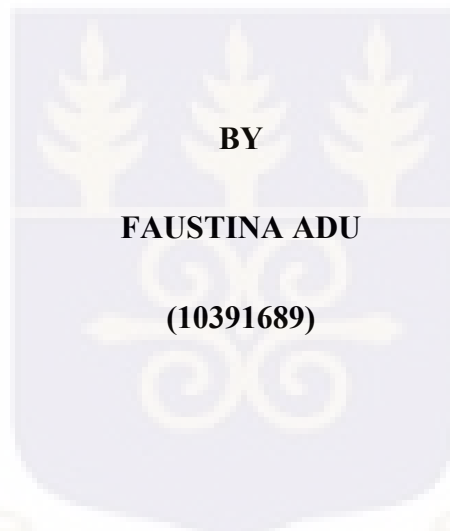


UNIVERSITY OF GHANA

**FACTORS INFLUENCING LIQUIDITY OF BANKS LISTED ON THE GHANA STOCK
EXCHANGE**



**THIS LONG ESSAY IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
DEGREE OF MASTER OF BUSINESS ADMINISTRATION (MBA) IN FINANCE**

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DECLARATION

The conduction of this study and the results found is solely done by I, Faustina Adu, in partial fulfillment of the requirements for this academic award and any shortcomings concerning this research, is mine responsibility. All references used in this study have been accordingly acknowledged.

.....

FAUSTINA ADU

(10391689)

DATE



CERTIFICATION

I hereby certify that this long essay was supervised in accordance with procedures laid down by the University of Ghana.

.....
DR. SAINT KUTTU
(SUPERVISOR)

.....
DATE



DEDICATION

This humble work is dedicated to my Family especially my Sisters, whose love, prayers and support for me throughout my life have never fallen short.



ACKNOWLEDGMENT

My gratitude and thankfulness can never match the ever unceasingly and unfailing love, mercies, and grace of the Almighty God upon my life, especially throughout my education career. His presence and unwavering support made this possible.

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Finally, my utmost gratitude and appreciation to all my family members especially my parents and loved ones for their support and contribution in my life.

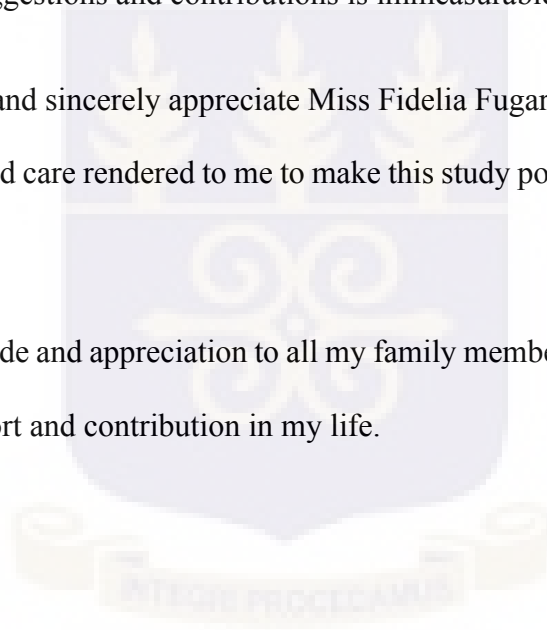


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ABBREVIATIONS

GSE	Ghana Stock Exchange
BOG	Bank of Ghana
LIQ	Liquidity
ROA	Profitability
CAP	Capital Adequacy
ERATE	Exchange Rate
LNSIZE	Bank Size
INFL	Inflation Rate
MEFF	Management Efficiency
UNEMP	Unemployment Rate
GDP	Gross Domestic Product
LNCOSTF	Cost Of fund
MPR	Monetary Policy Rate



ABSTRACT

The conduction of this study involves regressing some specific external and internal factors on the dependent liquidity function which is, liquid assets to the total asset (LIQ) for the 11-year period from 2007-2017 of 8 Ghanaian banks listed on the stock exchange. Two separate analyses, fixed effect, and random effect panel regressions were conducted during the analyses of the study with the Hausman test performed to choose the best among the two. The result showed that bank size is the only bank-specific variable that positively affects liquidity at 5% significant level whilst capital adequacy, profitability, management efficiency did not show any significant impact on liquidity. In addition, inflation rate, exchange rate, GDP and unemployment significantly influenced liquidity, though inflation and GDP exhibited a positive impact while exchange rate and unemployment had a negative impact at that same level of significance. The variables highly explained variations on commercial banks liquidity as indicated by the coefficient of determination of 0.8083. The study recommended banks consider both the external settings and internal factors simultaneously in developing strategies for managing their liquidity position efficiently and the constant reviewing of such policies and directives by Bank of Ghana, as the macroeconomic factors continue and frequently varies in making sure they add to economic growth.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The ability of banks to effectively perform their core function which is to give out loans and accept deposits hugely depends on liquidity. It is the blood of banks; without it, banks cannot survive. Even though liquidity forms part of the main sources of a bank's vulnerability, it provides justification to their defense in times of bank run (Bryant, 1980; Diamond and Dybvig, 1983).

When banks issue out demand deposits, it paves room for mass depositors to withdraw at an unannounced time factor which creates a mismatch between a bank's asset and liability where unbalanced liquidity will arise to facilitate liquidity risk (Diamond, 2007).

Aside that, the immense competition between banks themselves, banks and other financial and non-financial institutions in Ghana such as microfinance institutions and credit unions for customer's deposits and lending, is actually slowing down the rate of bank liquidity creation which has provided even more evidence for banks to pay extra attention to their liquidity levels and ensure they maintain adequate liquidity at all times (Na-ihmatu, 2015).

Diamond and Rajan (1999) described the function performed by banks as ensuring the movement of money in the system through the provision of a loan to tough illiquid customers while at the same time making money accessible upon request to investors, which is recorded on the asset side and liability side of the balance sheet respectively.

The concept of liquidity cannot fully be addressed if the difficulty of banks in making loans that can be sold quickly enough in times of distress is not mentioned. Individuals' preference for holding liquidity results from the fact that, they are uncertain about the timing of their consumption.

According to Philip Strahan (2008), defining liquidity is more difficult. He claims that the distinction between funding liquidity with market liquidity is spell out by the likes of Brunnermeier and Pederson (2007) and went on to state that, the short term way of raising money befits the term funding liquidity while the cost at which asset is sold for liquidity depicts market liquidity.

Bryant (1980); Diamond and Dybvig, (1983) all describe liquidity as the ability to readily convert liquid asset into money without loss in value. Indicating the idea principles that set aside funding liquidity and market liquidity, Brunnermeier and Pedersen (2007) provided a solid description that state the characteristics of market liquidity by implying market liquidity;

- a. can abruptly finish
- b. Has similar characteristics across investments
- c. Linked to inconsistency and variations
- d. Is prone "flight to liquidity,"
- e. Coherent with market movements.

But the concept of liquidity is quite general with a lots of researchers biting in and describing liquidity as the potentiality of banks attaining short term financial demands, thus their ability to quickly convert their securities to cash without losing capital or income in the process. In line with Bank for International Settlements (2008), on the side of every financial transaction or obligation

made by bank has its own consequences on liquidity. They further detailed that, for a bank to meet its cash flow commitment successfully, measures of effective liquidity risk must be highly pointed out which is not actually 100% certain because of external factors.

In relating to the study of public and private supply of liquidity by Holmstrom and Tirole (1996), they indicated that when aggregate of doubt is absent the private sector can be self-reliant with regard to liquidity but when there is the presence of aggregate uncertainty, the private sector is no longer self-reliant, the government has to intervene by seeing to the proximity of things affecting liquidity either through loosening or tightening aggregate liquidity when shock is high or low respectively.

For Na-Ihmatu Sumaila (2015), issues concerning liquidity risk should not be left out of the picture because the unforeseen liquidity problem that affects one bank can entirely cost the whole financial industry, nevertheless affecting the whole economy. The market havoc which emerged in mid-2007 threw more light on how valuable liquidity is to the financial markets and the banking sector combined (Bank for International Settlements, 2008).

Horatiu (2013), added that, when there is any disturbance involving the day to day running of the liquidity movements within the banking sector, it has the tendency to make bank's lending capacity vulnerable and even destabilize their state. This can be said to be a reflection of what most banks are currently experiencing in Ghana, which resurfaced due to the recent quest of Central bank (BOG) to strengthen the industry.

