

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF BUSINESS**

**DEPARTMENT OF ACCOUNTING AND FINANCE**

**DETERMINANTS OF LIQUIDITY OF BANKS LISTED ON THE GHANA STOCK  
EXCHANGE.**

**BY**

**KORANTENG EBENEZER**

**A DISSERTATION PRESENTED TO THE DEPARTMENT OF ACCOUNTING AND  
FINANCE IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE  
AWARD OF MASTERS IN BUSINESS ADMINISTRATION**

**2015**

## DECLARATION

I declare that I have personally, under supervision, undertaken the study herein submitted.

| NAME               | INDEX No. | SIGNATURE | DATE  |
|--------------------|-----------|-----------|-------|
| Koranteng Ebenezer | PG9627613 | .....     | ..... |

CERTIFIED BY;

|                |       |       |
|----------------|-------|-------|
| Mr. Kwasi Poku | ..... | ..... |
|----------------|-------|-------|

(Supervisor)

|                 |       |       |
|-----------------|-------|-------|
| Dr. K.O. Appiah | ..... | ..... |
|-----------------|-------|-------|

(Head of Department)

## **DEDICATION**

To God Almighty and to my family whose moral and financial supports have contributed significantly towards the author's education.

## **ACKNOWLEDGEMENT**

Any person who can rely on the candid comment, constructive criticism, advice and in-depth knowledge of well-informed people is fortunate. In this respect, the author has been especially fortunate and we owe much appreciation to all the lecturers of KNUST School of Business.

Special mention is also made of Mr. Kwasi Poku, my supervisor, who in spite of his tight schedule, managed to supervise this work.

I am also grateful to my classmates especially Bernice Duah Boateng, Edusei-Mensah William, Oppong Fosu Kennedy and Dennis Nii Addy for their support.

## **ABSTRACT**

Achieving the optimum level of liquidity is crucial for every bank. A lot of factors have been examined by number of researchers in this area. This study examines the bank specific and macroeconomic determinants of liquidity of banks listed on the Ghana stock exchange. The study examines the determinants of liquidity of banks listed on the Ghana stock exchange. With a data set of 7 banks over a 10 year period spanning 2004 and 2013, the random effects GLS regression based on the Hausman test is used to estimate the determinants of bank liquidity. The study employs liquid assets to total assets as the measure of liquidity (dependent variable) with return on assets, loans, capital adequacy, inflation, gross domestic product, unemployment, return on equity and bank size as the explanatory variables. The results of the panel data regression showed that, while capital adequacy, bank size and return on equity exhibit a positive and a statistically significant relationship with liquidity. Meaning that an increase in any of these variables leads to an increase in liquidity level, components of loan, return on assets and gross domestic product show a negatively significant relationship. Inflation and unemployment have no significant relationship with liquid assets to total assets (dependent variable).

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## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.0 BACKGROUND OF THE STUDY**

Recent crisis of banks all over the world has increased research into liquidity risk and its management. Moreover, there exists lots of discussion about liquidity management importance due to the recent financial institution failures. The nature of banks activities brings about liquidity crisis (Chaplin et al). The position of a bank with regards to its liquidity can impact on its capital and profitability as well. Liquidity risk is of serious concern to banks since there is increased struggle for deposits and the variety of products in the market and advancement in technology. Crowe (2009) asserts that, a bank with inadequate liquidity might fail irrespective of the fact that it has quality assets, high earnings and enough shareholders' funds. This is why liquidity management is one of the main bank's success factors.

A bank is considered liquid when it has assets and investments in securities that are effortlessly realizable at a short notice without a cost to the bank together with the capacity to raise fund from other source, to help the bank to meet its obligation and commitments in an appropriate manner. Also virtually all financial emergencies should be met with financial commitment cushion. Financial institutions because of the monetary and credit role they play in the economy face a lot of restrictions but they are obliged to function within the limits of the law and resolve the problem of liquidity and profitability impasse the economy is facing. Recent failure of financial institution indicated that managers have not assessed liquidity threat or have not

handled it appropriately. Meeting financial obligations when they fall due is the meaning of liquidity. Amengor (2010) defines liquidity as a bank meeting its obligations when due, lending, withdrawal of deposits, investments and maturing liabilities are commitments of the bank.

The shortage of cash as a result of a bank losing deposits and customers defaulting on loan commitments is referred to as liquidity risk.

Loans are funded by short term deposits by financial institutions and this generates a possible market crisis and the public must intervene as a matter of necessity. This potential failure causes a run on the bank where depositors rush to the bank to withdraw their funds. Unpleasant information about a bank's assets or a fear that cannot be explained can cause a run on the bank. This results in discount sale of assets in both cases resulting in a loss. Moreover, a systemic crisis could arise because failure of one bank can ultimately affect the solvency of other banks. Banking regulations and safety measures are established because of this market failure. Bank license, regulation of capital founded on risk valuation, liquidity, interest rate and foreign exchange rate regulations and disclosing to the public financial information are controls put in place by central banks (Zenios & Ziemba, 2007). Section 31 of the banking amendment Act 2007, Act 738 requires commercial banks to save a percentage of the banks' customer deposits as reserves with the central bank of Ghana that is principally used in paying debts owed to other banks and provide coverage for customers. The central bank of Ghana monitors this through the submission of weekly returns and banks are penalized when they fail to file returns.

Siddiqi (2008) however stated that, sustaining strong liquidity level and managing it is problematic and difficult considering the tough competition in the world today. Established

system is required by successful and well-structured banks for appraisal and managing risk relating to liquidity also.

Ismael (2010) asserts demand and supply liquidity should be managed appropriately by financial institutions to securely run their business, sustain good stakeholder relations and escape risk relating to liquidity. Banks should sustain suitable liquidity to meet unexpected and periodic loan demand and variations of deposits. In order to take advantage of the unexpected profitability, cash reserves are also required.

### **1.1 PROBLEM STATEMENT**

Borrowed funds that are idle are invested in various portfolios through the financial intermediation role. The problem with such business activity of the bank is that, customers' deposits that the bank invest to maximize profit can be recalled by the fund savers who cannot meet their obligations at any point in time.

Every bank must retain enough liquidity to pay the banks' depositors and also function on profit as this will prevent the public losing confidence. This loss of confidence could be bank distress facing financial institutions due to intense competition resulting from the advent of new banks. This is why ensuring that enough funds are available to offset depositors and loan seekers demands in a judicious manner is the main concern of management of banks. Moreover, (Jenkinson 2008) is of the view that, the reputation of a bank is also affected when it has liquidity problem but not only its performance.

There are usually asset liability mismatch and this disparities must be stabilized since the liabilities given out by banks are liquid but have investments in assets that are illiquid (Zhu 2001). In other words, if a bank fails to bridge the gap, liquidity crisis might occur exposing the

bank to some risks which might affect the reputation of the bank. Hence (Ismal 2010) is of the view that, for a bank to compete and continue with its activities, liquidity management capability of a bank is crucial.

Recent times in Ghana has witnessed a tense competition among banks for customer deposits characterized by regular advertisement in both the print and electronic media, attractive promotions and the employment of salesmen who sell to varied customers on daily basis the different banking products offered by them in their quest to maximize customer deposits. Non-bank financial institutions also compete for deposits with commercial banks by reaching out to a large number of the middle class and poor in mobilizing deposits to help individuals, small, medium and large scale enterprises in their establishment and growth of businesses. This function of financial intermediation surely exposes these banks to liquidity risk.

Since management of banks pay attention to lending to corporate or wholesale, it becomes a problem sustaining the necessary liquidity level (Akhtar 2007). These corporate or wholesale lending might cause liquidity crisis for the bank because they are almost always long-term in nature (Kashyap et al 2002). Procedure involved in retiring loan slows down when the economy experience poor production of resources. Non-performing loans (NPLs) increase as a result of this situation making liquidity crisis becoming inevitable.

Shareholders of banks are interested in profits because banks are business oriented firms. Banks might pursue profitability to the neglect of liquidity in an attempt to satisfy shareholders by investing in illiquid assets at the expense of liquid assets which do not yield high interest and this situation is dangerous. Ozdincer & Ozyildirim (2008) states that, banks who defaulted was not the result of profits dwindling but was due to liquidity complications in the short term.

Therefore, a bank should concentrate on meeting customers' financial obligation through keeping enough liquidity and maximizing profits to ensure equilibrium between the two. Since each level of liquidity has a different effect on the levels of profitability and the problem arises when the banks try to maximize their profit at the expense of liquidity which may cause hardship technically and financially following deposits withdrawal, choosing the optimal point at which banks assets can be sustained to accomplish these goals simultaneously is problematic.

The study investigates banks situation with regards to liquidity risk and impact of both macroeconomic and bank specific factors on liquidity. This study, as part of its objectives, is to provide strategic policy recommendations that are expected to contribute significantly towards the improvement of the management of the various liquid assets.

## **1.2 RESEARCH OBJECTIVES**

The main objective is to assess the impact of the determinants of listed banks' liquidity.

Specifically, the study sought to;

1. Identify the determinants of liquidity of listed banks in Ghana.
2. Examine the impact of bank specific factors on liquidity of listed banks in Ghana.
3. Examine the impact of macroeconomic factors on liquidity of listed banks.

## **1.3 RESEARCH QUESTIONS**

1. What are the factors affecting liquidity of listed banks?
2. How is the liquidity of listed banks in Ghana impacted by bank specific factors?
3. How do macroeconomic factors impact liquidity of listed banks in Ghana?



