International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2017): 7.296

A Study of Relationship between Liquidity and Profitability in Georgian Banking Sector

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Abstract: ***The following research paper was devoted to identify bank profitability ratio and liquidity ratio trends. Based on the statistical financial data published by National Bank of Georgia, liquidity ratio, net interest margin, Return on Equity and Return on Assets was discussed and trend results was shown. Besides, correlation coefficient analyses and regression analyses was used to investigate relationship between the four variables mentioned above. As the results showed relationship between liquidity ratio and banks profitability is positively correlated. Besides, coefficient of determination is valid for net interest margin and liquidity in regression analyses, whereas in other cases coefficient was not valid.***

Keywords: Liquidity, Profitability, Correlation, Regression, Banks

1. Introduction

After the global crises 2007-2008 liquidity measures became one of the main question for bank stakeholders. The mentioned crises showed that liquidity need special attention from central bank regulators. In our research we proposed trend analyses of bank profitability trends for Georgia from 1998-2017 years (Section 43). Besides, we studied liquidity ratio trends for Georgia (section 4). We took our data from national bank of Georgia's official site and based on our calculations some trends are exhibited.

Many researchers suggest, that there is a significant relationship between bank profitability and bank liquidity. Our aim is to find out what kind of relationship exists between liquidity and profitability of a bank and show results for Georgian banks example. Based on correlation and regression analyses, we suggested that there is significance relationship between liquidity and bank profitability variables, such as net interest margin, Return on Equity and Return on Assets (section 5).
To sum up our research results we suggest our conclusion in the end of the paper.

2. Literature Survey

After the crisis the latest research papers show relationship of bank profitability and liquidity. World's attention is concentrated to the banks risks and bank's ability to survive during shock and crises. Many of the researchers studied relationship between profitability and liquidity and different views are supported. Étienne Bordeleau and Christopher Graham suggest that nonlinear relationship exist between bank profitability and liquidity. Based on their research bank which holds some liquid assets improve theirprofitability (Bordeleau&Graham, 2010). Based on the research made in Ghana banks liquidity and profitability have weak relationship (Lartey, Antwi&Boadi, 2013). Their results support Bourke (1989) finding, which supports the existence of positive relationship between liquid assets and bank profitability in Europe, North America and Australia from 1972 to 1981. Authors suggest, that holding adequate liquidity is recommended to minimize liquidity risk and financial crises. Adequate liquid assets help to improve profitability of a bank. NurhazimahSamsuri supports the idea that liquidity has negative relationship with gain and recommends that banks should keep respectable quantity of their quick assets so as to induce higher rate of profit (Sumsuri, 2017).

Also, AkinyeleAkinwumi, Essien Joseph Micheal and Adegboyega Raymond (Akinwumi, Raymond&Micheal E, 2017) suggest, that excessive liquidity reduces profitability. Their study showed results, that relationship between liquidity and profitability is highly cyclical, becoming more positive during the periods of distress as banks that increase their liquidity improve their profitability (Osborne et al., 2012). Authors suggest that bank with a higher liquidity level has more chances of surviving and improving profitability in the future.

Rafiq Ahmad rejected null hypothesis and positive relation between profitability and liquidity. His finding showed a significant relationship between liquidity and profitability. Also, a negative relation between current ratio and profitability was found. There is a positive relation between quick ratio and profitability. There is positive relation between net-working capital and profitability (Rafig, 2016). Sardar Shaker Ibrahim made a research about Iraq banking sector and he exhibited an interesting and valuable result that liquidity ratios have a positive impact on profitability of banks (Sardar S.I., 2017). TanveerBagh, Sadaf Razzaq, Tahir Azad, IdreesLiaqat, Muhammad Asif Khan (2017) The results demonstrates that ADR, CDR and DAR has positive and significant impact on Return on assets (ROA). Deposit ratio (ADR), CDR Cash deposit ratio and DAR have positive and significant impact on Return on equity (ROE). Authors concluded the profitability of banks understudy is influenced by liquidity management proxies

On the contrary DimitriosKalanidis (Kalanidis, (2016) result showed that the ratio of Loans to Total assets was negatively related with ROAA, ROAE and PBT, but positively related with NIM. Stewart (2016) support the idea that negative correlation between profitability (ROAA) and level of liquid assets to deposits (LADR) exist. He concludes that keeping excess liquidity has a mildly negative impact on profitability.