The recent mismanagement of funds by some banks and improper supervision from the Central bank of Ghana had led to the collapse of banks within the industry, instigating panic among

depositors. The aftermath of this is the constant withdrawal of deposits hence triggering liquidity crises within the sector.

Kwamina (2018), in examining the problem of liquidity concerns said, the banking sector of Ghana which is fraught with credit problems needs to change their posture on credit issues. He added that this can only be effective if corporate organizations change their behavior towards credit settlement too. He also came to a conclusion that, in an attempt to meet the recapitalization of the central bank, most banks within the industry especially (indigenous banks) are trying to reserve as much deposit as possible while at the same time trying to curb the attack of a bank run, furthering the cause of liquidity crises.

Samson et al. (2013) stated that, for banks to meet unexpected future demands on loans and fluctuations of deposits, adequate liquidity should be sustained. On a wider view, for us to understand the knowledge embedded in a banking crisis, we should understand the job description of banks and how they line up their capital and institutional structures to facilitate their tasks (Diamond & Rajan, 2000).

A lot of research has been conducted by (Gyamerah & Amoah, 2015; Dore, 2013; Tan, 2015; Opoku-Agyeman, 2015; Nisar et al, 2015) on factors affecting profitability but not much can be said of factors that determine liquidity and its effects on liquidity. Although the likes of (Diamond & Dybvig, 1983; Boadi et al, 2016; Na-Ihmatu Sumaila, 2015) and others have provided literature on liquidity but it is not enough as much research supporting the fact is not substantial to support the claims on liquidity determinants among universal banks in Ghana comparably to that of profitability.

Moreover, due to recent failings of several banks within the banking industry which liquidity contributed as one of the main cause, there is the need for the country to pay particular interest to the factors of liquidity. It is in the light of this that liquidity is said to be of value hence the need for this research which is to determine both the macroeconomic and bank-related factors disrupting the flow of liquidity of listed banks on the Ghana stock exchange.

1.2 Problem Statement

Recently, there was an outburst from the general public when the central bank decided to remove some banks from liquidity support. This came in not long after the failure of several banks within the industry.

It was revealed that some of the main reasons for their failure were because of liquidity issues resulting from high non-performing loans and inability to meet the required reserved liquidity ratio that every bank was supposed to retain under the new Bank and Specialized Deposit-Taking Institution Act. It was further explained by the officials of the central bank that, these two and other equally important reasons led to those banks heavy reliance and continuous use of emergency liquidity support from BOG.

BOG observed that the above incident worsened when the said banks experienced panic withdrawals (Bank run) from depositors including some of their core customers which in effect shook their finances, making it more difficult for them to meet the necessary cash demands. Most importantly, it should be noted that even though a bank might be solvent, it can easily collapse

when it experiences liquidity problem since lack of adequate liquidity shows one of the first signs of a troubled bank.

According to the recent Banking Survey Report (2018), it was realized that liquid assets now contributes a significant portion of 38% the sectors operating assets which is an increase of 37% from 2016 to 2017. This altered the general trend of loans and advances being the major contributor, indicating the desire of most banks to have more access to liquidity by holding risk-free government securities instead of funding loans and advances with associated default risk.

It further went on to say that, the keen market awareness on the industry after the failure of some banks contributes to the increase in liquid assets such that banks in a way are demonstrating sufficient funds in sustaining their operations. Holding a lot of liquid assets might seem good but it also comes with the risk of affecting profitability.

Most importantly, also gathered from the Ghana's Banking survey reports over the years is the realization that, the few banks listed on the Ghana stock exchange has on average more than 40 percent of the banking industry's market share in terms of operating assets, deposits takings and loans and advances granted to the general public when compared to the majority of those banks not listed on the stock exchange

It is of this context that, it is has become a necessity to determine the external and internal factors that determine the liquidity of banks registered on the Ghana stock exchange so as to know when and how to manage liquidity for the ultimate growth of the banking sector.

1.3 Research Objectives

The greater will of the study seeks to examine the factors that determine the liquidity of listed banks in Ghana. Specifically;

- a. To investigate the Bank-Specific and Macro-economic factors that affect the liquidity of listed banks in Ghana.
- b. To assess the impact of Bank-Specific and Macro-economic factors on the liquidity of listed banks.

1.4 Research Questions

The research is deemed to answer the questions below;

- a. The ideal content of what entails liquidity that is really affected by macroeconomic and bank-specific factors
- b. What are the essential contributions made by the macroeconomic and bank-specific factor on liquidity?

1.5 Significance of the Research

As cited earlier, a bank in short of liquidity reflects one of the first signs of inefficiency which in effect will affect its survival. This study will therefore, lay more emphasis on existing literature of the need of banks and financial institutions in knowing liquidity is core to their daily operations for their ultimate survival.

It is worth knowing that, this study also adds to prevailing literature as the first or one of the few studies that throws much light on the elements that influence the liquidity of listed banks in Ghana. Most of the studies have been contributing to the profitability of banks or factors influencing liquidity of rural banks with no highlight on factors affecting the liquidity of banks registered on the stock exchange in Ghana and the effect of those determinants on the banks.

Moreover, with the recent issues surrounding the banking industry in Ghana of which liquidity emerge as one of the basic cause, there is the need for banks to know much about the external and internal determinants of liquidity. Banks should also be reminded that as much as they will like to keep more liquid assets, it has an adverse effect on profitability. There is therefore, the need of them to be informed of the factors in order to manage liquidity and its associated problems since its effect do not affect only the banking industry but the whole economy at large.

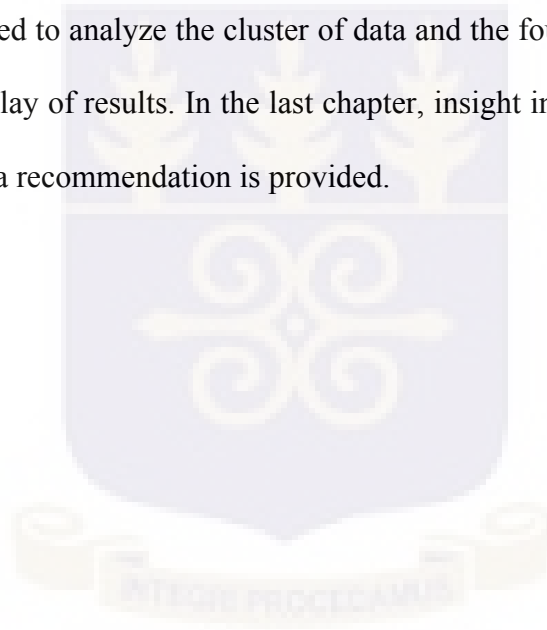
1.6 Limitations of the study

Out of the 23 universal banks in Ghana, only 8 were listed on the Ghana Stock market, hence the study was limited to the data available for only these 8 banks. Also due to lack of information availability for some of these eight banks, the period for the research could not be extended further than the 11-year period of 2007-2017. Moreover, the data used for this research may be subjected to managerial discretion since only published financial statements and reports were employed. Finally, the generalization of the findings of this research in other jurisdictions will be fatal since each country is distinct in terms of culture, political backgrounds and regulations.

1.7 Chapter Disposition

This study is categorized into five components;

The first chapter talks about the origination of the study as a whole which sums up the framework of the study thus, looking into the problem statement, finding research objective, asking research questions, knowing the significance and limitations of the study as well as component disposition involvement. The second chapter is more or less talking about the literature review consisting of the concepts and theories associated with the study. The third chapter involves gathering data and the methods which are used to analyze the cluster of data and the fourth chapter involves issuing the data analysis and display of results. In the last chapter, insight into the results and outcomes, the conclusion as well as a recommendation is provided.



CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical review

The concepts surrounding liquidity's literature including its creation, funding, risks, and management have been widely researched by prominent authors such as Diamond and Dybvig (1983); Brunnermeier and Pedersen (2007); Holmstrom and Tirole (1996) and many more. Guernsey (2017) in affirming to the general definition of liquidity defined it as when banks are able to fund increasing assets and honoring commitment as at when needed without sustaining undesirable losses. Additionally, the reason for liquidity risk was elucidated by the author as, the risk incurred during maturity transformation; where banks in honoring their obligations, make funds available on short notice to be withdrawn by depositors while at the same time, using this same fund to grant lengthy credit facilities for borrowers. It also added that, for banks to meet their cash flow commitments, it is advisable in every sense to intensively stir up the affairs of liquidity risk management because of the issue of uncertainty based on factors of external events and other agents' behavior. This stresses the significance of liquidity risk management because the liquidity deficit at a single institution will result in larger consequences.

