liquidity risk ( $r = 0.014$ ) and operational risk ( $r = 0.247$ ) are positively correlated with deposit mobilization. An increase in LR which implies lower liquidity risk will improve deposit mobilization. Similarly, an increase in OR which implies higher operational risk will improve deposit mobilization. However, the two control variables, inflation and GDP, have a high negative correlation coefficient ( $r = -0.967$ ), albeit justifiable indicating the potential presence of multicollinearity.

**Table 4: Correlation Analysis**

Corr	OR	LR	lnINF	lnGDP	lnDP
OR	1				
LR	-0.140	1			
lnINF	0.010	0.116	1		
lnGDP	0.014	-0.097	-0.967	1	
lnDP	0.247	0.014	0.005	0.026	1

#### 4.4 Variance Inflation Factor

Table 4 presents the values of the VIF for all predictors. A variable suspected to have a problem of multicollinearity must have a value of at least 10. To check multicollinearity attention is given to the values of the centered VIF. From the results, however, none of the predictors has a VIF value of more than 10. Therefore, there is no indication of multicollinearity.

**Table 5: Variance Inflation Factor**

Variables	Coefficient Variance	Uncentered VIF	Centered VIF
lnINF	2.39E+18	64.89519	1.348
lnGDP	1.21E+20	2977.391	4.3563
OR	6.56E+17	7.979247	3.7997
LR	6.67E+20	30.58954	6.3336
C	1.18E+22	2979.387	NA

#### 4.5 Diagnostic Tests

Table 3 reports the diagnostic tests for the DPD model analysis. The results for both the AR (1) and AR (2) are presented for all three performance variables. From the results, both AR (1) and AR (2) have p-values of greater than 0.05 and 0.1 for all the performance variables. This is an indication of no serial correlation in residuals. This indicates that the results obtained by employing the dynamic panel data model are consistent and reliable.

**Table 6: Diagnostic Tests**

Test Order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-1.2728	-2.4318	1.9107	0.2031
AR(2)	0.2267	0.1989	0.8773	0.8206

#### 4.6 Dynamic Panel Data Analysis

Table 4 displays the results of the study and the statistical significance of each variable. The study investigates effect of OR and LRS on mobilization of deposits of emerging banks in Ghana. From the correlation analysis, the GDP and inflation are highly correlated which indicates some presence of multicollinearity. Though the results of the VIF indicate the absence of multicollinearity in all the predictors, I adopted an appropriate technique to address any potential risk of multicollinearity

in the regression results. I employed the principal component analysis (PCA) on the two highly correlated variables to combine them into one predictor, macroeconomic performance (MP) to reduce the possibility of high correlation and any potential multicollinearity.

**Table 7: Dynamic Panel Data Model**

Variables	DM	Std. Error	t-Statistic	Prob.Value
DM(-1)	0.7852	0.6763	1.1600	0.2535
LR	0.1041	0.0451	2.3114	0.0265
OR	-0.0182	0.0044	-4.1721	0.0002
MP	-0.0378	0.0265	-1.4284	0.1616

*Note: lnDM(-1) denotes lag of log of total deposits, LR denotes liquidity risk OR denotes operational risk, MP denotes macroeconomic performance and DM denotes deposit mobilization*

From Table 4, the total deposits in the past year [DM(-1)] have an insignificant positive impact on the current total deposits among the emerging banks in Ghana. Specifically, a 1 % increase in the amount of total deposits mobilized in the previous year would cause the current total deposits mobilized in the current year to increase by 0.7852%, all else equal. This implies that an increase amount of deposits is likely to cause a further increase in the amounts of deposits in the future albeit less than the initial increase.

When banks fulfil their promises of meeting timely and untimely deposit withdrawals, customers develop confidence in the banking sector and continue to save with the bank. This would then cause increase in the amount of deposits that the banks can mobilize and accumulate. This would further the financial intermediation functions of the banks. However, the subsequent amount of deposits, as reported by the results of the study, would be less than the previous depending on the macroeconomic performance of the economy.

Similarly, the main predictors employed for the study, both LR and OR, have significant impacts on the number of total deposits mobilized by the emerging banks in Ghana. However, whereas LR has a significant (5%) positive effect on DM, OR has a significant (1%) negative impact on deposit mobilization of emerging banks in Ghana, all else equal. Specifically, an increase in the LR by \$1 would cause the deposit mobilized to increase by \$0.1041, all else equal. This finding agrees with the results of Maina and Otwoko (2021). This implies that a low liquidity risk would increase the number of deposits accumulated or mobilized. An increase in LR measured by cash ratio implies a low liquidity risk (LR) and, hence, the amount of cash balances is greater than deposit liabilities (current liabilities) which would improve the ability of the banks to meet deposit withdrawals. This would, therefore, increase their ability to solicit more deposits.

