

**DETERMINANTS OF LIQUIDITY RISK OF COMMERCIAL BANKS IN
KENYA**

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**A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF
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DECLARATION

This research project report is my original work and has not been presented for a degree in any other university.

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This research project report has been submitted for examination with my approval as University Supervisor.

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DEDICATION

I dedicate this research project to my family for the special part they occupy in my life and for the support they accorded me during the entire period of study.

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ABSTRACT

The objective of this study was to establish the determinants of liquidity risk for commercial banks in Kenya. The study employed a descriptive research design. A census targeting the 43 commercial banks licensed in Kenya between 2010 and 2014 was conducted. The study used secondary data obtained from the Central Bank of Kenya website and the respective banks website. Multiple regression analysis was used to evaluate the determinants of liquidity risk. Capital adequacy ratio, liquid assets ratio, ownership type, size and leverage were regressed on loan to deposit ratio. The coefficient of determination R^2 was used to evaluate the explanatory power of the regression. Analysis of variance (ANOVA) was used to test significance of the regression result at 5% level. The result of regression indicated that capital adequacy had positive effect on liquidity risk while liquid asset ratio, ownership type, size and leverage had negative effect. The coefficient of determination R^2 for the regression model was found to be 0.185, indicating that the model had a moderate explanatory power. The result of analysis of variance indicated that capital adequacy, liquid asset ratio, ownership type, size and leverage were significant determinants of liquidity risk at 5% significance level. The study concluded that capital adequacy ratio, liquid asset ratio, ownership type, size and leverage were significant determinants of liquidity risk. The study recommends that bank managers can effectively manage liquidity risk by collectively focusing on capital adequacy, liquid asset ratio, ownership type, size and leverage. Further studies may seek to identify qualitative factors that influence liquidity risk, the effect of macroeconomic factors on liquidity risk, evaluating the strategies that managers use to mitigate exposure to liquidity risk.

LIST OF ABBREVIATIONS AND ACRONYMS

ATS – Automated Trading System

CAR – Capital Adequacy Ratio

CBK – Central Bank of Kenya

CSD – Central Securities Depositories

GDP – Gross Domestic Product

LAR – Liquid Asset Ratio

LDR – Loan Deposit Ratio

LLRR – Loan Loss Reserve ratio

LEV – Leverage

NPL – Non Performing Loans

NSE – Nairobi Securities Exchange

OWNT – Ownership Type

PRFT – Profitability

UK – United Kingdom

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Liquidity risk arises from the fundamental role of banks in the maturity transformation of short term deposits into long term loans. It is the inability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. It is 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. It includes 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 (Decker, 2000). Drehmann and Nikolaou (2009) stated that liquidity risk can adversely affect the earnings and capital of banks. Thus bank's management must ensure there are sufficient funds to meet future demands of providers and borrowers at reasonable costs.

The inventory theory of capital and liquidity buffer argue that it is costly for banks to keep a stock of liquid assets but may also be beneficial as it reduces the probability of running out of cash. Profitability is improved for banks that hold some liquid assets; however, beyond a certain point holding further liquid assets diminishes a bank's profitability. This argument is in line with the idea that the opportunity cost of holding low-return assets eventually outweighs the benefit of any increase in the bank's liquidity. However there are benefits to holding more liquid assets when economic conditions deteriorate (Baltensperger, 1980). Goodhart(2008) notes that the ultimate objective of any commercial bank is to maximize the profit but preserving liquidity is equally an

important objective. The dilemma that is faced by the management of commercial banks is that increasing profits at the cost of liquidity can bring serious problems to the bank. The inventory theory predicts that the size of liquidity buffer should reflect the cost of foregone return from holding liquid assets rather than loans, and the cost of raising funds at a short notice and should also relate to the distribution of liquidity risks that the bank face.

Commercial banks play the critical roles of financial intermediation, liquidity transformation and risk transformation. In Kenya commercial banks dominate the financial sector and as such the process of financial intermediation in the country depends heavily on commercial banks (Kiganda, 2014). Kenyan commercial banks are licensed and regulated pursuant to the provisions of the Banking Act and the regulations and prudential guidelines issued by the Central Bank of Kenya. Central bank of Kenya regulations requires commercial banks to maintain a liquidity buffer of twenty percent (CBK, 2014). In a country where commercial banks dominate the financial sector a liquidity shortage from the commercial banks would have an immense implication on the economic growth of the country. As at December 2014 Kenya had 43 commercial banks (CBK, 2014). The banking sector is the largest sector by the number of listed companies at the Nairobi Securities exchange with eleven commercial banks (appendix 1) being listed under the sector. Listing at the Nairobi Securities Exchange can be considered an important aspect for a bank as will provide a bank with an easier access to capital markets where it can issue securities to finance a liquidity gap.

1.1.1 Liquidity Risk

Liquidity risk is the possibility that over a specific time period, the bank will become unable to settle obligations with immediacy (Drehmann and Nikolaou, 2009). It is a risk arising from a bank's inability to meet its obligations when they come due without incurring unacceptable losses. This risk can adversely affect both banks' earnings and the capital and therefore, it becomes the top priority of a bank's management to ensure the availability of sufficient funds to meet future demands of providers and borrowers, at reasonable costs. The vulnerability of banks to liquidity risk is determined by the funding risk and the market risk. Liquidity risk needs to be monitored as part of the enterprise-wide risk management process, taking into account market risk and credit risk to ensure stability in the balance sheet and dynamic management of liquidity risk. Jenkinson (2008) notes that Liquidity risk not only affects the performance of a bank but also its reputation. A bank may lose the confidence of its depositors if funds are not timely provided to them. The bank's reputation may become at stake in this situation.

