Zimbabwean Commercial Banks Liquidity and Its Determinants

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Abstract
The liquidity problems are bedeviling Zimbabwean commercial banks since the introduction of multi-currency system and this is impacting the economic development. After the 2003 to 2004 liquidity crisis, the central bank has re-emphasised on liquidity needs, and thus liquidity is very important for functioning of financial markets and the banking sector. The aim of this paper is therefore to identify determinants of liquidity of Zimbabwe commercial banks. The regression analysis was used and it has been found that there is a positive link between bank liquidity and capital adequacy, total assets, gross domestic product and bank rate. We have found that the adoption of multi-currency, inflation rate and business cycle have a negative impact on liquidity. It seems the banks size and their liquidity is positively correlated.

Keywords: Commercial banks, determinants of liquidity, liquidity ratios, panel data regression analysis.

1. Introduction
Financial disasters (e.g. the collapse of Trust Bank Corporation Limited, Barbican Bank Limited, CFX Bank Limited, CFX Merchant Bank, Intemarket Banking Corporation Limited, Intemarket Building Society, Intemarket Discount House, Royal Bank of Zimbabwe Limited, Time Bank Zimbabwe Limited, etc and the subsequent establishment of the Zimbabwe Allied Banking Group (ZABG)) in the financial and banking sector in Zimbabwe in 2003 has been the major reason for having appropriate risk management techniques in place (RBZ Annual Report, 2006). The Reserve Bank of Zimbabwe (RBZ) made it clear in 2003 that banks must implement a risk management and analysis infrastructure that is fully integrated with their daily risk management. In year 2011 to 2012 Zimbabwean small banks (Genesis Investment, ZABG and Interfin Commercial Bank) experienced a fair share of liquidity problems which led them to be monitored and some placed under curatorship. Lack of liquidity led to Genesis Investment Bank and Interfin Commercial Bank to close their doors. The small banks failed to access funds to finance the deposit withdrawals and loans. Thus a number of secular forces have led to liquidity risk measurement more important than ever before. However the varying levels of sensitivity of depositors is making it very difficult for commercial banks to predict volume response and as a measure, most financial intermediaries are focusing on deposit rate and the volume response (Vento and La Ganga; 2009).

Liquidity and liquidity risk is fast becoming the epicenter of Zimbabwe economic recovery. The aim of the paper is therefore to identify the determinants of liquidity in Zimbabwe banking industry. The paper is organized as follows, Section 2 looked at Zimbabwean bank liquidity and how it can be measured. Different ratios are explained in this section. Section 3 explores different determinants that can be used and those that have been used in other countries. The regression model is described and expected explanatory variable signs are presented in Section 4. The regression analysis method has been chosen because of its relevance. The results are presented in Section 5 and lastly, Section 6 presents the conclusion and recommendations.

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2. Zimbabwe’s Bank Liquidity and its Measuring

Banks must manage their liquidity risk judiciously through liquid assets on the balance sheet and reserves at Reserve Bank of Zimbabwe (hereafter RBZ). According to Bessis (2002), liquidity risk results from size and maturity mismatches of assets and liabilities. Liquidity deficits make banks vulnerable to market liquidity risk. Liquid assets protect banks from market tensions. Then liquidity has been defined by Keating and Marshall (2010) as the moneyness of an asset. Liquidity, according Schwarz (2010), can be decomposed into market, balance sheet, funding and macroeconomic liquidities. Market liquidity is the ability to transform financial assets into cash at current market prices and the balance sheet liquidity focuses on institution’s cash holdings. The institution should be able to convert the underlying assets into cash and this is referred to as the funding liquidity. Lastly, we have the macroeconomic liquidity which focuses on the availability of cash in the economy. There are different methods that can be used to measure banks’ asset liquidity such as bid-offer spread, market depth, immediacy and resilience. Basel 3 Accord defined the minimum short-term and long-term resilience that are supposed to be fully adopted by all financial institutions by 1 January 2015 and 1 January 2018 respectively (Basel; 2011).