Similarly, a fall in the LR implies a high risk and, hence, the amount of cash balances fall short of deposit liabilities which would incapacitate the banks in meeting deposit withdrawals. This would, therefore, reduce their ability to solicit more deposits. This further explains the importance of liquidity in the banking system and the financial intermediation functions of the banks. Banks, being a payment mechanism system, must keep enough cash by minimising the risk associated with liquidity in order to meet potential deposit withdrawals. This would incentive deposits to continue saving their monies with the banks thereby reducing the difficulty banks encounter in soliciting deposits. This finding supports the shiftability theory that suggests that banks should invest into more liquid assets that have short-terms maturities so as to be able to meet untimely deposit withdrawals.

Table 4 also reports a significant negative impact of the OR on the total amount of deposits mobilized at a 1% significance level, all else equal. This finding agrees with the findings of (Herald and Heiko, 2008) who reported that financial risk may affect deposits to fall. Specifically, a \$1

increase in operating expenses as the ratio of operating earnings (operational risk) would cause the total amount of deposits mobilized to fall by \$0.0182, all else equal. This implies an increase in operational risk (operating expenses outweigh operating income) would decrease the profitability of the banks and, hence, the availability of cash to meet deposit withdrawals. Similarly, a \$1 decrease in operating expenses as the ratio of operating earnings (operational risk) would cause the total amount of deposits mobilized to increase by \$0.0182, all else equal. This implies a decrease in OR (operating expenses fall short of operating income) would increase the profitability of the banks and, hence, the availability of cash to meet deposit withdrawals.

A reliable efficient bank attracts more clients including depositors and stabilizes the country's economic situation (Iqbal and Molyneux, 2016). Though external events such as fraud are caused by third parties, the detection systems of fraud have contributed immensely to mitigating operational risks (Bolancé et. al., 2012). By managing OR, banks maximize targeted cash flows. This further reduces the bank panic and runs by customers (Saeed, 2015).

The control variable, macroeconomic performance, has an insignificant negative impact on the total number of deposits of emerging banks in Ghana. This finding disagrees with the results of (Islam et. al., 2019). Specifically, macroeconomic performance has a \$-0.0378 impact on the number of deposits, holding all other variables constant. An improvement in the performance of the Ghanaian economy will raise the confidence people have in the economy and would rather opt to invest than save which would affect the deposits accumulation of banks to decrease. An expansion of the economic performance would incentivize households, firms, businesses and government to withdraw funds and invest them in the economy to take advantage of the expanded productive ventures. Similarly, these entities would reduce the amount of deposits at the banks due to a conducive atmosphere in the productive sector as a result of the expansion of the economy.

This study contradicts the study by Nathanael, (2014) who reported a significant impact of macroeconomic performance indicators such as interest rate, bank branches, interest rate, inflation, and bank investment on Nigerian bank deposits. This study further contradicts the findings of Banke at al., (2022) who reported a significant negative effect of economic growth, and inflation on DM of commercial banks in Ethiopia.



## CHAPTER FIVE

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.0 Introduction

This chapter presents the summary of the findings, conclusions, and recommendations of the study.

#### 5.1 Summary of Findings

##### 5.1.1 Impact of LR on deposit mobilization of emerging banks in Ghana

The results indicate that LR has a significant positive impact on the total number of deposits mobilized by the emerging banks in Ghana. Specifically, an increase in the LR by \$1 would cause the deposit mobilized to increase by \$0.1041, all else equal at a 5% significance levels. Similarly, means that a decrease in the LR which implies an increase in cash ratio would improve the ability of the banks to meet deposit withdrawals. This would, therefore, increase their ability to solicit more deposits.

