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Determinants of Liquidity Risk of Commercial Banks in Kenya

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Abstract:
This study sought to establish the determinants of liquidity risk oncommercial banks in Kenya. The study employed a descriptive research design. A census targeting the 43 commercial banks licensed in Kenya was conducted. The determinants of liquidity risk were evaluated by regressing capital adequacy ratio, liquid assets ratio, ownership type, size and leverage on loan deposit ratio. The multiple regression analysis indicated that capital adequacy ratio and leverage were individually significant determinants of liquidity risk. Liquid asset ratio, ownership type and size individually were not significant determinants of liquidity risk. The result of F test indicated that collectively capital adequacy, liquid asset ratio, ownership type, size and leverage were significant determinants of liquidity risk. The study concluded that collectively 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.

Keywords: Liquidity risk, Capital Adequacy ratio, Liquid assets ratio, Ownership type

1. Introduction

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) found out 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 being listed under the sector. Listing at the Nairobi Securities Exchange can be considered an important aspect for a bank as it will provide a bank with an easier access to capital markets where it can issue securities to finance a liquidity gap.

Diamond and Dybvig (1983) posit that the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk. 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).

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 non-linear. 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 isinfluenced 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. Research Objective
The objective of this study was to establish the determinants of liquidity risk on commercial banks in Kenya.

2. Methods
A descriptive research design was used in this study. The population of interest consisted of all 43 commercial banks licensed and operating in Kenya. This research study made use of secondary data. Data was collected from financial statements of commercial banks obtained from the Central Bank of Kenya and the respective banks website for a period between 2010 and 2014. 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.

2.1. Model Specification
The multiple regression model used to establish the determinants of liquidity risk was of the specific form;
$$LDR = \alpha + \beta_1 CAR + \beta_2 LAR + \beta_3 OWNT + \beta_4 SIZE + \beta_5 LEV + \varepsilon_i$$
Where LDR=Loan to deposits ratio
 CAR=Capital adequacy ratio
 LAR=Liquid assets ratio
 OWNT=Ownership type
 SIZE=Bank size measured by total assets
 LEV= Leverage

2.2. 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

Table 1

2.3. 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 each independent variable in explaining liquidity risk was tested using student ANOVA at 5% level of significance. The overall significance of the model was tested by conducting an F-test at 5% level of significance.

3. Results and Discussion
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.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.958	.183		5.234	.000
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 2: Regression Coefficients

Table 2 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
As reported in table 2, the coefficients of capital adequacy ratio and leverage had a p-value of 0.008 and 0.016 respectively. These coefficients are statistically significant at 5% level since $0.008 < 0.05$ and $0.016 < 0.05$. The coefficients of liquid assets ratio, ownership type and size had p-values of 0.104, 0.294 and 0.481respectively. Since the p-value for these coefficients are greater than 0.05, the coefficients are not statistically significant.

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 3: Model Summary

Table 3 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.

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: Analysis of Variance (ANOVA)

Table 4 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. Discussion of Findings
As reported in table1 the capital adequacy ratio had a coefficient of 0.755. This implies that the effect of capital adequacy was 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 significant probability of 0.104 as reported in table 2. 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 significant probability (p-value) of 0.294as reported in table 2. 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 was not statistically significant at 5% level. As indicated in table 2 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 2. 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 3 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 3 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.

4.1. Conclusion
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 result of t-test indicated that of individually capital adequacy and leverage were significant determinants of liquidity risk at 5% level of significance. Liquid assets ratio, ownership type and size of the commercial bank were not significant determinants of liquidity banks for commercial banks in Kenya. The result of F test indicated that taken together capital adequacy, liquid asset ratio, ownership type size and leverage were significant determinants of liquidity risk.

4.2. Recommendations
This study recommends that for commercial banks in Kenya, capital adequacy and leverage are individually significant determinants of liquidity risk. Liquid asset ratio, ownership type and size individually are not significant determinants of liquidity risk. Collectively capital adequacy, liquid asset 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. Particular attention should be paid to capital adequacy and leverage.

4.3. 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.

4.4. Suggestions for Further Studies
Further studies 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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