There are two types of risk in the economy; which are the non-systematic and systematic risks. Figure 1 shows the interaction among different risks and a bank's liquidity. Some of these risks can be eliminated by holding a well-diversified portfolio. However, not all risks can be eliminated or diversified and these are very important to the institution. The risks can arise from correlation between returns from investments and returns from the whole stock market. Referring to Figure 1 below liquidity risk tends to compound other risks. For example, if a bank’s client has a position in an illiquid asset, its limited ability to liquidate that position at short notice will compound its market risk. Now suppose the bank has offsetting cash flows with two different counterparties on a given day, and one of the counterparties failed to honour his obligation. The bank has to raise the cash from other sources and if it is unable to do so, it too defaults and compound credit risk. So we can infer that liquidity risk can compound other risks. On the other hand, liquidity risk can be a consequential risk. In other words, it can be triggered by other risks such as market risk and credit risk (Vodov’a; 2011).

Commercial banks may experience liquidity excess or liquidity shortage. Liquidity excess is preferred by all depository institutions, but is it a good position? Lamoo and Casey (2005) argued that excess liquidity can have damaging consequences for financial stability by leading to speculative feedback loops such as momentum trading. Hence because of the liquidity destabilization property, it needs to be constrained or harnessed. Liquidity can be “too much of a good thing”. In this case depository institution management may be tempted to put a fair amount of that liquidity to good work by converting liquid assets into riskier, less liquid assets that yield higher returns. Thus assets that are liquid today are not necessarily going to be liquid on the date that the institution management expects them to be liquid.

On the other hand, liquid shortage is a threat to institutions. Liquidity shortages lead to liquidity risk and have contagion effect. Liquidity risk arises when an unexpected deposit withdrawal or a loan demand occurs. Banks like any other business, cannot make enough money without taking on risk. Risk-taking, may lead to bank failure, is therefore an essential part of the game. Hence banking business becomes more and more portfolio information driven and thus we are concerned with proper liquidity determinants with particular to Zimbabwe.

Different measures have been developed focusing on the sources of liquidity risk; that is on the liability side, asset side and off balance sheet operations. Moore (2009) pointed out that one can measure liquidity by stock approach or flow approach. The stock approach focuses on the asset and liability sides of the balance sheet employing ratios to identify liquidity trends. The flow approach focuses on comparing the variability in bank’s inflows and outflows to determine the amount of reserves that are needed during a period. Liquidity measure can be one-dimensional or multi-dimensional, thus according to Von Wyss (2004). One-dimensional liquidity measures take only one variable into account whereas multi-dimensional liquidity measures capture different variables in one measure. Furthermore, the measures can be subdivided into;
time-related, volume-related, and model based. There are two basic traditional methods for measuring liquidity risk which are liquidity gap and the liquidity ratios.

For the purpose of this research, balance-sheet related liquidity ratios has been used and Vodov'a (2011) and Moore (2009) provided four liquidity ratios. Here five liquidity ratios are going to be considered. The first liquidity ratio is the total loans-to-total deposits. The ratio is given by $L_1$ that follows;

$$L_1 = \frac{\text{Total Loans}}{\text{Total Deposits}}$$

Here the total loans include; loans and advances, mortgage advances, credit card debtors, overdrafts and loans to public and private sectors. On the other hand, the total deposits in this context include the demand, short-term, medium-term and long-term deposits. The demand deposits include cash managed, cheque and transmission deposits. The short-term savings fall under the short-term deposits. The second liquid ratio relates illiquid and semi-liquid assets with liquid and semi-liquid liabilities. As per general rule, the higher the liquidity ratio the less liquid the bank is. The second liquidity ratio is given by $L_2$ that follows;

$$L_2 = \frac{\text{Total Loans}}{\text{Total Liabilities}}$$

The equation (2) represent the total loan-to-total liabilities ratio. Theoretically, the higher liquidity ratio indicates lower bank's liquidity. The total liabilities include; total funding-related liabilities to the public, and outstanding liabilities on behalf of clients. The equation (3) is the total loans-to-total assets ratio and is a very important liquidity measure. The third liquidity ratio is represented by $L_3$ that follows;

$$L_3 = \frac{\text{Total Loans}}{\text{Total Assets}}$$

The ratio $L_3$ indicates the percentage of bank's assets tied up in illiquid loans. The bank's total assets include all liquid, semi-liquid and illiquid assets. The fourth liquidity ratio is the total liquid assets-to-total assets, which is represented by $L_4$ below;

