ASSESSMENT ON RELATIONSHIP BETWEEN BANK'S LIQUIDITY AND ITS PROFITABILITY: A LONGIDUTINAL STUDY OF THE SELECTED BANKS IN TANZANIA.

*Dennis Hyera

Assistant Lecturer

Accounting and Finance Department

Institute of Accountancy Arusha

CPA. Bakari Haule

Accountant Management

Account Department

Mbeya University of Science and Technology

ABSTRACT

This study focused on determining the association between the bank's liquidity and performance of commercial banks in Tanzania and the association examined by different scholars in Tanzania and outside the country in different aspects but this study intend to put more light through ratio analysis between liquidity and profitability of the Tanzania commercial banks. These two components are the essential elements for commercial banks operation with three specific objectives; to determine the relationship between liquidity ratios (LDR and LADR) with net interest margin which is a one profitability measures, to study the association between liquidity ratios (LDR and LADR) with return on asset, to study the relationship between liquidity ratios (LDR and LADR) with return on equity. The banks liquidity ratios treated as independent variables and the profitability ratios treated as dependent variables, and data were analyzed through regression equation analysis where by the equations; $NIM = 0.0956774 - 0.029457LDR - 0.280439LADR + \text{£}_1$, $ROA = 0.320742 - 0.0309878LDR + 0.0933533LADR + \text{£}2$, and $ROE = 0.3925308 - 0.3458776LDR - 0.1311809LADR + \text{£}3$. It was longitudinal study conducted in Tanzania commercial banks whereby five commercial banks were selected as samples (NMB bank, CRDB bank, NBC bank, Exim bank Tanzania, and Barclays bank Tanzania) from thirty-six licensed commercial banks were taken into consideration for the time period from 2012 to 2019. All models revealed that there is weak relationship evidence between the bank's liquidity and its profitability, thus banks can concentrate on rising profitability without affecting its liquidity. Consequently, the banks can focus on raising their profitability without upsetting their liquidity, although this is not guaranteed because the situation might change.

Keywords; Profitability, Liquidity, Ratios such as Net Interest Margin (NIM), Return on Asset (ROA), Return on Equity (ROE), Loan to Deposit ratio (LDR), and Liquid Asset to deposit ratio (LADR).

1.0 Introduction

Liquidity and profitability are the key parameters to measure bank financial performance. In order to attain long term survival and healthy growth of any business venture, both liquidity and profitability should go directly (Ahmad, 2016).

Several studies discussed about the relationship between liquidity and profitability of the company from different industries within the country and outside. As it shown in literature reviews there are different results from different scholars, for instance Masaka (2013) in his study on the assessment of the relationship between liquidity management and companies' profitability, a case study of the selected manufacturing companies listed on the Dar es salaam Stock Exchange (DSE) in Tanzania found that liquidity management has significant impact on corporate profitability.

Maina (2017) revealed that there was no bidirectional relationship between liquidity and profitability of commercial banks in Kenya. Dickson and Mutaju (2011) uses CAMEL model to examine the financial performance level of the banking system in Tanzania.

Since there were different methodology used find out results on the subject matter of the study; this study intended to find out some more light on liquidity-profitability impact in the bank's operation in Tanzanian banks by using ratios.

2.0 Literature Review

This section covers the theoretical literature review and empirical literature review and detects the knowledge gap which is going to be covered by this research.

2.1 Theoretical Literature Review

The source of capital of any business venture and banks as well is retaining the profit earned, also supporting the future growth of asset, and paying returns to the investors as dividend. The profitability of the commercial bank is obtained from different sources such as foreign exchange, commission and transaction fees, income from investing activities, and trust operation are also a considerable source of income. The profitability of the bank is examined by three key ratios; Net Interest Margin (NIM), Return on Asset (ROA), and Return on Equity (ROE). (Credit and Finance Risk Analysis, 2012).

Bank's liquidity refers to reserves of short-term securities that mature either less than or in one year period: it can either be cash or securities. This indicates that a quick conversion of assets into cash so as to meet instant obligations. There are two main ratios to examine liquidity of the banks such as Loan to Deposit ratio (LDR), and Liquid Asset to deposit ratio (LADR). (Credit and Finance Risk Analysis, 2012).

