

Assessing the Determinants of Bank Liquidity: Experience from Tanzanian Banks

Josephat Lotto & Justus Mwemezi ***

Abstract

This paper identifies the determinants of banks' liquidity in Tanzania. The panel regression was employed for secondary data extracted from published bank financial statements of 49 banks in the sample, covering the period from 2006 to 2013. The results revealed that capital adequacy, bank size and interest rate margin had a negative and statistically significant effect on banks' liquidity, while non-performing loans and inflation were found to have positive impact on bank's liquidity. On the other hand, the profitability and GDP growth rate had statistically insignificant impact on banks' liquidity, although they both had expected positive relationships. According to the study results smaller banks are more liquid because they mainly focus on short-term loans that mature shortly, and are therefore are believed to be more liquid as compared to bigger banks that tie up most of their capital on long-terms loans that mature after some years.

Keywords: *Tanzanian banks, liquidity ratio, liquidity risk, determinants, capital adequacy*

1. Introduction

The elementary role of a bank is to link surplus economic units with deficit economic units in channelling funds. Banks also provide an avenue for policy makers to conduct monetary policies that manage the fluctuation of prices and foreign exchange in the market. However, this role is often accompanied with some challenges since banks have a fundamental role in the maturity transformation of short-term deposits into long-term loans that is naturally exposed to liquidity risk. In such circumstance, banks will be exposed to liquidity risks that may frustrate their customers and also affect the financial sector as a whole. Likewise, holding too much idle liquid assets such as cash and non-interest bearing deposits are also hazardous as this affects profitability. Hence, every bank has to ensure that its operations

satisfy its profitability target and at the same time to meet the financial demands of its customers by maintaining optimum level of liquidity (Vodova, 2011, 2012, 2013; Malik & Rafique, 2013; Chagwiza, 2013). Research shows that bank liquidity is influenced by both bank-specific and macroeconomic factors. However, factors that impact on liquidity in one country may not be replicated in another country.

Most recently, liquidity risk has become one of the key concerns of financial institutions throughout the world. It was learnt in the recent global financial crisis that liquidity is considered as one of the top priorities of a bank's management so as to ensure the presence of sufficient funds to meet future demands at reasonable costs. In the banking industry, maintaining optimum level of liquidity is greatly linked with efficient banking operations. According to Malik and Rafique (2013), when a bank's liquidity is not

* Institute of Finance Management (IFM), Dar es Salaam, Tanzania: tathioaga@yahoo.co.uk

** Institute of Finance Management (IFM), Dar es Salaam, Tanzania: jmwemezitz@yahoo.co.uk

adequately managed, a bank suffers insolvency and ultimately jeopardizes the wealth of shareholders. Hence, maintaining an optimum level of liquidity is very important to enable a bank to function successfully and profitably.

The International Settlements (2008) claims that when banks transform short-term deposits to long-term loans that have a maturity mismatch, they will be vulnerable to liquidity problems. As a consequence, banks fundamentally need to hold optimal level of liquidity to maintain efficiency. Effective and efficient liquidity management is of paramount importance as a liquidity problem in one bank may have industry-wide repercussion. On the other hand, maintaining large amount of liquid asset affects the profitability of a bank.

During the last two decades the private banking sector in Tanzania has been playing an important role in the economic development of the country. As banks dominate the financial sector in Tanzania, the process of financial intermediation in the country depends heavily on banks. Hence, keeping their optimal liquidity is crucial to meet the demand of their present and potential customers. The importance of managing

liquidity of banks is further insisted by the BOT by issuing the Banking and Financial Institutions (Liquidity Management) Regulations of 2008. These regulations require banks to monitor their funding structure and their ability to handle short-term liquidity problems; and provide them with a better means of assessing present and future liquidity risks associated with their future liquidity position.

