Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.6, No.15, 2015

Determinants of Banks Liquidity: Empirical Evidence on Ethiopian Commercial Banks

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Abstract
Liquidity creation is the main concerns of commercial banks because it is crucial for its existence. Hence this paper intended to assess bank specific factors that affect liquidity of Ethiopian commercial banks. The data covered the period from 2007-2013 for the sample of ten commercial banks in Ethiopia and used secondary data. Bank specific variables were analyzed by employing the balanced panel fixed effect regression model and the result of the study revealed that capital adequacy and profitability have statistically significant impacts on liquidity of Ethiopian commercial banks while bank size has positive and statistically significant impact on liquidity. Nonperforming loan and loan growth were found to be statistically insignificant/ has no any impact on liquidity of Ethiopian commercial banks for the tested period.
Key word: liquidity determinants, balanced panel data, Ethiopian commercial banks

Introduction

It is known that the banking sector plays an important role in the economic growth of a country. This is made through matching surplus economic units with deficit economic units. However, this fundamental role of banks in the 'maturity transformation' of short term deposits into long term loans make banks inherently vulnerable to liquidity risk, both of an institution specific nature and that which affects markets as a whole . This is due to the fact that loans are regarded as the most profitable service yet the most risky service provided by banks (Berger and Bouwman2006). It is most risky due to the likeliness of credit risk which may eventually end up in liquidity shortage. This indicated by; as default risk increases, liquidity risk also increases (Ericsson & Renault 2006). Different authors define liquidity differently; Yeager and Seitz (1989) define liquidity as the ability of a financial institution to meet all legitimate demands for funds. Also the Basel Committee on Banking Supervision (2008) define liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses. Hence, liquidity risk can be defined as the risk of being unable to liquidate a position timely at a reasonable price (Muranaga and Ohsawa 2002). Liquidity risk has become one of the main concerns of financial institutions following the financial crisis of 2007 (Longworth 2010; Bernanke 2008). Liquidity and liquidity risk is very up to date and important topic, hence the intent of this study is to identify micro-economic determinants of banks liquidity in Ethiopian commercial banks.

Objective of the study

To investigate the impact of bank specific factors on liquidity of Ethiopian commercial banks.

Significance of the study

This research is expected to provide empirical evidence on micro-economic determinants of Ethiopian commercial banks' liquidity and greatly contribute to the existing knowledge in the area of this title in the context of Ethiopia. Its findings are highly important for commercial banks and central banks.

Scope of the study

The scope of the study is limited to see the impact of micro-economic factors that determining banks liquidity from the period 2007 to 2013 for ten commercial banks in the sample.

Literature Review

As of Alger et al. (1999) the asset is liquid if it can be sold quickly without significant losses but what determine the liquidity of an asset is still a disputed issue among theorists. As of the conventional wisdom found in the bank management literature, an asset is liquid if it is widely known to have low risk (such as government debt) and if it has a short maturity this implies that asset's price is less sensitive to interest rate movement, making large capital losses unlikely (Garber and Weisbrod 1992 and Hempel et al. 1994). According to that definition, the typical bank liquid asset includes cash, reserves representing an excess of reserves required by law (i.e., funds held in the account at the central bank), securities (e.g., government debt, commercial paper), and interbank loans with very short maturity (one to three days).

Bordo et al. (2001), suggest two explanations on the cause of liquidity runs on deposit money banks. Their explanation indicated that runs on banks are a function of mob psychology or panic, such that if there is an expectation of financial crisis and people take panic actions in anticipation of the crisis, the financial crisis

becomes inevitable. Bordo et al. (2001) also asserts that crises are an intrinsic part of the business cycle and result from shocks to economic fundamentals. When the economy goes into a recession or depression, asset returns are expected to fall. Borrowers will have difficulty in repaying loans and depositors, anticipating an increase in defaults or nonperforming loans, will try to protect their wealth by withdrawing bank deposits. Banks are caught between the illiquidity of their assets (loans) and the liquidity of their liabilities (deposits) and may become insolvent.

There is a large volume of theoretical literature dealing with bank liquidity creation (Bryant 1980; Diamond and Dybvig 1983; Holmstrom and Tirole 2010 and Kashyap et al. 2002). Most recent studies focused on measuring the amount of liquidity created in the banking sector (Deep and Schaefer 2004; Berger and Bouwman2008); yet few studies shed light on the determinants of bank liquidity creation. Hence, this part focused on the review of relevant empirical literatures on banks liquidity and its determinants.

Vodová (2012) aimed to identify determinants of liquidity of commercial banks in Slovakia. In order to meet its objective the researcher considered the data for bank specific factors over the period from 2001 to 2009. The data was analyzed with panel data regression analysis by using an econometric package Eviews7and the findings of the study revealed that bank liquidity decreases mainly as a result of higher bank profitability, higher capital adequacy and with the size of bank. The level of non-performing loans has no statistically significant effect of the liquidity of Slovak commercial banks.