Diamond and Dybvig (1983) posit that the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk. The liquidity risk refers to the inability to sell assets at or near the fair value, and in the case of a relevant sale in a small market; it can emerge as a price slump. Goodhart (2008) posits that there are two basic facets of liquidity risk: maturity transformation (the maturity of a bank's liabilities and assets) and the inherent liquidity of a bank's asset (the extent to which an asset can be sold without incurring a significant loss of value under any market condition). Banks do not need to be worried about the maturity transformation if they

have the assets that can be sold without bearing any loss. Whereas, banks having assets that are going to be matured in a shorter period may have a less need to keep the liquid assets. This increases the demand of depositors creating liquidity risk. This may cause the failure of a given bank or even the entire banking system due to contagion effect (Diamond and Rajan, 2001).

1.1.2 Determinants of Liquidity Risk

Saunders and Cornet (2006) posit that liquidity risk can be measured by two main methods: liquidity gap and liquidity ratios. Shen, Chen, Kuo and Yeh (2009) using liquidity ratios found that bank size was a major determinant of bank liquidity risk. They found that liquidity risk was positively related to size but beyond a certain level it was negatively related. Thus the relation between bank size and liquidity risk was found to be nonlinear. Bunda and Desquilbet (2008) included the size of a bank in the determinants of liquidity risk of banks from emerging economies. The result showed that the size of a bank had a positive effect on liquidity risk.

Liquidity risk is influenced by capital adequacy, banks with higher capital adequacy ratio experience lower liquidity risk. Capitalization and size of the bank has a positive influence on liquidity risk. Bigger banks present lower liquidity where it would seem that bigger banks are less motivated to hold liquidity since they rely on government intervention in case of shortages (Vodova, 2011). Also Bonfim and Kim (2011) underline that banks with a better capital adequacy present a lower liquidity risk exposure.

Capitalization measured by the ratio between equity and total assets has a significant effect on liquidity risk since it affects a banks' ability to obtain funding from the capital markets (Bunda and Desquilbet, 2008). Ahmed, Ahmed and Naqvi (2011) found out that liquidity risk is influenced by leverage and the measures of bank tangibility. Shen et al. (2009) noted that a banks reliance on non-deposit sources of funding to be an important factor in assessing a banks liquidity risk. They argued that the larger the funds that banks would need to borrow in the money market, the greater the liquidity risk they would be challenged with. Dang (2011) claimed that the quality of a banks' loan portfolio also determines the banks liquidity risk.

1.1.3 Commercial Banks in Kenya

Licensing and regulation of banks Kenya is the responsibility of the Central Bank of Kenya. Kenya has 43 licensed commercial banks (CBK, 2014). The Banking Supervision department carries out the function of supervising banks to ensure the following; liquidity, solvency, and proper functioning of a stable market based banking system. Further to this, audited performance of the banking sector is measured in terms of capital adequacy, asset quality, liquidity, and earnings based on the Central Bank internal rating system. Under section 19 of the Banking Act in Kenya, an institution shall maintain a minimum holding of liquid assets as the Central Bank may from time to time determine. Currently an institution is required to maintain a statutory minimum of 20% of its deposit liabilities with the Central Bank (CBK, 2014).

The Central bank has adopted the Capital Adequacy, Asset Quality, Management Quality, Earnings and Liquidity (CAMEL) rating system in assessing the soundness of the commercial banks. The banking sector registered enhanced performance during the year ended December 2014. The sector recorded a 12.2 percent growth in pretax profits during the year. Both the total net assets and total deposits held by commercial banks recorded growth rates of 18.4 percent. The sector also recorded strong capitalization levels as a result of retention of profits and additional capital injection. The lag effects of high interest regime in 2012/2013 and subdued economic activities witnessed in the period ended December 2014 impacted negatively on the quality of loans and advances. As a result, non –performing loans (NPLs) increased by 32.4 percent from 2013. As per the CBK Prudential Guideline on Capital Adequacy, the minimum regulatory capital adequacy requirements that are measured by the ratio of Core Capital and Total Capital to Total Risk weighted assets were 8 per cent and 12 per cent respectively. These ratios decreased from 18 per cent and 21 percent in 2013. The decline is attributable to higher increase in total risk weighted assets, which grew by 31 per cent compared to the increase in the core capital and total capital. Liquidity is one of the important financial stability indicators since liquidity shortfall in one bank can cause systemic crisis in the banking sector due to their interconnected operations. Liquidity held by commercial banks depicts their ability to fund increases in assets and meet obligations as they fall due. The banking sector average liquidity in 2014 was above the statutory minimum requirement of 20 per cent., with all the banks meeting the minimum requirement. The liquidity ratio stood at 37.7 per cent as at 31st December 2014 compared to 38.6 per cent registered in December 2013. The marginal decline in the liquidity ratio is attributable to the increased lending in

2014 as reflected in the increase in loans to deposits ratio from 81.6 per cent in 2013 to 83.1 per cent in 2014 (CBK, 2014).

1.2 Research Problem

Diamond and Dybvig (1983) noted that in performing the fundamental role of providing liquidity by transforming short term deposits into long term loans banks are inherently vulnerable to liquidity risks, the risk that demands for repayment outstrip the capacity to raise new liabilities or liquefy assets. According to Decker (2000) liquidity risk is the inability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. It is 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. Gomes and Khan (2011) indicate that liquidity risk as the inability of a firm to generate funds by deploying assets held on its balance sheet to meet financial obligations on short notice. The liquidity position of a given bank is determined primarily by its holdings of cash and other readily available marketable assets, as well as by its funding structure and the amount and type of contingent liabilities that may come due over a specified horizon. Rochet and Vives (2008) pointed that the primary source of liquidity risk is due to the development of certain assets and liabilities. On the liability side, there is a large uncertainty about the volume of deposit withdrawals or the renewal of rolled over interbank loans especially when the bank is under suspicion of insolvency or when there is a temporary aggregate liquidity shortage. On the assets side there is uncertainty on the volume of new request for loans that a bank will receive in the future.