2.1.1 Concept of Liquidity, Liquidity Risk, and Liquidity Risk Management

The theoretical part of liquidity was earlier initiated in the study of the model of reserves, bank runs and deposit insurance by John Bryant. Diamond and Dybvig (1983) on their research on "bank

runs, deposit insurance, and liquidity” were more specific in showing how liquid assets and illiquid liabilities give rise to self- fulfilling panics among depositors.

Diamond and Rajan (2001) added to the literature by identifying the most integral role of banks which is to make liquidity; that involves presenting deposits which are more liquid than assets in hand. They expressed illiquid asset to be an asset where there are no losses in the income from the earnings made from physical liquidation or trade of the asset.

They added that significant undertakings are executed by banks on the balance sheet, where difficult and illiquid loans to borrowers reflect on the asset side to ensure movement of credit in the economy and provision of the fund on-demand to customers. They attributed the need for banks to create liquidity to investors demand for money and explained that investors choose to save in a bank and not hold their assets or funds right out because of unforeseen uncertainties surrounding their consumption date or how long they will like to hold the asset or fund.

They further established a notion that there is an insurance arrangement where bank customers share the threat of trading an asset early at a loss with banks in the process of them making deposits that are more liquid than the asset they possess. It contributes to making banks fragile since they have to execute the role of providing for insurance alongside transforming maturity in regards to possible liquidity requests of investors.

Alger and Alger (1999) in their study “Liquid Assets in Banks: Theory and Practice” affirmed the function of a bank by broadly stating the two vital undertakings of banks which are to take deposits and grant loans. They came out with strong evidence that;

- a. In proportion to total assets, banks which have a higher demand for liquidity have a less liquid asset which is not the same as the theoretical prediction that states, liquidity shocks are proportional to demand deposits.
- b. They also found out that banks which are larger in size have superior access to borrowings to catch up with their liquidity needs because they are popular and considerably ‘too big to fail’.
- c. Their last conclusion supports the intuition that when there is a prolonged aggregate of liquidity squeezes on the banking system, only small banks have got to sometimes cut their available possessions of liquid assets, while there is rather an increase in the possessions of liquid assets by medium and large banks.

Aspachs, Nier and Tiesset (2005) with their research on “Liquidity, Banking Regulation and the Macro-economy of liquidity holdings of UK Banks” filled the gap in the literature by analyzing the key ingredients that make banks safer institutions. They identified a number of mechanisms such as, possessing buffer of liquid assets large enough on the asset side which may be used in insuring against liability shocks that threaten the sustainability of banks, co-insuring in the interbank market and examining macroeconomic conditions and bank liquidity buffers interactions in detail. They also discovered how countercyclical liquidity buffers are, in the sense that, in a frail state of the economy, they add to liquidity buffers while in the robust state, they cut it. This is similar to increasing liquidity buffers when interest rates in the short term are small and lessening it when interest rates in the long term are high.

Berger and Bouwman (2009) paper on ‘Bank Liquidity Creation’ provided literature on complete measures on making of bank liquidity. Four methods were raised by them that were applied across

all US banks for a 10-year period. They found out that bank liquidity creation is never static but changes with time. In the situation of creating most liquidity, large banks, multibank, retail banks, and recently merged banks all fall under one bracket. They also proved that value of banks correlates highly with bank liquidity creation in a positive way and with their exploration on existing theory that, there is a relationship that lies between capital and liquidity creation resulted in an outcome of a favorable relationship with large banks and alternate outcome for smaller banks.

Strahan (2012) on his paper on 'Liquidity Production in 21st Century banking' posits the provision of both funding liquidity and market liquidity by banks. Production of funding liquidity enables banks to perform their traditional intermediate function of granting loans through the use of liquid customers' deposit.

This is distinct from the cost of sale of assets known as market liquidity. He proved that the loans which banks are able to grant help them to access market liquidity thus through functioning as broker-dealers and traders in securities and derivatives markets, in loan syndication and sales, and in loan securitization. He also proved that as deposits are becoming less important in the creation of liquidity in our present day, banks now fund liquidity from loan commitments and positions of credit.

He also indicated that more and more organizations besides banks render market liquidity in similar fashion, but banks comparatively come on top when it comes to funding liquidity because of their knowledge advantage in overcoming funding liquidity risk which is attributed to the opportunity they enjoy with their access to the central bank's liquidity and government assurance for depositor's fund as well as structure of their balance sheet. He ended that providing this funding

liquidity is the ‘special role’ of banks, but the provision of market liquidity for their daily functioning is essential for the progress and expansion of securities markets.

Bonfim and Kim, (2012) also contributed to the existing literature on their study on “Liquidity risk in Banking”. They indicated that even though holding a buffer of liquid assets elevate mismatch in maturities between assets and liabilities, it comes at a cost and has proven to be inefficient as it limits the provision of liquidity to depositors and brings in lower returns as well.

They proceeded on to say that, banks may have reasons to keep buffer of liquid assets, which maybe insuring against sudden bank run and dry-ups but the buffer of liquid assets may not be adequate and it is the main reason that regulation became obligatory, thus to lessen some of these risk not forgetting, these risk gets worsened by the fact that eventhough liquidity shocks have low probability of occurring its impact turns out to be high.

They, however, concluded that peer-effect is an essential factor in selecting liquidity of larger banks which might stem out of the likely competition between themselves, having access to more diversified funding sources and better liquidity management tools.

‘The Determinants of Banks' Liquidity Buffers in Central America’ by Deléchat, Henao, and Muthoora (2012) mentioned the implications of the cyclical behavior of liquidity demand. They suggested in their study that, banks would reserve liquid assets during economy declines and discharge them in booming seasons given more prospects to lend if capital markets are imperfect, which indicates that, liquidity buffers would be adversely linked to measures of the output gap or real GDP growth, credit cycle, and policy interest rates.

They stated that pumping liquidity to fuel a declining economy may be inefficient because of the counter-cyclical nature of liquidity buffer, adding that, credit will not certainly pick-up even though liquidity buffers would rise or stabilize. Finally, they added that the quality of financial institutions and degree of financial growth which are structural elements are estimated to fluctuate with financial resistances in relations of capital market imperfections.

Drehmann and Nikolaou (2013) on their paper, 'Funding Liquidity Risk; Definition and Measurement' explain the capacity to resolve commitments with promptness as funding liquidity whose vulnerability is determined by the likelihood that banks will not be capable to resolve commitments as and when they occur.

They initiated the discovery of related characteristics between funding liquidity and market liquidity backed with empirical evidence and stated that funding liquidity and market liquidity moves coherently, as revealed by literature. They also found out that both have features such as low intensities, tenacity and sporadic spikes, which have already been discussed by literature. In conclusion, significant and contrast link between funding liquidity risk and market liquidity risk was established.

Bonner, Lelyveld, and Zymek (2013) researched on how liquidity risk became part of the main focus of banking regulations and how the crises of 2007-2009 revealed that rapid changes in market conditions can expose severe liquidity risks in businesses which mostly will not relate to capital levels. Since it was generally accepted that insufficient liquidity buffer was the root cause of the crises, improving liquidity assessment and regulation have been a vital concern now and future.

Their outcome was that, banks' liquidity buffers are resolved by a blending internal elements such as business models, profitability, deposit holdings, size and country-specific elements such as disclosure requirements, concentration of the banking sector, in the absence of liquidity regulation, while the occurrence of liquidity regulation serves as replacements for most of these variables, making them insignificant causes of liquidity buffers with the exemption of an organization's disclosure requirement and size which still remains significant.

2.2 Determinants of liquidity

The factors of liquidity comprise of the macroeconomic (external factors) and bank-specific factors (internal factors). External factors which include GDP, inflation, unemployment, and others are those that banks have no control over because they are either industry-specific or nationwide variables while internal elements which include profitability, capital adequacy, cost of funding are those that banks can control.

2.2.1 Bank-specific determinants

2.2.1.1 Capital adequacy

A bank's financial strength is based on its capital which has the capacity to absorb some reasonable number of unexpected losses (BOG, 2018). Amengor (2016) points out that, the value of a bank's assets and the entire size of liabilities to resolve affects the sufficiency of any given capital base. He added to this fact by stating, capital adequacy is a key obligation needed for BOG's authorization for listed banks to operate and that BOG regulatory mechanism entails, banks retain a minimum capital adequacy ratio of 10% at all times while in function (Banking Act, 2004 Act

673, section 23(1)). It is of this utmost importance that BOG has raised the new capital requirement to 400 million Ghana cedi to strengthen the industry via instilling confidence in the financial services system in bringing comfort and satisfaction to both customers, shareholders, and regulators of the industry.