Also the study made on Bank-specific determinants of liquidity on English banks studied (Valla et al.2006) and assumed that the liquidity ratio as a measure of the liquidity should be dependent on following factors: bank profitability, which is according to finance theory negatively correlated with liquidity, loan growth, where higher loan growth signals increase in illiquid assets, size of the bank is ambiguous and Emmons (1993) as cited by Gizycki (2001), when considering USA banking failures, concludes that increased risk-taking at individual banks alone does not fully account for the observed pattern of bank failures. Local economic conditions are also important predictors of bank failure. It is the coincidence of risky bank portfolios and difficult economic conditions that makes bank failure most likely.

The study made by Vodová (2013) with the aim of identifying determinants of liquidity of Hungarian commercial banks which cover the period from 2001 to 2010 and used panel data regression analysis. The result of the study showed that bank liquidity is positively related to capital adequacy and bank profitability but negatively related to bank size.

And the study made by Subedi andNeupane (2011) on determinants of banks' Liquidity and their impact on financial Performance in Nepalese commercial Banks. It used multivariate linear regression model to include Liquid Assets to Total Assets Ratio, Loan to Deposit & Short Term Financing and Return on Assets for the data of six commercial banks in the sample covering the period from 2002 to 2011/12. The results of regression analysis showed that capital adequacy, share of non-performing loans in the total volume of loans had negative and statistically significant impact on banks liquidity whereas loan growth, liquidity premium paid by borrowers and short term interest rate had negative and statistically insignificant impact on banks liquidity. Bank size had positive and significant impact on banks liquidity.

And also Cornett et al. (2011) studied how banks manage the liquidity shock that occurred during the financial crisis of 2007-2009 by adjusting their holdings of cash and other liquid assets and how these efforts affected credit availability. Their sample included quarterly data of all US commercial banks over the period 2006Q1 through 2009Q2. They estimated regression function separately for small and large banks with following explanatory variables: the share of illiquid assets such as loans, leases, asset-backed securities, mortgage-backed securities on total assets; the share of core deposits i.e. deposits under USD 100 000 plus all transactions deposits on total assets; bank capital adequacy and the ratio of unused commitments to commitments plus assets.

They came to conclusion that during the crisis, liquidity risk exposure led to greater increases in liquid assets, mirrored by greater decreases in credit origination. In other words, banks with more illiquid asset portfolios increased their holdings of liquid assets and decreased lending. The results showed significant differences between small and large banks. Mainly small banks that relied more heavily on stable sources of financing, i.e. core deposits and capital, continued to lend relative to other banks. Moreover, large banks have higher share of illiquid assets on total assets than small banks and also hold a greater fraction of unused commitments. Large banks are 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. Off-balance sheet liquidity risk materialized as borrowers drew on pre-existing commitments in large quantities.

The study made by Vtyurina et al. (2012) on the determinants of banks' liquidity buffers in Central America by using the Using a panel of about 100 commercial banks from the region. According to this study; Bank size, capital adequacy, and financial development has positive relationship with bank liquidity holding, whereas profitability, loan loss reserve ratio has negative relationship with liquidity holding and the recent study by Berrospide (2013) examined bank liquidity Hoarding and the Financial Crisis in U.S commercial banks. The

study was conducted through panel dataset using quarterly balance sheet data from reports of income and condition (Call Reports) for all U.S. commercial banks between 2005 and 2009. The findings of his study revealed that banks held more liquid assets in anticipation of future losses from securities write-downs. This implies that small amount of liquid assets may lead banks to liquidity risk.

Therefore, banks preferred to hold more liquid assets to remain liquid. However, holding more liquid assets in banks portfolio had an adverse impact on their profit. For instance, Bordeleau&Graham (2010) by their study entitled the impact of Liquidity on Bank Profitability, analyze the impact of liquid asset holdings on bank profitability for a sample of large U.S. and Canadian banks. The result reveals that even though there is a situation at which holding further liquid assets diminishes a banks' profitability, the banks that hold some liquid assets could improve their profitability.

Chagwiza (2011) made study on Zimbabwe regarding the commercial banks liquidity and its determinants. The main objective of his study was to identify the determinants of liquidity in Zimbabwean commercial banks using data from January 2010 to December 2011 and the regression analysis was used. The result of his study revealed that, there was a positive relationship between bank liquidity and the following firm specific factors; capital adequacy, total asset (TOA). And the most recent studies made by Laurine (2013) again in Zimbabwe regarding Zimbabwean Commercial Banks Liquidity Risk Determinants after Dollarization. The aim of his paper was that empirically investigating the determinants of Zimbabwean commercial banks liquidity risk after the country adopted the use of multiple currencies exchange rate system and to attain the intended objective panel data regression analysis was used on monthly data from the period of March 2009 to December 2012.

The result of the study revealed that capital adequacy and bank size have negative and significant influence on liquidity risk where non-performing loans has a positive and significant relationship with liquidity risk. Tseganesh (2012) made study on determinants of banks liquidity and their impact of financial performance on commercial banks in Ethiopia. The aim of her study was concerned with two points; identify determinants of commercial banks liquidity in Ethiopia and see the impact of banks liquidity up on financial performance through the significant variables explaining liquidity. The data was analyzed by using balanced fixed effect panel regression model for eight commercial banks in the sample covered the period from 2000 to 2011 and the result of her study indicate that capital adequacy, bank size, share of nonperforming loans in the total volume of loans, had positive and statistically significant impact on banks liquidity where as loan growth had statistically insignificant impact on banks liquidity.