#### **1.4 SCOPE OF THE STUDY**

The study focused on determinants of liquidity and their impact on the liquidity position of listed banks in Ghana. The study meant to examine all banks listed on the stock exchange but to ensure uniformity and avoid distortion, Trust bank Ltd and Ecobank Transnational Incorporated were excluded from the study. This is because their reporting currency is not in Ghana cedis. The selected banks also have their financial and other regulatory reports available on the internet making it easy to access basic information on its operations. The banks nature of business and years of existence were among the reasons why the banks were chosen.

#### **1.5 SIGNIFICANCE OF STUDY**

This study provided an idea of how bank specific and macroeconomic variables impact on the liquidity of banks and how liquidity can be managed to forestall liquidity problems which might affect Ghana's financial system. It also provided guidance for future research on determinants of liquidity. Also, this study will complement existing information on liquidity provided by earlier researchers.

Recommendations in the study will enable managers of risk to moderate risks related to banks' processes thereby strengthening liquidity positions and improving performance.

#### **1.6 LIMITATION OF WORK**

Every research work is faced with some kind of challenges and this work was not an exception. The study does not take into account all the variables that impact on liquidity so it might not

identify the impact of all the variables on liquidity. Also literature on the subject area is limited especially in Africa so most of the literature in the study is on studies conducted outside Africa.

Another anticipated challenge which posed a threat to the exhaustive study of the topic is the differing information by the central bank, World Bank and the Ghana statistical service, hence limiting the reliability of information needed for the study.

Lastly, IMF country report in 2011 claims that there are various unprincipled practices being involved by Ghanaian banks which result in profitability, capital and liquidity being overstated in the banking sector. And some of these practices include: the inappropriate classification of Non-Performing Loans particularly those linked to government arrears, under providing for Non-Performing Loans, the treatment of restructured loans as current and accrual of interest on NPLs.

## **1.7 ORGANISATION OF THE STUDY**

This study will be organized into five chapters. Chapter one will introduce the study by looking at the background, problem statement, research questions and objectives, scope of the study, significance of study and limitation of work. Chapter two will deal with a critical analysis of prior associated literature while chapter three will deal with the methodology of the research under study. Chapter four will deal with the presentation of data, analysis and discussion of findings whilst chapter five will deal with the summary, conclusion and policy recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 INTRODUCTION**

This study reviews related literature on liquidity and the determinants of banks' liquidity.

The concept of liquidity, theoretical aspects related to banks liquidity concept, its measurement and determinants of liquidity and its impact are discussed in this chapter.

#### **THEORETICAL REVIEW**

##### **2.1 CONCEPT OF BANK LIQUIDITY**

Adebayo et al (2011) argue liquidity is a financial term that means the amount of capital that is accessible for investment. They are of the view that, most of this capital is credit not cash.

Bank liquidity is referred to as the capacity of the bank to maintain adequate funds to meet its maturing obligations. It is the ability of the bank to immediately meet cash, cheques, other withdrawals commitments and new loan demand while abiding by existing reserve requirements (Ibe 2013).

Liquidity in Commercial Bank means the ability of the bank to finance all its contractual obligations and these obligations can include lending, investment and withdrawal of deposits and maturity of liabilities which occur in the normal course of the bank activities (Amengor, 2010).

Liquidity therefore is the capability to finance the increase in assets and meet liabilities when they fall due without any unanticipated losses (Alshatti, (2015). Adebayo et al (2011) contend that, liquidity includes three features namely Marketability, Stability and Conservatism.

The definitions above give the dimensions of liquidity as the time required to convert an asset into money, the certainty associated with the conversion and the price realized for the assets and the ability to meet obligations as and when they fall due without incurring losses. That is, a bank's liquidity lies in its liquid assets, its ability to obtain funds through deposits and capital injection.

### **2.1.1 OBJECTIVES OF LIQUIDITY IN BANKS**

Amengor (2010) is of the view that, banks require liquidity for the following reasons;

- The need to be able to cover withdrawal of funds by customers.
- To meet inter-bank indebtedness, which may arise on day-to-day basis following the payment clearing process.
- To be able to meet unforeseen borrowing requests from customers.
- To be able to cope with interruptions to their normal cash flow.

Bankakademie (2000) stated that the objectives of liquidity management are to:

- Honor all cash outflow commitments on a daily and ongoing basis,
- Minimize the cost of foregone earnings on idle liquidity,
- Satisfy minimum reserve requirements and other regulatory liquidity standards,
- Avoid additional cost of emergency borrowing and forced liquidation of assets.

Apart from these commercial factors, commercial banks in Ghana are required by law under section 31 of the banking Act to keep 10% of the bank's deposits as primary reserves which is used mainly to settle inter-bank obligations and also provides coverage for depositors.

As discussed above, the authors see the objective of liquidity management as a tool for mitigating liquidity risk by making sure banks have enough liquid assets to meet maturing obligations but goes further to state that, one of the objectives of liquidity management is being able to withstand the interruptions of normal cash flows and be able to take advantage of investment opportunities.

### **2.1.2 LIQUIDITY COMPONENTS OF BANKS**

Adebayo et al (2011) in their research point out the following as components of liquidity of banks;

- Vault Cash
- Treasury Bills
- Treasury Certificates
- Bills Discounted Payable In Nigeria
- Balances Held With CBN
- Negotiable Certificates of Deposits
- Inter-bank Placement

Madura (2007) identified borrowed funds, deposit accounts and long term funds as the three main sources of liquidity. The amounts and sources of funds obviously affect how much liquidity banks can generate. The amount of funds a bank hold and the liquidity a bank create is dependent

on how easy the bank can access funds. Deposit accounts comprise transaction deposits known as demand deposits, savings deposits, time deposits and money market deposit accounts. The longer term sources of funds for banks are bonds that banks issue and bank capital.

## **2.2. LIQUIDITY RISK**

Liquidity risk can be defined as the risk of being unable to liquidate a position timely at a reasonable price (Ohsawa & Muranaga 2002).

Bessis (2010) however defines liquidity risk from three distinct situations. The first viewpoint is where the bank has complications in raising funds at a reasonable cost due to situations involving transaction volumes, level of interest rates and their fluctuations and the problems in funding counterparty. The second viewpoint considers liquidity as a safety buffer which helps to gain time under challenging situations. In this case, liquidity risk is considered as a state where short-term asset values are not adequate to match short term liabilities and unanticipated outflows. The last viewpoint from where liquidity risk is seen as the extreme situation. Such a condition can arise from instances of large losses which generates liquidity concerns and suspicions about the future of the bank. Such suspicions can end in massive withdrawal of funds and closing of credit lines by institutions which try to safeguard themselves against a likely default. Both can cause brutal liquidity crisis which probably can end in bankruptcy.

The above definitions imply that, a bank faces liquidity risk if its short term assets cannot cover short term liabilities. The authors went further to expand that, liquidity risk occurs when a bank cannot convert its assets readily to meet depositors demand causing doubt about the solvency of the bank.

### **2.2.1 TYPES OF LIQUIDITY RISK**

Mounira (2008) stated that, liquidity risk can be divided into two types: Liquidity of assets: Inability to sell assets at current market prices, and the Liquidity Instability of Liability (LIL), which refers to the inability to assess sufficient funds to meet payment obligations in a timely manner.

According to Decker (2000) there are two forms of liquidity risk namely, funding liquidity risk and market liquidity risk. He explained funding liquidity risk as the risk that a bank will be unable to meet its obligations as they come due because of the inability to liquidate assets or inadequate funding sources. Market liquidity risk on the other hand is the risk that a bank cannot easily unwind or offset specific exposures without significantly lowering market prices because of inadequate market depth or market disruptions. In addition, liquidity risk can be defined in terms of the counterparty to a transaction. In this vein the word means the risk inherent in the fact that the counterparty may not be able to settle the transaction even if they are in good financial standing, because of lack of liquidity (Petria & Petria, 2009).

The authors point to the fact that, the types of liquidity risk are the banks selling their assets at a discount to meet liabilities and the bank having inadequate funds to meet its obligations.

### **2.3 THEORIES ON LIQUIDITY MANAGEMENT**

There are a number of liquidity management theories, as follows:

### 1) Anticipated Income Theory

This theory states that the bank can manage its liquidity through the appropriate directing of the granted loans, and the ability to collect these loans when due in a timely manner and to reduce the possibility of delays in repayment at the maturity time. This theory posits that bank's management can plan its liquidity based on the expected income of the borrower and this enables banks to give out loans as the settlement of these loans are linked by the borrowers expected income to be paid in a periodic and regular premiums and that will enable the bank to offer high liquidity when the cash inflows are regular and can be anticipated.

### 2) Shiftability Theory

The theory of shiftability is to ensure banks are liquid by assisting the shifting of assets. When a bank is out of immediate cash, it is able to sell its assets to a more liquid bank. The approach allows the system of banks run more efficiently with smaller amount of reserves or investing in long-term assets. Under the theory of shiftability, the banking system attempts to prevent liquidity crisis by allowing banks to always sell at good prices. That is, banks hold assets that are marketable and their convertibility will not be at a discount.

### 3) Liability Management Theory

This theory stresses that maintaining liquid assets by banks is of no essence, liquid investments and so on but banks have to focus on liabilities side of the balance sheet. According to this theory, banks can satisfy liquidity needs by borrowing in the money and capital markets. The fundamental contribution of this theory was to consider both sides of a bank's balance sheet as sources of liquidity.



The theory posits that, since banks can borrow and obtain funds from depositors and other creditors, they need not hold liquid assets. That is, the liquidity needs are catered for by the borrowed funds. The setback with this theory is that, in times of financial distress, the banks might not obtain the desired liquidity.

#### 4) Commercial Loan Theory

The theory suggests repayments from assets of a bank that are self-liquidating will be adequate to offer liquidity. These assets are normally short term assets.