3. Methodology

Bank variables and liquidity ratio are used and studied in the research. In order to find out the relationship between liquidity and bank profitability, we used correlation analyses and regression for the following variables:

Bank variables:
Bank's net interest margin is calculated as the difference between interest income and interest expense divided by interest-bearing assets.

Return on Equity (ROE) is the measure of profitability. It is calculated as the net income divided by total equity. This measure is given from National Bank of Georgia.

Return on Assets (ROA) is also the measure of profitability. It is calculated as the net income divided by average total assets. This measure is given from National Bank of Georgia.

Liquidity Ratio is liquid assets to total assets ratio. They are used for controlling bank assets. Banks with high liquidity assets with cash, they can get lower interest income, then banks with low liquid assets.
H0: Relationship between bank liquidity and profitability exist.
H1: Liquidity has positive relationship with Return on Assets (ROA).
H2: Liquidity has positive relationship with Return on Assets (ROE).
H3: Liquidity has positive relationship with Net Interest Margin.

4. Liquidity and Profitability Ratio trends

Difference between bank interest revenue and interest costs had increasing trend through 2002-2017 year. Despite of this bank net interest margin changed from year to year. Bank interest margin for Georgia during 2002-2003 years increased slightly, it was 0.51 and 0.53. Based on our calculations, all three components in the mentioned period increased. Interest revenue and interest assets, both increased by 13%, interest cost increased by 3% only in 2002 year. In 2003 year interest revenue increased by 23%, interest cost increased 21% and interest assets increased by 20%. These caused 4% growth of net interest margin, like in previous year.

As for 2004-2007 years, bank interest margin had declining trends. During this period, difference between bank interest revenue and interest costs continued to increase importantly, at the same time, interest assets also increased in 2005, 2006 and 2007 years importantly. Consequently, net interest margin declined from 0.5 to 0.42. In the crisis period, net interest margin changed importantly and increased by 41% compared to 2007 year. Interest revenue increased by 48%, interest cost decreased by 34%, so the difference between interest revenue and interest costs increased lower than in previous years. As for 2009, net interest margin declined dramatically by 30% and became 0.42. Unlike 2008 year, the difference between interest revenue and interest costs increased by 153% in 2009 year. As the interest costs increased by 136%, while other components of the margin decreased slightly.

During 2010-2012 years, net interest margin had declining trend, as the interest costs continued to increase from year to year until 2013 year, when it did not changed. As for other components of the margin, they continued to increase. In 2010 year all components increased by 9%. In 2011 interest revenue increased by 19%, interest cost increased by 21% and Assets interest increased by 20%. In 2012 year, interest revenue increased by 15%, interest cost increased by 20% and Assets interest increased by 14%. As a result, interest margin declined by 3% in 2011 and in 2012 years.

During 2013-2014 years, net interest margin increased by 7% and by 6%. During these period interest revenue increased by 8-9%, assets interest increased by 10-11%, while interest costs declined by 2% in 2014 year. In 2015 years, net interest margin did not change and was 0.44. Again in 2016 and 2017 years, net interest margin had declining trend, as all margin components continued to increase (see fig. 3).