Berger and Bouwman, (2009) postulate that consequences of banks capital on liquidity depends on the size of the bank where large banks have significant and a positive bond with liquidity, medium banks can have both positive and negative relationship while small banks have a negative and significant relationship with liquidity.

Cucinelli, (2014); Issues, Aymen and Moussa, (2015); Mohamad, (2016); Munteanu, (2012) and others, proved a significant and positive relationship between liquidity and banks capital.

2.2.1.2 Profitability

One of the most researched areas in banking studies has to do with profitability. Banks generate profit by charging fees on their services and using leverages. Tan, (2016) studied the influence of competition and risks on the profitability of banks in China using data of 41 Chinese universal banks made up of joint-stock commercial banks, national banks, and city commercial banks between the periods, 2003 to 2011.

He came to the conclusion that being able to handle and observe granted loans to borrowers by Chinese banks helps in increasing profitability in the sense that the cost of default is minimized. He added that they can only achieve this if funds are allotted in granting of loans instead of reserving it as liquidity buffers hence the significant and negative relationship between the two.

Hooshyari, (2015) and Nisar, et al (2015) found similar results in their quest to evaluate the influence of inflation on profitability and determinants of profitability in Pakistan respectively.

Yakubu, (2016) researched on determinants of profitability of universal banks in Ghana found the relationship between liquidity and profitability to be positive. His research sample five (5) commercial banks in Ghana from the period of 2010 to 2015 which he concluded that the relation between the two was not only positive but significant which differs from the above studies. Similar result found by (Dore, 2013). Gyamerah and Amoah, (2015) and Opoku-agyemang, (2015) revealed an insignificant relation between profitability and liquidity of banks in their study of determining factors influencing profitability in Ghana; A study on of foreign and local banks in Ghana.

2.2.1.3 Bank Size

Size of a bank signifies the ownership of assets by banks. There are varied influences on liquidity in general when we discuss issues concerning the sizes of banking firms. Deléchat et al (2012) found liquidity buffers to increase with bank size, while Vodova (2013) on her study on contributing factors of liquidity of commercial banks in Hungary using a panel regression analysis resulted in, the effect of sizes of banks on liquidity to be negative (decreasing) explaining further that large banks count on inter-banks funding or resort to the Lender of Last Resort during liquidity crises in so doing decreasing their drive to keep assets which are liquid.

Dinger (2009) found a similar result which is adverse relation between liquidity and sizes of banks which is consistent with the concept that more of liquid assets are kept by smaller banks while less of it are kept by the larger bank even though its influence seems to be exhausted at a certain point.

He researched on 378 banks from Central European Emerging countries on the topic “Do foreign-owned banks affect banking system liquidity”.

Moreover, Al-Harbi, (2017) at 1 percent level of significance had a positive effect of size on liquidity of emerging countries banks which he added that developing countries have most of their banks to be smaller in size which means they hold more liquidity to face crises because of their limited access to borrowing from capital markets. He affirmed Dinger’s (2009) findings that a non-linear relationship exists between the two in the presence of squared size.

2.2.1.4 Cost of funding

Singh and Sharma (2016) found an insignificant outcome of cost of funding on liquidity in their investigations on determinants of liquidity on Indian banks. However, Quaid et al (2018) had a significant and positive result of the cost of funding on liquidity. Cost of funding can be described as; compensation borrowers pay to lenders for using their funds. It is one of the key input cost for banks since minimal cost yields better earnings through borrowing.

When the cost of funding escalates, banks hold more liquidity since inter-bank borrowing will be expensive. Munteanu (2012), added that banks which have enough liquid assets are less reliable on funds from external sources since being able to meet the frequent withdrawals by depositor’s forces will prevent them from accessing funds through interbank borrowings or from the central bank, as a last resort.

2.2.1.5 Management Efficiency

Boadi et al. (2016) describe management efficiency in terms of banks interest expense to their total deposits. They explained that the amount of customers' deposits that the managers of banks use to settle the operating expense of their banks indicates whether management is efficient or not. A higher ratio means management is inefficient which will affect liquidity hence decrease in liquidity and vice versa. Al-Harbi (2017) and Boadi et al. (2016) came out with similar results which is a significant and positive relationship of management efficiency on liquidity.

2.2.2 Macro-economic factors

2.2.2.1 Inflation rate

Chiu & Meh (2007) posits that the actual worth of money decreases from the effect of inflation which makes the control of liquidity more obligatory and in effect lead to costly borrowing. Trenca et al (2015) found a significant and positive influence of inflation on liquidity which was similar to that of Singh & Sharma (2016).

However, Abdul-rahman et al (2017) in their studies speculated that liquidity blows are endured by banks in a non-tiring routine when they had a demeaning relationship between inflation and liquidity. Contrary to these findings, (Sheefeni & Nyambe (2016); Ferrouhi & Lehadiri (2014); Mohamad (2016)) studies resulted in inflation having a negative relationship with liquidity though statistically insignificant. Deléchat et al. (2012) added that minor inflation fluctuations are linked to high liquidity.

2.2.2.2 Monetary policies

Lucchetta (2010) exposed that banks capacity to provide loans to clients can be measured by the monetary policy rate. Berger and Bouwman (2017) establish that monetary policy has sparingly slight influence but statistically significant on small banks liquidity creation while the varied and weak influence on liquidity is linked to medium and large banks.

They added that, during financial misfortunes, the influence of monetary policy on liquidity is weak. While Vodova (2013) explained that lower liquidity is associated with appealing lending undertakings when monetary policy rates increase.

2.2.2.3 Gross Domestic Product

Al-Harbi (2017) describe GDP as an index to check the general condition of a country. It is also used as a business cycle indicator. He found liquidity to be negatively significant to GDP which can be explained by the fact that rise in business undertakings is linked to high GDP growth which affects banks liquidity negatively since it indirectly means banks granting more loans for business expansion and vice versa.

His explanation is in line with the concept of financial fragility and bank liquidity. Similarly, (Nahmatu (2015); Valla et al. (2006); Melese, (2015); Aspachs et al. (2005); Ferrouhi and Lehadiri (2014)) affirmed this result in their various studies. Boadi et al. (2016) and Pa & Norkaityt (2011) rather found the relation between liquidity and GDP to be positive whiles Vodova (2013) and Fola (2015) added that there is a vague relation between bank liquidity and the growth rate of GDP.

2.2.2.4 Unemployment rate

(Singh & Sharma (2016); Ferrouhi & Lehadiri (2014); Vodova (2013)) all found unemployment to have insignificant relation with liquidity.

2.3 Empirical Review

While the theoretical part of liquidity had been thoroughly researched, not much can be said of the determinants of liquidity especially in Ghana. Factors determining liquidity have always been on the blind side of researchers and even more so when it comes to Africa hence Sub-Sahara countries precisely. This omission has even been admitted in the works of the few authors (Singh & Sharma 2016; Trenca et al. 2015; Ionica 2012; Horatiu 2013; Boadi et al. 2016; Na-Ihmatu Sumaila 2015) who have taken interest in identifying these factors.

Cucinelli, (2014) researched on the factors affecting the liquidity of banks across European countries with its main purpose as exploring the various forms of the relationship existing between peculiar bank structure elements and liquidity risk. The bank structure elements include specialization, capitalization, assets quality, and bank size while liquidity risk involves calculating net stable funding ratio and. liquidity coverage ratio. The research uncovered, larger banks are highly exposed to liquidity risks, asset quality only affects the measure of short term liquidity risk, better liquidity in the long term are obtainable with highly capitalized banks, and with specialization, destitute funding structure banks signal banks that only specializes in the lending activity. Lastly, the study determined that, in periods of financial predicaments, fluctuations in liquidity control transpire only on the short term horizon.

A study on Hungarian commercial banks liquidity positions which was evaluated using three different ratios from the period 2001 to 2010 was conducted by (Vodova, 2013) in an attempt to identify factors of liquidity. Four internal and eight external variables were used. The outcome of the study based on the panel regression analysis revealed that capital adequacy, interest rate on loans and profitability of banks within the Euro area are all related to liquidity in a positive way while interest rate margin, bank size, monetary policy rate, interbank transactions rates are negatively related to liquidity. The growth rate of GDP had no relation to bank liquidity.