Baltensperger (1980) inventory theory of capital and liquidity buffer argue that it is costly for banks to keep a stock of liquid assets but may be also beneficial as it reduces the probability of being out of stock in case of deposit withdrawals. The inventory theory predicts that the size of liquidity buffer should reflect the cost of foregone return from holding liquid assets rather than loans, and the cost of raising funds at a short notice. Diamond and Rajan (2001) argue that from individual banks' point of view holding sufficient liquidity is necessary to insure against liquidity risk. As loans are relatively illiquid, large and unexpected deposit withdrawals can lead to insolvency as it may be too costly or not possible to raise liquidity on short notice, due to capital market imperfections. The shift ability theory holds that banks could most effectively protect themselves against massive deposit withdrawals by holding, as a form of liquidity reserve, credit instruments for which there existed a ready secondary market.

A number of studies have been conducted in to evaluate the determinants of liquidity risk in developed markets. These studies provide some evidence on the determinants of liquidity risk. Vodova (2011) indicated that capital adequacy, capitalization and size had a significant positive relationship with liquidity risk. Doriana (2013) found that bigger banks have higher liquidity risk while assets quality impacts liquidity risk only in the short term. Bunda and Desquilbet (2008) established that bank size had a positive effect on liquidity risk while equity to assets ratio had a negative effect. In Kenya liquidity risk management has been of major concern over the years. To mitigate liquidity risk the CBK requires banks management to develop and implement adequate liquidity risk policies. Commercial banks are required to maintain a minimum liquidity ratio of 20%.

In the year 2014 the central bank reported that the average liquidity ratio for the commercial banks was 37.40% (CBK, 2014) which is way above the required minimum. However this is not to be understood that Kenya's commercial banks are safe of the liquidity risks. The actual liquidity ratio hence liquidity risk differs among banks. Njeri (2013) found a positive association between liquidity and financial performance of microfinance institutions. Kamau, Erick and Muriithi (2013) found that credit rating, monetary policies, government expenditure and balance of payment status affected liquidity of commercial banks. Maaka (2013) found that liquidity risk had a negative effect on profitability of banks. While the studies done in the Kenyan commercial banking environment have largely evaluated the effect of liquidity risk on financial performance, limited attention have been given to the determinants of liquidity risk. This study sought to fill this gap in knowledge by addressing the following question: What are the determinants of liquidity risk for commercial banks in Kenya?

1.3 Research Objective

The objective of this study was to establish the determinants of liquidity risk for commercial banks in Kenya.

1.4 Value of the Study

The recent financial crisis underlined the importance of sound bank liquidity management. In response, regulators are devising new liquidity standards with the aim of making financial system more stable and resilient. Liquidity problems may adversely affect the financial performance of a bank as well as its solvency. It is therefore important

that industry players understand what effect determinants of liquidity risk have on their day to day decision making. Banks senior management will refer to this report in improving and formulating more focused and robust decisions.

From a policy perspective, the results of this study will be highly relevant. As the policy makers devise standards establishing appropriate level of liquidity for banks, helping to ensure adequate stability for the overall financial system, they should bear in mind the trade –off between resilience to liquidity shocks and the cost of holding lower yielding liquid assets. While holding liquid assets will make banks more resilient to liquidity shocks, thus reducing the negative externalities they might impose on the economic agents, holding too many may impose a significant cost in terms of reduced profitability

In theory the study will contribute to the existing literature on risk management and particularly to research that analyzes liquidity risk and its determinants. The study could be used as an initiation for those who are interested to conduct further studies in relation to liquidity risk in other financial institutions or the financial markets generally.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviewed various theories suggested to explain liquidity risk management within financial institutions as well as the related empirical evidence. The chapter was organized as follows; discussion of the relevant theories followed by the empirical review and a summary of the literature concluded.

2.2 Theoretical Review

This study was anchored on three theories namely inventory theory of capital and liquidity buffer, shiftability theory and risk absorption hypothesis.

2.2.1 Inventory Theory of Capital and Liquidity Buffer

Baltensperger (1980) argued that it is costly for banks to keep a stock of liquid assets but may be also beneficial as it reduces the probability of being out of stock in case of deposit withdrawals. The cost of holding liquid assets (with low returns compared with other types of investments) is compared to the benefits of reducing risks of “running out”. The inventory theory predicts that the size of liquidity buffer should reflect the cost of foregone return from holding liquid assets rather than loans, and the cost of raising funds at a short notice. It should also relate to the distribution of liquidity shocks that the bank may face, and in particular be positively related to the volatility of the funding basis as well as the cost of raising additional funds. In order to lessen the maturity gap between assets and liabilities or the inherent liquidity risk, banks can adequately manage the liquidity risk underlying their balance sheet structure by holding a buffer of liquid assets.

Banks create liquidity and transform assets by investing into illiquid loans which are financed with liquid deposits. It involves risk associated with financing illiquid loans with short term deposits. This mismatch causes banks vulnerability to depositors' confidence. Banks hold illiquid loans that are hard to sell at short notice without incurring a loss if there is a large deposit outflow. To insure against liquidity risk arising from massive deposit outflows banks can hold significant liquidity and capital buffers (Diamond and Dybvig, 1983).