Similarly, a fall in the LR implies a high risk and, hence, the amount of cash balances fall short of deposit liabilities which would incapacitate the banks in meeting deposit withdrawals. This would, therefore, reduce their ability to solicit more deposits. Liquidity is the most important determinant of the sustenance of banks and the banking sector. Hence, sufficient holding of cash and short-term assets would help reduce the financial difficulties that banks would be exposed to in times of crisis. This finding agrees with the results of Maina and Otwoko (2021). This implies that a low liquidity risk would increase the number of deposits accumulated or mobilized. An increase in LR measured by cash ratio implies a low liquidity risk (LR) and, hence, the amount of cash balances

is greater than deposit liabilities (current liabilities) which would improve the ability of the banks to meet deposit withdrawals. This would, therefore, increase their ability to solicit more deposits.

This further explains the importance of liquidity in the banking system and the financial intermediation functions of the banks. Banks, being a payment mechanism system, must keep enough cash by minimising the risk associated with liquidity in order to meet potential deposit withdrawals. This would incentive deposits to continue saving their monies with the banks thereby reducing the difficulty banks encounter in soliciting deposits. This finding supports the shiftability theory that suggests that banks should invest into more liquid assets that have short-terms maturities so as to be able to meet untimely deposit withdrawals.

### **5.1.2 Impact of OR on deposit mobilization of emerging banks in Ghana**

The study also reports that OR improves deposit mobilization of emerging banks in Ghana. This implies an increase in operational risk (operating expenses outweigh operating income) would decrease banks profitability and, hence, the availability of cash to meet deposit withdrawals. Similarly, a decrease in operational risk (operating expenses fall short of operating income) would increase banks profitability and, hence, the availability of cash to meet deposit withdrawals. This finding agrees with the findings of (Herald and Heiko, 2008) who reported that financial risk may affect deposits to fall.

Specifically, a \$1 increase in operating expenses as the ratio of operating earnings (operational risk) would cause the total amount of deposits mobilized to fall by \$0.0182, all else equal. This implies an increase in operational risk (operating expenses outweigh operating income) would decrease the profitability of the banks and, hence, the availability of cash to meet deposit withdrawals. Similarly, a \$1 decrease in operating expenses as the ratio of operating earnings

(operational risk) would cause the total amount of deposits mobilized to increase by \$0.0182, all else equal. This implies a decrease in OR (operating expenses fall short of operating income) would increase the profitability of the banks and, hence, the availability of cash to meet deposit withdrawals. A reliable efficient bank attracts more clients including depositors and stabilizes the country's economic situation (Iqbal and Molyneux, 2016).

Though external events such as fraud are caused by third parties, the detection systems of fraud have contributed immensely to mitigating operational risks (Bolancé et. al., 2012). By managing OR, banks maximize targeted cash flows. This would minimize the expenses the banks would incur arising from internal disruption in the bank and external factors. These internal and external factors that disrupt operations of the banks such as network failure, absenteeism, holidays, natural disasters amongst others would be minimized and eventually improve operations of the banks and their earnings. Ideally, management of OR implies reducing operational expenses and improving operational earnings. This further reduces the bank panic and runs by customers (Saeed, 2015). The study also employed macroeconomic performance, a control variable, to improve upon the efficiency of the results and reduce biasedness. The study reports an insignificant negative effect of MP on DM of banks in Ghana. The control variable, macroeconomic performance, has an insignificant negative impact on the total number of deposits of emerging banks in Ghana. This finding disagrees with the results of (Islam et. al., 2019). Specifically, macroeconomic performance has a \$-0.0378 impact on the number of deposits, holding all other variables constant. An improvement in the performance of the Ghanaian economy will raise the confidence people have in the economy and would rather opt to invest than save which would affect the deposits accumulation of banks to decrease. An expansion of the economic performance would incentivize

households, firms, businesses and government to withdraw funds and invest them in the economy to take advantage of the expanded productive ventures.

Similarly, these entities would reduce the amount of deposits at the banks due to a conducive atmosphere in the productive sector as a result of the expansion of the economy.

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## **5.2 Conclusion**

Deposit mobilization serves as an important source of funds for investments through credit facilities made available by the banks to borrowers (investors). Banks' ability to solicit deposits improves their intermediation function, capital accumulation, and investment in the economy and, hence, increases economic growth. Banks have adopted several methods to improve their liability management and their intermediation functions. However, banks have been exposed to many financial risks that have undermined their liability management and intermediation functions.

The most notable of these financial risks in Ghana have been operational and liquidity risks as they affect banks' ability to meet deposit withdrawals. The recent crisis in the financial sector in Ghana has heightened the need for the financial service regulators and the banks to take a keen interest in the management of risks the banks face. Many banks experienced the issue of non-performing loans and had to even write off some bad debts just to improve their books. The current study seeks to address the following research questions:

1) What is the effect of liquidity risk on the DM of emerging banks in Ghana?