$$L_4 = \frac{\text{Total Liquid Assets}}{\text{Total Assets}}$$

The $L_4$ depicts the bank's ability to absorb liquidity shocks. In theory, the higher liquidity ratio indicates that the bank is in a better position to meet its stochastic withdrawals. However, the $L_4$ can be misleading in both positive and negative sense, in that high liquidity ratio is not necessarily good and low liquidity ratio is not necessarily bad. This liquidity ratio as a liquidity indicator is flawed because it is conceptually based on the assumption that all the bank's assets are going to be liquidated to meet all its stochastic withdrawals. This assumption might not be true and as such banks must look at the institution as a going-concern. In addition, it is not realistic for banks to purposefully maintain high levels of liquid assets to meet stochastic withdrawals. If that happens, it is seen as poor asset utilisation for a bank to hold large amounts of liquid assets on its balance sheet. Rather the liquid assets could have been invested to generate higher returns. For the purpose of this research, the liquid assets include Reserve Bank of Zimbabwe money and gold, Zimbabwe bank group funding including negotiable certificates of deposits (herein after NCDs). Other assets that are included are; the Zimbabwe interbank group funding including NCDs, loans granted under resale agreement, liquid bills, notes and acceptances. The deposits with and advances to the Reserve Bank of Zimbabwe, deposits with and advances to Zimbabwean Banks, marketable Republic of Zimbabwe government stock, other public sector interest-bearing securities and debentures and other interest bearing security investments are regarded as liquid assets. The last liquidity ratio that is considered here is the total liquid assets-to-total deposits represented by $L_5$ that follows;

$$L_5 = \frac{\text{Total Liquid Assets}}{\text{Total Deposits}}$$
The \( L_5 \) is to ascertain whether the bank's short-term assets are readily available to pay off its short-term liabilities. The \( L_4 \) can be interpreted same as \( L_4 \) above. Here, the higher ratio signifies that the bank has the capacity to meet stochastic withdrawals. As has been pointed above, the bank as a going-concern business, it must focus on the time required to convert its working capital assets to cash.

3. Determinants of Bank Liquidity

Depository institutions depend on core deposits and interest earned on loans and investments. Core deposits can be defined as those deposits that will stay with the bank over an extended period of time. These deposits are relatively stable sources of funds and consist mainly of demand, savings and retail time deposits. Hence, in this regard, depository institutions need to predict the distribution pattern of net deposit drains and the variables that affects it. Different literature explains different determinants that can be employed by banks. Liquidity determinants can be divided into three classes which are; micro-economic, macro-economic and financial variables.

According to Gunsel (2008), micro-economic approach uses financial ratios that are in the context of CAMELS (C-Capital Adequacy, A-Asset Quality, M-Management Efficiency, E-Earnings, L-Liquidity and S-Asset Size) theory. The micro-economic variables are bank-specific variables which are; capital, assets, deposits, and loans. Micro-level approach focuses on individual institution's balance sheet and those variables are the main causes of bank failure. Moore (2009) investigated liquidity determinants in Latin America and Caribbean countries. The determinants include cash demands and bank rate. Some authors such as, Aspachs et al (2005), Bunda and Desquilbert (2008) and Lucchetta (2007) identified the following liquidity determinants; interbank rate, exchange rate, loan growth, bank's total asset size, central bank bailout and business cycle.

The macro-economic variable broadly focuses on the state of the economy. The liquidity position of a bank is very sensitive to macro-economic variable fluctuations. This has been echoed by Eichengreen and Arteta (2000), Hutchison and McDill (1999) and Hardy and Pazarbasioyglu (1998). The increasing inflation, decline in asset prices, high interest rates, credit expansion, real gross domestic product growth determine the bank's liquidity position. High inflation rate and sudden changes of inflation have a negative impact on interest rates and bank's capital. In this respect, the bank's non-performing loans will expand and collateral security values deteriorate. It has been found that inflation rate significantly determines bank liquidity (Heffernan; 2005 and Bessis; 2002). Unanticipated rise in interest rates can lead to liquidity crunch as result of decrease in cash flows. Interest rate would signal an impending liquidity crises and compound credit risk. Yilmaz (2003) and Vodova (2011) indicate that interest rate significantly determines liquidity. In addition, the country's real gross domestic product growth rate and unemployment rate influence the financial institution's liquidity levels. We cannot exclusively classify financial variables since some fall in micro-economic and others in macro-economic variables.