2.2 Empirical Literature Review

Evidence from other industries

Masaka (2013) in his study on the assessment of the relationship between liquidity management and companies' profitability, a case study of the selected manufacturing companies listed on the

Dar es salaam Stock Exchange (DSE) in Tanzania found that liquidity management has significant impact on corporate profitability.

Bolek and Wiliński (2012) examined the relationship between liquidity and profitability on a group of construction sector companies listed on the Warsaw Stock Exchange. The researchers applied quarterly industrial average financial data for 11 years from 2000 to 2010; therefore, the examination was included of 44 observations. The results showed that the only one statistically significant variable of liquidity that affect profitability is the quick ratio and the probability of its influence on return on assets was 98.24%.

Ben-Caleb, Olubukunola, and Uwuigbe (2013) examined the association between liquidity and profitability established on a sample of 30 manufacturing companies listed on the Nigeria Stock Exchange for the period 2006-2010. The result proposed that the current ratio and liquid ratio were directly related to profitability while the cash conversion period was negatively related to the profitability of the manufacturing companies. However, the association was statistically insignificant in all the cases, establishing a weak impact of liquidity on the profitability of manufacturing companies.

 Evidence from banking Industry

Mwizarubi (2013) examines the relationship between banks' profitability and liquidity, a case study of Tanzania commercial banks found that there is no statistically significant relationship between banks' profitability and liquidity.

Bordeleau and Graham (2010) analyzed the impact of liquid asset holdings on bank profitability for a sample of large U.S. and Canadian banks. They found that profitability is generally improved for banks that hold some liquid assets; however, there is a point at which holding further liquid assets reduced banks' profitability, assume other factor remains constant. Furthermore, the findings suggested that this relationship varies depending on a bank's business model and the state of the economy.

2.3 Research gap and conceptual framework
In all cited articles and journals in this chapter, the researcher passes through all available literature and found that the study is not yet being conducted in Tanzania on the relationship between bank's liquidity and its profitability. Therefore, the researcher finds this to be a chance to conduct this research in Tanzania so as to add something in the body of knowledge.
Figure: Conceptual framework
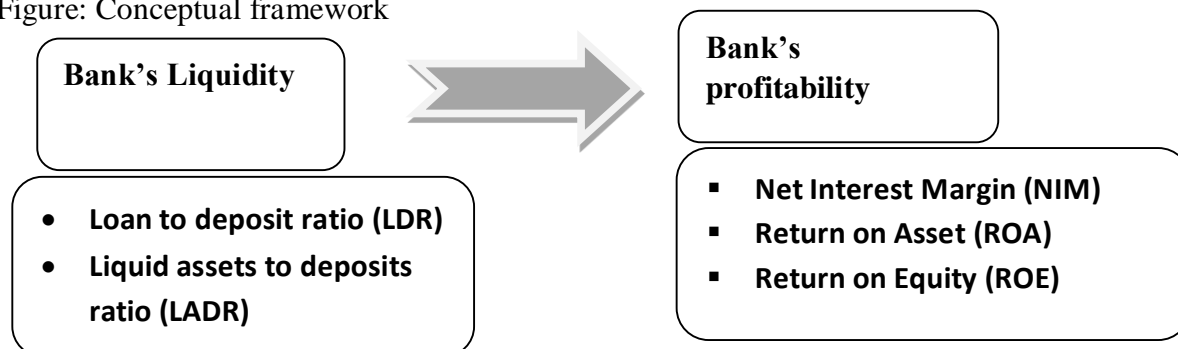
Source: Researcher's Conceptualization year 202