From the result in Table 4, I provide evidence that the risks banks face undermine their ability to mobilize deposits. The results of the study report that LR significantly affects DM by 0.1041 at a 5% significance level. The results, hence, indicate that LR adversely affects the DM of emerging banks. Lower LR increases the DM of the banks and higher LR reduces the DM of the banks. This implies that the banks can improve their soliciting of deposits and DMs when they appropriately manage their LRs. The availability of cash flows by minimizing LRs would increase the ability of the banks to meet deposit withdrawals when due. This would finally improve the confidence of the deposits to continue to keep their monies with the banks and, as a result, improve the deposit mobilization and accumulations of the banks.

2) What is the effect of operational risk on the DM of emerging banks in Ghana?

From the result in Table 4, I provide evidence that the risks banks face undermine their ability to mobilize deposits. The results of the study report that OR significantly affects DM by -0.0182 at a 5% significance level. Both liquidity risk and operational risk have been revealed to adversely influence deposit mobilization. The lower the operational and liquidity risks, the higher the number of cash deposits the banks can mobilize. That implies that prudent management of risk exposure of banks can improve their liability management and deposit mobilization. Hence, the banking industry and its regulator should institute measures to help minimize the risks facing banks in order to improve confidence in the financial sector.

### **5.3 Recommendations**

The following are some of the recommendations based on the findings for informed policymaking;

i) The management of liquidity risk is a critical aspect of deposit mobilization for financial institutions. Liquidity risk refers to the potential that a financial institution may not have enough liquid assets to meet its short-term obligations, including withdrawals by depositors. Effective management of liquidity risk is essential to ensure the stability and solvency of the institution. Financial institutions engage in Asset-Liability Management to match the maturity and cash flow profiles of their assets and liabilities. This involves assessing the timing and amounts of cash inflows and outflows to ensure that the institution can meet its obligations.

In addition, relying on a variety of funding sources can help mitigate liquidity risk. Financial institutions may diversify their funding by attracting deposits from various segments of the market, offering different types of deposit products with varying maturities and interest rates. Also, Relying on a variety of funding sources can help mitigate liquidity risk. Financial institutions may diversify their funding by attracting deposits from various segments of the market, offering different types of deposit products with varying maturities and interest rates. Also, accurate and dynamic cash flow forecasting allows financial institutions to anticipate liquidity needs and adjust their strategies accordingly. This involves analyzing historical data, considering seasonal variations, and incorporating potential changes in market conditions.

By adopting a comprehensive approach that combines these strategies and practices, financial institutions can enhance their ability to manage liquidity risk effectively while mobilizing deposits from various sources. It's important for institutions to continuously evaluate and update their liquidity risk management frameworks to adapt to changing market conditions and regulatory requirements.

ii) Managing operational risk is crucial for maintaining the stability and reputation of a financial institution. Firstly, banks should implement strong internal control systems to ensure that deposit mobilization processes are executed accurately and in compliance with policies and regulations. Regularly review and update internal controls to adapt to changes in the business environment. In addition, banks should educate customers about safe banking practices and potential risks associated with deposit transactions.

Provide clear information about the institution's security measures and how customers can protect themselves from fraud. Moreover, banks should utilize technology and automation to streamline deposit mobilization processes and minimize manual errors. Implement robust IT controls and cybersecurity measures to protect against technological risks such as data breaches and system failures. By implementing these strategies, financial institutions can enhance their ability to manage operational risk in the deposit mobilization process, safeguarding both the institution and its customers from potential losses and disruptions.

iii) The study reports that macroeconomic environment can adversely impact deposit mobilization for banks. Economic downturns, inflation, and other macroeconomic factors can affect individuals' and businesses' ability and willingness to deposit funds. Diversify funding sources to reduce dependence on a specific economic sector or segment. This can help mitigate the impact of economic downturns in particular industries.