Similar studies were conducted by her in Poland and Czech. With the paper on Poland (Vodová, 2012), the aim was to identify factors of liquidity of Polish universal banks over a 10-year period from 2001 to 2010.

Again, with the use of the same method of analysis, the study resulted statistically and significantly that, overall economic condition greatly defines bank liquidity in a major way, which happens as a result of rising unemployment, decline of the economy and financial crises. Unlike the study done in Hungary, bank liquidity had a negative relationship with bank profitability but similar to its effect on interest rate margin and size of banks. Inflation, interest rates, interbank transactions, non-performing loans, and higher capital adequacy increases with bank liquidity.

In Czech (Vodova, 2014), the author used the tool stress-testing to show how susceptible banks are to liquidity shocks in an attempt to manage its risks. Using a significant section of the Czech banking sector, liquidity risks of these banks were evaluated through six different liquidity ratios where the baseline values were stressed in three different scenarios: bank-run, confidence predicament on the interbank market which were all replicated by withdrawal of 20% of deposits

and interbank deposits respectively, and use of dedicated loans by a party to a financial transaction imitated by 5% growth of loans delivered to non-bank customers.

The author discovered that bank-run influences the most serious liquidity problems while interbank market confidence predicaments have no influence on liquidity. In the third scenario, use of dedicated loans even though has a negative influence, is less severe. The study further revealed that due to massive deposits withdrawals during crises, banks which are most exposed to liquidity shocks are large and medium banks since all the above developments deteriorate in periods of financial misery.

Trenca et al., (2015), analyzed the influence of external factors on banks' liquidity over the period 2005-2011 on some specific set of countries just affected by unfavorable financial and economic conditions. These countries are Spain, Italy, Greece, Portugal, Croatia, and Cyprus. The study revealed inflation, public deficit, unemployment, GDP and liquidity in the years before the crises influence the current liquidity of banks but liquidity in the years before the crises and inflation rate had the most significant influence while GDP had the least effective when they applied the General Method of Moments (GMM).

Singh and Sharma (2016) studied determinants of bank liquid affecting Indian banks. They used 59 banks from the period 2000 to 2013. Capital adequacy, profitability, GDP, cost of funding, deposits, inflation and bank size were the factors that were explored. Fixed effect model, random effect model of the panel data analysis was run in addition with OLS model estimation, and they discovered that cost of funding and unemployment were the only factors that did not have a significant influence on liquidity. The rest of the factors all had a significant impact on liquidity even though, only GDP and bank size affected liquidity negatively. Ownerships of banks were

found to have a significant effect on the liquidity of Indian banks when the researchers conducted a trend analysis. The trend further indicated that the level of liquidity maintenance for foreign banks is higher compared to that of private and public Indian banks.

Data was collected from 21 conventional banks in Turkey over the range of 8-year period from 2006-2013 in detecting the factors of Turkish banks liquidity using the panel random effect regression. Two measures of liquidity ratios: the ratio of liquid assets to customer deposits and short term funding and the ratio of liquid assets to total deposits were used to detect the factors of liquidity determinants. The study ended with the capitalization of banks indicating a significantly positive effect on the two ratios of liquidity. The first ratio was positively and significantly influence by Loan loss reserve only. Similar to this outcome is that of sizes of banks but this time with a negative influence. The profitability of banks nevertheless exhibited a negative and significant effect on the second liquidity ratio. The external factors which have crises as dummy variables had an ambiguous relationship with liquidity ratios (Mohamad, 2016).

Comprehensive research covering an eleven-year period from 2002-2013 was conducted on 8 commercial banks in Ethiopia by Fola, (2015) to explore the external and internal factors affecting banks liquidity. Using a fixed effect panel regression model on balanced data, the research indicated a statistically significant positive link between, interest rate margin, inflation, capital strength, and the dependent variable.

Statistically, the insignificant outcome was revealed between banks liquidity and profitability, bank size, non-performing loans, and gross domestic product were established to be statistically insignificant while's loan growth exhibited a negative relationship with liquidity. He recommended that commercial banks in Ethiopia can boost their liquidity position by developing

strategies, aiming and reengineering banks to move along with the key drivers of liquidity, both internally and externally.

Two measures of liquidity thus liquid assets to total assets and liquid loans to total loans were estimated in determining factors of banks liquidity in Tunisia with a sample of 18 banks (Moussa, 2015). A 10-year period data was analyzed through the method of static panel and method of panel dynamic. He had an insignificant outcome of financial costs to total credits, total deposits to total assets and bank size on the liquidity of banks. Meanwhile, a significant relationship exists between the liquidity of banks and financial performance, capital to total assets, operating cost to total assets, the growth rate of GDP, inflation rate, delayed liquidity.

Boadi et al., (2016) in using CAMEL controlling factors and external elements examines the performance of liquidity of Rural and Community Banks (RCBs) in Ghana where the moderating variable used is the market jurisdiction of RCBs'. They estimated 114 rural and community bank related factors across the panel and ordinary least square models ranging from 2005 to 2013. Their results suggested that positive influence and statistically significant relation exist between the liquidity of RCBs' and capital adequacy, management efficiency, GDP and asset quality.

External elements influence on the performance of banks have varied outcomes which endorsed studies on liquidity performance. They established that influences on liquidity performance of Ghanaians RCBs are inconsistent when management efficiency and profitability are regressed on it. Lastly, it was revealed in their study that, imprudent investment conduction and market jurisdiction negatively and significantly affects liquidity performance of RCBs' in Ghana.

2.4 Summary of Literature review.

The ability of banks to effectively perform their core function which is to give out loans and accept deposits hugely depends on liquidity. It is the capability of banks to meet their short term financial demands, thus their ability to quickly convert their securities to cash without losing capital or income in the process (BIS, 2008; Brunnermeier & Pedersen, 2007; Diamond & Rajan, 1999).

Liquidity issues arise from the ultimate task of banks in the maturity conversion of short-term deposits into long-term loans (Vodova, 2013). Even though liquidity form's part of the main sources of a bank's vulnerability, it provides justification to their defense in times of bank run (Bryant, 1980; Diamond & Dybvig, 1983). As the ultimate and oldest role of banks is to be an organization for maturity transformation one would assume a universal approval and understanding of the role they offer but banks including Ghanaian banks seems from time to time overlook this function hence, crises upon crises.

To ensure financial stability, most countries including Ghana have supervisory and monetary regulators that ensure that banks have or meet the adequate liquidity requirement. Holding a lot of liquid assets might seem good but it also comes with the risk of affecting profitability which is why there is the need for banks to know the external and internal factors that affect liquidity for it to be properly manage in ensuring the ultimate growth of the sector.

With the rapid introduction of new financial institutions in Ghana, resulting in a high level of competition between these institutions, there is the need for every bank within the banking industry to maintain a reasonable level of liquidity at all times to satisfy the need of both creditors and debtors (Na-ihmatu, 2015). It is in the light of this that liquidity is said to be of value hence the

need for this study which is to determine the Macroeconomic and Internal factors affecting the liquidity of listed banks in Ghana.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section discloses the strategies for gathering secondary data fundamental in examining the research. It talks about the examination configuration utilized. The techniques for collecting information, target population and the study design used are described under the methodology. In addition, it explained the data analysis, with more detailed information on the statistical instruments and models used for evaluating the data.

3.2 Research Design

The data consist of a compilation of macro-economic variables of Ghana's economy and bank-specific factors such as inflation, interest rate, and profitability. Research design is a comprehensive overview of how the study was conducted, according to Gall et al. (2006). Information collection, analysis techniques and processes used are specified in the research design. The study sought to examine the macro-economic factors and bank-specific determinants of liquidity affecting banks registered on the Ghana stock market.

To describe the link between variables, a descriptive research design was used to explain the techniques that quantitatively blend the real proof of an exact field of study. Using Descriptive research design to analyze studies under the field of economics and finance has substantiated its significance in assessing policies all over the world as indicated by Flick (2009).

3.3 Data Collection and Source of Data

The unit of analysis was secondary data obtained from the Bank of Ghana, Ghana Statistical Service, WDI (World Development Indicators, 2017) and reports available on the internet.

The data collected for the purpose of the research include macroeconomic factors made up of exchange rate, GDP, inflation rate, monetary policies, unemployment rate and internal factors which includes management efficiency, bank size, cost of funding, profitability and capital adequacy. Data for these factors were recorded for the eleven-year period between 2007 and 2017.