Methodology

Data type and sources

The panel secondary data was quantitative in nature and encompasses seven years banks' audited financial statements (balance sheet and income statement). Hence, the data used for this study was pure quantitative.

Sampling design and sampling frame

The target population were all commercial banks,(i.e both private and public) that exist in the fiscal year 2012/13. According to NBE (2012/13) there are eighteen commercial banks in Ethiopian in the fiscal year 2012/13. Of these two are publicly owned while sixteen are privately owned. The frame for the sample included commercial banks having at least seven years working experiences (i.e from 2007 to 2013) ten commercial banks were selected. The reason behind taking seven years data was to increase the sample size. Hence, the matrix for the frame was 7*10 that included 70 observations.

Regression Model specification

The study used panel/longitudinal data model which involve the pooling of observations on the cross sectional over several time periods. Brooks (2008) stated the advantages of using panel data set; first and perhaps most importantly, it can address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time series or pure cross sectional data alone. Second, it is often of interest to examine how variables, or the relationships between them, change dynamically (over time). Third, by structuring the model in an appropriate way, the researcher can remove the impact of certain forms of omitted variables bias in regression results.

The regression model used for this study was similar with that of Rafique& Malik (2013) and Vodová (2011). The fixed effect panel data model was selected and used for hypothesis testing. It is one of panel data model which enables to control for unobserved heterogeneity among cross sectional units and to get the true effect of the explanatory variables. Thus, the following equation indicated the general model for this study:

$$yit = \alpha_0 + \Sigma\beta_k x_{k,i,t} + \varepsilon_{i,t}$$

Where y_{it} = the dependent variable (i.e. Liquidity of banks i at time t), $X_{k,\,i,\,t}$= the independent variables of the study, α_0= intercept/constant term, β_K's(β_1–β_8) = parameters estimated/coefficients of the explanatory variables, **i** = the cross section, **t** = time series dimension, $\varepsilon_{i,t}$=the error term, and **Σ**=Summation.

The hypothesis developed by the study was as follows:

H1. Capital adequacy has positive and significant impact on banks liquidity.

H2. Nonperforming loans has negative and significant impact on banks liquidity.
H3. Bank size has positive and significant impact on banks liquidity.
H4. Profitability has negative and significant impact on banks liquidity.
H5. Loan growth has negative and significant impact on banks liquidity.

Data presentation and analysis

Under this part the collected data were presented and important correlation and regression results were discussed. Also important tests of classical linear regression model (CLRM) were made.

Choosing fixed vs random effect model

In order to choose fixed or random effect model a formal test so called hausman test was used which was based on the null hypothesis in favor of random effect model estimator. If p value is higher than 0.05 (i.e. it is insignificant) hence random effects is preferable whereas if p value is lower than 0.05 (i.e. it is significant) fixed effect is preferable (Gujarati 2004). Hence according to hausman test for this panel data model shown in the appendix A, table 4.1 the model is better off if fixed effect model is used since the p-value for the model is 0.0204, which is less than 0.05(significant).

Test of the classical linear regression model (CLRM)

The assumptions of CLRM was tested to know whether the data and the model for this study was fit or not with the assumption. As per Brooks (2008), the first assumption required that the average value of the errors is zero ($E(u_t) = 0$). In fact, if a constant term is included in the regression equation, this assumption will never be violated. Therefore, since the constant term (i.e. α) was included in the regression equation, the average value of the error term in this study was expected to be zero.

i.Test for normality assumption

The normal distribution is not skewed and is defined to have a coefficient of kurtosis 3. Bara Jarque (BJ) test is one of the most commonly applied tests for normality. Hence, if the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. This means that the *p*-value given at the bottom of the normality test screen should be bigger than 0.05 to not reject the null of normality at the 5% level (Brooks 2008). As shown in the appendix B1, kurtosis approaches to 3 (3.311816) and the Bera-Jarque statistics were not even at 10% level of significance as per the P-values shown in the histogram in the appendix B1(0.295445). Therefore, the null hypothesis that is the error term was normally distributed should not be rejected and it seems that the error term in this case follows the normal distribution.

ii.Test for multicollinearity assumption

If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect collinearity, and it cannot be estimated by OLS (Brooks 2008). The condition of multicollinearity exists where there is high, but not perfect, correlation between two or more explanatory variables (Cameron and Trivedi 2009; Wooldridge 2006). Churchill and Iacobucci (2005) stated that when there is multicollinearity, the amount of information about the effect of explanatory variables on dependent variables decreases.