The annual banking operations report issued by the BoT for the year 2014 shows the liquidity of banks to be changing over time. For example, in between 2010 and 2014 there is much variation of liquid assets held by banks in various years as Table 1 depicts. The average ratio of liquid assets to demand deposits stood at 35% in 2014; as compared to 36% in 2013.

Liquidity risk management is an elementary issue that affects commercial banks and will elicit more interest from governments, regulators, bank managers, depositors and borrowers as well. Regulators such as the BoT require bank management to establish strong policies to guarantee liquidity adequacy. It is possible that a liquidity problem in one bank

Table 1: Liquid assets of Tanzanian Banks for the Period 2010 - 2014

Item	Dec-10	Dec-11	Dec-12	Dec-13	Dec-14
Liquid Assets					
Cash (TZSbn)	476	558	625	607	783
Cash (% Change)		17.18	11.99	-2.78	29.00%
SMR Account (TZSbn)	1,010	1,294	1,448	1,680	1,669
SMR Account (% Change)		28.09	11.89	16.03	-0.63
Banks abroad (TZSbn)	1,001	1,155	842	1,196	1,064
Banks abroad (% Change)		15.42	-27.09	42.10	-11.07
Treasury Bills (TZSbn)	1,450	895	1,493	2,156	2,195
Treasury Bills (% Change)		-38.26	66.80	44.35	1.81
Other Liquid Assets (TZSbn)	1,179	1,607	1,693	1,564	1,753
Other Liquid Assets (% Change)		36.26	5.37	-7.36	0.12
Total liquid assets (TZSbn)	5,116	5,509	6,101	7,203	7,464
Total liquid assets (% Change)		7.68	10.75	18.07	3.62

Source: Bank of Tanzania Annual report, 2014

may systematically affect other banks as it may create a bank run due to depositors' panic.

It is essential to understand the determinants of liquidity risks to adequately assess and analyse bank liquidity risk. While there are a few studies in Tanzania that assess the liquidity of banks, none has deeply looked at the determinants of bank liquidity. Hence, this study aims to fill this gap by providing information about macroeconomic and bank-specific factors that affect the liquidity of Tanzanian banks.

This rest of the paper is organised as follows. The next section reviews the relevant literature, followed by a methodology section that highlights all data issues, model specifications and data variables. The paper then presents data analysis and results in the section that follows, including the OLS diagnostic tests and regression results. The last section concludes the study, and provides recommendations.

2. Related Literature

2.1 Theoretical Review

2.1.1 Information Asymmetry and Bank Liquidity

Theoretical research has concentrated on the role of financial market problem in explicating the imperfect access of firms to external sources of finance. Stiglitz and Weiss (1981), Myers and Majluf (1984) and Greenwald et al. (1984), identify information asymmetry between a firm and a lender as the cause of the difference between the cost of external and internal sources of funds. Increases in external finance premium may result in financial constraint of firms. When the banks face liquidity problems their ability to issue long term loans is jeopardized. According to Greenwald et al. (1984) during liquidity crisis banks choose to invest their money into relatively short-term investment so as to recoup back cash in near future as early as possible to solve liquidity shortage problems. Diamond and Dybvig (1983) put forward that the transformation of

maturity of short-term deposits into long-term loans is what attract more bank liquidity risk. According to Goodhart (2008), two basic aspects of this type of bank risk may be worth noting: (i) maturity transformation risk, which is a maturity of a bank's liabilities and assets, and (ii) an inherent liquidity of a bank's asset, which is the extent to which an asset can be sold without incurring a significant loss of value under any market condition.

2.1.2 Inventory Theory of Capital and Liquidity Buffer

According to Baltensperger (1980), although it is wise for banks to have a stock of liquid assets at any point in time so as to take care of a liquidity problem when more customers come for withdrawal, it is also costly for banks to keep a stock of liquid assets for liquidity purpose because a bank may miss out returns in investing such cash in profitable ventures. It is therefore important for a bank to keep a stock of liquid assets at an optimal level to balance between liquidity issues and investments. According to Diamond and Rajan (2001) it is crucial for banks to hold adequate liquidity to cover liquidity concerns.