## **2.4 REGULATIONS FOR LIQUIDITY OF BANKS**

Allan (2003) argues that regulation of banks shapes market behavior thus providing a protection to poorly informed clients and avoiding moral hazard.

Central Bank of Ghana's Regulation on liquidity management is issued under section 31 of the Banking Amendment Act (2007) Act 738. Under the Banking Act, the Central Bank of Ghana may determine, vary or alter such minimum levels of liquid assets to be held by all institutions.

According to section 31 of the Act 738, it states that,

(1) The Bank of Ghana may prescribe

(a) That a bank shall hold liquid assets

(b) The amount provided for under paragraph (a) either as a certain percentage of all the bank's deposit liabilities or in any other manner, and

(c) Different percentages for different classes of deposits or assets, as the Bank of Ghana may determine in any particular case.

(3) A bank shall at a time and in respect of a period that the Bank of Ghana may require, submit to the Bank of Ghana a report on the liquid assets of the bank.

(5) A bank which fails to comply with the requirement under subsection (3) shall pay to the Bank of Ghana a fine not exceeding 250 penalty units.

In pursuance of secured banking and maintenance of confidence in the financial service industry in Ghana, the Bank of Ghana does not compromise on liquidity requirements of banks. Banks are expected to send weekly liquidity reserve return to the bank of Ghana. The purpose of the return is to ensure the maintenance of prescribed liquidity to serve as a buffer for deposit liabilities as well as indicating the excess liquidity available for investments in assets and meeting other obligations.

## **2.5 LIQUIDITY MEASUREMENT**

Ibe (2013) posits that, primarily a firm's liquidity rests not so much on its balance sheet as on whether or not it is doing well and earning money. A strong balance sheet with a large current ratio simply suspends liquidity difficulties for a short while the firm is losing money. He is of the view that, an accurate measurement of liquidity therefore is the stock approach. One of these is the loan to deposit ratio which is the most widespread and commonly used measure in commercial banking. Arise in the ratio shows a less liquid position and vice versa. Another measure of bank liquidity is the loan to liabilities ratio. The approach identifies that liabilities other than deposits ratio characterize possible drain on bank funds. A third measure of liquidity

is the liquid asset ratio which allows assets to be carefully chosen on the basis of their liquidity, whether they are loans or investments. Liquidity ratios are calculated as a percentage of bank's current liabilities such as deposit liabilities, short term interbank loans, net balances with foreign branches and free balances with central bank. A fourth measure of liquidity is the cash ratio which is the ratio of cash to total deposit or total assets. Under this ratio, liquid assets are related directly to deposits rather than to loans and advances that constitute the most liquid or hard of banks assets. The cash ratio has a shortcoming in that considerable part of the liquidity assets is not readily available to meet liquidity needs.

Adebayo et al (2011) suggest because current liabilities are paid out of current assets within one year, liquidity measures are calculated using current assets and current liabilities. Therefore the main measures of liquidity are; capital ratio, cash ratio, current ratio, quick ratio, investment ratio.

Liquidity risk can be measured by two main methods: liquidity gap and liquidity ratios. The liquidity gap is the difference between assets and liabilities at both present and future dates. At any date, a positive gap between assets and liabilities is equivalent to a deficit (Bessis 2009).

According to Basel (2010), there are two standards for measuring liquidity. The standards include two quantitative metrics: the Liquidity Coverage Ratio and the Net Stable Funding Ratio, which were developed to meet two separate, but complementary objectives. The objective of the Liquidity Coverage Ratio is to encourage short-term resilience by ensuring that a bank has adequate high-quality liquid assets to endure an acute stress scenario that persists for one month. The Net Stable Funding Ratio was to promote longer-term resilience by encouraging banks to fund their activities with more stable sources of funding. The Liquidity Coverage Ratio is

calculated as stock of high-quality liquid assets/total net cash outflows over the next 30 calendar days. The Net Stable Funding Ratio is calculated as the available amount of stable funding/required amount of stable funding.

Malik and Rafique (2013) and Almunani (2013) calculated liquidity ratio using cash and cash equivalents to total assets. This ratio relates most liquid assets to total assets.

There are various ways banks measure the liquidity risk as the various authors have described. Different ratios and liquidity gap analysis are often used to measure liquidity.

## **2.6. LIQUIDITY MANAGEMENT**

Liquidity management is about the planning and control required to ensure that banks keep sufficient liquid assets as a commitment to the customers of the bank so as to meet some commitments incidental to survival of the bank.

Liquidity management includes forecasting, and managing cash flow and the cash position, and ideally should include setting and managing toward a preferred cash position, or liquidity target (Zietlow et al 2007).

According to Dodds (1982), is of the view that, liquidity management consists of the activities involved in obtaining funds from depositors and other creditors and determining the appropriate mix of funds for a particular bank.

Eljelly (2004) states liquidity management is associated planning and controlling current assets and current liabilities in an efficient manner so as to eliminate the risk of non-payment of dues for short term requirements and it also avoids excessive investment in these assets.

The authors analyzed the of liquidity management as financial institutions implementation strategies of insuring themselves against shortage of cash required to meet current and forthcoming obligations in a variety of ways. These authors go further to suggest that, liquidity management is concerned with ensuring the availability of funds in banks to meet obligations as they fall due and also an ongoing process.

## **2.7. LIQUIDITY MANAGEMENT TECHNIQUES IN BANKING**

The management of liquidity policies of a bank has to include a decisional structure for the risk management, a pattern (a strategy) for approaching operations and funding, a set of exposure limits to liquidity risk and a set of procedures for planning liquidities after alternative scenarios including crisis situations (Loan and Dragos 2009).

Adebayo et al (2011) are of the view that, for a commercial bank to plan or manage its liquidity position, it first manages its money position by conforming to the legal requirement. Actually, management of money position is important if a bank must avoid excesses or insufficiencies of required primary reserves. Where there is a drop in market price of securities or where additional funds required to correct the bank reserve position are for a very short time, it will be certainly expensive to sell securities than to borrow from another bank. Moreover, it may be more required to borrow for bank's liquidity needs than to call back unsettled loans, cancel or place embargo on new loans. This situation that will decrease the existing and potential customers of a bank.

Almumani (2013) suggests that, a bank should create a strong liquidity risk management framework that ensures and sustains adequate liquidity including a buffer of unencumbered, high

quality liquid assets to survive a range of stress events as well as those involving the loss or impairment of both unsecured and secured funding sources. Supervisors should evaluate the suitability of both a bank's liquidity risk management framework and its liquidity position and should take swift action if a bank is lacking in either area in order to safeguard depositors and to limit possible damage to the financial system. Top management should come up with strategies, policies and practices to manage liquidity risk in accordance with the risk tolerance and to ensure that the bank maintains adequate liquidity. Top management should constantly review information on the bank's liquidity developments and report to the board of directors on a regular basis. Board of directors of a bank should appraise and approve the strategies, policies and practices related to the management of liquidity at least yearly and ensure that top management manages liquidity risk effectively.

Cornett and Saunders (2006) identify two liquidity management approaches. Purchased liquidity where management is trying to adjust to the net outflows of deposits by purchasing liquidity. Purchasing liquidity can be done in two ways, either a bank borrows money on interbank market or it can issue or sell securities. However, this way of borrowing can be costly. A bank gets rid of paying low interest cost on drained deposits while it has to cover it by funds having higher market rates on the wholesale money market.

Stored liquidity management is the second management and deals with the net deposits drains with the use of cash. This means that instead of obtaining the needed funds after net deposit drain occurs, a bank is equipped for this situation by holding the cash. This management approach permits a bank to bear net deposit drains without relatively expensive borrowing but they are still facing the loss by not earning the interest from potential long term investments.

Mourina (2008) in his study on Islamic banks concluded that, the Islamic bank should try not to depend on a few large depositors they should rather try to mobilize their deposits from a large a cross section of depositors as possible. Diversify their sources of deposits. There are two major types of fund providers: (a) current account holders; and (b) Profit and Loss Sharing deposit holders. These account holders require a degree of liquidity to be maintained by the Islamic bank to meet their requirements for withdrawals.

Diamond and Rajan (2005) suggest that, by issuing demand deposits in enough quantity, the banker can efficiently tie his collection skills to the loans made and borrow what is required from unskilled depositors. That is, the banker does not pass on illiquidity but decreases it through the combination of his collection skills and demand deposits. Moreover, so long as there is no collective shortage of resources, the bank's capacity to issue new demand deposits permits it to meet an uncertain depositor demand for resources. That is, banks play a principal role in funding potentially long-term projects while permitting depositors to withdraw when in need. They also state that, in periods of liquidity shortages, banks adopt three strategies; firstly, real interest rates they are ready to pay for new deposits of resources are increased by the banks. Secondly, they attempt to sell late project loans. The third choice is to call loans as compels the borrowers to terminate late projects and restructure them to harvest resources immediately.

Liquidity management techniques as discussed above therefore is the planning and control required to ensure that the organization maintains sufficient liquid assets either as a responsibility to the customers of the organization so as to meet some commitments related to existence of the business or as a measure to stick to the monetary policies of the central bank.

## **2.8. IMPORTANCE OF LIQUIDITY MANAGEMENT**

Alshatti (2014) asserts that, the liquidity management is a critical factor in business processes. For the very existence of business, the firm should have required degree of liquidity. It should be neither excessive nor insufficient. Excessive liquidity means accumulation of idle funds which may lead to lower profitability, increase speculation and unjustified extension whereas insufficient liquidity results in disruptions of business processes. A proper balance between these two extreme conditions therefore should be maintained for efficient operation of business through skillful liquidity management.