Even if how much correlation causes multicollinearity is not clearly defined, there is an argument provided by different authors. Hair et al (2006) argue that correlation coefficient below 0.9 may not cause serious multicollinearity problem. Malhotra (2007) stated that multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. Kennedy (2008) suggests that any correlation coefficient above 0.7 could cause a serious multicollinearity problem leading to inefficient estimation and less reliable results. This indicates as there is no consistent argument on the level of correlation that causes multicollinearity. According to appendix B2 correlation matrix table, the highest correlation value of 0.451 was observed between nonperforming loan and capital adequacy. Since there is no correlation value above 0.7, 0.75, and 0.9 according to Kennedy (2008), Malhotra (2007) and Hair et al (2006) respectively, hence it was possible to conclude that there was no multicollinearity problem in this study.

iii.Test for Heteroskedasticity assumption

If the residuals of the regression have systematically changing variability over the sample, (i.e. the errors do not have a constant variance) that a sign of Heteroskedasticity is observed. To test this assumption the white test was used having the null hypothesis of Heteroskedasticity. Hence, according to appendix B3, p-value was in excess of 0.05, therefore it is possible to say that there was no evidence for the presence of Heteroskedasticity.

iv.Test for Autocorrelation assumption

It is assumed that the errors are uncorrelated with one another. Besides if the errors are not uncorrelated with one another it would be stated that they are 'autocorrelated' or that they are 'serially correlated' (Brooks 2008). This test was made by using Durbin and Watson test. Durbin-Watson (DW) is a test for first order autocorrelation i.e. it tests only for a relationship between an error and its immediately previous value. DW is approximately equals to $2(1 - \hat{\rho})$, where $\hat{\rho}$ is the estimated correlation coefficient between the error term and its first order lag (Brooks 2008). Hence, as per appendix C (i.e the regression output), the value of Durbin-Watson stat (i.e. 1.815196) this revealed that there was no serious evidence of autocorrelation in the data since the DW

test result approaches two(2) because as per Brook(2008) stated above there is no autocorrelation problem if the *DW* is near 2. To make it more convincible for the absence of autocorrelation problem a formal test so called Breusch-Godfrey was made because as stated above the Durbin-Watson tests' only for the first order autocorrelation or (i.e. it test only for one lag- value). Since the p-value of F-stat as BG test result (i.e appendix B4) was 0.7936, we fail to reject the null hypotheses in that the p-value was above 5% which indicated that there is no autocorrelation problem.

Correlation analysis between study variables

Correlation is a way to index the degree to which two or more variables are associated with or related to each other. If it is stated as *y* and *x* are correlated, this means that y and x are being treated in a completely symmetrical way. Thus, it is not implied that changes in *x* cause changes in *y*, or indeed that changes in *y* cause changes in *x* rather it is simply stated that there is evidence for a linear relationship between the two variables, and that movements in the two are on average related to an extent given by the correlation coefficient (Brooks 2008).

As a result indicated on appendix C, capital adequacy was negatively correlated with liquidity indicated by the correlation of -0.29916. This correlation showed that as the bank's capital strength increase, liquidity decreases. Nonperforming loan was negatively correlated with liquidity, with the correlation coefficient of -0.03991. This correlation revealed that as the nonperforming loan of banks increase, liquidity decreases. The LnTOA which measured the size of banks and loan growth was positively correlated with liquidity, with the correlation coefficient of 0.243805 and 0.01077 respectively. This indicated that as the banks size and loan growth increases, liquidity also increases. On the other hand profitability has the coefficient of -0.29583. This revealed that as the aforementioned variable increases, liquidity move to opposite direction.

Discussion of the regression analysis results

In this section, the output of fixed effect panel regression analysis was discussed. In the previous part, the study discussed the results of the tests for validity of the classical linear regression model (CLRM) assumptions. Accordingly, the model has all the important tests of the CLRM assumptions. Thus, the remaining point was concerned with the discussion of the result of regression analysis which is done by applying the fixed effect panel regression using Eviews6 soft ware econometrics pakage.

The result of the regression analysis revealed that, natural logarithm of total asset as a proxy for bank size was found to be statistically significant and has positive influence on liquidity of commercial banks, where as the ratio of equity to total asset as a proxy for capital adequacy and return on asset as proxy for profitability were statistically significant but have negative influence on liquidity of commercial banks. Surprisingly the result also indicated that loan growth and nonperforming loan have no significant influence on liquidity of commercial banks.

As it could be observed from the regression result on appendix D, adjusted R-square(R^2) which measures the degree to which the model explains the actual variations in the dependent variable, indicated that variations of liquidity in Ethiopian commercial banks 80.52% explained by the independent variables which were included in the model. Overall, test of significant F statistics shows that the model was good enough fitted and statistically significant at 1% level (i.e. p-value = 0.000). Thus, the regression model is feasible.

Hence, the regression result as given on appendix D was deeply discussed as follows: Capital adequacy which was measured by the ratio of equity to total asset was statistically significant variable that affected liquidity of Ethiopian commercial banks at 1% significant level with the p-value of 0.000. And has a negative coefficient value of -0.505137 (Appendix D), which indicated that when the ratio of capital to total asset rises by 1%, the liquidity of Ethiopian commercial banks decreases by 50.51%, holding other variables constant. This finding was opposite to the hypotheses of this study (H1) and in line with the findings of Vodová (2012); Subedi and Neupane (2011); and Laurine (2013). The negative and statistically significant impact of capital adequacy on liquidity of Ethiopian commercial banks were supported the arguments of the financial fragility-crowding out hypotheses. According to this argument, bank capital tends to impede liquidity creation through two distinct effects: the financial fragility structure and the crowding-out of deposits. The financial fragility structure is characterized by lower capital, tends to favor liquidity creation; this theory was supported by (Diamond andRajan 2001), and hence they model a relationship bank that raises funds from investors to provide financing to an entrepreneur. The entrepreneur may withhold effort, which reduces the amount of bank financing attainable. More importantly, the bank may also withhold effort, which limits the bank's ability to raise financing. A deposit contract mitigates the bank's holdup problem because depositors can run on the bank if the bank threatens to withhold effort and therefore maximizes liquidity creation. Providers of capital cannot run on the bank, which limits their willingness to provide funds, and hence reduces liquidity creation. Thus, the higher a bank's capital ratio, the less liquidity it will create. The second theory was concerned to a higher capital ratio may reduce liquidity creation through the crowding out of deposits. This argument was supported by Gorton and Winton (2000), and they stated that deposits are more effective liquidity hedges for investors than investments in equity capital. Thus, the finding of this study revealed that higher capital ratios shift investors' funds from