3.4 The population of the Study

As banks registered on the Ghana stock exchange has more than 40 percent of the banking industry's market share in terms of operating assets, deposits takings, loans and advances granted, when compared to the overall non-listed banks, the data sample size of this study therefore comprises of all registered banks on Ghana Stock market operating between the periods 2007 to 2017.

3.5 Ordinary Least Square Regression Model

The data was first estimated with the ordinary least squares regression model. The OLS estimator disregards the panel structure of the data and simply assume homoscedasticity and no correlation between a unit observation in different periods or between different units in the same period. If an individual effect u_i (cross-sectional or time-specific effect) does not exist ($u_i=0$), ordinary least squares (OLS) produces efficient and consistent parameter estimates while if they do, panel data

models provide ways in dealing with these problems. OLS regression model can best be explained when these assumptions exist thus, when the error term and a set of independent variables is used to formulate the regressed variable (linearity), when there is no correlation between the error term and the regressors, there are homoskedasticity, non-autocorrelation, and no multicollinearity and lastly when exogeneity means disturbances are not correlated with any independent variables.

3.6 Panel Regression Model

So as to manage the heterogeneity of a unit's observations and time, panel data approach is viewed as increasingly sensible. Firstly, the methodology permits the estimation of specific parameters as well as inquiries, without forcing prohibitive presumptions. Also, panel information takes into account conceivable changes at the individual dimension.

At last, the panel regression approach is viewed as increasingly exact in light of the fact that it isn't influenced by heterogeneity, not as in the standard multiple linear regression. What's more, the panel data is regularly bigger than cross-sectional data or time-series data collection. It permits explanatory factors to vary crosswise over time and individual variables. In addition, as indicated by Baltagi (2013) panel information gives the better understanding and dynamic of modification, when the interactions are large time-series observation (T), vibrant in nature and bulky cross-sectional observation (N).

3.7 Methodology

This study analyses balanced panel data of Ghanaian commercial banks registered on the stock market pertaining to the period from 2007 to 2017. Based on assumptions of the unobserved

individual effects within the cross-sectional time-series data, we applied both the fixed-effect model and random-effect model in describing or determining determinants of the dependent variable; bank liquidity.

Fixed effect or demean estimates produce consistent outcomes, which is why they are generally favored over random-effect estimates. Since the estimates of fixed effects do not rely on the premise that individual error term (ε) is not correlated to the independent variables (β s), it is more robust than random-effect estimates. In deciding which assumptions of the two models best describe the data, the Hausman test was conducted.

3.8 Model Specification and Variable Description

Analysis of panel data regression was used to establish the determinants of the outcome variable (liquidity) of banks registered on Ghana's stock exchange and it's the only realistic way for multiple linear regression models to handle analogous derivations and results.

Multiple linear regression specifications of determinants of the liquidity levels of banks to be assessed have been framed in the subsequent equation:

$$Y_{it} = \beta_0 + \sum_{j=1}^N \beta_j X_{jit} + \varepsilon_{it} \quad (3.1)$$

A panel with indices i and t which represent the different banks and year respectively was created.

Where β_0 is a common intercept across companies and β_j is the j^{th} coefficient for the j^{th} determinant variables or covariates over company i and time t , and ε_{it} is the error term.

The data comprised of 8 banks spread over 11 years (2007–2017). The entire number of observations was 88. As huge data of some sample will not provide a significant result during an examination, the natural log of some variables was taken to make the data concise. A small data point provides precise and lucid results by exhibiting a small variance. I have taken the natural log (L_N) of the variables COSTF and SIZE.

3.9 The Individual Specific Models

Under these models we assume that there is an unobserved heterogeneity captured by μ_i . Where μ_i is the unobserved effect or intercept of the individual companies which is time-invariant. And if there is a correlation between the individual specific effect μ_i and the regressors x_{it} then our panel data will be described by a fixed-effect model else random-effect model will be the best model to be used in describing the data.

3.10 Fixed Effect Model

We included specific fixed-effect μ_i . It denotes to any leftover deviation in the regressand that is not clarified by the regressors.

The fixed-effect model (FE) allows correlation between the specific fixed effect, μ_i and regressors,

x_{it} thus, $\text{corr}(\mu_i, \chi_{it}) \neq 0$

Each individual bank has different intercept term and the same slope

From equation (3.2), the fixed-effect model can be written as;

$$Y_{it} = \beta_0 + \sum_{j=1}^N \beta_j X_{jit} + \mu_i + \varepsilon_{it} \quad (3.2)$$

$$LIQ_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 L_NCOSTF_{it} + \beta_3 L_NSIZE_{it} + \beta_4 ERATE_{it} + \beta_5 CAP_{it} + \beta_6 GDP_{it} + \beta_7 MEFF_{it} + \beta_8 MPR_{it} + \beta_9 INFL_{it} + \beta_{10} UNEM_{it} + \mu_i + \varepsilon_{it} \quad (3.3)$$

Y_{it} = Bank liquidity: thus liquid assets over total assets

For $J=1, 2, 3, \dots, 8$ the independent variables are given as;

x_{1it} = Profitability (ROA); thus, return on assets

x_{2it} = log of cost of funding (LNCOSTF)

x_{3it} = log of bank size (SIZE) thus, total asset

x_{4it} = Exchange rate (ERATE)

x_{5it} = Capital adequacy ratio (CAP)

x_{6it} = Gross domestic product (GDP)

x_{7it} = Management efficiency (MEFF) i.e. expenses over the deposit

x_{8it} = Monetary policy interest rate (MPR)

x_{9it} = Inflation rate (INFL)

x_{10it} = Unemployment rate (UNEM)

ε_{it} = Error term

Estimation of Parameters

To estimate parameters under the fixed-effect model, we first found the demeaned dependent on the demeaned regressors and applied Ordinary Least Square

$$Y_{it} - \bar{Y}_i = \beta_0 + \sum_{j=1}^N \beta_j ((X_{it} - \bar{X}_i)_j) + (\varepsilon_{it} - \bar{\varepsilon}_i) \quad (3.4)$$

Where

$$\bar{Y}_i = \frac{1}{T} \sum_{t=1}^T Y_{it}$$

$$\bar{X}_i = \frac{1}{T} \sum_{t=1}^T X_{it}$$

$$\bar{\varepsilon}_i = \frac{1}{T} \sum_{t=1}^T \varepsilon_{it}$$

We then apply ordinary least square (OLS) on equation (3.4) for the estimation of parameters

3.11 Random Effect Model

The random effect model also included the individual-specific effect error term or intercept

Each individual has the same slope parameter but composite error term, η_{it}

Assumptions

$\{\mu_i\}$ are random variables instead of fixed, yet unknown parameters

Maybe policies, workers' expertise, and competencies

$\{\mu_i\}$ are independent of the error term random variables, $\{\varepsilon_{it}\}$

$$\text{Corr}(\mu_i, \varepsilon_{it}) = 0$$

There is an interclass correlation between composite errors

$$\text{Corr}(\eta_{it}, \eta_{is}) \neq 0, t \neq s$$

$\{\mu_i\}$ are identical and independently distributed (i.i.d.) with mean zero and variance σ_μ^2

From equation (3.3) the random effect model can be written as

$$Y_{it} = \beta_0 + \sum_{j=1}^T \beta_j X_{jit} + \eta_{it} \quad (3.5)$$

$$LIQ_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 L_NCOSTF_{it} + \beta_3 L_NSIZE_{it} + \beta_4 ERATE_{it} + \quad (3.6)$$

$$\beta_5 CAP_{it} + \beta_6 GDP_{it} + \beta_7 MEFF_{it} + \beta_8 MPR_{it} + \beta_9 INFL_{it} + \beta_{10} UNEM_{it} + \eta_{it}$$

Where,

$$\eta_{it} = \mu_i + \varepsilon_{it} \text{ (The composite error term)}$$

Optimization remains the same as in equation (3.2)

We transformed the Random effect model and thereafter applied OLS in estimating the parameters.