According to Diamond and Rajan (2001) it is necessary for individual banks' to hold sufficient liquidity to insure against liquidity risk. As loans are relatively illiquid, large and unexpected deposit withdrawals can lead to insolvency as it may be too costly or not possible to raise liquidity on short notice, due to capital market imperfections. Instead of self-insuring, banks could resort to other forms of financing, such as accessing interbank markets, central bank liquidity windows, or external credit lines. However, asymmetric information may lead to coordination failures on the interbank market, and external credit lines may freeze, so that solvent but illiquid banks would still fail, absent a lender of last resort. Thus banks hold a buffer of liquid assets as self-insurance, equating the marginal benefit of holding liquid assets to the marginal cost of alternative investments

2.2.2 The Shift ability Theory of Liquidity

Formally developed by Harold Moulton in 1915, the shift ability theory held that banks could most effectively protect themselves against massive deposit withdrawals by holding, as a form of liquidity reserve, credit instruments for which there existed a ready

secondary market. Included in this liquidity reserve were commercial paper, prime bankers' acceptances and, most importantly as it turned out, Treasury bills. Under normal conditions all these instruments met the tests of marketability and, because of their short terms to maturity, capital certainty. The shift ability theory was enhanced during the 1930's and 1940's by the rapid growth in volume of short-term U. S. Government obligations (Diamond, 1984).

Allen and Gale (2004) noted that the shift ability theory provided a theoretical framework that could accommodate new and innovative approaches to business lending by commercial banks. This was so because liquidity meant the ability to exchange secondary reserve assets for cash, an approach that relaxed the constraints previously placed on loan arrangements. As bank holdings of Government securities grew, the thrust of the liquidity question was increasingly transferred from loan to investment portfolios. Bank lending techniques changed dramatically against this background, a process that was stimulated as a result of changes in business credit demands after the Great Depression. It is under the shift ability theory of liquidity that commercial bank loan commitment practices began to assume the form that prevails today. By holding liquid assets with a ready market, commercial banks are able to minimize vulnerability to liquidity risk.

2.2.3 Risk Absorption Hypothesis

Diamond and Dybvig (1983) framed a risk absorption hypothesis linking a bank capital to liquidity creation. The hypothesis stems from the role of banks as risk transformers. The risk absorption hypothesis predicts that increased capital enhances the ability of banks to create liquidity. Liquidity creation increases the bank's exposure to risk because

banks that create more liquidity will face greater losses when they are forced to sell illiquid assets to satisfy the liquidity demands of customers while bank capital allows the bank to absorb greater risk.

Risk absorption effect is relatively strong for large banks because these institutions are subject to more regulatory and market discipline. The effect may be relatively strong for banks with low capital ratios of any size because these banks have thin buffers to absorb risks and tend to face more regulatory, market, and/or owner pressures to control risk taking. That the net effect of capital on liquidity creation is positive and statistically significant is consistent with the risk absorption effect (Berger and Bouwan, 2009).

2.3 Determinants of Liquidity Risk

2.3.1 Bank Size

Shen et al. (2009) considered bank size as one of the major determinants of bank liquidity risk. They suggest that bank size measured by the bank's total assets contributes to its liquidity levels since it has an effect on its ability to mobilize funds from different sources as well as the cost associated with it. As banks grow in size, they acquire the inherent capacity to mobilize many deposits with less difficulty and for that matter are able to grant more loans at any point in time. Further they noted that the huge financial commitments associated with several branch openings increases vulnerability to liquidity risk. Bunda and Desquilbet (2008) included the size of a bank in the determinants of liquidity risk of banks from emerging economies. Their result showed that the size of a bank had a positive effect on liquidity risk.

2.3.2 Liquid Assets Ratio

Jasienei, Jonas Filomena and Grazina (2012) indicated that the nature of banks assets in terms of the propensity to transforming them into cash or very liquid assets affects its liquidity risk. Because a bank could sell or collateralize its liquid assets to obtain liquid funds, holding liquid assets can reduce a bank's liquidity risk. However, this may not be the case for all the banks due to the difficulty in selling or collateralizing their liquid assets. As a result, in order to ascertain the degrees of liquidity of each bank's assets, the liquid assets are classified into either risky liquid assets or less risky liquid assets after which each is divided by the bank's total assets for standardization. Less risky liquid assets include liquid assets such as cash and balances with central bank, treasury bills, monies due from other banks and other short term government securities which could be sold with little price risk and low transaction cost and easily passes for collateral as well.

Risky liquid assets include investment in medium and long term securities and other financial products presented on the bank's balance sheet which are relatively difficult to sell or collateralize when the need arises. With respect to the relationship with liquidity risk, it is expected that risky liquid assets has a positive relationship while less risky liquid assets have a negative effect on the liquidity risk of each bank. The higher the proportion of less risky liquid assets to the bank's total assets, the better the position of the bank to finance its obligations as they fall due while the opposite is expected to be true for risky liquid assets (Jasienei, et al., 2012).

2.3.3 Asset Quality

Dang (2011) noted that loans are the major asset of commercial banks from which they generate income. The quality of loan portfolio determines the banks liquidity risk. The loan portfolio quality has a direct bearing on bank liquidity since the highest risk facing a bank is the losses derived from delinquent loans. Li (2007) posited that ratio of loan loss provision to total loans is a measure of bank's asset quality that indicates how much of the total portfolio has been provided for but not charged off. The higher the ratio the poorer the quality and hence the higher the liquidity risk of the loan portfolio will be.