The inventory theory postulates that the size of liquidity cushion should mirror the cost of foregone returns from holding liquid assets rather than loans, and the cost of raising funds at a short notice. Also the cushion has to relate to the allotment of liquidity distress that a bank may encounter, and particularly be directly linked with the volatility of the financing basis plus the cost of raising additional funds. To reduce the maturity gap between bank assets and liabilities, banks may adequately manage this risk by keeping adequate liquid assets, (ibid.).

Diamond and Dybvig (1983: 406) further amplifies:

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.

2.2 Empirical Review

Studies on the factors determining bank liquidity have identified factors that are common among countries. These include, but are not limited to: capital adequacy, profitability, bank size, non-performing loans, loan growth, inflation and other macroeconomic factors. Such studies have been conducted in countries like England, Hungary, China, Iran, Kenya, Malaysia, Czechoslovakia, Nepal, USA, Zimbabwe, Ethiopia, Ghana, to mention but few. Thus, this literature review employs the vast of information and knowledge obtained in the above mentioned studies.

According to the Basel Committee (2009), the viability of commercial banks greatly depends on its position of liquidity. Chaotic economic times can change whole bank reserves and this may affect the liquidity position of a bank. On one hand, liquidity constrains a bank's productivity and efficiency; while on the other it strangles the share of credit allocated to the private sector, consequently upsetting economic growth (Aikaeli, 2006).

A study conducted on English banks specifically on the determinants of bank liquidity, found that profitability, growth in credit, GDP, monetary policy, interest rates: all have a negative impact on bank liquidity (Valla & SaerEscorbia, 2006). The authors assumed three factors of profitability, loan size and size of a bank to be the measure of bank liquidity. Bank profitability negatively correlated with liquidity, loan growth signals positively correlated with liquidity, and size of a bank was ambiguous. Therefore, the study did not

ascertain whether the size of a bank is relevant to the determination of a bank's liquidity

Rauch et al. (2010) found that monetary policy, size of bank, interest rate and profitability are negatively correlated with bank liquidity. On the other hand, a study by Vodová (2013) with the aim of identifying determinants of liquidity of Hungarian commercial banks in the 2001 to 2010 period, showed that bank liquidity is positively related to capital adequacy and bank profitability, but negatively related to bank size. This study solved the ambiguity of bank size that was left out in the study conducted on English banks.

A study conducted on Chinese banks showed that the performance of a bank and the creation of liquidity are positively and negatively related to small banks and to large banks, respectively (Lei & Song, 2013). Again, it was found that the incentive of having liquid assets is reduced by securitization, synergy credits and deposits. In this regard the study identified the performance of a bank to be another determinant factor of bank liquidity.

Shahchera (2012) carried out a study on the relationship between liquidity and profitability of banks in Iran over the 2002-2009 period, and found a non-linear relationship between profitability and possession of liquid assets. The study identified the profit of a banks as one of the determinants of bank liquidity in Iranian banks.

A study conducted in Kenya specifically to identify factors determining bank liquidity found that 42.2% of the variation in the liquidity of 27 commercial banks in the country was explained by the change of factors such as monetary policy, credit rating, policy management, obligation and profitability, while 57.8% is explained by others factors (Kamau et al., 2013).

On the other hand, Lartey et al. (2013) have shown a positive relationship between liquidity and profitability of listed banks in Ghana, and that macroeconomic variables determine significantly bank liquidity. This was revealed in a study conducted after the global financial crisis to examine the problems of bank liquidity and its importance to the overall performance of the banking sector and financial markets (Vodova, 2011). Furthermore, Saxegard (2006) found that excess liquidity changes transmission monetary policies in SSA in such a way that monetary authorities fail to control the demand for currency. Similarly, in order to encourage the use of tools of monetary instruments like the title of a central bank which has a major interest, a monetary authority needs to absorb liquidity, and this will lead to ineffective transmission of monetary policy (Gauley, 2004).