Adebayo et al (2011) discussed the importance of liquidity management as follows;

Adequate liquidity enables a commercial bank to meet customers' withdrawal and request for loans. This decreases the likelihood of providing financing under very unfavorable loan agreement constraints and at relatively high interest costs.

Liquidity management enables a commercial bank to maintain stability in operations and earnings by serving as a guide to investment portfolio packaging and management.

Effective liquidity management functions as a proper tool through which commercial banks keep the statutory requirements of the central bank as it affects the proportion of deposits to liquid assets and deposits to loans and advances. Liquidity management decreases the occurrence of bankruptcy and liquidation which can be the later effect of illiquidity or insolvency and help them to achieve some margin of safety for their customers' deposits. Stated differently, sufficient liquidity helps to create and sustain public confidence of the depositors and the financial



markets. If the financial market identifies a bank to have liquidity problems, the bank may find it difficult to raise additional funds except at a premium.

Liquidity management helps commercial banks in the tradeoff between risk and return and liquidity and profitability. Liquidity management also serves as a tool through which commercial banks avoid over liquidity and under-liquidity and their consequences.

As financial institution, banks should manage the demand and supply of liquidity in an appropriate manner in order to safely run their business, maintain good relations with the stakeholders and avoid liquidity problem (Ismal 2010).

Improving liquidity management is reasonably important for companies to withstand the impacts of economic turbulence (Reason, 2008). In times of economic crisis, the lack of liquidity in the market can lead to fire sales of assets. This means the company looking to sell the assets will have to offer them at a large discount because it needs the cash now due to liquidity pressure. Therefore, in crisis periods banks holding more liquidity will be able to both grow in new business and take over business of other banks by buying their assets at low prices. By purchasing assets at fire sale prices banks that are the purchaser stand to make a great deal of profit (Acharya, et al 2009).

Trevisan (2011) noted that, in the face of financial stress, an accumulated stock of high-quality liquid assets will help banks to absorb liquidity shocks, enabling them to continue to meet their obligations and perform their intermediation role. This will help to reduce the impact of any liquidity shocks on the broader financial system and the real economy.

Liquidity is one of the essential requirements for the effective functioning of the banking system. Without adequate liquidity, banks are not able to perform some of their core functions, including the settlement of their inter-bank obligations wholesale transactions occurring between banks and also help to maintain relationship with stakeholders. In addition, it enables commercial banks in the tradeoff between risk and return and liquidity and profitability. It also serves as a medium through which banks prevent excessive liquidity and under-liquidity and associated repercussions.

## **2.9. SOURCES OF LIQUIDITY PROBLEMS**

This transformation of liquid liabilities (deposits) into risky liquid (illiquid) assets in the form of loans capitalizing on their maturity mismatch expose the banks to liquidity risk (Jekinson, 2008). Mourina (2008) in his study of Islamic banks posits the liquidity risk of Islamic banks, which mainly takes the form of mismatch between assets and liabilities, is, however, partly originated from the shortage of long-term funds.

Diamond and Rajan (2005) asserts, liquidity problems arise if too many projects which the banks have invested in are delayed in the economy so that there are too few resources produced at the interim date relative to depositor demand. They also view that, anticipation of a future liquidity shortage or bank insolvency for any other reason causes depositors to redeem their claims immediately. This is because, depositors are coordinated so a panic in a section of depositors can cause a run on the bank.

Rochet (2005) highlights that, there are three main sources of liquidity risk, on the liability side, there is a large uncertainty on the volume of withdrawals of deposits or the renewal of rolled-

over inter-bank loans, especially when the bank is under suspicion of insolvency or when there is a temporary aggregate liquidity shortage. Also on the asset side, there is an uncertainty on the volume of new requests for loans that a bank will receive in the future and finally, off-balance sheet operations, like credit lines and other commitments, positions taken by banks on derivative markets.

The various authors are of the view that, banks are not endowed financially but depend on the deposits of clients and these demandable claims are used to finance illiquid assets causing liquidity problems.

## **2.10. PROBLEMS ASSOCIATED WITH ILLIQUIDITY IN BANKS**

Kamau et al (2013), argue that, a poor liquidity status could lead to inability of banks to meet their financial obligations. In the event of such situations, bank customers lose confidence and may engage in a run on the bank. This eventually results to bank failures since poor liquidity situation would further result in inability to take advantage of favorable discount and other opportunities, lower profitability, delay in collection of interest and principal payments for creditors, and damage to customer relationships.

Gauthier and Tomura (2011) note that the market liquidity risk resulting from endogenous fire sales of assets is a significant conduit of contagion that intensifies system-wide instability. In the absence of a suitable liquidity-risk management, banks that face a liquidity shock often involve in fire sales, hoard liquidity and decrease lending to the real economy (Brunnermeier 2009).

Diamond and Rajan (2001) argue that, no depositor will ever accept a lower amount than originally assured. Because of the first-come, first-serve nature of deposits, the depositor is

always better off demanding instant payment if he thinks others will accept. This means that, any effort by the banker to bargain down deposits will be met by a run on the bank.

In Smith (1991) and Allen and Gale (2000), banks are connected through a banker's bank where investments are pooled and through interbank loans. When the realized liquidity demand exceeds the supply, connected banks have to fail.

From the discussions above, it is clear that illiquidity of banks can lead to banks selling assets at a discount, not being able to take advantage of investment opportunities. They are of the view that, illiquidity can cause banks to hoard the liquidity that comes from fire sales and this affects the economy and also bank illiquidity can be contagion because banks are linked directly or indirectly. Liquidity shortage, no matter how small, can cause great damage to a financial institution's operations and customer relationship in particular. Every business relies on its clients to succeed and so it is a strategic business plan to build good client relationships.

## **2.11. CHALLENGES FACED IN THE MANAGEMENT OF LIQUIDITY**

Basel committee on banking supervision (2008) stated that, liquidity risk involves meeting uncertain cash flow obligations, which depend on external events and on other agents' behavior. The fundamental role of banks in facilitating the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk, the risk that demands for repayment outstrip the capacity to raise new liabilities or dissolve assets. Effective liquidity risk management estimates future cash flow requirements under both normal and stressed conditions. This presents a challenge even under relatively benevolent market conditions, as it requires the ability to draw information from various operations of the bank and assess the

impact of external events on the availability of funding liquidity. This challenge increases, however, during stressed conditions, as the assumptions underlying liquidity risk may change notably through changes in counterparty behavior and market conditions that affect the liquidity of financial instruments and the availability of funding. These factors give rise to a different and significant set of challenges for firms in assessing their liquidity risk and for supervisors in the evaluation of risk management and controls.

Unrestrained financing of the deficit by the central banks either through ways and means advances or the absorption of unsubscribed government debt issues increase bank liquidity thereby restraining the effectiveness of instruments for liquidity management (Amarachukwu Ona,2003)

Suan (2005) outlined four challenges of liquidity management:

- Difficulty in organizing an optimal or feasible cash management structure after taking into account the operational and regulatory constraints.
- Inability to forecast short-term and long-term cash requirements.
- Struggle on centralizing and outsourcing cash management decisions.
- Excess cash-in-transit or cash float locked in operational processes.

Looking at the studies above, they were all pertaining to the problem of how to choose or ascertain the optimal point or the level at which a commercial bank can keep its assets in order to meet the financial demands of its depositors by maintaining adequate liquidity. This leads to inability to obtain financing from banks due to poor cash flow positions or too high a leverage. Conversely, a bank that is overly aggressive in minimizing liquidity in order to enhance profits

may find that its correspondent banks and depositors will decide to test its liquidity by canceling credit lines and withdrawing deposits precisely when liquidity is already tight.

## **EMPIRICAL EVIDENCE**

### **2.12. DETERMINANTS BANK'S LIQUIDITY**

According to Günsel (2008), micro-economic approach uses financial ratios that are in the context of CAMELS (C-Capital Adequacy, A-Asset Quality, M-Management Efficiency, E-Earnings, L-Liquidity and S-Asset Size) theory. The micro-economic variables are bank-specific variables which are; capital, assets, deposits, and loans. Micro-level approach focuses on individual institution's balance sheet and those variables are the main causes of bank failure.

Valla & Saes-Escorbiac (2006) assume that, the liquidity ratio as a measure of the liquidity should be dependent on following factors: Probability of obtaining the support from lender of last resort, which should lower the incentive for holding liquid assets, interest margin as a measure of opportunity costs of holding liquid assets, bank profitability, which is according to finance theory negatively correlated with liquidity, loan growth, where higher loan growth signals increase in illiquid assets, size of the bank measured by the number of customers, gross domestic product growth as an indicator of business cycle, and short term interest rate, which should capture the monetary policy effect. This is confirmed by Lucchetta (2007) analyze the determinants of European banks' liquidity. Banks' liquidity is negatively affected by an increase of monetary policy rate, share of loans on total assets and share of loan loss provisions on net interest revenues.

Bunda & Desquilbet (2008) confirm this by suggesting that, The liquidity ratio as a measure of bank's liquidity assumed to be dependent on total assets as a measure of the size of the bank, the ratio of equity to assets as a measure of capital adequacy, the presence of prudential regulation, which means the obligation for banks to be liquid enough, the lending interest rate as a measure of lending profitability, the share of public expenditures on gross domestic product as a measure of supply of relatively liquid assets, the rate of inflation, which increases the vulnerability of banks to nominal values of loans provided to customers and a financial crisis, which could be caused by poor bank liquidity. The panel data regression analysis revealed that, there is a negative relationship between bank size and liquidity whiles capital adequacy, prudential regulation and macroeconomic variables have positive effects on liquidity.