Rauch et al (2009) analysed the Germany savings banks' liquidity determinants. It has been found that the bank rate, unemployment rate, previous liquidity levels, banks' clientele base and its profitability are crucial liquidity determinants. Fielding (2005) had a different view and paid attention on political instability in Egypt. The determinants were; level of economic output, discount rate, reserve requirements, and violent political incidence. Fadare (2011) researched on liquidity and financial crisis in Nigeria and pointed out that the determinants of liquidity were the monetary policy rates and currency circulation. The decrease in monetary policy rates prompted the demand for cash and there by leading to an increase in loan-to-deposit ratios. On the other hand, Fadare (2011) pointed out that the decrease in currency circulation in proportion to banking sector deposits led to the decline in loan-to-deposit ratios. The bank competition within East African community was assessed by Sanya and Gaertner (2012), and specifically looked at Tanzania, Kenya, Uganda, Rwanda and Burundi. The Kenyan banking system liquidity was determined by return on assets and return on equity. Tanzanian banks liquidity was determined by return on equity, return on assets and bank’s capital. Therefore, the determinants of banks liquidity can be grouped as micro-economic variables encroach
to financial variables such as liquid assets, total assets, capital, return on equity and loans and macroeconomic variables.

4. Methodology

The variables are grouped into two main groups namely the microeconomic and macroeconomic variables. Now to identify the determinants of Zimbabwean commercial banks liquidity, a multiple-regression analysis was used. Five liquidity ratios were used to analyse the overall commercial banks liquidity. For each liquidity ratio, we estimate the following equation (6);

\[ L_t = \beta_0 + \beta_1 v_{1t} + \beta_2 v_{2t} + \beta_3 v_{3t} + \beta_4 v_{4t} + \beta_5 v_{5t} + \varepsilon_t \] (6)

where \( L_t \) is the liquidity ratio in time \( t \), \( v_{1t} \) and \( v_{2t} \) are the vectors of micro-economic and macro-economic variables, respectively. The \( \beta \)'s are constant terms and \( \varepsilon_t \) is the random error term representing the collection of everything that is not accounted for by observable variables included in the model. The model offers the two marginal effects vectors \( \frac{\partial L_t}{\partial v_{1t}} = \beta_1 \) and \( \frac{\partial L_t}{\partial v_{2t}} = \beta_2 \) which represent effect from a unit change in micro-economic variable and macro-economic variable on the conditional expected value of the liquidity value respectively, where \( i = 1, \ldots, n_1 \) and \( j = 1, \ldots, n_2 \). All the five liquidity ratios are going to be in form of equation (6). The Table 1 shows the chosen liquidity determinants, source and their expected economic effects to liquidity ratios. The criterion that has been used to choose determinants was based on previous researches, economic importance and data availability. Moreover, some of the liquidity determinants that have been proposed by other researchers are unquantifiable.

For the purpose of this research, we consider two micro-economic variables which are the banks' total capital and total assets. The soul reason for using only those two variables was centred on data availability. As has been explained by other researchers, the logarithm has been introduced on total assets. Under macro-economic variables, only five variables have been considered. From Table 1 theoretically, it is assumed that banks' capital, inflation rate and interbank rate do have positive impact on an institution's liquidity. The banks' total assets can have a positive or negative impact on banks' liquidity. However, the remaining variables are expected to have a negative impact on banks liquidity position. The micro-economic and macro-economic data was obtained from RBZ Monetary Policy Statement except the GDP which was obtained from Ministry of Finance. The data that was used was from January 2010 to December 2011. However, the data is unbalanced because some of the data is represented on monthly basis, quarterly basis or after every three months. Here only the overall commercial banks data was used leaving the merchant banks and other financial institutions.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-economic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v_1 )</td>
<td>Banks’ capital</td>
<td>RBZ Monetary Policy</td>
<td>+</td>
</tr>
<tr>
<td>( v_2 )</td>
<td>Total assets</td>
<td>RBZ Monetary Policy</td>
<td>+/-</td>
</tr>
<tr>
<td>Macro-economic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( v_3 )</td>
<td>Gross domestic product</td>
<td>Ministry of Finance</td>
<td>-</td>
</tr>
<tr>
<td>( v_4 )</td>
<td>Inflation rate</td>
<td>RBZ Monetary Policy</td>
<td>+</td>
</tr>
<tr>
<td>( v_5 )</td>
<td>Lending rate</td>
<td>RBZ Monetary Policy</td>
<td>-</td>
</tr>
<tr>
<td>( v_6 )</td>
<td>Interest rate spread</td>
<td>RBZ Monetary Policy</td>
<td>-</td>
</tr>
<tr>
<td>( v_7 )</td>
<td>Bank rate</td>
<td>RBZ Monetary Policy</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Vodov’a (2011)
Note: RBZ is Reserve Bank of Zimbabwe
The Minitab 10.2 software package was used to analyse the data. The tests were carried to determine the stationarity of data, and where necessary the data was transformed through differencing and introducing logarithms. The dependent variables, in this case the chosen liquidity ratios, was generated using the explanatory variables. Tests were carried out to determine the statistical significance of different variables and the best model was chosen according to the highest value of the adjusted coefficient of determination.