Using a sample of 15 commercial banks by using fixed effect model with annual data, Choon et al. (2013) carried out a study in Malaysia to identify the determinants of bank liquidity in the period (2003-2012). The findings showed that, except for bank interest rate, size of bank, capital adequacy, profitability, credit and macroeconomic factors such as GDP, interbank rate, and financial crisis were significant. According to the study, factors that positively influenced bank liquidity were non-performing loans, profitability and GDP; while factors that negatively affected liquidity were bank size, capital adequacy and financial crisis. In this study the bank rate had no significance in determining bank liquidity.

In identifying determinants of liquidity of commercial banks in Slovakia, Hovarth et al. (2012) studied a sample of Czech banks, and found that the creation of bank liquidity was negatively correlated with bank capital. This gives a message that Basel III reduces liquidity creation, although the creation of high liquidity can reduce bank solvency.

A study conducted in Nepal by Subedi and Neupane (2011) on the determinants of bank liquidity in Nepalese commercial banks concluded that capital adequacy, share of non-performing loans in the total volume of loans are negatively correlated and with statistically significant impact on banks liquidity. On the other hand, loan growth, liquidity premium paid by borrowers and short-term interest rate had negative insignificant impact on banks liquidity. This study came up with many factors determining the liquidity of banks similar to what other studies have also found out. However, it came out with liquidity premium paid by borrowers as an additional factor.

Cornett et al. (2011) conducted a study on the determinants of bank liquidity by in the US and reported a significant difference between small and large banks. According to the authors, small banks relied more heavily on stable sources of financing (i.e., core deposits and capital), continued to lend relative to other banks. Large banks had higher share of illiquid assets on total assets than small banks, and also held a greater fraction of unused commitments. Thus large banks were more exposed to liquidity risk than small banks across four dimensions: more undrawn commitments, less capital, less reliance on core deposits and lower liquidity of balance sheet assets.

Chagwiza (2011) conducted a study in Zimbabwe regarding the liquidity of commercial banks and its determinants employing a regression analysis. The result revealed a positive relationship between bank liquidity, capital adequacy and total asset (TOA). Another most recent study in Zimbabwe was by Laurine (2013) regarding determinants of the liquidity risk of Zimbabwean commercial banks after the country adopted the use of multiple currencies exchange rate system. The study revealed that capital adequacy and bank size had a negative and significant influence on liquidity risk, whereas non-performing loans had a positive and significant relationship with liquidity risk.

Tseganesh (2012) conducted a study aimed at identifying the determinants of commercial banks liquidity in Ethiopia, and assessing the impact of banks liquidity on financial performance through the significant variables explaining liquidity. Her study reported that capital adequacy, bank size, and share of non-performing loans in the total volume of loans had positive and statistically significant impact on banks liquidity; whereas loan growth had statistically insignificant impact on bank liquidity.

Generally, the vast literature discussed above has come out with many factors that determine the liquidity of banks. As previously said, these factors are mostly common in all the countries studied. However, some of these factors differ from one country to the other. In this view, therefore, the interest of this paper is to discern the specific determinants of liquidity in Tanzanian banks.

3. Methodology and Data

The data used in this paper were collected from the respective banks' published quarterly financial reports for the period 2006-2012. The sample included large banks, medium banks, regional and smaller banks. Because some of the observations in the sample are missing due to the emergence of new banks, our empirical work used unbalanced panel data. This empirical test is concerned with the determinants of bank liquidity in Tanzanian banks. Both external and internal determinants/indicators of banks liquidity are employed in this paper. Likewise, macro-economic measures indicators are used as external factors. This study employed a panel data regression analysis to identify factors affecting bank liquidity, as hereunder:

$$LQ_{it} = \alpha + \beta_1(CAP_{it}) + \beta_2(CAP_{it}) + \beta_2(SIZE_{it}) + \beta_3(NPL_{it}) + \beta_4(ROA_{it}) + \beta_5(NIM_{it}) + \beta_6(GDP_t) + \beta_7(INF_t) + \delta_i + \varepsilon_{it}$$

Where:

- LQ_{it} is bank liquidity ratio for bank i in time t ,
- X_{it} is a vector of explanatory variables for bank i in time t ,
- α is constant,
- $\beta_1 \dots \beta_8$ are coefficient which represents the slope of variables,
- δ_i denotes fixed effects in bank i , and
- ε_{it} is the error term.