relatively liquid deposits to relatively illiquid bank capital, which reducing the overall liquidity for investors. Therefore, the hypotheses stated; there was positive and statistically significant relationship between capital adequacy and banks liquidity was rejected.

Nonperforming loan in this study was measured by the ratio of provision for impairment loses to the total outstanding loan and advance to customer found to be insignificant with the p-value of 0.3913 and has a negative coefficient of (i.e. -0.598288) and it was opposite to the hypotheses of this study (H2). But in line with the findings of Vodová (2012) made study on Slovaks' commercial banks regarding the determinants of liquidity and found that non-performing loans have no statistically significant effect of the liquidity of Slovak commercial banks. And the coefficient of -0.598288 indicated that for 1% rises in the NPL leads to a 59.83% decreases in liquidity of Ethiopian commercial banks for the sampled period under the study, holding other variables constant. Since the amount of nonperforming loan measures the quality of bank assets, large amount of nonperforming loans (NPL) leads the banking sector to efficiency problem and the banking system into failure by reducing their liquidity holding; however, as per the finding of this study NPL has no statistically significant impact on the liquidity position of Ethiopian commercial banks. Therefore, the hypotheses stated; there was negative and statistically significant relationship between nonperforming loan and banks liquidity was rejected.

Natural logarithm of the total asset as a proxy of bank size was used to know the effect of bank size on liquidity of Ethiopian commercial banks in this study. Bank size found to be a positive and statistically significant at 1 % level of significance with a p value of 0.0000 and this was in line with the hypotheses of this study (H3).The coefficient value of 0.311664 indicated that one birr increases in the total asset, resulted in the rises of 0.311664 birr in liquid assets of Ethiopian commercial banks, holding other variables constant.

This finding was consistent with the findings of Malik and Rafique(2013); Vtyurinen et al.(2012);Chagwiza(2011); Subedi and Neupene(2011).And also it was supported the argument's that; small banks focus on the traditional intermediation and transformation activities and hold less liquid assets. This is to mean that small banks has little cash and cash equivalent reserves in other banks (central bank and other commercial banks) and hold less liquid assets (i.e. since they have little dealing with other types of investment instruments than loans). Besides the finding of this study showed that big banks (i.e. Commercial banks of Ethiopia, etc) have better trust by customers and good deposit attraction capacities that makes them more liquid than small banks i.e. LIB. Therefore, fail to reject the hypotheses stated; there was positive and statistically significant relationship between bank size and liquidity.

Profitability was measured by return on asset (ROA) for Ethiopia commercial banks in the sampled period and found to be significant at 5% level of significance with the p-value of 0.0283. The coefficient of -0.728726 showed that a 1% rises in banks liquidity leads to 72.87% decrease in the ratio of financing gap to total asset, holding other variables constant and it was in line with the hypotheses of this study (H4). This finding was consistent to the findings of Vtyurine et al.(2012); Vodová(2011); Berger and Bouwman(2007); Aspaches et al.(2005); Deep and Schaefer(2004).Also Valla et al.(2006) asserts that bank profitability which is according to finance theory negatively correlated with liquidity. Besides, it was in line with the arguments of that; holding liquid assets imposes an opportunity cost on the bank given their low return relative to other assets, which indicated the inverse relationship between liquidity of bank and profitability (Molyneux and Thornton 1992; Goddard, et al. 2004). Also the adverse effect of increased liquidity for financial institutions stated that, 'although more liquid assets increase the ability to raise cash on short-notice, they also reduce the ability of management to commit credibly to an investment strategy that protects investors' which finally can result in reduction of the 'firm's capacity to raise external finance' in some cases (Myers and Rajan 1998). Hence, both the empirical founding's of the previous researchers' and theoretical argument supported the finding of this study in that there was negative and statistically significant relationship between profitability and liquidity of commercial banks in Ethiopia. Therefore, fail to reject the hypotheses stated; there was negative and statistically significant relationship between profitability and banks liquidity.