Moore (2010) also observes that, liquidity should depend on cash requirements of customers, captured by fluctuations in the cash-to-deposit ratio, current macroeconomic situation, where a cyclical downturn should lower banks' expected transactions demand for money and therefore lead to decreased liquidity and money market interest rate as a measure of opportunity costs of holding liquidity. This means that, he identified the above factors as inversely related to liquidity.

Vodova (2011) analyzed the banks liquidity positions of commercial banks in the Czech Republic and identified the determinants of bank liquidity. The conclusion was the positive correlation between unemployment rate and liquidity. On the other hand, the author noted the negative impact of inflation, financial crisis and the size on banks liquidity. He also found that unemployment, interest margin, bank profitability and monetary policy interest rate have no statistically significant effect on the liquidity. Liquidity created by Germany's state-owned

savings banks and its determinants has been analyzed by Rauch et al (2009), it revealed that unemployment which is connected with demand for loans is negatively linked to liquidity.

According to Fielding and Shortland (2005), level of economic output, discount rate, reserve requirements, cash-to-deposit ratio, rate of depreciation of the black market exchange rate, impact of economic reform and violent political incidence are positively related to liquidity in commercial banks.

Vodova (2012), using a panel data regression analysis, attempts to identify the liquidity determinants of commercial banks in Poland. The results determine that liquidity tends to decrease with bank size, more exactly large banks tend to hold less liquid assets, relying on a liquidity assistance of the lender of last resort in case of distress, while small and medium sized banks hold more liquid assets. On the other hand, the research demonstrates that the inflation, increases in capital adequacy, share of non-performing loans have a positive impact on bank liquidity.

Almumani (2013) studied Saudi banks and found liquidity to be negatively correlated with loan to deposits, size, debt to equity ratio and ROE as well as positively correlated with capital adequacy, investment to assets ratio and ROA. In Jordanian banks liquidity was found to be positively correlated with ROA, debt to equity ratio, size and capital adequacy meanwhile loan to deposits, investment to asset ratio and ROE have negative correlation relationship with liquidity.

Malik and Rafique (2013) researched into the determinants of commercial banks in Pakistan and the results indicate that the bank specific fundamentals (non-performing loans to total loans and total assets of the bank) and monetary policy interest rate positively determine the bank liquidity



whereas inflation and ROE has a negative impact. Additionally bank liquidity is also negatively affected by the financial crisis.

Ferrouhi and Abderrassoul (2013) concluded that, liquidity of Moroccan banking industry is positively correlated with bank's size, share of own bank's capital, external funding, foreign assets, foreign direct investment and negatively correlated with return on assets, inflation rate, growth rate of gross domestic product, public deficit and financial crisis. However, bank's returns on equity, equity to total assets and unemployment rate have no impact on Moroccan bank's liquidity. Chagwiza (2014) confirmed that, the liquidity of Zimbabwean commercial banks has a positive link with capital adequacy, total assets, gross domestic product, bank size and bank rate. Also, the adoption of multi-currency, inflation rate and business cycle have a negative impact on liquidity.

The macro-economic variable broadly focuses on the state of the economy. The liquidity position of a bank is very sensitive to macro-economic variable fluctuations. This has been echoed by Eichengreen and Arteta (2000) that the increasing inflation, decline in asset prices, high interest rates, credit expansion, real gross domestic product growth determine the bank's liquidity position. High inflation rate and sudden changes of inflation have a negative impact on interest rates and bank's capital. In this respect, the bank's non-performing loans will expand and collateral security values deteriorate.

Holod & Peek (2006) suggest that, a factor of bank liquidity creation is whether or not the bank is publicly traded. Being publicly traded means that a bank must file with the Securities and Exchange Commission (SEC). The filing requirements are rigorous and include both yearly and interim financial information and require financial reporting to be finalized under precise

guidelines. This means that banks which are publicly traded become transparent than banks that are private. This transparency leads to less information asymmetry between a bank's management and possible lenders to the bank. Lenders are more willing to lend to a bank that has less information asymmetry and is publicly traded than one that has more information asymmetry and is not publicly traded. This means that banks that are publicly traded and thus more transparent have better access to external financing and hence more liquid.

Studies cited above suggest that commercial banks' liquidity is determined both by bank specific factors such as size of the bank, profitability, capital adequacy and factors describing risk position of the bank as well as macroeconomic factors such as interest rates differentials, inflation and gross domestic product. It can be useful to take into account some other influences, such as the realization of financial crisis, changes in regulation or political incidents. They further view that, liquidity of the banks is dependent on the reserve requirements by the central banks, expenses and loan composition of the banks. This means that, the determinants of banks' liquidity can be both bank specific and external factors.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 INTRODUCTION**

This section of the research explains the tools applied in the study to answer the research questions stated in chapter one above. That is, the methodology of the study is presented in this section of the thesis. The sources of data employed in the study, the selected samples with respects to the banks under study and the reason why they were selected are presented in this section. Also the section focuses on the evaluation of the liquidity determinants. These will help the researcher to be able to analyze and discuss the answers to the research questions and in arriving at the conclusions.

#### **3.1 Research design**

This study seeks to evaluate the determinants of liquidity of listed banks on the Stock Exchange in Ghana. The longitudinal time dimension, specifically the panel study type is adopted for the study. The data used in the estimation and analysis with regards to the factors to be examined is Panel data this is because according to Vong et al (2009) the usage of panel data provides more informative data because it contains both information which is cross sectional, which captures individual variability and time series information which captures dynamic adjustment. In this research, specific listed banks on the Stock Exchange of Ghana were studied in terms of their liquidity across the time period of 2004-2013.

## **3.2 Sources of Data**

There are many sources for a researcher to tap into with regards to the gathering of data when undertaking a case study research. According to Yin (1994) some of the indication of sources of data with which one could access in relation to case study research comprises documentation, archival records, interviews, direct observation, and participant observation. It is appropriate to make use of documentations, archival records and historical records in the collecting of the data required for the analysis and discussion due to the nature of this study.

### **3.2.1 Secondary data**

The secondary data includes data received from bank of Ghana; data on the annual reports retrieved from the web site of the banks. The annual reports covered the periods of 2004 to 2013. The data contained in the report were used to answer questions regarding the determinants of banks' liquidity.

The macroeconomic data were gathered from Ghana statistical services and Bank of Ghana, data on the annual reports of the banks under study were retrieved from the web sites. With respects to the data on the several bank specific liquidity determinants that have been considered in the study, the study used ratios estimated from annual reports of the banks under study over the period 2004–2013 on total annual assets, loans, profits after tax, shareholders fund and cash to estimate the ratios and percentages. For the external determinants, inflation, unemployment and GDP are obtained from the Ghana Statistical Service, World Bank and Bank of Ghana over the period 2004–20013.

### **3.2.2 Panel Data**

The longitudinal time dimension, specifically the panel study type is adopted by this study. Panel study is a powerful form of longitudinal research in which the researcher observes exactly the same people, group, or organization across multiple time points (Neuman, 2007). This means that, the panel study type helps to identify characteristics of exact organizations over a time period. Also, this study type helps to capture dynamic adjustments.

### **3.2.3 Other Literature Sources**

The author used textbooks, journals and the company's bulletins to collect data about the company.

### **3.3 Methods of data collection**

The necessary data for the study were attained from the annual reports of the banks under study, websites and related web pages of Ghana stock exchange, Ghana statistical service, World Bank, and Central bank of Ghana. Mainly, the required information were gathered from the financial statements of the selected banks over the period of 2004-2013. These data were used to calculate key financial ratios of the selected banks for the mentioned period as well as to assess firm's level aspects with liquidity risk in banks listed on the Ghana stock exchange. In addition, data was gathered from Books, papers, journal articles, the World Wide Web (Internet), and relevant earlier studies.

As the study requires historical financial data, which are from corporate reports, retrieving publicly available data is presumed as the suitable method for the correctness of the data.

Financial reports and other significant information of the listed banks for the period 2004-2013 were accessed from the internet by search engines.

### **3.4 Population and sample of the study**

The population of this study was made up of all banks listed on the Ghana Stock Exchange. These included Ecobank Ghana Limited, CAL Bank Limited, Ghana Commercial Bank Ltd. Ecobank Transnational Incorporated, SG-SSB Ltd., HFC Bank Ltd, Trust Bank Ltd., Standard Chartered Bank Ltd., and UT Bank Limited. In this study, purposive sampling was used to select seven out of the nine banks listed on the Ghana Stock Exchange. The two banks omitted were Ecobank Transnational Incorporated and Trust Bank Ltd. These banks were excluded from the study because their financial statements were reported in currencies other than Ghana Cedis. With regards to the explanation above, the selection of the banks in this research was mainly as a result of the availability of data, nature of business and to ensure uniformity and easy comparison.

### **3.5 Method of Data Analysis**

Financial analytical tools and techniques involving some statement of financial position and income statement items financial ratios such as liquidity and profitability ratios were calculated using Excel, a Microsoft Application to assist in the analysis and evaluation of the data collected. The data were analyzed in line with the main objectives of the study to determine the relationships of the study. Panel data regression analysis was used to determine the relationship between the factors and the liquidity level of banks listed on the Ghana stock exchange. The use of Stata 12 statistical package was also brought on board to aid the researcher in analysis of the

data. The results were then interpreted and recommendations suggested appropriately. The study was concluded by the whole research work through to the recommendations offered.

### **3.6. Specification of model**

The researcher used a panel data regression to test for the impact of bank specific and macroeconomic factors on liquidity of the banks under study. The justification of the use of panel data regression is the fact that panel data analysis is a more accurate inference of model parameters and a simplifying computation and statistical inference. It has a greater capacity for capturing the complexity of human behavior than a single cross section or time series data including constructing and testing more complex behavioral hypotheses, controlling the impact of omitted variables, uncovering dynamic relationships, generating more accurate predictions for individual outcomes by pooling the data rather than generating predictions of individual outcomes using the data on the individual in question and providing micro foundations for aggregate data analysis (HSIAO, 2007).