LQ (Liquidity) should give information about general liquidity shock absorption capacity of a bank. This is measured by the ratio of liquid assets to total assets.

CAP (Capital Adequacy) is the share of equity on total assets of a bank. According to Gul (2011), capital adequacy shows the strength of a bank capital against the vagaries of economic and financial environment.

SIZE (Size of a bank) is the logarithm of total assets of a bank. Size can show the economies of scale. Large banks benefit from economies of scale which reduces the cost of production and information gathering as depicted by Boyd and Runkhle (1993).

NPL (Non-performing Loans) is the share of non-performing loans on total volume of loans.

ROA (Profitability) is the ratio of net profit before tax to total asset. ROA depicts how a bank uses its assets to generate profits as used in the previous studies such as by Chin (2011), Naceur (2003), Khravish (2011), and Ongore and Kusa (2013).

NIM (Interest rate margin) is the difference between interest income from loan and advances as a fraction of total loans and advances and interest paid out on deposit as a percentage of total deposits. This measure indicates the efficiency of financial intermediation as reflected in Hamadi and Awdeh (2012).

GDP (Gross Domestic Product): growth rate of gross domestic product (GDP volume percent change)

INF is inflation rate (CPI percent change)

The variables INF and GDP are responsible for the impact of the macro environment to bank liquidity. According to Ayadi and Boujelbène (2012), GDP shows the growth of economic activity in a country; and inflation shows the increase in the price index.

4. Empirical Analysis and Results

The first thing we did before running linear regression was to perform regression diagnostics to confirm whether it is viable to run Ordinary Least Square (OLS). These tests include heteroscedasticity and multicollinearity.

4.1 Testing for Heteroscedasticity

A sample is said to have heteroscedasticity if the variance of the error term is not homogenous, i.e., the variance of the error term is constant, one of the assumptions on which OLS is built. The sources of heteroscedasticity include, among others, model misspecification using logarithms of some variables like, in our case, per capita income and bank size. According to Long and Ervin (2000), when heteroscedasticity is moderate, OLS standard errors behave quite well. However, when heteroscedasticity is severe, ignoring it may render standard errors and *p*-values biased, the direction of which depends on the pattern of heteroscedasticity.

In some cases the form of heteroscedasticity is clear and can be easily modelled. More commonly, though, heteroscedasticity is a trouble that cannot be modelled because its source is not clearly understood. When the Breusch-Pagan test is run, results show that heteroscedasticity is a problem because the variance of the error term is constant. Table 2 shows that the hypothesis that the variance of the error term is constant is rejected, and

therefore it is imperative to believe that the effect of heteroscedasticity does not exist in our case.

Table 2: Heteroscedasticity using Breusch-Pagan Test

Breusch – Pagan/Cook-Weisberg test for heteroscedasticity	
HO: Constant variance	
Variables: fitted values of bank liquidity	
Chi2(1)	0.16
Prob >chi2	0.6899

Based on the p-value of B-P above, which is greater than alpha of 5%, we can conclude that there is no substantial amount of heteroscedasticity in the model; hence the normal OLS can be run.

4.2 Testing for Multicollinearity

We also check the possibility of multicollinearity which might have an influence on our regression results. According to Wooldridge (2006), multicollinearity increases the variance of beta although it strictly does not violate OLS assumptions. According to Wooldridge (ibid.), the level of multicollinearity is directly related to the size of the standard errors in our regressions. This test checks whether there is a need to disregard the simple OLS results and renders them biased and inconsistent.