2.3.4 Capital Adequacy

Ayele (2012) points that capital adequacy is a measure of a bank's financial strength, in terms of its ability to withstand operational costs and fund liquidity. The study suggest that the regulatory requirement on the minimum capital required to be maintained by banks, the ratio of core capital to customer deposits as measure of capital adequacy to be a significant determinant of liquidity risk. Capital adequacy also indicates the ability of bank to undertake additional business. The size of capital provides financial flexibility for bank and financial institution. Banks with high capital ratio tend to experience lesser probability of liquidity risk. Ongore and Kasu (2013) argued that capital adequacy ratio shows the internal strength of the bank to withstand losses during crisis. The ratio is directly proportional to the resilience of the bank to crisis situations

2.3.5 Ownership Type

Siaw (2013) suggested that ownership structure of banks can also determine the vulnerability of a bank to liquidity risk. Banks with external affiliations are able to manage their liquidity better than local banks because of the opportunity of getting

external help from their foreign partners in times of difficulty which may not be the same for a local bank. Banks' vulnerability to liquidity risk is expected to be significantly different from the other in line with the type of ownership be it foreign or local. The study suggests that liquidity risk is thus expected to have a positive relationship with local owned banks but a negative relationship with foreign owned banks.

2.4 Empirical Review

Doriana (2013) studied the determinants of bank liquidity within the Euro area. The objective of the study was to analyze the type of relationship that exists between liquidity risk, measured with the liquidity coverage ratio and the net stable funding ratio, and some specific bank structure variables-size, capitalization, assets quality and specialization. The study found that bigger banks have a higher liquidity risk exposure, while banks with higher capitalization present a better liquidity on long horizon. The assets quality impacts only on the measure of the short term liquidity risk. With regard to the specialization, banks more specialized on the lending activity showed a more vulnerable funding structure. The study also found that during the financial crisis, the liquidity risk management changes only on the short term horizon.

A study to investigate the effect of liquidity on the financial performance of deposit taking microfinance institutions in Kenya found that the financial performance of microfinance institutions in Kenya is highly dependent on the level of institutions liquidity. It established that there existed positive association between liquidity and financial performance of microfinance institutions. The relationship between financial

performance and capital adequacy was also found to be statistically significant (Njeri, 2013).

Kamau, Erick and Muriithi (2013) studied the factors influencing liquidity level of commercial banks in Kisumu city, Kenya. The study sought to investigate whether factors internal and factors external to commercial bank influences liquidity level of commercial banks in Kisumu City. The study found that variations in liquidity level are caused by both internal and external factors. The internal factors found significant in determining liquidity level of commercial banks were contingency planning, profitability, banks major obligations and management policies. The external factors found to be significant determinants of liquidity were credit rating, monetary policies, government expenditure and balance of payment status.

A study conducted to analyze the relationship between liquidity risk and financial performance of commercial banks in Kenya, sought to investigate liquidity risks faced by commercial banks and to establish the relationship between liquidity risk and the performance of banks in Kenya. It was found that profitability of the commercial bank in Kenya is negatively affected due to increase in the liquidity gap and leverage. With a significant liquidity gap, the banks may have to borrow from the repo market even at a higher rate thereby pushing up the cost of banks. The levels of customer deposits were found to positively affect the bank's profitability (Maaka, 2013).

Horvath, Seidler and Weill (2012) studied bank capital and liquidity creation. The objective of the study was to determine how capital impact on bank liquidity creation. The study found that, for smaller banks, Basel III might lead to banks' reduced liquidity creation by introducing tighter capital requirements and symmetrically greater liquidity creation might hamper banks' solvency. This implied that, enhanced liquidity creation can have some detrimental consequences. The results underline that there is a tradeoff between the benefits of financial stability introduced by the capital requirements and those of greater liquidity creation. The study concluded that banks that create less liquidity on the market have also a lower exposure to liquidity risk.

Vodova (2011) studied liquidity and its determinants in Czech Republic using 22 banks during the 2006-2009 periods. The results show that the liquidity of Czech commercial banks is higher when capital adequacy is higher and when the interest rates on loans are higher. Furthermore, the liquidity measures identify a positive relationship with capitalization and with size. The author finds that bigger banks present lower liquidity in line with the too big to fail theory, where it would seem that bigger banks are less motivated to hold liquidity since they rely on government intervention in case of shortages.

The relationship between liquidity risk can be measured with two new liquidity indicators proposed by the Basel Committee; liquidity coverage ratio and net stable funding ratio, some balance sheet indices -the natural logarithm of total assets, the ratio between loans to customers and total loans and some macroeconomic indicators GDP annual growth

rate, the spread between the interbank rate and central bank policy rate (Angora and Roulet, 2011). Their study found that the liquidity risk ratio has a negative relationship with most of the indicators analyzed including size and the ratio between regulatory capital and total assets, while the liquidity measure has a significant and positive relationship with macroeconomic variables such as GDP and the central bank policy rate.

Rauch, Steffen, Hackethal, and Tyrrel (2010) studied the determinants of liquidity risk and attempted to identify the determinants of liquidity creation. Their results highlight that the most important determinants are macroeconomic variables and monetary policy, while not showing a significant relationship between liquidity creation and bank specific variables such as size and performance. They also found that capitalization measured by the ratio between equity and total assets has a significant and positive relationship with liquidity and an insignificant relationship with inflation rate and growth rate.

Liquidity risk measured using liquid assets to total assets ratio, analyzed the determinants of liquidity risk of banks from emerging economies. The result showed that the size of a bank had a positive effect on liquidity risk, the ratio of equity to assets as a measure of capital adequacy had a negative effect on liquidity risk. The presence of prudential regulation compelling banks to be liquid enough, the share of public expenditure on GDP as a measure of supply of relatively liquid assets and the rate of inflation which increases the vulnerability of banks to nominal values of loans provided to customers were found to have negative effect on liquidity risk. The association between assets growth and

financial performance was also found to be positive and significant (Bunda and Desquilbet, 2008).