5. Results

The economic importance of variables and availability of data were roped in to choose the appropriate variables. The tables that follow show the coefficients, standard deviation, t-statistic, probability and the descriptive statistics per liquid ratio. In the appendices, graphs are presented which were used to test heteroscedasticity, normality and autocorrelation.

<table>
<thead>
<tr>
<th>Table 2: Determinants of Liquidity Measured by $L_1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>c</td>
</tr>
<tr>
<td>$v_1$</td>
</tr>
<tr>
<td>$v_2$</td>
</tr>
<tr>
<td>Observations</td>
</tr>
<tr>
<td>F(2, 19)</td>
</tr>
<tr>
<td>Prob &gt; F</td>
</tr>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>R-squared Adjusted</td>
</tr>
<tr>
<td>Durbin-Watson test</td>
</tr>
<tr>
<td>Root MSE</td>
</tr>
</tbody>
</table>

The determinants of $L_1$ at 5% significant level are shown in Table 2. In the estimated model in Table 2, the descriptive statistic represented by R-squared, F-statistic and Durbin-Watson statistic at 5% significant level are relatively free of estimation problems, we can safely infer that loan-to-deposit ratio can be determined by two variables. The variables are; the bank's capital base and its total assets. Within Durbin-Watson statistic value of 1.82, the model is free from error of multicollinearity. However, the explanatory power of variables is low as depicted by the R-squared adjusted value of 44.6%. The positive influence of bank capital is consistent with the apriori expectations and this signifies its importance in determining the banks liquidity. The results for total assets are negative in agreement with apriori expectations and significant in influencing liquidity in Zimbabwe according to the results.

The Table 3 shows the determinants of $L_2$. By evaluating the descriptive statistic F-statistic and R-squared, the estimated model is relatively free of estimation problems. However, the Durbin-Watson value of 2.51 implies that, we cannot solely conclude that the model is from the errors of multicollinearity. Now relating to R-squared value of 67.9%, the loan-to-total liability ratio's explanatory power is slightly above average. This implies that the determinants do have an effect on banks liquidity.
Table 3: Determinants of Liquidity Measured by $L_3$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Deviation</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c$</td>
<td>-0.000631</td>
<td>0.003855</td>
<td>-0.16</td>
<td>0.872</td>
</tr>
<tr>
<td>$v_1$</td>
<td>0.28371</td>
<td>0.06179</td>
<td>4.59</td>
<td>0.000</td>
</tr>
<tr>
<td>$v_2$</td>
<td>-0.44622</td>
<td>0.07030</td>
<td>-6.35</td>
<td>0.000</td>
</tr>
<tr>
<td>$v_3$</td>
<td>0.2955</td>
<td>0.1413</td>
<td>2.09</td>
<td>0.052*</td>
</tr>
<tr>
<td>$v_7$</td>
<td>0.02948</td>
<td>0.02641</td>
<td>1.12</td>
<td>0.280</td>
</tr>
</tbody>
</table>

Observations 22
F(4, 17) 21.09
Prob > F 0.000
R-squared 74.0%
R-squared Adjusted 67.9%
Durbin-Watson test 2.51
Root MSE 0.06198

Key: * - 10% significant level

The $L_3$ is determined by bank's capital, total assets, the gross domestic product, and bank rate at 5% level except GDP. As on $L_1$, the bank’s capital and total assets have significant impact on liquid ratio of the Zimbabwean banks in line with apriori expectations. However, the results of the explanatory variables, GDP at 10% level and bank rates influence the opposite than expected. The positive GDP signals that liquidity tends to be inversely related to the business cycle. According to the results, the bank rate at 5 or 10% level is insignificant in determining bank’s liquidity. Surprisingly, the results indicate that the constant value is insignificant.