To test whether there is a potential multicollinearity we use Variance Inflation Factor (VIF). The 1/VIF (tolerance factor) gives us the proportion of variance of an explanatory variable that is independent of all the other explanatory variables. A VIF above 10 indicates potential trouble. When this test was run the average VIF value was only 1.22 as Table 2 shows, indicating no threat of multicollinearity as this value is far more below the recommended threshold of 10 as previously suggested by Belsley et al. (1980).

Table 3: Multicollinearity Test

Variable	VIF	1/VIF
NIM	1.40	0.711919
CAR	1.39	0.717887
ROA	1.34	0.743944
BSZ	1.32	0.755207
INF	1.03	0.970072
GDP	1.03	0.970427
NPL	1.01	0.988322
Mean VIF	1.22	

We also present a multicollinearity matrix that shows how regressors correlate with each other. We can see in Table 4 that the larger correlation coefficient is between net interest margin and capital adequacy, which is about 0.503. This shows that there is no serious correlation problem between regressors as supported by Kennedy (2008), Malhotra (2007) and Hair et al. (2006), who suggest that a correlation coefficient between regressors of below 0.7, 0.75 and 0.9, respectively, do not cause any serious multicollinearity problem.

Table 4: Correlation Matrix

	LIQ	NPL	BSZ	CAR	NIM	ROA	GDP
LIQ	1.000						
NPL	0.2048	1.000					
BSZ	-0.0925	-0.0558	1.000				
CAR	-0.4047	-0.0128	-0.2259	1.000			
NIM	-0.3193	-0.0375	-0.1294	0.5033	1.000		
ROA	0.0808	0.0354	0.4535	-0.1781	-0.2454	1.000	
GDP	0.1293	-0.0269	0.0689	-0.0782	-0.1180	0.0974	1.000
INFL	0.1574	-0.0576	0.0516	0.0645	0.0639	-0.0679	0.1032

5. Findings and Discussion

5.1 The Banking Industry in Tanzania

As at the close of 2014, the banking sector in Tanzania was composed of the Bank of Tanzania, as a regulatory authority, and 53 banking institutions consisting of 34 fully-fledged commercial banks, 12 community banks, 4 financial institutions and 3 deposit microfinance companies. In the same year, one banking institution, namely the Vision Fund

Tanzania M.F.C Ltd was licensed to operate as a microfinance company. The ownership structure of the banking institutions for that year comprised of 5 state-owned and 48 privately owned banking institutions. In terms of local and foreign ownership, 25 banking institutions were locally owned, while 28 were foreign owned. In terms of total assets held, the largest four banks held 49.48% of the total assets of the banking sector, 48.23% of the total capital, 49.52% of the total deposits and 50.03% of the total loans advances and overdrafts. On the other hand, local banking institutions' share of the total banking sector's assets was 52.65%, slightly higher than that of foreign banking institutions at 47.35%.

5.2 Correlation Analysis

The results in correlation matrix (Table 4) shows that non-performing loans positively relate with bank liquidity with a correlation coefficient of 0.205; bank size negatively relates to bank liquidity (coefficient= -0.09); and capital adequacy negatively correlates

with bank liquidity (coefficient of -0.405). Likewise, net interest margin relates negatively with bank liquidity, while ROA relates positively with bank liquidity with correlation coefficients of -0.319 and 0.08, respectively.

4.3 Analysis of Regression Results

4.3.1 Bank Specific Factors

Bank Net Interest Margin

The regression Table 5 shows that the net interest margin negatively relates to bank

liquidity, and the relationship is statistically significant at 5% significant level with a coefficient of -0.027. This implies that a 1% increase in net interest margin results into a decrease of bank liquidity by 2.7%. Increase in interest margins encourages banks to focus more on lending activity, and as a result the share of liquid assets decreases as reflected by Vodova (2013).