The transformed model is given by equation (3.7)

$$Y_{it} - \hat{\lambda} \bar{Y}_i = \beta_0 + (1 - \hat{\lambda}) \alpha + \sum_{j=1}^T \beta_j (X_{it} - \hat{\lambda} \bar{X}_i) + v_{it} \quad (3.7)$$

Where,

$$v_{it} = (1 - \hat{\lambda}) \mu_i + (\varepsilon_{it} - \hat{\lambda} \bar{\varepsilon}_i)$$

$$\hat{\lambda} = 1 - \frac{\sqrt{\frac{\text{var}(\varepsilon_{it})}{\text{var}(\eta_{it})}}}{1 + \frac{\delta_{\varepsilon}}{\sqrt{\delta_{\mu}^2 + \delta_{\varepsilon}^2}}}$$

3.12 Hausman Test

The Hausman test checks whether there is a substantial variance between the fixed and the random effects estimators

Hypothesis Testing:

Null hypothesis: The random effect model is more appropriate in describing the data

Alternate: the fixed effect model is more consistent in describing the data.

The Hausman test statistic is calculated for time-varying regressors

$$H = (\hat{\beta}_{RE} - \hat{\beta}_{FE})' \text{var}(\hat{\beta}_{RE}) - \text{var}(\hat{\beta}_{RE}) (\hat{\beta}_{RE} - \hat{\beta}_{FE}) \quad (3.8)$$

3.13 Unit Root Test

In ensuring the inclusion of the time series data stationarity, testing for the stationarity of each variables error term is essential especially concerning factors such as GDP and exchange rate which may add to the econometric problems leading to spurious regressions because they are characterized by unit-roots. For the purpose of this study, the Augmented Dickey-Fuller (ADF) unit root test will be conducted.

Hypothesis Testing:

Null hypothesis: The series is non-stationary

Alternate: The series is stationary.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

The presentation of the outcome of the research analysis and the interpretations of its result is discussed in this chapter. The outcome elaborated below entails, the descriptions of the variables, correlations between the variables, stationarity of the variables error term, the Hausman test for predicting the appropriate model and regressions results for both the ordinary least square model and the random effect model.

4.2 Data Analysis

Table 4.1 presents the descriptive statistics of variables for Ghanaian banks listed on the stock exchange. The table established the fact that listed Ghanaian banks hold (LIQ), on an average, 261% of liquid buffer (liquid asset over total asset). Profitability measured by ROA came out to be 8%. To make the data more concise for further analysis, the log of some variables were taken.

Table 4.1 Descriptive Statistics of the Sample Data (2007-2017)

	LIQ	LNCSTF	CAP	ROA	MEFF	INFL	MPR	ERAT	GDP	UNEM
Min.	0.09	8.64	0.02	-0.02	0.01	8.4	12.5	0.92	0.12	0.07
1st Qu.	0.59	16.18	0.13	0.02	0.06	10.03	13.5	1.43	1.16	0.37
Median	0.67	17.46	0.16	0.04	0.09	12.9	16	1.83	4.82	0.5
Mean	2.61	16.28	0.16	0.08	0.11	13.5	17.55	2.32	4.34	1.31
3rd Qu.	0.79	18.3	0.18	0.05	0.12	16.9	21	3.76	6.35	0.64
Max.	0.91	19.49	0.5	0.75	1.37	20.7	26	4.41	11.28	4.93
std.Dev	0.17	2.89	0.07	0.15	0.14	3.81	4.37	1.19	3.3	1.69
Kurt	4.22	3.16	10.57	11.65	69.35	1.84	2.25	1.74	2.61	3.04
Skewness	-1.08	-1.26	1.93	3.05	7.83	0.33	0.67	0.57	0.55	1.4

4.3 Correlation Analysis

Correlation coefficients between dependent variables and the regressors were explained by the table of the correlation matrix. A high correlation between dependent variables is acceptable while it's unacceptable for high correlation to exist between independent variables. Besides, if a high correlation coefficient exists between two independent variables, either one of such factors or both are excused from the analysis or each of those is considered as an individual factor. Multicollinearity is present when a correlation coefficient between two independent variables is above 0.55.

Table 4.2 Correlation Matrix

	LIQ	COSTF	CAP	ROA	MEFF	INFL	MPR	ERATE	SIZE	GDP	UNEM
LIQ1	1.00										
COSTF	0.13	1.00									
CAP	0.03	-0.20	1.00								
ROA	0.08	0.01	0.05	1.00							
MEFF	0.11	0.21	-0.22	0.20	1.00						
INFL	0.11	0.18	-0.02	0.20	0.22	1.00					
MPR	0.06	0.23	0.05	0.16	0.01	0.70	1.00				
ERATE	-0.01	0.19	0.10	0.19	-0.11	0.87	0.35	1.00			
LNSIZE	0.34	0.90	-0.14	0.02	0.16	0.11	0.20	0.19	1.00		
GDP	-0.04	-0.12	0.06	-0.19	-0.08	-0.71	-0.61	-0.41	-0.10	1.00	
UNEMP	0.09	-0.07	-0.19	0.01	0.26	0.34	-0.25	-0.53	-0.03	-0.17	1.00

Table 4.2 shows, a high correlation exists between the following independent variables; LNSIZE and LNCOSTF, MPR and INFL, and ERATE and INFL. These variables have correlation coefficient 0.90, 0.70 and 0.87 respectively. Apart from these independent variables mentioned above the other independent variables have all shown less collinearity between them since their correlation coefficients are less than 0.55.

Table 4.3 Unit Root Test

Chi-sqr	Df	P-value
525.55	24	0.000

The Unit root test applied for determining the stationarity of the variable with a p-value of 0.000 less than the 0.05 rejects the null hypotheses in favor of the alternative and conclude that all variables are stationary at a significance level of 0.05 which indicates that the entire parameter and a regression model are not spurious.

4.4 Regression Analysis (Ordinary Least Square Estimation)

The data was first estimated with Ordinary Least Square model for the ratio: Liquid assets to Total assets (LIQ). Result for the estimation is presented in Table 4.4. Management efficiency and bank Size were found to significantly influence listed banks liquidity in a positive way whiles the other regressors did not indicate any useful impact on liquidity as shown from table 4.4. Since the OLS estimator disregards the panel structure of the data and simply assume homoscedasticity and no correlation and multicollinearity between a unit observations in different periods or between different units in the same period, panel data models (Fixed and Random effect estimates) are conducted to help explain the data better.

Table 4.4 OLS Regression model for LIQ (Liquid assets to Total assets)

	Coeff	Std-Err	P-value
(Intercept)	0.2436	0.2549	0.3433
CAP	0.0929	0.2871	0.7474
ROA	0.0190	0.1244	0.8790
MEFF	-1.0779	0.4593	0.0225*
INFL	0.0169	0.0184	0.3604
ERATE	-0.0487	0.0360	0.1813
LNSIZE	0.0213	0.0066	0.0020*
GDP	-0.0096	0.0352	0.7871
UNEMP	0.0059	0.0170	0.7281
R-Sq	0.198		
Adj.R-Sq	0.0814		
Df	8 and 55		
F-stat	1.698		
p-value	0.1196		

Significance code 0.05

4.5 Regression Analysis (Fixed and Random Estimates)

From **table 4.5** below, the Hausman test was run alongside the fixed-effect and random-effect regressions to choose the appropriate test suitable for the analysis. The Hausman test carried out indicated a p-value of 0.9928 being greater than 0.05, which means we do not reject the null

hypothesis in favor of the alternative. The random-effect estimate is therefore approved over the Fixed-effect estimate as established in Table 4.5.

Table 4.5 Hausman Test for LIQ

F-Stat	Df	P-value
1.4962	8	0.9928

Table 4.6 contains the results of the random effect regression model. The small p-values of the Random effect estimates concluded that INFL, ERATE, GDP and UNEMP and LNSIZE significantly affect LIQ. GDP, INFLA, and LNSIZE positively influenced liquidity whereas the impact of ERATE and UNEMP was negative.

Table 4.6 Regression model for LIQ (Liquid assets to Total assets)

	Coeff	Std-Err	P-value
Intercept	4.6441	6.895	5.376e-12**
CAP	-0.138	0.2724	0.625
ROA	0.113	0.1133	0.37
MEFF	0.113	0.7228	0.406
INFL	0.0809	2.451	0.01425**
ERATE	-0.7543	-7.261	3.845e-13**
LNSIZE	0.022	0.0698	0.027**
GDP	0.1168	3.523	0.00051**
UNEMP	-0.9758	-13.948	2.2e-16**
R-Square	0.8259		
Adj.RSq	0.8083		

F-stat	374.7970
p-value	2.2E-16

Significant code 0.05

The Random-effect test revealed that R-square Adjusted had a value of 0.8083 which confirms model fitness. It also shows significant p-value of 2.2E-16 less than 0.05.