Annual growth rate of gross loans and advances to customers was used as a proxy for loan growth and which has a positive coefficient of 0.033774. The positive impact of loan growth on liquidity of Ethiopian commercial banks was opposite to the hypotheses of this study (H5). Besides, the positive impact of loan growth on liquidity of banks' was statistically insignificant with the p-value of 0.4136 and it was in line with the findings of Tseganesh (2012); Subedi and Neuwpane (2011). The finding of this study revealed that the impact of loan growth on liquidity of Ethiopian commercial banks was statistically not different from zero/insignificant; hence as per this finding larger amount of loans were provided from periodic deposits without affecting the amount of liquid assets held by the Ethiopian commercial banks. Therefore, the hypotheses stated; there was negative and statistically significant relationship between loan growth and banks liquidity was rejected.

Conclusion

Generally, some of the findings of this study were consistent with the previous research done by other scholars. The finding that, ratio of equity to total asset was positive and statistically significant that affected liquidity of

commercial banks was consistent with the findings of Vodová (2012); Subedi and Neupane (2011); and Laurine (2013). Also, the finding was revealed that size has positive and statistically significant influence on liquidity; which was consistent with the findings of Malik and Rafique(2013); Vtyurinen et al.(2012);Chagwiza(2011); Subedi and Neupene(2011). ROA as proxy of profitability was found to be negative and statistically significant influence on liquidity, which was consistent with the findings of Vtyurine et al.(2012); Vodová(2011); Berger and Bouwman(2007); Aspaches et al.(2005); Deep and Schaefer(2004).Also Valla et al.(2006) asserts that bank profitability which is according to finance theory negatively correlated with liquidity. Besides, it was in line with the arguments of that; holding liquid assets imposes an opportunity cost on the bank given their low return relative to other assets, which indicated the inverse relationship between liquidity of bank and profitability (Molyneux and Thornton 1992; Goddard, et al. 2004). Hence, these variables were found to be statistically significant that affect liquidity of Ethiopian commercial banks for the test period.

Reference

Alger, G, Agenor, PR and Alger, I 1999, Liquid Assets in Banking: Theory and Practice, Boston College, Chestnut Hill, MA Working Paper, No. 446

Aspachs, O, Nier, E and Tiesset, M 2005, 'Liquidity, Banking Regulation and then Macroeconomy: Evidence on bank liquidity holdings from a panel of UK-resident banks', *Bank of England Working Paper*, Available at: http://www.bis.org/bcbs/events/rtf05AspachsNierTiesset.pdf

Basel Committee on Banking Supervision 2008, *Principles for sound liquidity risk management and supervision BIS*

Berger, NA and Bouwman, HS 2006,*The Measurement of Bank Liquidity Creation and the Effect of Capital,*Weatherhead School of Management, Case Western Reserve University, pp.1-42

Berger, A and Bouwman, C 2007, 'Bank Liquidity Creation', Working Paper.

Berger, AN and Bouwman, C 2008, Financial Crises and Bank Liquidity Creation; Working Paper, Wharton Financial Institutions Center, pp. 8-37

Bernanke, B 2008, 'Liquidity Provision by the Federal Reserve, Risk Transfer Mechanisms and Financial Stability Workshop', Basel: Switzerland

Berrospide, J 2013, Bank Liquidity Hoarding and the Financial Crisis: An Empirical Evaluation, Finance and Economics Discussion Series, working paper

Bordo, M, Eichengreen, B, Klingebiel, D and Martinez-Peri, M 2001, 'Is the Crisis Problem Growing More Severe?:*Economic Policy*', Vol.16, No. 32, pp.51-82

Brooks, C 2008, *Introductory Econometrics of Finance*, 2nd ed., the ICMA Center, University of Reading, CAMBRIDGE University press

Bryant, J 1980, 'A model of reserves, bank runs, and deposit insurance', *Journal of Banking and Finance*, Vol. 4, pp. 335-344

Bordeleau, E & Graham, C 2010,The impact of liquidity on bank liquidity; Bank of Canada, working paper

Cameron, A C and Trivedi, P K 2009, *Micro econometric Using Stata;* Stata Press Publication:USA

Chagwiza, W 2011, Zimbabwean Commercial Banks Liquidity And Its Determinants, *International Journal of Empirical Finance,*Vol. 2, No. 2, PP.52-64

Churchill, G A and Iacobucci, D 2005, Marketing ResearchMethodological Foundations, 9th edn. Thomson South-Western, USA

Cornett, M, Jamie, J.M, Philip, S and Hassan, T, 2011,'Liquidity Risk Management and Credit Supply in the Financial Crisis', *Journal of Financial Economics*, Vol. 101, No.2, pp. 297-312

Deep, A and Schaefer, G 2004,'Are banks liquidity transformers?' Harvard University Faculty Research, Working Paper

Diamond, D W and Dybvig, P H 1983, 'Bank runs, deposit insurance, and liquidity', *Journal of Political Economy*, Vol. 105, No. 91, pp. 401-419

Diamond, D W and Rajan, R G 2001, 'Liquidity risk, liquidity creation, and financial fragility: a theory of banking', *Journal of Political Economy*, Vol. 109, No. 2, pp.287

Ericsson, J & Renault, M 2006, Liqudity and credit risk, *Journal of finance*; McGill University, No.5, pp. 19-50

Garber, P and Weisbrod, S 1992, The Economics of Banking, Liquidity and Money; working paper

Gizycki,M 2001, The effect of macroeconomic conditions on banks; Risk and Profitability, Research Discussion Paper*;* System Stability Department Reserve*;*Bank of Australia,available at: http://www.rba.gov.au/publications

Goddard, J, Molyneux, P and Wilson, J 2004, Dynamics of growth and profitability in banking;*Journal of Money Credit and banking* No. 36, pp.1069-1090

Gorton, G and Winton, A 2000, 'Liquidity provision, bank capital, and the macro economy', University of Minnesota, Working Paper.