Bank Size

We also report an inverse relationship between bank size and liquidity as shown in Table 5. The relationship between bank size and liquidity is strongly and statistically significant at 1% significant level. It is shown that as a bank size increases by 1%, its liquidity decreases by about 1.9% as indicated by the coefficient of -0.019. This is results is consistent with that of Malik and Rafique (2013), and Kashyap et al. (2002). According to the results we may argue in a similar way as these scholars that, because large banks are mainly comprised of holders of sizeable deposit balances and customers who borrow in substantial amounts, this may influence the short-term liquidity needs of an individual bank to a degree that it is directly related to the bank's size. It should be emphasized that smaller banks mainly focus on issuing short-

term loans that mature shortly, usually within a year, and therefore they are believed to be more liquid as compared to larger banks which tie up most of their capital in hands of large borrowers in terms of long-terms loans that mature after several years.

Bank Capital Adequacy

On the other hand, the study results show a negative and statistically strong significant relationship between capital adequacy and bank liquidity. The results show that a 1% increase in capital adequacy results into a corresponding decrease in bank liquidity by almost 45% as reflected by the coefficient of -0.449 as shown in Table 5. Previous studies (e.g., Berger & Bouwman, 2009) argue that bank capital increases the ability of a bank to create liquidity, but our study shows contradicting results that can be supported by the hypothesis of financial fragility. This hypothesis predicts that an increase of capital reduces liquidity creation as stipulated by Diamond and Rajan (2001). This finding can be interpreted using the *crowding-out effect* whereby increased liquidity creation is associated with increased deposits that crowd out capital. More generally, when a bank's access to depositors' base increases, bank managers become reluctant to search for external funding, including capital. Since a

Table 5: Regression Results

Source	SS	Df.	MS	Number of obs = 195		
model	1.41191548	7	.201702211	F(7, 187)	=	12.67
residual	2.97610978	187	.015915026	Prob > F	=	0.0000
Total	4.38802526	194	.0226186	R-squared	=	0.3218
				Adj R-squared	=	0.2964
				Root MSE	=	.12615
LIQ	Coef.	Std. Err.	t	P>[t]	[95%Conf. Interval]	
ROA	.2775725	.2093473	1.33	0.186	-.1354135	.6905585
NIM	-.0270848	.014564	-1.86	0.064**	-.0558157	.001646
CAR	-.4492033	.791397	-5.68	0.000***	-.6053247	-.293082
BSZ	-.019166	.005745	-3.57	0.000***	-.0297686	-.0085636
NPL	.3896384	.1238128	3.15	0.002***	.145389	.6338877
GDP	.0186065	.0151325	1.23	0.220	-.0112459	.0484589
INFL	1.113311	.35533	3.13	0.002	.4123403	1.814281
Cons	.5025058	.1243316	4.04	0.000	.257233	.7477787

bank's loan-loss reserves also serve as a buffer for absorbing losses, a broader definition of bank capital may include this account.

Contrary to the standard view of liquidity creation in which banks create liquidity by transforming liquid liabilities into illiquid assets, recent theories indicate the creation of liquidity by changing asset mixes. This finding is backed up by the inventory theory of capital and liquidity buffer as explained earlier. Raghavan (2003) showed that banks can create more or less liquidity by simply changing their funding mix on the liability side (Maness & Zietlow, 2004). This shows that capital may also affect the composition of a bank's asset portfolio, thereby affecting liquidity creation through a change in the asset mix.

Non-Performing Loans

The study findings also report a positive relationship between non-performing loans and bank liquidity, a relationship that is strongly and statistically significant at 1% with a coefficient of 0.389. This implies that a 1% increase in non-performing loan brings about an increase in a bank's liquidity by about 39%. This is a surprising result as the two variables are theoretically negatively related. However, our results are consistent to those of Vodova (2011). This could be a sign of prudent policy of banks: they offset higher credit risk with cautious liquidity risk management. Our argument is based on the practice by banks to reduce the value of loans partly or entirely from the assets on their balance sheets. Usually banks set aside a part of their capital as a loan loss reserve to anticipate future loan losses. Using loan loss reserves enables banks to avoid large swings in their reported profits and capital from write-offs. So, when a bad loan is actually written off, a bank profits as capital do not decline further.