The panel data model is normally estimated with either the fixed effect model or the random effect model also known as the error components model. The fixed effect model is a statistical model that represents the observed quantities in terms of explanatory variables that are treated as if the quantities were non-random. The fixed effects model allows the partial regression coefficients to be common across cross-sectional units but the intercepts in the regression model are taken to be distinct among individual banks. This model hinges on the assumption that the individual specific effect is correlated with the independent variables.

On the other hand, the random effects model assumes that a common mean value for the intercepts exists and the cross-sectional differences in the intercept values of each bank are reflected in an error term. The random effects assumption (made in a random effects model) is that the individual specific effects are uncorrelated with the independent variables.

Consequently, the choice of either the fixed effects model or the random effects model is based on the Hausman tests (Baltagi, 2001). The Hausman test determines whether the estimates of the coefficients, taken as a group, are significantly different from the two regressions (fixed effects and random effects). In simple terms, the null hypothesis in the Hausman tests is that the preferred model is random effects as opposed to the alternative which says the preferred model is the fixed effect.

In this study, the Hausman test for the determinants of liquidity level equation where the liquid assets to total assets represented liquidity level as the dependent variable produced a test statistic of  $\text{Prob} > \chi^2 = 0.7361$  which is more than 0.05 leading to the failure to reject the null hypothesis and thus preferring the random effect to the alternative, the fixed effect. The result of the Hausman test is shown in appendix II.

Thus, for the defined liquidity ratio, the researcher estimates the following equation:

$$\text{LQR}_{it} = \beta_0 + \beta_1 \text{SZE}_{it} + \beta_2 \text{LTA}_{it} + \beta_3 \text{ROE}_{it} + \beta_4 \text{ROA}_{it} + \beta_5 \text{CAR}_{it} + \beta_6 \text{INF}_{it} + \beta_7 \text{GDP}_{it} + \beta_8 \text{UNE}_{it} + \varepsilon_{it}$$

Where  $\text{LQR}_{it}$  is liquidity ratio of bank  $i$  at time  $t$ ,  $\text{SZE}$  is bank size,  $\text{LTA}$  is loan to total assets,  $\text{ROE}$  is return on equity,  $\text{ROA}$  is return on assets,  $\text{CAR}$  is capital to total assets,  $\text{INF}$  is inflation,  $\text{GDP}$  is gross domestic product,  $\text{UNE}$  is unemployment,  $\beta_0$  is constant,  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$  and



$\beta_8$  are coefficients of the independent variable to measure a change in the dependent variable and  $\varepsilon$  is the error term.

The study does not include all bank specific and macroeconomic factors determining banks' liquidity. Previous relevant studies and whether they make economic sense to the Ghanaian condition were the basis for the selection of the variables.

The study was limited to the following determinants;

The liquidity ratio (LQR) represents the dependent variable of the study and the independent variables include; bank size (SZE), loan to total assets (LTA), return on equity (ROE), return on assets (ROA), capital adequacy ratio (CAR), inflation (INF), gross domestic product (GDP) and unemployment (UNE).

## JUSTIFICATION OF VARIABLES

### **Liquidity (Liquid assets to total assets)**

This liquidity ratio which measures liquid assets to total assets has been used in literature to measure liquidity. The ratio measures the general liquidity shock absorption of banks. A higher ratio indicates more liquidity.

### **Bank size**

The bank size is measured as the natural log of total assets. Bank size is expected to be negatively related to liquidity. This is because, when the size of the bank increases, mobilizing deposits from customers becomes easier to meet maturing obligations. The size of the bank helps

to obtain funding from different sources at a lower cost. These make banks lend more as the size increases.

### **Inflation**

Inflation is the persistent increase in prices of goods and services. Inflation is expected to be negatively linked to liquidity. This is because during inflationary periods, there is a rise in cost of production and this leads to the increase in the demand for loans by businesses and individuals.

### **Capital adequacy**

Capital is one of the bank specific factors that influence the level of bank's liquidity. Capital is the amount of own fund available to support the bank's business and act as a buffer in case of adverse situation. Banks capital creates liquidity for the bank due to the fact that deposits are most fragile and prone to bank runs. Moreover, greater bank capital reduces the chance of distress. Capital adequacy ratio is directly proportional to the resilience of the bank to crisis situations. Therefore, capital adequacy is expected to be positively correlated to liquidity.

### **Gross domestic product**

Gross Domestic Product as a measure of growth in total economic activity in an economy. Higher economic growth encourages banks to lend more. GDP is expected to influence numerous factors related to the supply and demand for loans. Therefore when there is no growth in GDP, demand and supply of loans will reduce hence reduce investment in illiquid assets. GDP is expected to have a negative effect on liquidity.

### **Return on assets**

Net profit to total assets shows the ability of management to acquire deposits at a reasonable cost and invest them in profitable investments. Liquid assets yield lower interest therefore to increase the ROA, banks must invest in assets that yield higher interest rates which tend to be illiquid and risky. This is an attempt to increase the performance of the bank. ROA is expected to indicate a negative correlation with liquidity.

### **Return on equity**

Shareholders demand higher returns on their investments so they prefer investment in risky assets. These assets also affect liquidity negatively because it exposes the bank to liquidity risk. ROE is expected to be negatively related to liquidity.

### **Loan to total assets**

Loan to total assets as a measure of loan growth is a ratio that measures the percentage of assets that is tied up in loans. The higher the ratio, the less liquid the bank is. Loan to total assets is expected to be negatively correlated to liquidity.

### **Unemployment**

Unemployment refers to the share of the labour force that is without work but available for and looking for employment. Unemployment is expected to be positively linked to liquidity since banks may not be willing to invest in illiquid assets (loans) when the unemployment rate is high because of high risk of default but keep liquid assets to meet unexpected withdrawals. Borrowers will also be reluctant to secure loans.

Table 1 show the list of variables which the researcher has used in the regression analysis.

| Variable | Definition                           | Source                    | Expected sign |
|----------|--------------------------------------|---------------------------|---------------|
| LQR      | Liquid assets to total assets        | Annual report             | N/A           |
| SZE      | Logarithm of total assets            | Annual report             | -             |
| CAR      | Capital to total assets              | Annual report             | +             |
| LTA      | Loans to total assets                | Annual report             | -             |
| ROE      | Net income to total equity           | Annual report             | -             |
| ROA      | Net income to total assets           | Annual report             | -             |
| INF      | Inflation rate in percentage         | Ghana statistical service | -             |
| GDP      | Gross domestic product in percentage | Ghana statistical service | -             |
| UNE      | Unemployment rate                    | World bank                | +             |

### 3.7 CONCLUSION

A panel data on banks listed on the Ghana stock exchange from various data sources is used to accomplish the objects of estimating the determinants of bank liquidity. The determinants of bank liquidity risk are estimated by a panel data regression; random effects generalized least squares (GLS) approach after the specification by the Hausman Specification Test. The Stata 12.0 Statistical Package is used for all the estimations.

## **CHAPTER FOUR**

### **DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS**

#### **4.0 INTRODUCTION**

This chapter presents the results and discussions of estimations of the model specified in the third chapter. The chapter is organized into sections on the initial analysis of the data used by the research which is basically describing the statistics of the regression variables. The analysis of the results and the discussion of estimates of the determinants of liquidity of banks on the Ghana stock exchange using liquid assets to total assets as the dependent variable. The chapter ends with a conclusion.

**Table 2: DESCRIPTIVE STATISTICS – DETERMINANTS OF LIQUIDITY**

| <u>Variables</u> | <u>Observation</u> | <u>Mean</u> | <u>Standard Dev.</u> | <u>Min</u> | <u>Max</u> |
|------------------|--------------------|-------------|----------------------|------------|------------|
| LQR              | 70                 | 0.4532857   | 0.146007             | 0          | 0.75       |
| ROA              | 70                 | 3.330143    | 1.452099             | 0          | 7          |
| LTD              | 70                 | 0.473       | 0.1469334            | 0          | 0.84       |
| CAR              | 70                 | 0.1278571   | 0.0374511            | 0          | 0.22       |
| INF              | 70                 | 12.51371    | 3.282175             | 8.73       | 19.3       |
| GDP              | 70                 | 6.657143    | 1.245929             | 4.1        | 8.4        |
| UNE              | 70                 | 4.26        | 0.7739228            | 3.6        | 6.6        |
| ROE              | 70                 | 27.18       | 13.07825             | 0          | 61.4       |
| SIZE             | 70                 | 13.27329    | 2.003062             | 0          | 15.86      |

#### **4.1 DISCUSSION OF DESCRIPTIVE STATISTICS – DETERMINANTS OF LIQUIDITY**

Table 2 provides the mean and standard deviation of all the variables for the determination of liquidity over the period under study. It also provides the maximum and minimum scores of the dependent and independent variables. The score of the mean for the liquid assets to total assets which is the measure of liquidity and the dependent variable is 0.4532857 with minimum value of 0.00 and maximum value of 0.75. The standard deviation of 0.146007 accounted for the variation between the minimum and maximum values stated earlier. This suggests that the banks

under study kept a considerable amount of liquidity and that faced little liquidity risk during the period under study. This means that banks were able to meet maturing liabilities without difficulty during the period. The banks' liquidity cover to meet maturing obligations remained fairly steady. The banks listed on the Ghana stock exchange's tendency to hold money market instruments are greater than performing their core business of lending. The money market instruments are held in bonds and treasury bills issued by Ghana government.

In light of the economic challenges facing businesses, the banks under study consider it prudent to continue be risk averse. The banks are being very careful in maintaining funds which are liquid to pay their contractual commitments when they fall due.