The Table 4 shows the determinants of $L_3$ at 5% significant levels. The R-squared value and F-statistic implies that the estimated model is relatively free of estimation errors. The Durbin-Watson statistic value of 2.48 prohibits us to make a conclusion regarding estimation errors. In other words, it is inconclusive to infer that autocorrelation does not exist. By assessing the R-squared value of 67.3%, it implies that the explanatory power is high, and is determined by the following variables; capital, total assets and gross domestic product. The banks’ capital and total assets are very significant as depicted by p-values.

However, GDP influence the opposite than expected and is significant in determining banks’ liquidity. The variable has the same impact as in $L_2$. Here the loan demands are high and banks might be tempted to meet loans demands thereby exposing themselves to potential liquidity crisis. Again, the constant value is insignificant in determining the banks’ liquidity.
Table 4: Determinants of Liquidity Measured by $L_3$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Deviation</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c$</td>
<td>-0.001257</td>
<td>0.003846</td>
<td>-0.33</td>
<td>0.748</td>
</tr>
<tr>
<td>$v_1$</td>
<td>0.28059</td>
<td>0.06226</td>
<td>4.51</td>
<td>0.000</td>
</tr>
<tr>
<td>$v_2$</td>
<td>-0.43130</td>
<td>0.06967</td>
<td>-6.19</td>
<td>0.000</td>
</tr>
<tr>
<td>$v_3$</td>
<td>0.3034</td>
<td>0.1424</td>
<td>2.13</td>
<td>0.047</td>
</tr>
</tbody>
</table>

Observations 22
F(3, 18) 15.41
Prob > F 0.000
R-squared 72.0%
R-squared Adjusted 67.3%
Durbin-Watson statistic 2.48
Root MSE 0.07058

The Table 5 shows the determinants of $L_4$ at 5% significant level except those variables that are indicated. The descriptive statistic represented by R-squared and F-statistic are less significant implying that the estimated model is less free of estimation problems. However, the Durbin-Watson statistic value of 2.02 implies that the model is free from error of multicollinearity. The constant value is significant at 15% level. The explanatory power of the model is very low, thus R-squared is 30.8%. From the results, bank's liquid assets-to-total assets ratio is influenced by; capital, total assets, inflation and lending rates. The results reveal that the banks’ capital influences the ratio in an opposite direction than expected and statistically significant at 5% level.

Table 5: Determinants of Liquidity Measured by $L_4$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Deviation</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c$</td>
<td>-0.0014306</td>
<td>0.0084550</td>
<td>-1.69</td>
<td>0.109**</td>
</tr>
<tr>
<td>$v_1$</td>
<td>-0.3072</td>
<td>0.1395</td>
<td>-2.20</td>
<td>0.042</td>
</tr>
<tr>
<td>$v_2$</td>
<td>0.3599</td>
<td>0.1540</td>
<td>2.34</td>
<td>0.032</td>
</tr>
<tr>
<td>$v_4$</td>
<td>0.0001310</td>
<td>0.00010440</td>
<td>1.25</td>
<td>0.226****</td>
</tr>
<tr>
<td>$v_5$</td>
<td>-0.1463</td>
<td>0.1029</td>
<td>-1.42</td>
<td>0.173***</td>
</tr>
</tbody>
</table>

Observations 22
F(4, 17) 3.33
Prob > F 0.034
R-squared 44.0%
R-squared Adjusted 30.8%
Durbin-Watson statistic 2.02
Root MSE 0.07179

Key: ** - 15% significant level
***** - 20% significant level
**** - 25% significant level