3.0 Data and Methodology

In this study, a longitudinal study research design applied to select banks, the study did cover all banks for various reasons and the study apply quantitative techniques therefore it was quantitated research (Kothari, 2004). In this study, the population includes thirty-six (36) licensed commercial banks in Tanzania the following were the licensed banks in Tanzania; Access Bank (Tanzania) Limited, African Banking Corporation (Tanzania) Limited, Akiba Commercial Bank Limited, Amana Bank Limited, Azania Bank Limited, Bank M (Tanzania) Limited, Bank of Africa (Tanzania) Limited, Bank of Baroda (Tanzania) Limited, Bank of India (Tanzania) Limited, Barclays Bank (Tanzania) Limited, Canara Bank (Tanzania), China Dasheng Bank Limited (Tanzania), Citibank (Tanzania) Limited, Commercial Bank of Africa (Tanzania) Limited, CRDB Bank Plc, DCB Commercial Bank Plc, Diamond Trust Bank (Tanzania) Limited, Ecobank (Tanzania) Limited, Exim Bank (Tanzania) Limited, Equity Bank (Tanzania) Limited, First National Bank (Tanzania) Limited, Habib African Bank Limited, I & M Bank (Tanzania) Limited, International Commercial Bank (Tanzania) Limited, KCB Bank (Tanzania), Letshego Bank (Tanzania) Limited, Mkombozi Commercial Bank Plc, Mwalimu commercial bank Plc, National Microfinance Bank Plc, NBC Bank Limited, NIC Bank (Tanzania) Limited, Peoples' Bank of Zanzibar Limited, Stanbic Bank (Tanzania) Limited, Standard Chartered Bank (Tanzania) Limited, TIB Corporate Bank Limited,TPB Bank Plc, United Bank for Africa (Tanzania) Limited and UBL Bank (Tanzania) Limited.

The five banks were selected as sample is NMB bank, CRDB bank, NBC bank, Barclay's bank Tanzania and Exim bank Tanzania. Researcher used non-probability sampling technique in the selection of the bank whose profitability trend would be studied against its liquidity.

As pointed above this study used secondary data, hence the researcher review documented data from annual reports or financial statements of the selected banks for the periods from the year 2012 to 2019, making a total of 40 observations (Cooper and Schindler, 2006). The profitability was treated as dependent variable measured by ratios; Net Interest Margin (NIM), Return on Asset (ROA), and Return on Equity (ROE) while liquidity was treated as explanatory variable measure by ratios; as Loan to Deposit ratio (LDR), and Liquid Asset to deposit ratio (LADR). (Credit and Finance Risk Analysis, 2012)

4.0 Data analysis and findings

4.1 Preliminary test of panel data

After inputting data in STATA software, the first step was to command STATA to handle panel data by using the command "xtset". This command was also essential in testing the suitability of dataset for longitudinal analysis (analysis of panel data). The results were as shown in the STATA output below;

Table: Suitability of panel data

```
. xtset bank year, yearly
      panel variable:  bank (strongly balanced)
       time variable:  year, 2012 to 2019
               delta:  1 year
```

Source: STATA output of research data (2020)

In this circumstance "bank" stands for entities or panels (i) and "year" stand for time variable (t). The note "(strongly balanced)" denotes to the fact that all banks have data for all years. This recommends that the panel data is appropriate for econometric analysis. Usually, analysis of panel data is done either using fixed effects or random effects approach. Hence, it was essential to choose whether fixed or random effects approach would be used. This was conducted by using Hausman test, in which the null hypothesis is that the chosen model is random effects while the alternative hypothesis is that fixed effects approach (Greene, 2008). The test was done by running a fixed effects model and store the estimates, then running a random model and store the estimates, then followed by performing the test. The results are as shown in Table below.

Table: Hausman Test

```
. hausman RE FE

                 ──── Coefficients ────
                  (b)         (B)           (b-B)      sqrt(diag(V_b-V_B))
                  RE          FE          Difference          S.E.
     ───────────────────────────────────────────────────────────────────
        ldr    -.2926155   -.3458776       .0532621          .027709
        ladr   -.0456993   -.1311809       .0854816          .0367585
     ───────────────────────────────────────────────────────────────────
                     b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

             chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                     =         14.17
             Prob>chi2 =      0.0008
```

Source: STATA output of research data (2020)