Gujarat, D.N 2004, *Basic Econometric;* 4th edn., McGraw–Hill, USA

Hair, J F, Black, W C, Babin, B J, Anderson, R E, and Tatham, R L 2006, Multivariate Data Analysis, 6th edn., New Jersey: Pearson Education

Hempel, G.H, Simonson, D.G and Coleman, A.B 1994, *Bank Management*, 4th ed., John Wiley & Sons: New York

Holmstrom, B and Tirole, J 2010, 'Private and public supply of liquidity', *Journal of Political Economy, Vol.* 106, No. 1, pp.1-40

Kashyap, A.K, Rajan, R.G and Stein, J.K 2002, 'Banks as liquidity providers: an explanation for the coexistence of lending and deposit taking', *Journal of Finance,* Vol. 58, No. 1, pp.33-73

Kennedy, P 2008, *A Guide to Econometric*. 6th edn., Blackwell Publishing, Malden

Laurine, Ch 2013, Zimbabwean Commercial Banks Liquidity Risk Determinants after Dollarisation, *Journal of Applied Finance & Banking*, Vol. 3, No.6, pp. 97-114

Longworth, D 2010, Bank of Canada Liquidity Facilities: Past, Present, and Future, Remarks, Howe Institute

Malhotra, N 2007, *Marketing Research: An applied Orientation*, 5th ed., PHI, New Delhi.

Malik, M.F and Rafique, A 2013, 'Commercial Banks Liquidity In Pakistan: Firm specific and Macroeconomic Factors', *The Romanian economic Journal,* No.48, pp. 144-146

Molyneux, P and Thornton, J 1992, Determinants of European Bank Profitability; *Journal of Banking and Finance*, Vol. 16, No.6, pp.173-178

Muranaga, GF and Ohsawa, H 2002, Liquidity Risk and Performance in the Banking Sector Finance Essay; available at: http://www.ukessays.com/

Myers, SC and Rajan, R 1998, The paradox of liquidity, *Quarterly Journal of Economics,* Vol. 113, pp.733–771

Rafique, A &Malik,M.F 2013, Commercial Banks Liquidity in Pakistan; Firm Specific &Macroeconomic factors, *Romanian Economic Journal*, pp. 139-154

Subedi, S andNeupane, B 2011, Determinants of Banks' Liquidity and their Impact on Financial Performance; unpublishedMBA thesis Institute of Management, Pokhar University

Tseganesh, T 2012, 'Determinants of Banks Liquidity and their Impact on Financial Performance', MSc research report: Addis Ababa University

Valla, N, Saes-Escorbiac, B, and Tiesset,M 2006, 'Bank liquidity and financial stability', *Financial Stability Review,*Banque de France, pp. 89-104

Vodova, P 2011, 'Liquidity of Czech commercial banks and its determinants', *International journal of mathematical models and methods in applied science,* Vol. 5, pp.1060-1067

Vodova, P 2012, 'Liquidity of Slovak Commercial Banks and its Determinants', *Proceedings of the 13th International Conference on Finance and Banking*, Karviná, Silesian University, pp. 487-494

Vodova, P 2013, 'Determinants of commercial banks liquidity in Hungary', Financial Internet quarterly, e-finance Vol.9, No.3, available at: http://www.e- finanse.com/artykulyeng/

Vtyurina, R, Bonner, C and Lely, IV 2012, Determinants of Banks Liquidity Buffers in Central America; working Paper, available at: http://www.managementparadise.com/

Appendix A. Result of fixed vs random effect model:

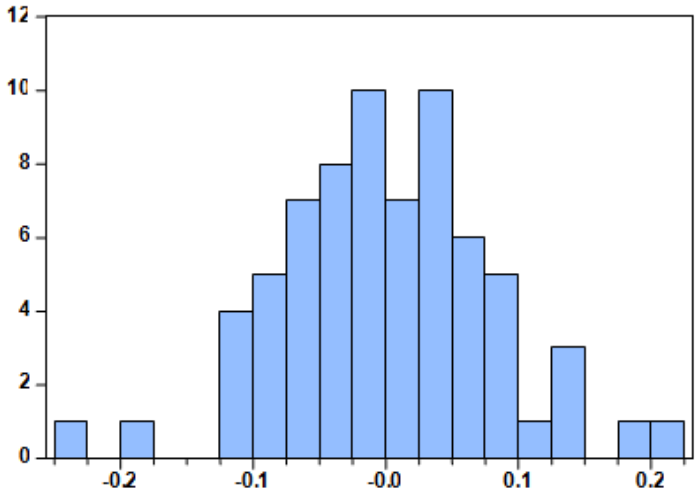
Test cross-section random effects

Test summary	Chi-sq. statistic	Chi-sq.d.f	Prob.
Cross-section random	14.986646	9	0.0204