4.6 Interpretation of Results

The aim of this study is to evaluate the determinants of liquidity for listed banks in Ghana. To accomplish this exchange rate, inflation, monetary policy, bank size, unemployment rate, GDP, capital adequacy, profitability, management efficiency and cost of the fund were regressed on liquid assets to total assets ratio. The results of this analysis are presented in table 4.6 above.

As reported in the table, the capital adequacy ratio has a coefficient of -0.138. This indicates a negative effect on liquidity, suggesting that banks with a high ratio of staple capital to their overall assets would experience lower liquidity. The effect of capital adequacy on liquidity was establish to be statistically insignificant at 5% level with probability (p-value) of 0.625 greater than 0.05.

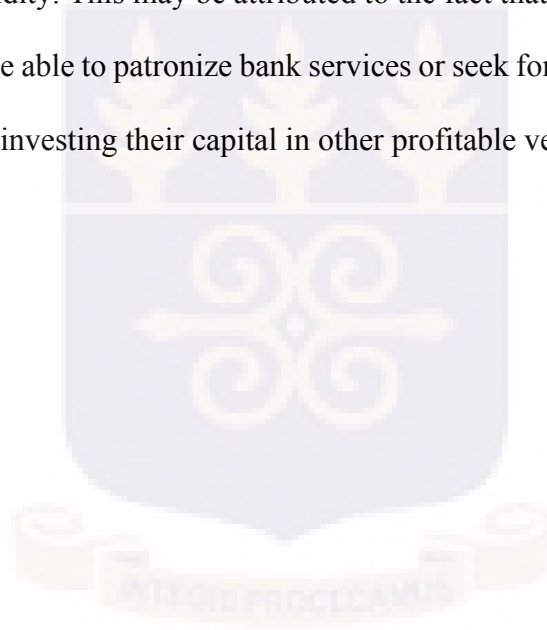
This contrast with studies from Diamond and Rajan (2001), Vodova (2011) and Vodova (2013) where they countered the theory that a high level of capital decreases with liquidity creation. The inverse relationship was proven from the recent happenings in the Ghanaian banking industry where the rise in the minimum capital requirement made it difficult for banks to decide whether to save more to meet the minimum capital requirement or keep more liquidity to meet with the increasing withdrawal needs of the customers due to the crises.

With a probability of 11.3%, profitability positively but insignificantly affects the liquidity of listed banks in Ghana. The relation between bank profitability and liquidity is varying with standard finance theory which accentuates the negative correlation of profitability and liquidity. The risky nature of some investments makes it necessary for the provision of adequate liquidity when banks want to improve or increase profit by investing in risky assets. Similar to these results are the studies of Vodova (2013) and Singh & Sharma (2016).

Management efficiency also exhibited positive but insignificant influence on liquidity. Management efficiency which has a coefficient of 11.3% indicated that for every marginal increase in management efficiency (that is an increase in operating expense), listed bank liquidity declines by 11.3% for the period which is a clue of weak management. A low value represents efficient management with good control of operating expenses with respect to listed banks total assets as indicated by Al-Harbi (2017) and Boadi et al. (2016). Inflation and exchange rate in contrast, have a significant influence on listed banks liquidity. With inflation, the study had similar findings with Singh & Sharma (2016) and Fola (2015) which proposed that, as an inflation rate of an economy rises, banks initiate reserving of more liquidity to curtail the consequence of inflation on the economy. This result is different from the study Moussa (2015) conducted. The opposite suggestion can be used for that of the exchange rate.

Bank Size is the only internal regressor that had a positive and significant influence on listed banks liquidity. It should be noted that based on the convenience of total assets, banks which are small in size needs to hold more liquidity buffer because they are limited to the external sources of funding which is mostly available to larger banks and in effect making them hold less liquidity. The outcome is coherent with the results of Aspachs et al (2005) and Fola (2015) but opposite to that of Bonfim and Kim, (2012), Dinger (2009) and Alger and Alger (1999).

GDP often used to signal the health of a state is also used as a gauge for business cycle. The result found of GDP contrast with the principle of bank liquidity and financial fragility that states high GDP growth shows an escalation in business undertakings, which in effect, upset banks' liquidity in a negative way since banks increase the loans granted and vice versa. Similar to the result is that of Vodova (2013), Fola (2015) and Boadi et al. (2016). Whiles Singh & Sharma (2016), Ferrouhi & Lehadiri (2014) Vodova (2013) all found unemployment to have insignificant relation with liquidity, the study rather had a negative and significant relation between unemployment and liquidity. This may be attributed to the fact that as unemployment increases, more people might not be able to patronize bank services or seek for loans. Banks therefore, tend to hold less liquidity by investing their capital in other profitable ventures.



CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

The final chapter of this research offers the conclusion and recommendation to the study which sought to explore the internal and macroeconomic factors that affect listed banks liquidity in Ghana.

5.1 Conclusion

The main purpose of this study was to empirically analyze the bank-specific and external factors of bank Liquidity in Ghana based on the eight (8) listed banks on the stock exchange which covered the period of 2011 to 2017. The external factors include exchange rate, inflation, monetary policy, unemployment rate, GDP while the internal variables include management efficiency, bank size, profitability, cost of fund and capital adequacy. Panel regression analysis was employed to test for variables affecting the liquidity ratio, liquid assets to total assets.

In conducting the panel regression, two separate analyses were performed thus the fixed effect and random effect regression models.

To choose between the two models, the Hausman test was conducted to select the appropriate model. The outcome of the Hausman test showed that the random effect panel regression was the most suitable for the liquidity ratio. Hence all conclusions and consequences follow from the results of the random effect panel regression. Prior to the running of the panel regression, tests of

correlation and variance inflation factor were carried out to test and avoid multicollinearity among independent variables.

Also, the Unit root test was conducted to investigate whether the variables were stationary while the Ordinary Least Square regression was also conducted to check whether it will be more suitable for modeling the data. The empirical findings of this study suggest the following conclusions;

The result showed bank size is the only bank-specific variable that positively affects liquidity at 5% significant level whilst capital adequacy, profitability, management efficiency did not show any significant impact on liquidity. Although capital adequacy, profitability, management efficiency was statistically insignificant, the direction of their relationship conveys a strong and important message for a policy decision.

In addition, inflation rate, exchange rate, GDP and unemployment significantly affected liquidity with inflation and GDP exhibiting a positive impact at 5% significance level and exchange rate and unemployment having a negative impact at that same level. The variables also highly explained variations on commercial banks liquidity risk as indicated by the coefficient of determination.

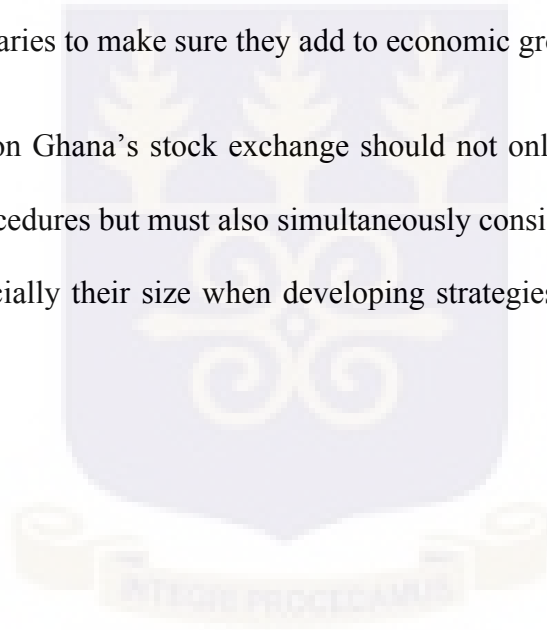
As established from the outcome above, the study therefore resolved that inflationary rate, unemployment, exchange rate, gross domestic products as well as size of bank significantly determine the liquidity of listed banks in Ghana.

5.2 Recommendation

With reference to the results established in the study, it can be recommended that, since majority of the macroeconomic variables thus exchange rate, GDP, inflation rate and unemployment affect a banks' liquidity, the direction of banks liquidity in Ghana can be inferred from these factors when used as liquidity indicators or signals in Ghana.

Also, the constant introduction of new minimum capital requirements and reviewing of new guidelines, directives, and policies by Bank of Ghana is really necessary as macroeconomic factors continue and frequently varies to make sure they add to economic growth.

Lastly, registered banks on Ghana's stock exchange should not only be alarmed about external structures, policies or procedures but must also simultaneously consider both the external settings and internal factors especially their size when developing strategies to efficiently manage their liquidity position.



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