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The coefficient on the measure of capital adequacy at 5% is negative suggesting that the ability of banks to absorb the cost of domestic and external shocks was seriously limited due to being under-capitalised. The inflation rate is positive and significant at 25% level in agreement with apriori expectations. Similarly, the lending rate show negative and significant at 20% level impact on liquidity ratio of the Zimbabwean banks.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Deviation</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$c$</td>
<td>0.00522</td>
<td>0.01360</td>
<td>0.38</td>
<td>0.705</td>
</tr>
<tr>
<td>$v_1$</td>
<td>-0.5610</td>
<td>0.2202</td>
<td>-2.55</td>
<td>0.020</td>
</tr>
<tr>
<td>$v_2$</td>
<td>1.1137</td>
<td>0.2418</td>
<td>4.61</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Observations 22  
F(2, 19) 11.14  
Prob > F 0.001  
R-squared 54.0%  
R-squared Adjusted 49.1%  
Root MSE 0.21229

The Table 6 shows the determinants of $L_s$ at 5% level and its explanatory power. The F-statistic and R-squared statistic imply that the estimated model is averagely free of estimation errors. The Durbin-Watson statistic value of 2.84 implies that we cannot infer whether there is correlation or not. Thus, liquid assets-to-deposits ratio's explanatory power is low, and is influenced by capital and total assets. However, bank’s capital influences in an opposite direction than theoretically expected. As has been explained on $L_s$, the negative capital adequacy implies that the banks are under-capitalised. The results reveal that the total assets are positively and statistically significant at 5% level in agreement with apriori expectations.

Therefore, in Zimbabwe, liquidity is mainly determined by bank’s capital adequacy, the total assets, lending rates, and country's GDP. However, comparing with other countries, such as Egypt, according to Fielding (2011), liquidity is determined by violent political incidence. The Czechs banks liquidity is determined by capital adequacy, non-performing loans and interest rates on lending and interbank transactions (Vodov’a, 2011). Sanya and Gaertmer (2012), found out that Kenyan banking system liquidity is determined by return on assets and return on equity. In Tanzania, banks liquidity is determined by return on equity, return on assets and banks’ capital. Fadare (2011) found out that currency circulation is the main determinant of Nigerian banks.

6. Conclusions

The main purpose for this paper was to identify the determinants of liquidity in Zimbabwe commercial banks since the inception of multi-currency system. Multiple regression models were used to analyse five liquidity ratios. From the complete set of variables, only few variables proved to be significantly important in determining bank liquidity. We have found that higher bank's capital, total assets volume, higher lending rates, and positive country's GDP increases the bank's liquidity position in Zimbabwe. In other words, there is a positive link between bank liquidity and capital adequacy, total asset volumes, gross domestic product
and bank rate. We have found that the adoption of multi-currency, inflation rate and business cycle have a negative impact on liquidity. It seems the banks' size and their liquidity is positively correlated.

However, there are other very important variables which were not included in the models due to unavailability of data such as non-performing loans, interbank rate, equity returns and political instability. The absence of active money market has serious impact on the bank liquidity. In other words, the liquidity level in the Zimbabwe Stock Exchange, translate to liquidity level in the banks. Since the dominant currency in Zimbabwe is the United States dollar, the country’s monetary policy is of less importance as long as the country has no control over the dollar. Rather it seems the country uses London Interbank Offer Rate. The RBZ in collaboration with the Ministry of Finance and other interested parties should put up measures to make sure that the money market is active. The RBZ should be heavily funded to perform the function of lender of last resort to instill confidence in the money and credit markets. In addition, the country should craft investor friendly laws to attract foreign direct investment to improve liquidity. The indigenisation and empowerment laws scare away foreign direct investment and need to be amended to be investor friendly. Lastly, the political environment is unstable and this needs to be solved amicably to improve investor confidence. The paper is a stepping stone to identify liquidity determinants in Zimbabwe which may be controlled and managed, and some which the government may not have control over them. However, future researches need to focus on qualitative factors such political instability, the currency circulation and salary and wages levels as probable determinants.

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Appendices
Tests for Normality

![Normal Plot of Residuals for Liquidity Ratio 1](image1)

![Normal Plot of Residuals for Liquidity Ratio 2](image2)

![Normal Plot of Residuals for Liquidity Ratio 3](image3)

![Normal Plot of Residuals for Liquidity Ratio 4](image4)
Tests of Autocorrelation

Liquidity Ratio 1

Liquidity Ratio 2

Liquidity Ratio 3

Liquidity Ratio 4

Liquidity Ratio 5

References