The mean score for return on assets (ROA) which is the degree of the capacity of the management of banks to create adequate revenue from the assets of the bank is 3.330143 with minimum value of 0 and maximum value of 7. The 1.452099 accounts for the deviation between the minimum and maximum values stated.

The ratio of loans to assets (LTA) averaged 0.473 and registers minimum and maximum score of 0.00 and 0.84 respectively with standard deviation of 0.1469334. This means the banks under study held about 47.30% of total assets as loans. Whereas some banks were lending insignificant amount to the public, others were growing their loan portfolio.

Equity to assets (CAR) registers an average of 0.1278571 with a minimum value of 0.00 and a maximum value of 0.22. Standard deviation between the maximum and minimum values is 0.0374511. This means that, the banks hold about 12.79% as own funds which serves as buffer in case of adverse situation.

The rate of inflation (INF) measures an average of 12.51371 having a minimum value of 8.73 and maximum value of 19.3 during the period under study. Gross domestic product (GDP) during the period under study measures an average of 6.657143 with the minimum value being 4.1 and the maximum value being 8.4. Unemployment measures an average of 4.26 with a minimum value of 3.6 and maximum value of 6.6.

Return on equity which is the measure of a bank's return to its shareholders measures an average score of 27.18 having minimum value of 0.00 and maximum value of 61.4. This suggests a good performance during the period under study.

The size of banks (SZE) measured by the natural log of banks' total assets averaged a score of 13.27329 with a deviation revealed by the standard deviation as 2.003062 and a minimum score of 0.00 and maximum score of 15.86.

## **4.2 CORRELATION MATRIX**

Appendix I present the matrix for correlation for all the variables integrated into the liquidity model. The negative and positive signs of the coefficients are indication of the direction of the relationship. The magnitude is indicated by the absolute value of the coefficient. The usefulness of the correlation matrix is to reveal whether there is multicollinearity in the data. Multicollinearity is the situation when some or all of the independent variables are greatly related making it hard to state which of them is influencing the dependent variable. The severity of multicollinearity would be displayed in a situation where all p-values of the coefficients of regression are insignificant but whole model having significant F statistic. All the coefficients were within the acceptable level.



### 4.3 REGRESSION RESULTS- DETERMINANTS OF LIQUIDITY

**Table 3: Determinants of Liquidity Risk with LQR as the Dependent Variable**

| <u>LQR</u>          | <u>EXP SIGN</u> | <u>COEFFICIENT</u> | <u>Std. Err.</u> | <u>Z</u>     | <u>P VALUE</u> |
|---------------------|-----------------|--------------------|------------------|--------------|----------------|
| ROA                 | -               | -0.0359267**       | 0.0165866        | -2.17        | 0.030          |
| LTA                 | -               | -0.5992758***      | 0.0707023        | -8.48        | 0.000          |
| CAR                 | +               | 1.254807***        | 0.4196941        | 2.99         | 0.003          |
| INF                 | -               | -0.0023725         | 0.0035596        | -0.67        | 0.505          |
| GDP                 | -               | -0.0237756**       | 0.0093819        | -2.53        | 0.011          |
| UNE                 | +               | -0.0214151         | 0.0143496        | -1.49        | 0.136          |
| ROE                 | -               | 0.0075252***       | 0.0019181        | 3.92         | 0.000          |
| SIZE                | -               | 0.0291763***       | 0.005979         | 4.88         | 0.000          |
| <u>_cons</u>        |                 | <u>0.3833406</u>   | <u>0.1324836</u> | <u>2.89</u>  | <u>0.004</u>   |
| R-Square            | 0.7300          | Adjusted R-Squared | 0.6946           | Wald Chi2(8) | 164.94         |
| No. of Observations | 70              |                    |                  | Prob>Chi2    | 0.0000         |

NB: \* \*\* \*\*\* implies significant at 10%, 5% and 1% respectively

Table 3 presents the results of regression of the determinants of liquidity where liquidity is measured by liquid assets to total assets (LQR). An  $R^2$  of 73.00% indicates how well the

independent variables explain the liquidity (dependent variable) of banks listed on the Ghana stock exchange while a significant Wald  $\chi^2$  (8) of 164.94 shows the validity or the overall fitness of the model.

About the bank specific variables, the relationship between capital adequacy (CAR) and liquidity measured as liquid assets to total assets is significantly positive providing evidence that, as the capital adequacy of banks increases, it generates liquidity for the bank. This is due to the fact that, capital is the amount of own funds accessible to support the business of the bank and act as a cushion in case of adverse circumstances. Capital of banks creates liquidity for the banks due to the fragile nature of deposits and prone to bank runs. This indicates that the bank become resilient to crisis situation. Moreover, the chance of bank distress reduces with adequate bank capital. A well-capitalized bank faces a lower risk of going bankrupt and hence offers safety for depositors in times of adverse macroeconomic conditions. This supports the findings of Bunda & Desquilbet (2008), Vodova (2012), Almumani (2013) and Chagwiza (2014) that, as the amount of bank's own funds increase, it creates liquidity for the bank and avoid distress.

Contrary to expectation, bank size (SZE) is positively related to liquidity and has a significant relationship. This implies that, as the banks increase in size, they hold on to enough liquidity to meet operational expenditure. New branches created as part of expansion need to be taken care of before they start to make profits and this prevents the banks from lending massively to the public. This result is supported by other studies from Almumani (2013), Ferrouhi and Abderrassoul (2013) and Chagwiza (2014). This conclusion nonetheless deviates from other studies by Vodova (2012) and Bunda & Desquilbet (2008) that, as size of the banks increases, mobilizing deposits from customers becomes easier to meet maturing obligations. The size of the

bank helps to obtain funding from different sources at a lower cost. These make banks lend more as the size increases thereby holding less liquid assets.

As expected, return on assets (ROA) which is the measure of the capability of management to obtain deposits at a reasonable cost and invest them in investments which are profitable indicated a negative relationship with liquidity which is significant. This implies that, the banks invest in assets that are risky and thus yield higher interest. That is, the banks lend most of their deposit and hold less liquid assets. This is attributed to higher interest charged on loans as compared to the liquid assets. This means that, the banks have to incur a high cost to attract funding when they are to meet financial obligations urgently. This result is consistent with the views expressed by Ferrouhi and Abderrassoul (2013).

Contrary to expectation, return on equity (ROE) measures the contribution of net income per Ghana cedi invested by banks' stockholders, a measure of the efficiency of the capital invested by owners has a positive relationship with liquidity and significant statistically. This outcome is in line with the findings of Almunani (2013) that, as the returns on shareholders increase, more investors will be attracted and this will enhance the capital adequacy of the banks. And as this high level of capital increase liquidity of the banks and offers depositors a safety net. This outcome however contradicts the study by Malik and Rafique (2013) that, shareholders demand higher returns on their investments so they prefer investment in risky assets. These assets are illiquid thereby exposing the banks to liquidity risk.

As expected, loans to total assets (LTA) is negatively correlated to liquidity and is highly significant. The negative relationship gives clear evidence that, banks that lend more to the public invest less in liquid assets. The high interest on loans as compared to what the banks earn

on liquid assets such as treasury bills make them tie up considerable amount of their assets in loans hence having less in terms of liquid assets. It is important for banks not to concentrate on the growth of the loans as this exposes them to failure in meeting other liquidity requirements. This indication is supported by studies from Valla & Saes-Escorbiac (2006) and Lucchetta (2007).

About the macroeconomic variables, gross domestic product (GDP) as a measure of growth in total economic activity in the economy is negatively correlated with liquidity which is statistically significant. This indicates that, growth in the economy will make individuals and businesses to demand more loans to expand their businesses. Banks on the other hand are encouraged to lend more since the risk of default is low due to the robust nature of the economy because banks capitalize on this to grant loans to firms that they foresee to be profitable because of the quality of their assets thereby exposing the banks to liquidity risk. Banks are not able to lend much during the period of low growth but rather hoard liquidity due to the high cost associated with obtaining short term funds from the money market in order to meet their financial commitments. This result confirms the findings of Valla & Saes-Escorbiac (2006), Moore (2010) and Ferrouhi and Abderrassoul (2013).

It is clear from the table that, unemployment (UNE) which is the proportion of the labour force that is deprived of work but available for and looking for employment though negatively related to liquidity is not statistically significant. This is an indication that unemployment is not a major determinant of bank liquidity. That is, even though an increase in unemployment decrease liquidity of banks as supported by Rauch et al (2009) that unemployment is connected to the demand for loans hence negatively affecting banks' liquidity, this relationship is weak in the

listed banks on the stock exchange in Ghana. There is therefore indication that though unemployment rate may be high, liquidity levels of banks can be high.

But this result is not an isolated one because the findings of Vodova (2011) on liquidity of commercial banks in Czech and its determinants showed that, unemployment does not affect liquidity of banks significantly.

Furthermore, inflation (INFL) defined as the general increases in the prices of goods and services in an economy at a given time exhibits negative but a statistically insignificant effect on bank liquidity among listed banks on the stock exchange of Ghana. Thus contradicts findings by Vodova (2011), Ferrouhi and Abderrassoul (2013) and Chagwiza (2014) which support the significance and negative association between inflation and banks' liquidity. This is because, all other things being equal surges in the prices of goods and services directly influence the cost of production therefore resulting in the increase in demand for loans by businesses and individuals. The annual inflation rate in Ghana has been the main basis for determining the rates of lending of banks. Thus as the rate of inflation becomes high, the base lending rate at which the banks lend to clients also increases. Hence the banks take advantage of the higher lending rate to give out more loans which affect liquidity negatively because of the illiquid nature of the loans.