4.3.2 External Determinants of Bank Liquidity

Furthermore, economic environment factors, inflation and GDP were also analysed to see how they affect bank liquidity. The regression

results in Table 5 shows that GDP has a statistically insignificant effect on bank liquidity, and the relationship is positive contrary to findings of previous studies. For instance, according to Aspachs et al. (2005), the level of liquidity, relative to both total assets and total deposits, is determined by the phase of economic growth where higher economic growth is accompanied with lower level of bank liquidity.

Previous studies (Vodova, 2011; Moussa, 2015; Bhati et al. (2013) on the relationship between inflation and bank liquidity reveal a negative relationship between inflation and bank liquidity. Contrary to this, our paper suggests that inflation has a strong positive relationship with bank liquidity. Table 5 shows that this relationship is statistically significant at 1% significant level, with a reported coefficient of 0.157. This means that a rise of inflation by 1% correspondingly increases bank liquidity by about 100%. The result shows that as inflation in the economy rises, banks start holding liquidity to control the condition. The finding is similar to that of Tseganesh (2012). The argument of this relationship is based on various studies in many counties which suggest that banks refrain from long-term investments due to a decline in the real value of their investments, and prefer to hold risk-free/liquid assets in an inflationary environment.

5. Concluding Remarks

Liquidity creation is among the most important things in the banking business. This paper aimed to determine factors affecting the liquidity of Tanzanian banks. It employed unbalanced panel regression for secondary data extracted from published bank financial statements of 49 banks in a sample covering the period 2006 - 2012. Several factors affecting banks liquidity were selected and analysed.

We can conclude the following from the study findings. *First*, capital adequacy negatively affects bank liquidity. This is to say that when banks' access to depositors' base increases, bank

managers become more reluctant to search for external funding, which in turn this affects the liquidity of a bank. Also, capital may also affect banks asset portfolio composition, thereby affecting liquidity creation through a change in the asset mix.

Second, the size of a bank relates inversely to bank liquidity. Smaller banks mainly focus on issuing short-term loans which mature shortly, usually within a year, which is believed to make the banks more liquid; compared to the larger banks which tie up most of their capital in hands of large borrowers in terms of long-terms loans which mature after some years.

Third, there is a positive relationship between interest margin and bank liquidity. This positive relationship implies that an increase in interest margins encourages a bank to focus more on lending activity and, hence reducing the share of liquid assets.

Fourth, there is also a positive relationship between non-performing loans and bank liquidity. This could be a sign of prudent policy by banks to offset higher credit risk with a cautious liquidity risk management. Usually banks set aside a part of their capital as a loan loss reserve to anticipate future loan losses. Using a loan loss reserve enables bank to avoid large swings in its reported profits and capital from write-offs. So, when a bad loan is actually written off, a bank profits and its capital do not decline further.

Fifth, inflation positively influences bank liquidity as banks start holding liquidity to control inflationary conditions in an economy. The argument of this relationship is based on the theory of information asymmetry, which suggests that in economic inflationary environment banks and other financial institutions refrain from long-term investments due to a decline in the real value of their investments, preferring instead to hold risk free/liquid assets.

Based on the study findings, we recommend banks to improve cash forecasting to enhance liquidity management because one the critical requirement of the 21st century's corporate treasurers is to provide timely, accurate and consolidated information to facilitate cash forecasts. Banks should look to offer cash management solutions that ensure this information is made available centrally to their corporate customers.

This study is based on secondary data. To improve the findings further, we recommend that similar future studies to employ both secondary information as well as primary sources because some of issues can best be expressed through interviews with bank officials. Probably this might be one of the shortcomings of this study. However, this does not nullify the importance of its findings.

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