The ratio of liquid assets to the total assets as a measure of liquidity risk was used to evaluate the bank specific and macroeconomic determinants of liquidity among UK banks. The results indicated that the probability of obtaining support from the lender of last resort, which should lower the incentive for holding liquid assets was positively related to liquidity risk. The desire to achieve higher net interest margins (higher profitability) which serves as a measure of opportunity costs of holding cash positively affected liquidity risk just as loan growth since higher loan growth signals increase in illiquid assets. It was also indicated that while the size of a bank had a non-linear effect on liquidity risk, GDP growth as an indicator of business cycle and short term interest rate had positive effects on liquidity risk (Aspachs, Nier and Tiesset, 2005).

2.5 Summary of Literature Review

Diamond and Dybvig (1983) stated that banks create liquidity and transform assets by investing into illiquid loans which are financed with liquid deposits. This mismatch causes banks vulnerability to liquidity risk. In order to lessen the maturity gap between assets and liabilities or the inherent liquidity risk, banks can adequately manage the liquidity risk underlying their balance sheet structure by holding a buffer of liquid assets. Among the determinants of liquidity risk identified in literature include: bank's size, capital adequacy, assets quality, liquid assets ratio, non-deposit dependence, ownership type and macroeconomic environment. Doriana (2013) found that bigger banks have a

higher liquidity risk exposure while asset quality impacted liquidity risk in the short term. Angora and Roulet (2011) found that liquidity risk ratio had a negative relationship with size, ratio of regulatory capital to total assets and a significant positive relationship with macroeconomic variables such as GDP and central bank policy. Bunda and Desquilbet (2008) showed that the size of a bank had a positive effect on liquidity risk, the ratio of equity to assets as a measure of capital adequacy had a negative effect on liquidity risk.

Liquidity risk management is a fundamental issue that faces commercial banks and will continue to be of interest to governments, regulators, bank manager's depositors and borrowers as well. Regulators such as Central Bank of Kenya require the management and board of directors to establish robust policies to ensure banks maintain adequate liquidity. A liquidity shock in one bank may be systemic and may affect other banks as it may create a bank run as due to depositors panic. To effectively evaluate and manage liquidity risk it is imperative that managers understand the determinants of liquidity risks. While a number of studies have been conducted to determine the effects of liquidity risk on financial performance of banks in Kenya, the studies attempting to identify the determinants of liquidity risk in Kenya are notably absent. This study sought to fill this gap in knowledge by evaluating the determinants of liquidity risk for commercial banks in Kenya.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter covered the research design and methodology that was used in the study. It also discussed the population from which the firms to be studied were obtained in addition to how the data used in the study was collected and analyzed.

3.2 Research Design

A descriptive research design was used in this study. Kothari (2004) indicate that descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. Zikmund (2003) notes that the main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening. It can involve collection of quantitative information that can be tabulated along a continuum in numerical form, such as scores on a test. Descriptive research often uses visual aids such as graphs and charts to aid the reader in understanding the data distribution. Most quantitative research falls into two areas: studies that describe events and studies aimed at discovering inferences or causal relationships. Descriptive studies are aimed at finding out 'what is', so observational and survey methods are frequently used to collect descriptive data.

3.3 Population of the Study

The population of interest consisted all commercial banks licensed and operating in Kenya between 2010 and 2014. There were 43 commercial banks operating in Kenya over the period covered by the study (CBK, 2014) -appendix 1. Because the population of interest is limited and accessible census study was carried out.

3.4 Data Collection

This research study made use secondary data. Data was collected from financial statement of commercial banks obtained from the Central Bank of Kenya and the respective banks website. The data to collected for each bank include total assets, customer deposits, loans and advances, cash and cash equivalents, ownership status (whether locally owned or a subsidiary of a foreign company) and equity were recorded for the five year period between 2010 and 2014. A data collection form (appendix 2) was used to record the data.

3.5 Data Analysis

Multiple regression analysis was used to establish the determinants of liquidity risk on commercial banks in Kenya. To accomplish this, the ratio of loans to deposits as the dependent variable was regressed against equity to total assets ratio, ratio of core capital to total customer deposits, ratio of cash and cash equivalents to total assets and bank size as the independent variables.

3.5.1 Analytical Model

The multiple regression model used to establish the determinants of liquidity risk was of the specific form;

$$\text{LDR} = \alpha + \beta_1 \text{CAR} + \beta_2 \text{LAR} + \beta_3 \text{OWNT} + \beta_4 \text{SIZE} + \beta_5 \text{LEV} + \varepsilon_i$$

Where LDR=Loan to deposits ratio

CAR=Capital adequacy ratio

LAR=Liquid assets ratio

OWNT=Ownership type

SIZE=Bank size measured by total assets and LEV= Leverage

3.5.2 Operationalization of Variables

Variable	Measurement
Dependent: Loan to deposit ratio (LDR)	Total loans and advances divided by total customers deposit
Independent	
Capital adequacy ratio (CAR)	Core capital divided by total customer deposits.
Liquid assets ratio (LAR)	Liquid assets (cash and cash equivalents) divided by the total assets.
Ownership type (OWNT)	Zero if bank is locally owned (not a subsidiary of a foreign bank) and one if bank is foreign owned (subsidiary of a foreign bank).
Leverage	Total shareholders fund divided total assets
Size	End of year total assets for the bank

3.5.3 Test of Significance

The coefficient of determination R^2 was used to assess the explanatory power of the independent variables in the model. The statistical significance of the regression was tested using analysis of variance (ANOVA) at 5% significance level.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter focused on the analysis of the data collected and discussions of the findings.