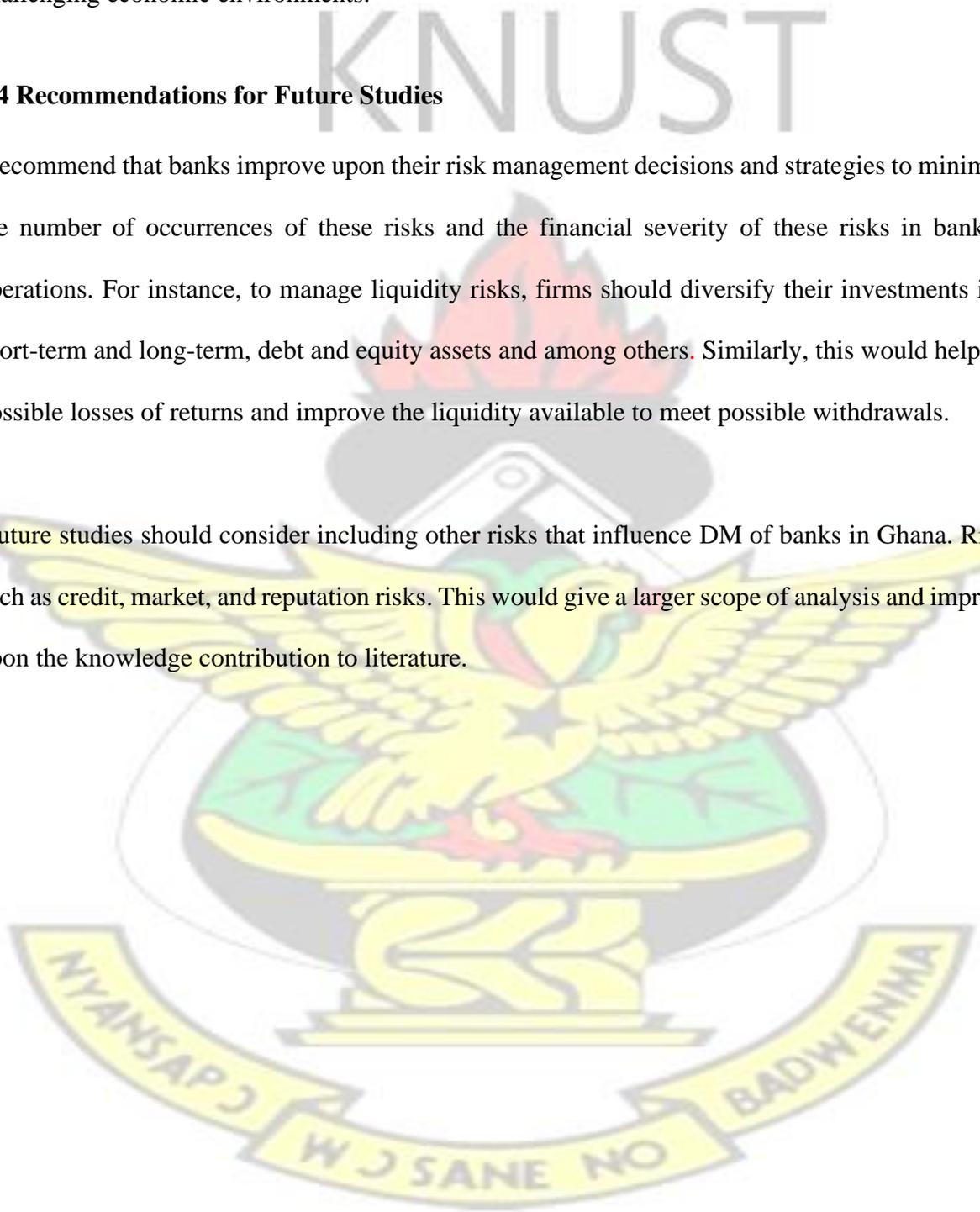
In addition, adopt a flexible interest rate strategy that considers the prevailing economic conditions. During economic downturns, lowering interest rates on deposits or offering attractive rates can incentivize depositors. Also, introduce innovative deposit products that cater to the needs of customers during challenging economic times. For example, products with features like flexible withdrawal options or higher interest rates can attract deposits. By implementing a combination of

these strategies, financial institutions can reduce the negative impact of macroeconomic performance on deposit mobilization, fostering resilience and sustainable growth even in challenging economic environments.

#### **5.4 Recommendations for Future Studies**

I recommend that banks improve upon their risk management decisions and strategies to minimize the number of occurrences of these risks and the financial severity of these risks in banking operations. For instance, to manage liquidity risks, firms should diversify their investments into short-term and long-term, debt and equity assets and among others. Similarly, this would help the possible losses of returns and improve the liquidity available to meet possible withdrawals.