#### **4.4 CONCLUSION**

The panel data regression based the random effects GLS outcomes showed bank size, capital adequacy and return on equity have positive and the relationship is significant statistically with liquidity while loans and return on assets showed a negatively significant relationship. Rate of Gross domestic product was the only macroeconomic variable that showed a significant and

negative relationship with liquidity. Other variables such as unemployment and inflation were all not significant determinants of bank liquidity.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.0 INTRODUCTION**

This chapter deals with the summary of the study, conclusions from the research objectives are drawn out and policy recommendations for the study based on determinants of liquidity among banks listed on the Ghana stock exchange are provided.

#### **5.1 SUMMARY OF FINDINGS**

Bank's liquidity specifies the capacity to finance its businesses efficiently. The inability of the bank to do this is referred to as liquidity risk. The bank finds it difficult to settle its obligations such as deposits withdrawal, funds for loan portfolio, investment and debt maturity as liquidity risk increases.

The main aim of the study was to ascertain the determinants of liquidity of banks listed on the Ghana stock exchange and also estimate the impact of bank specific and macroeconomic factors on liquidity. The study depended on data of 7 banks listed on the stock exchange of Ghana for a period of 10 years from 2004 -2013.

With liquid assets to total assets as a measure of bank liquidity, return on assets, loans, capital adequacy, inflation, gross domestic product, return on equity and bank size were considered to be the determinants of liquidity.

The return on assets (ROA) was established to be negatively related with liquidity and statistically significant at 5% and thus validating the fact that, banks invest in assets that yield

high interest in order to improve the performance of the banks. This indicates that, an increase in the return on assets will cause a decrease in the liquidity level of the banks.

The component of loans was negatively related to liquidity and statistically significant at 1% and thus confirming the fact that, as banks give out more loans to the public, the liquidity levels of the bank fall exposing them to liquidity risk. The results indicated that, the banks in an attempt to improve their loan portfolio increase the loans given out to the public.

The results indicated that, increase in capital adequacy of banks make them resilient and liquid in order to absorb shock in times of crisis. Capital adequacy had a positive relationship with liquid assets to total assets ratio and statistically significant at 1%. This is why the bank of Ghana always ensures that, the minimum capital requirements of the banks are always met to avoid liquidity problems. Since the banks are connected, liquidity problems in one bank could affect the entire industry.

The study also revealed that inflation which is a macroeconomic variable has no significant impact on liquidity of banks. The result revealed that inflation has no influence on the liquidity of the banks under study.

The results depicted that, growth in the economy impact on the liquidity of the banks. This is due to the demand and supply of loans by firms and individuals to expand their businesses. Gross domestic product (GDP) was negatively related with liquidity and statistically significant at 5%. Thus the effect of GDP depends on how the banks take advantage of the opportunities the economic activities present.



The study showed that, unemployment as a macroeconomic variable has no impact on liquid assets to total assets. The result reveals statistically insignificant relationship of unemployment with liquid assets to total assets.

However the positive impact of return on assets on liquidity is quite surprising and can only be explained by the fact that, not increasing the returns on shareholders might not necessarily mount pressure on management to invest in illiquid assets thereby exposing the banks to liquidity risk. Return on equity has a positive relationship with liquid assets to total assets and statistically significant at 1%. Thus as the returns to the shareholders increase, investors are attracted to invest in the banks thereby increasing the firm's own capital making them able to absorb shock since deposits are not a reliable source of funding.

Bank liquidity increases with the size of the bank. As bank grows in branch network, they keep enough liquid assets to meet unexpected withdrawals and high operational expenditure. On the other hand the deposits to the bank increase because of the wider network coverage and the associated increase in customers. Bank size had a positive relationship with liquid assets to total assets and statistically significant at 1%. Thus banks as they grow in size have the capacity to mobilize funds without any difficulty.

## **5.2 CONCLUSION**

Though there may be other factors that influence liquidity levels of banks, the study concludes that, return on assets, loans, capital adequacy, the rate of gross domestic product, return on equity and bank size are the major determinants of liquidity levels.

The conclusion of the study is that, disparities in liquidity levels are determined by bank specific factors and macroeconomic factors. The bank specific factors that were identified significant as impacting liquid assets to total assets (liquidity) are; return on assets, component of loan, capital adequacy, return on equity and the size of the bank. Gross domestic product was the only macroeconomic variable found significant in determining liquidity level of the banks under study.

While return on equity, capital adequacy and bank size impacted positively on liquidity levels measured as liquid assets to total asset, return on assets, component of loans and gross domestic product impacted negatively on liquidity measured as liquid assets to total assets.

### **5.3 POLICY RECOMMENDATIONS**

The findings of this study contribute to existing facts derived from other studies on determinants of liquidity. The results of this research have implications for management of bank especially with respect to management of liquidity.

The Bank of Ghana should establish tight monetary policy to control inflation and its effect on liquidity of banks.

Since the survival of banks depends on liquidity management and profitability, they should not solely concentrate on profit maximization but effective management of liquidity. This will help minimize the effects of excessive and deficient liquidity.

The banks should employ the services of qualified and competent personnel. This will ensure that decisions as to the optimal cash level and liquid assets to keep are right, control bank

specific factors influencing liquidity, taking advantage of the opportunities the macroeconomic variable presents and avoiding unnecessary risks.

The bank of Ghana should monitor and review the liquidity management practices of banks and appropriate sanctions meted out to banks who failed to comply with the liquidity requirements. This will help in implementing the liquidity policy effectively in order to achieve desirable liquidity level.

The banks should put in place measures that will help them understand customers better and enhance the benefits from their relationship. Enhancing the collection of data and establishing social media platforms into the banks' value proposition.

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## APPENDICES

### **Appendix I: Correlation matrix for determinants of liquidity of listed banks in Ghana**

|     | LQR     | ROA     | LTA     | CAR     | INF     | GDP     | UNE    | ROE    | SZE    |
|-----|---------|---------|---------|---------|---------|---------|--------|--------|--------|
| LQR | 1.0000  |         |         |         |         |         |        |        |        |
| ROA | 0.3694  | 1.0000  |         |         |         |         |        |        |        |
| LTA | -0.5651 | -0.0304 | 1.0000  |         |         |         |        |        |        |
| CAR | 0.0874  | 0.2024  | 0.1708  | 1.0000  |         |         |        |        |        |
| INF | -0.0616 | -0.1210 | 0.0228  | -0.1299 | 1.0000  |         |        |        |        |
| GDP | -0.1500 | -0.0011 | 0.0921  | 0.0483  | -0.5039 | 1.0000  |        |        |        |
| UNE | 0.2537  | 0.1411  | -0.2445 | 0.1815  | -0.0484 | -0.1707 | 1.0000 |        |        |
| ROE | 0.4500  | 0.8085  | -0.0945 | -0.2464 | -0.0207 | -0.0225 | 0.0689 | 1.0000 |        |
| SZE | 0.4618  | 0.2688  | 0.0700  | 0.3260  | -0.2243 | 0.1534  | 0.3200 | 0.2230 | 1.0000 |

## Appendix II: Hausman specification test – Determinants of liquidity

---- Coefficients ----

|     | (b)       | (B)       | (b-B)      | $\sqrt{\text{diag}(V_b - V_B)}$ |
|-----|-----------|-----------|------------|---------------------------------|
|     | fixed     | random    | Difference | S.E.                            |
| ROA | -.0319463 | -.0359267 | .0039804   | .0085193                        |
| LTA | -.7270632 | -.5992758 | -.1277873  | .0775906                        |
| CAR | .8795148  | 1.254807  | -.3752918  | .3017356                        |
| INF | -.0013932 | -.0023725 | .0009792   | .0008017                        |
| GDP | -.0242485 | -.0237756 | -.0004729  | .0013078                        |
| UNE | -.0329528 | -.0214151 | -.0115377  | .0069116                        |
| ROE | .008396   | .0075252  | .0008708   | .0008449                        |
| SZE | .0396139  | .0291763  | .0104376   | .0065724                        |

b = consistent under  $H_0$  and  $H_a$ ; obtained from xtreg

B = inconsistent under  $H_a$ , efficient under  $H_0$ ; obtained from xtreg

Test:  $H_0$ : difference in coefficients not systematic

$$\chi^2(8) = (b-B)'[(V_b - V_B)^{-1}](b-B)$$

$$= 5.20$$

$$\text{Prob} > \chi^2 = 0.7361$$

**Appendix III: Determinants of liquidity with liquid assets to total assets as a measure of liquidity**

| LQR  | EXP. SIGN | COEFFICIENT   | Std. Err. | Z     | P-VALUE |
|------|-----------|---------------|-----------|-------|---------|
| ROA  | -         | -0.0359267**  | 0.0165866 | -2.17 | 0.030   |
| LTA  | -         | -0.5992758*** | 0.0707023 | -8.48 | 0.000   |
| CAR  | +         | 1.254807***   | 0.4196941 | 2.99  | 0.003   |
| INF  | -         | -0.0023725    | 0.0035596 | -0.67 | 0.505   |
| GDP  | -         | -0.0237756**  | 0.0093819 | -2.53 | 0.011   |
| UNE  | +         | -0.0214151    | 0.0143496 | -1.49 | 0.136   |
| ROE  | -         | 0.0075252***  | 0.0019181 | 3.92  | 0.000   |
| SIZE | -         | 0.0291763***  | 0.005979  | 4.88  | 0.000   |
| cons |           | 0.3833406     | 0.1324836 | 2.89  | 0.004   |

R-Square 0.7300 Adjusted R-Squared 0.6946 Wald Chi2(8) 164.94

No. of Observations 70 Prob>Chi2 0.0000