4.2 The Relationship between Liquidity and Banks' Profitability in Tanzania

4.2.1 Results Based on Net Interest Margin (NIM) as a Dependent Variable

As it shown in Table below, the command used in STATA software was "xtreg nim ldr ladr, fe". In this command "nim" represents net interest margin (dependent variable) while "ldr" and "ladr" represents loans to deposits ratio and liquid assets to deposits ratio respectively (explanatory variables). It has seen that the coefficients of the regressor for both explanatory variables were negative, indicates that there is a negative relationship between net interest margin (profitability measure) and the independent variables (liquidity measures i.e. LDR and LADR). Yet, the t-values for both explanatory variables were not more than 1.96 (for a 95% confidence) showing that the explanatory variables had no significant influence on the dependent variable. The t-value for LDR is -0.05 while that of LADR is -0.45 (we usually take the absolute value). Also, it has seen that two-tail p-values for both independent variables are greater than 0.05 or 5% (95% confidence interval) which the value are 0.958 for LDR and 0.655 for LADR, which mean that the independent variables have no significant impact on the dependent variable. Finally, the Prob > F value for the model is greater than 0.05 (it is 0.9033) in this circumstance, which fails to demonstrate that all the coefficients in the model are different from zero. The overall clarification of these results is that there is no statistically significant relationship between banks' profitability as it measured by net interest margin and banks' liquidity as it measured by LDR and LADR. Even though the coefficients of the regressors are both negative then it is suggested that a negative relationship between the regressors and the dependent variable, this association is not statistically relevant as it suggested by the t-values, p-values and Prob > F value.

Table: Liquidity-Profitability Relationship Based on Net Interest Margin (NIM) as a Measure of Profitability (Dependent Variable)

```
. xtreg nim ldr ladr, fe

Fixed-effects (within) regression              Number of obs      =         40
Group variable: bank                           Number of groups   =          5

R-sq:  within  = 0.0061                         Obs per group: min =          8
       between = 0.0157                                        avg =        8.0
       overall = 0.0004                                        max =          8

                                               F(2,33)            =       0.10
corr(u_i, Xb)  = -0.0930                        Prob > F           =     0.9033
```

nim	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ldr	-.0029457	.0550069	-0.05	0.958	-.1148581	.1089667
ladr	-.0280439	.0621274	-0.45	0.655	-.154443	.0983552
_cons	.0956774	.0416075	2.30	0.028	.0110264	.1803284
sigma_u	.03374185					
sigma_e	.02344229					
rho	.67445287	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(4, 33) =    16.05                Prob > F = 0.0000
```

Source: STATA output of research data

4.2.2 Results Based on Return on Assets (ROA) as a Dependent Variable

As it shown in Table below, the command that was used in STATA software was "xtreg roa ldr ladr, fe". In this command "roa" represents return on assets (dependent variable) while "ldr" and "ladr" represent loans to deposits ratio and liquid assets to deposits ratio respectively (independent variables). It has seen that the coefficient of the independent variables is negative for ldr (-

0.0309878) and positive for ladr (0.093533), displaying that there is no defined relationship between liquidity (measured by LDR and LADR) and banks' profitability measured by ROA. In addition to that the values of the coefficients are very small showing that the relationship (whether positive or negative) is very weak; but the key point here is that the relationship between liquidity and profitability has weak definition of whether it is positive or negative

Considering other econometric measures, we can see that the t-values for both independent variables are not more than 1.96 (for a 95% confidence) showing that the explanatory variables have no significant impact on the dependent variable. The t-value for LDR is -1.44 while that of LADR is 0.39 (we usually take the absolute value). Also, in two-tail p-values for both explanatory variables are more than 0.05 which the value is 0.159 for LDR and 0.702 for LADR, once again as it suggested that the independent variables have no significant influence on the dependent variable. Finally, the Prob > F value for the model is more than 0.05 (it is 0.3241) in this circumstance, demonstrates that the coefficients have weak evidence to prove that all the model are different than zero. The overall interpretation of these results is that there is weak statistically significant association between banks' profitability (as measure through return on assets) and banks' liquidity (as measured through LDR and LADR). This began with the contradiction in the coefficients of the regressors, whereby one coefficient is positive though another one is negative, and thereafter comes to be proved by t-values, p-values and Prob > F value that even the suggested relationship (whether positive or negative) is not statistically significant. Table below contributes more details on this discussion. Even though, basing on returns on assets, it is not enough to define the relationship between liquidity and banks' profitability in Tanzania, it was good to seek for the profitability measure in order to put more light on the study which is Return on Equity (ROE).

Table: Liquidity-Profitability Relationship Based on Return on Assets (ROA) as a Measure of Profitability (Dependent Variable)