Data was collected from secondary source, the published financial statements of commercial banks from respective websites. Forty 42 of the 43 licensed commercial banks were included with Charterhouse bank-under statutory management excluded. Data was collected for the years 2010 to 2014 inclusive.

4.2 Effect of Capital Adequacy, Liquid Asset Ratio, Ownership Type, Size and Leverage on Liquidity Risk

To evaluate the effect of capital adequacy, amount of liquid assets, ownership type, size and leverage on liquidity risk, the ratio of core capital to customer's deposit, ratio cash and cash equivalents to total assets, ownership type, total assets and ratio of equity to total assets were regressed on loan to deposit ratio as the dependent variable. The results of the regression are presented below.

Table 4.1 Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.958	.183		5.234	.000
capital adequacy ratio	.755	.275	.324	2.741	.008
Liquid asset ratio	-.216	.132	-.169	-1.643	.104
ownership type	-.045	.042	-.110	-1.055	.294
size	-.007	.010	-.072	-.709	.481
Leverage	-1.114	.453	-.293	-2.461	.016

a. Dependent Variable: Loan deposit ratio

Table 4.1 indicates the coefficients of the independent variables for the regression model. Capital adequacy ratio has a coefficient of 0.755, liquid asset ratio has a coefficient of -0.216, ownership type has a coefficient of -0.045 while size had a coefficient of -0.007 and leverage had a coefficient of -1.114. Using these coefficients a regression as discussed in chapter three is as follows:

$$LDR=0.958+0.755CAR-0.216LAR-0.045OWTP-0.007SIZE-1.114LEV$$

Table 4.2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.430 ^a	.185	.135	.1829591

a. Predictors: (Constant), Leverage , size , ownership type , liquidity asset ratio, capital adequacy ratio

Table 4.2 provides a summary of the result of regression. The coefficient of determination R^2 for the model was found to be 0.185. This indicated that variations in capital adequacy, liquid asset ratio, ownership type, size and leverage jointly explained 18.5% of variation in loan deposit ratio.

Table 4.3 Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	.623	5	.125	3.725	.004
Residual	2.745	82	.033		
Total	3.368	87			

a. Predictors: (Constant), Leverage , size , ownership type , liquidity asset ratio, capital adequacy ratio

Table 4.3 provides the result of analysis of variance (ANOVA). From the table the F-statistic for the model was found to be 3.725 with a significance level of 0.004. Because $0.004 < 0.05$, the regression is statistically significant at the 5% level of significance.

4.3 Interpretation of Results

The objective of this study was to evaluate the determinants of liquidity risk for commercial banks in Kenya. To accomplish this capital adequacy ratio, liquid assets ratio, ownership type, size and leverage were regressed on loans to deposit ratio. The results of this analysis are presented in table 4.1. The result showed that capital adequacy ratio had a coefficient of 0.755. This indicated that capital adequacy had a positive effect on liquidity risk, suggesting that banks with a high ratio of core capital to customers deposit would experience higher liquidity risk. The effect of capital adequacy on liquidity risk was found to be statistically significant at 5% level since the significance probability (p-value) of 0.008 is less than 0.05.

Liquid asset ratio had a coefficient of -0.216 with a significance probability of 0.104 as reported in table 4.1. Liquid assets ratio had a negative effect on liquidity risk indicating that a higher ratio of liquid assets to total assets would reduce liquidity risk exposure of commercial banks. However the p-value of 0.104 is greater than 0.05 hence the effect of liquid assets ratio was not statistically significant at 5% level.

As reported in table 4.1, ownership type had a coefficient of -0.045 with a significance probability (p-value) of 0.294. Ownership type had a negative effect on liquidity risk of commercial banks. This was to suggest that that foreign owned commercial banks

experienced lower liquidity risk than locally owned commercial banks. Since the probability of significance (p-value) of 0.294 is greater than 0.05, the effect of ownership type on liquidity risk was not statistically significant at 5% level.

Size of the bank had a coefficient of -0.007 having a p-value of 0.418 as indicated in table 4.1. The result indicated that size had a negative effect on liquidity risk. This is to suggest that bigger banks had a lower liquidity risk. However the effect of size on liquidity risk was not statistically significant at 5% level since the p-value of 0.418 is greater than 0.05.

Leverage had a coefficient of -1.114 with a significance probability of 0.016 as shown in table 4.1. Leverage had a negative effect on liquidity risk. The result suggested that highly levered commercial banks would experience lower liquidity risk. Because the p-value of 0.016 is less than 0.05, the effect of leverage was statistically significant at 5% level.

From table 4.2 the coefficient of determination R^2 was found to be 0.185. This result showed that variation in capital adequacy ratio, liquid assets ratio, ownership type, size and leverage jointly explained 18.5% of the variations in loan deposit ratio. This indicates that the independent variable used in the study had a moderate explanatory power of liquidity risk.

The result of analysis of variance (ANOVA) reported in table 4.3 indicated that the F statistic for the regression was 3.725 with a significance probability (p-value) of 0.004. Because 0.004 is greater than 0.005 the overall regression was found to be significant at 5% level of significance. This indicated that collectively capital adequacy ratio, liquid assets ratio, ownership type, size and leverage had a statistically significant effect on liquidity risk at a 5% level of significance.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter a summary of the findings from the study, conclusions and recommendations are presented. Also areas for further research are suggested.

5.2 Summary of the Findings

This study sought to establish the determinants of liquidity risk for commercial banks in Kenya. The study adopted a descriptive study design. The population of the study was commercial banks in Kenya where published financial statements from 2010 – 2014 were analyzed. The coefficient of determination R^2 was used to evaluate the explanatory power of the regression. Analysis of variance (ANOVA) was used to test significance of the regression result at 5% level. Key findings are summarized hereunder.