Source: E-views output from the financial statements of sampled banks and own computation

Appendix B: Tests for the CLRM assumptions/Diagnostic test

1.Test for Normality; Bera-Jarque(BJ) test



Series: Standardized Residuals
Sample 2007 2013
Observations 70

Mean	0.000000
Median	-0.003512
Maximum	0.214621
Minimum	-0.249089
Std.	0.080169
Skewness	-0.034154
Kurtosis	3.311816
Jarque-Bera	2.438548
Probability	0.295445

2. Test for multicollinearity assumption

	LIQ	CAP	NPL	SIZE	PROF	LG	GDP	INF	IRM
LIQ	1								
CAP	-0.29916	1							
NPL	-0.03991	0.451010	1						
SIZE	0.243805	-0.236236	0.185064	1					
PROF	-0.29583	-0.070824	-0.016464	-0.001268	1				
LG	0.01077	-0.006209	-0.153305	-0.039991	-0.103021	1			
GDP	-0.27105	0.071542	-0.000296	-0.016342	-0.090906	0.045384	1		
INF	-0.00274	0.005084	0.000316	-0.069258	-0.111132	0.083236	-0.029452	1	
IRM	0.07975	0.295533	0.220681	-0.340793	-0.016051	0.302571	0.088740	0.096201	1

Source: E-views output from the financial statements of sampled banks and own computation.

3. Test for Heteroskedasticity assumption

Heteroskedasticity test: white test result

F-statistic	1.876999	Prob. F (9, 60)	0.2250
Obs*R-squared	35.54355	Prob. Chi-square (9)	0.3566
Scaled explained SS	33.66031	Prob. Chi-square (9)	0.3451

Source: E-views output from financial statements of sampled banks and own computation

4.Test for Autocorrelation;
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.473948	Prob. F(10,50)	0.7936
Obs*R-squared	3.066317	Prob. Chi-Square(10)	0.6898

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 12/24/14 Time: 22:31
Sample: 2007 2013
Included observations: 70
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.489301	0.479097	1.021297	0.3120
CAP	0.030568	0.087193	0.350579	0.7274
NPL	-0.276913	0.580368	-0.477134	0.6353
SIZE	-0.027917	0.041750	-0.668666	0.5068
PROF	-0.394346	0.383750	-1.027612	0.3091
LG	0.046915	0.048326	0.970804	0.3363
GDP	-0.821374	1.329250	-0.617923	0.5394
INF	-0.018733	0.114578	-0.163494	0.8708
IRM	-0.018845	0.018552	-1.015807	0.3146
RESID(-1)	0.569740	0.559363	1.018551	0.7832
RESID(-2)	0.280874	0.168230	1.669584	0.1173
RESID(-3)	-0.013596	0.157211	-0.086485	0.9314
RESID(-4)	-0.049718	0.150319	-0.330750	0.7422
RESID(-5)	0.000406	0.150964	0.002690	0.9979
RESID(-6)	0.125206	0.154069	0.812657	0.4203
RESID(-7)	-0.213751	0.154396	-1.384438	0.1724
RESID(-8)	0.051133	0.159116	0.321353	0.7493
RESID(-9)	0.283325	0.165808	1.708748	0.1765
RESID(-10)	0.028263	0.147668	0.191393	0.8490

R-squared	0.051105	Mean dependent var	3.11E-17
Adjusted R-squared	-0.272382	S.D. dependent var	0.074164
S.E. of regression	0.083657	Akaike info criterion	-1.901004
Sum squared resid	0.307934	Schwarz criterion	-1.342512
Log likelihood	73.03013	Hannan-Quinn criter.	-1.682547
F-statistic	0.157983	Durbin-Watson stat	1.879062
Prob(F-statistic)	0.999821		

Appendix C. correlation matrix between dependent and independent variables

	LIQ	CAP	NPL	SIZE	PROF	LG	GDP	INF	IRM
LIQ	1	-0.29916	-0.03991	0.243805	-0.29583	0.01077	-0.27105	-0.00274	0.07975

Source: E-views6 output from financial statements of sampled banks and own computation

Appendix D. Results of the regression analysis

Variable	Coefficient	Std.error	t-stat	Prob.
C	3.5916240.7	108015.0	52923	0.0000
CAP	-0.505137	0.072600	-6.957807	0.0000***
NPL	-0.598288	0.691987	-0.864594	0.3913
SIZE	0.311664	0.066924	4.656948	0.0000***
PROF	-0.728726	0.322788	-2.257596	0.0283**
LG	0.033774	0.040968	0.824387	0.4136
GDP	-2.285726	0.990677	-2.307238	0.0251**
INF	-0.078707	0.088728	-0.887063	0.3792
IRM	0.013292	0.017931	0.741307	0.4619

R^2 = 0.830694 Mean dep.var = -0.128715
Adj.R^2 = 0.805298 S.D dep.var = 0.297034
Prob. (F-statistic) = 0.000000 DW-stat = 1.815196
The coefficient estimates are significant at 1 %$^{(***)}$; 5 %$^{(**)}$; and 10 %$^{(*)}$ respectively

Source: E-views output from financial statements of sampled banks and own computation

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