```
. xtreg roa ldr ladr, fe

Fixed-effects (within) regression              Number of obs     =         40
Group variable: bank                           Number of groups  =          5

R-sq:  within  = 0.0660                         Obs per group: min =         8
       between = 0.2016                                        avg =        8.0
       overall = 0.0066                                        max =          8

                                                F(2,33)           =       1.17
corr(u_i, Xb)  = -0.3080                        Prob > F          =     0.3241
```

roa	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
ldr	-.0309878	.0214826	-1.44	0.159	-.0746944	.0127189
ladr	.0093533	.0242634	0.39	0.702	-.040011	.0587176
_cons	.0320742	.0162495	1.97	0.057	-.0009857	.0651341
sigma_u	.01406833					
sigma_e	.00915523					
rho	.70249392	(fraction of variance due to u_i)				

```
F test that all u_i=0:      F(4, 33) =     16.21                  Prob > F = 0.0000
```

4.2.3 Results Based on Return on Equity (ROE) as a Dependent Variable

As it shown in Table below, the command that was used in STATA software was "xtreg roe ldr ladr, fe". In this command "roe" represent return on equity (dependent variable) while "ldr" and "ladr" represent for loans to deposits ratio and liquid assets to deposits ratio respectively (independent variables). It has seen that the coefficient of the independent variable s is both negative for ldr (-0.3458776) and for ladr (-0.1311809), indicates that there is a negative relationship between return on equity (profitability measure) and the independent variables (liquidity measures i.e. LDR and LADR).

From other econometric measures from the same table, it has seen that the t-values for both independent variables are less than 1.96 (for a 95% confidence) indicating that the explanatory variables have no significant influence on the dependent variable. The t-value for LDR is -2.34 while that of LADR is -0.79 (we usually take the absolute value). In addition to that the two-tail probability values (p-value) for one independent variable are more than 0.05 (the value is 0.025 for LDR and 0.437 for LADR), again suggesting that the independent variables do not have significant influence on the dependent variable. Finally, the Prob > F value for the model is more than 0.05 (it is 0.0674) in this case, which indicates that there is weak evidence for all the coefficients in the model are different than zero.

The overall conclusion drawn from these results is that there is weak statistically evidence on the association between Tanzania banks' profitability (as measure through return on equity) and liquidity (as measured through LDR and LADR). This starts with the contradiction in the coefficients of the regressors, and also from the fact that the t-values, p-values and Prob > F value suggested that the relationship (whether positive or negative) is not statistically significant.

Table: Liquidity-Profitability Relationship Based on Return on Equity (ROE) as a Measure of Profitability (Dependent Variable)

```
. xtreg roe ldr ladr, fe

Fixed-effects (within) regression              Number of obs      =        40
Group variable: bank                           Number of groups   =         5

R-sq:  within  = 0.1508                         Obs per group: min =         8
       between = 0.2486                                        avg =       8.0
       overall = 0.0024                                        max =         8

                                                F(2,33)            =      2.93
corr(u_i, Xb)  = -0.4168                        Prob > F           =    0.0674
```

roe	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
ldr	-.3458776	.1475196	-2.34	0.025	-.6460084	-.0457468
ladr	-.1311809	.1666155	-0.79	0.437	-.4701627	.207801
_cons	.3925308	.1115844	3.52	0.001	.1655105	.619551

sigma_u	.09590416				
sigma_e	.06286841				
rho	.69943547	(fraction of variance due to u_i)			