Future studies should consider including other risks that influence DM of banks in Ghana. Risks such as credit, market, and reputation risks. This would give a larger scope of analysis and improve upon the knowledge contribution to literature.



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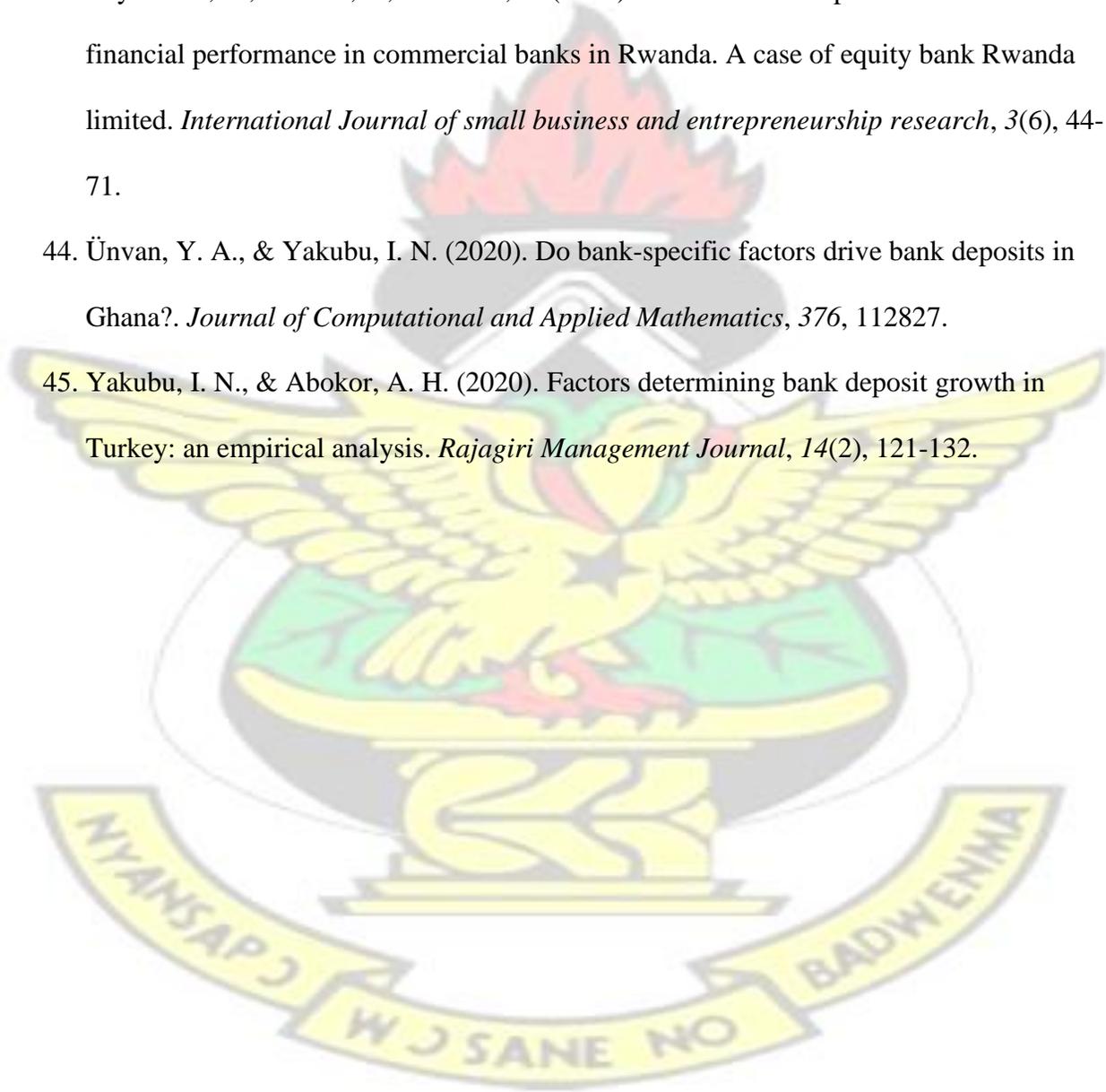
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## APPENDIX

### Names of Banks Employed in the Study

UBA, STANBIC BANK, GCB, ZENITH BANK, REPUBLIC BANK, SOCIETE GENERAL, FIDELITY BANK, ADB, GTB, ACCESS BANK, ECOBANK, CAL BANK, GBC, ABSA BANK, STANDARD CHARTERED BANK.