As reported in table 4.1 the capital adequacy ratio a coefficient of 0.755. This implies that the effect of capital adequacy is statistically significant on liquidity risk at 5% level. The result indicated that capital adequacy had a positive effect on liquidity risk. Banks with higher ratios of core capital to customers deposit had higher liquidity risk.

The ratio of liquid assets had a coefficient of -0.216 with a significance probability of 0.104 as reported in table 4.1. This meant that liquid assets ratio had a negative effect on liquidity risk. However, the P-value of 0.104 is greater than 0.05 hence the effect on liquidity risk is statistically significant at 5% level. Banks with higher ratio of liquid assets to total assets had lower liquidity risk.

Ownership type had a coefficient of -0.045 with a significance probability (p-value) of 0.294 as reported in table 4.1. This implied that ownership type had a negative effect on liquidity risk. Commercial banks with foreign ownership would experience lower liquidity risk. The effect of ownership type is not statistically significant at 5% level.

As indicated in table 4.1 size of the bank had a coefficient of -0.007. The result suggested that size had a negative effect on liquidity risk. Larger banks by asset base had lower liquidity risk.

The coefficient of leverage was found to be -1.114 with a significance probability of 0.016 as reported in table 4.1. The p-value being less than 0.05, the effect of leverage is statistically significant at 5% level. This indicated that leverage had a negative effect on liquidity risk. Highly levered commercial banks would experience lower liquidity risk.

Table 4.2 reported the coefficient of determination R^2 to be 18.5%. Variations in capital adequacy, liquid assets ratio, ownership type, size and leverage jointly explained 18.5% of the liquidity risk of commercial banks. The result of analysis of variance (ANOVA) shown in table 4.2 indicated that the regression model had F statistic of 3.725 with a significance probability (p-value) of 0.004. Since p-value 0.004 is less than 0.05, capital adequacy, liquid assets ratio, ownership type, size and leverage were found to be significant determinants of liquidity risk for commercial banks.

5.3 Conclusions

This study sought to establish the determinants of liquidity risk for commercial banks in Kenya. The result of regression analysis indicated that capital adequacy had a positive

effect on liquidity risk while liquid assets ratio, ownership type, size and leverage had a negative influence on liquidity risk. The variables moderately explained variations on commercial banks liquidity risk as indicated by the coefficient of determination. The result of analysis of variance indicated that capital adequacy ratio, liquid assets ratio, ownership type, size and leverage were significant determinants of liquidity risk. The study concluded that capital adequacy ratio, liquid assets ratio, ownership type, size and leverage are significant determinants of liquidity risk.

5.4 Recommendations

This study recommends that for commercial banks in Kenya, capital adequacy, liquid assets ratio, ownership type, size and leverage are significant determinants of liquidity risk. Capital adequacy influences liquidity risk positively while liquid assets ratio, ownership type, size and leverage influence liquidity risk negatively. Accordingly bank managers can lower their banks liquidity risk exposure by collectively managing the capital adequacy, liquid assets ratio, ownership type, size and leverage.

5.5 Limitations of the Study

The study relied on data from published financial statements which are subject to managerial discretion, thus the quality of information reported in the financial statements of commercial banks will have a major effect on the findings of this study. Further the period considered under the study may not have captured a period in which the banking sector had undergone significant liquidity stress. In addition other factors especially qualitative factors relating to commercial bank management as well as macroeconomic factors that may influence liquidity risk have not been captured by the study.

5.6 Suggestions for Further Study

Further study may seek to identify qualitative factors that influence liquidity risk. It may also consider the effect of macroeconomic factors on liquidity risk. Further research may focus on evaluating the measure that bank managers take to mitigate exposures to liquidity risk.

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APPENDICIES

Appendix 1: Commercial Banks in Kenya

1. (ABC) African Banking Corporation Ltd.	24. First community Bank Limited
2. Bank of Africa Kenya Ltd	25. Giro Commercial Bank Ltd
3. Bank of Baroda (K) Ltd	26. Guardian Bank Ltd
4. Bank of India	27. Gulf African Bank Limited
5. Barclays Bank of Kenya Ltd.	28. Habib Bank A.G Zurich
6. CFCStanbicBank Ltd	29. Habib Bank Ltd
7. Charterhouse Bank Ltd	30. Imperial Bank Ltd
8. Chase Bank (K) Ltd	31. I &M Bank Ltd
9. Citibank N.A Kenya	32. Jamii Bora Bank Limited.
10. Victoria Commercial Bank Ltd	33. Kenya Commercial Bank Ltd
11. Commercial Bank of Africa Ltd.	34. K-Rep Bank Ltd
12. Consolidated Bank of Kenya Ltd.	35. Middle East Bank (K) Ltd
13. Co-operative Bank of Kenya Ltd	36. National Bank of Kenya Ltd
14. Credit Bank Ltd.	37. NIC Bank Ltd
15. Development Bank of Kenya Ltd.	38. Oriental Commercial Bank Ltd
16. Diamond TrustBankKenya Ltd	39. Paramount Universal Bank Ltd
17. Dubai Bank Kenya Ltd.	40. Prime Bank Ltd
18. Eco bank Kenya Ltd	41. Standard Chartered Bank Kenya Ltd
19. Equatorial Commercial Bank Ltd.	42. Trans-National Bank Ltd

20. Equity Bank Ltd	43. UBA KenyaBank Limited
21. Family Bank Limited	
22. Fidelity Commercial Bank Ltd	
23. Fina Bank Ltd	

Source: Central Bank of Kenya

Appendix 2: Data Collection Form

Bank							
Year	Loans and advances	Customer deposits	Equity	Cash and cash equivalents	Total assets	Core capital	Ownership