```
F test that all u_i=0:      F(4, 33) =     13.32                Prob > F = 0.0000
```

Source: STATA output of research data (2020)

It has conducted the econometric tests using three instinct dependent variables against the same independent variables and getting more or less or the same kind of results, the researcher is confident to propose that there is weak statistical significance on association between banks' profitability and liquidity for the banks operating in Tanzania. These results are accurate on the basis of the sample taken, time period considered and the type of study conducted (longitudinal study). Therefore, there is a chance for other researchers to find different kind of results if the sample or time factor differ, or if the study will conduct using a different methodology, but for the mean time the research is confident to say that there is no statistically significance association between banks' profitability and liquidity for Tanzanian banks.

5.0 Conclusion and Recommendation

From the results of the study, the researcher provides the following recommendations so as to put more light in some areas; some of the banks were found to incur losses in some years, and this is mostly associated with bad loan portfolio. As it shown in the conclusion, it is not guaranteed that profitability has no influence to banks' liquidity, therefore there is a no chance for the banks that keep on incurring losses to maximize their liquidity and then insolvent situation will definitely lead into bankruptcy. Even though there are just some few cases, it is good to demonstrate that there are some observed instances whereby the banks did not optimally utilize the deposits as theoretically recommended by the loans to deposits ratio. From the theory, it is suggested that the ratio of between 70% and 80% is good, and the maximum should be around 80% to 90%. However, there is one case whereby the bank used less than 20% of the deposits in lending money while there were two cases whereby another bank exceeded the 90% maximum limit of lending, which is unsafe for the bank. The researcher therefore suggests that the banks should keep on utilizing the deposits effectively to lend money to the public.

REFERENCE

Bank of Tanzania (2006), Banking and Financial Institutions Act, accessed online through www.bottz.org/BankingSupervision/BAFIA2006 on 15th December 2019.

Bank of Tanzania (2010), Financial Stability Report, accessed online on 16th December 2019 through https://www.bot-tz.org/Publications/Fin-stability/financial%20Stability%20Report.pdf

Ben-Caleb, E., Olubukunola, U. and Uwuigbe, U. (2013), Liquidity Management and Profitability of Manufacturing Companies in Nigeria, IOSR Journal of Business and Management, Vol.9, Issue 1, pp.13-21.

Bobáková, V. (2003), Raising the Profitability of Commercial Banks, BIATEC, Vol. XI, No. 4, pp.21-25

Bolek, M. (2013), Profitability as a Liquidity and Risk Function Basing on the New Connect Market in Poland, European Scientific Journal, Vol.9, No.28, pp.1-15

Bolek, M. and Wiliński, W. (2012), The Influence of Liquidity on Profitability of Polish Construction Sector Companies, Financial Internet Quarterly, vol. 8, No. 1, pp.38-52.

Cooper D.R and Schindler P.S (2006), Business Research Methods, 9th ed. New York: McGraw Hill.

Credit and Finance Risk Analysis (2012), *Bank Financial Statement Analysis and Ratio Analysis* cited online through http://credfinrisk.com/bank.

Greene, W.H. (2008), Econometric Analysis, 6th ed., Upper Saddle River, N.J: Prentice Hall.

Guba, E.G and Lincoln, Y.S (1994), Handbook of Qualitative Research, Sage Publishers, USA.

Kothari C. R (2004), Research Methodology: Methods and Techniques, 2nd ed, New Delhi: New Age International Publishers.

Masaka A (2013), Assessment of the Relationship between Liquidity-management and companies Profitability of listed manufacturing companies in Tanzania.

Mwizarubi M & Harjit S (2015), Liquidity and Profitability trade-off in commercial banks in Tanzania.

Nimer, M., Warrad, L. and Omari, R. (2013), The Impact of Liquidity on Jordanian Banks Profitability through Return on Assets, Interdisciplinary Journal of Contemporary Research in Business, Vol. 5, No. 7, pp.70-76

Odunayo, M.O & Oluwafeyisayo, K.A (2015). Causal relationship between liquidity and profitability of Nigerian Deposit Money Banks. *International journal academic research in accounting, finance, and management science*,5(2), 165-171.