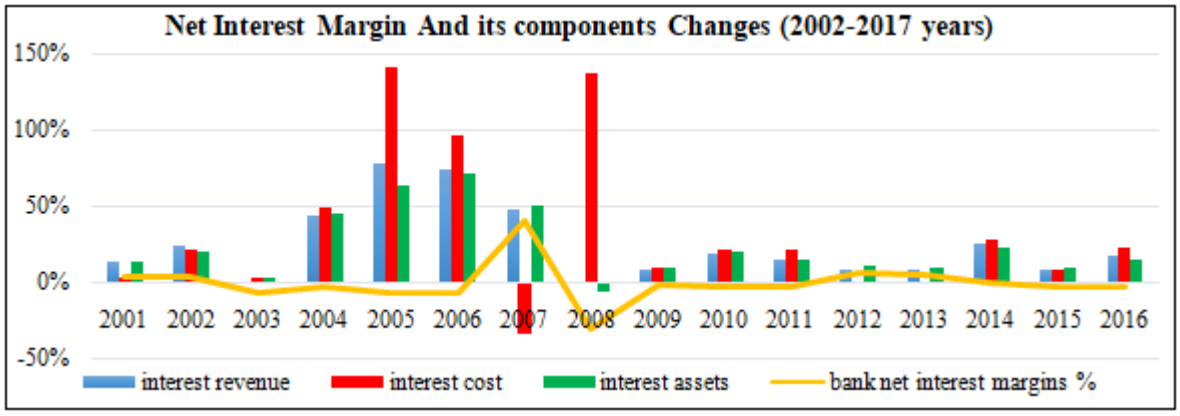

Figure 3: Net Interest Margin and its components changes during 2002-2017 years

According to National Bank of Georgia return on equity (ROE) has been changing in Georgian banks during 2001-2017 years. In 2002 year, ROE increased by 174% compared to previous year. Next year it declined slightly by 1%. As for 2004, return on equity decreased dramatically by 43%. Fortunately, in 2005-2006, ROE increased importantly

and in 2005 it became 18.16 and in 2006 it became 20.18. During the crisis, ROE decreased by 35%, 196%, 66% and even by 367% in 2007-2010 years. In 2011 year, ROE became 11.52 and increased by 66%.Unfortunately, in 2012 year ROE decreased by 59% and became 7.87.

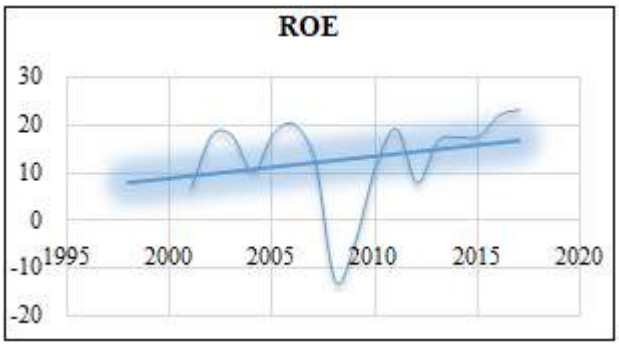

Figure 4: Return on equity trend 2001-2017 year.

For the last five years, ROE had increasing trend. In 2013, it had 111% growth, in 2014 year- 5% growth, in 2015 -1% growth, in 2016- 26% growth and in 2017 it had 5% growth. The maximum ROE was in 2017 year and it became 23.25. As we see trend line in fig. 4, during 2001-2017 years return on equity had growing trend. In part 1.7 of our research, ROE will be studied with relationship to other banks profitability measures and liquidity. Also, profitability and capital regulation relationship.

Return on equity (ROA) had a declining trend during 2001-2017 year. In 2001 ROA was 2.07. It increased essentially in next year and became 147%. In 2003 and 2004 it declined by 9% and then by 49%. In 2005 year ROA increased by 54% and became 3.71. From 2006 to 2010 year ROA was decreasing dramatically. As we see from fig. 5 the lowest point of ROA was in 2008. Return on assets decreased importantly during the crisis. In 2011 ROA became 3.16 and increased by 57%, but next year it decreased by 58% compared to 2011 year. In 2013 and 2014 year return on assets increased by 113% and by 6% appropriately. In 2015 year ROA decreased by 12%, but in 2016 it increased by17%. In 2017 year ROA was 3.09 and decreased slightly by 1%.

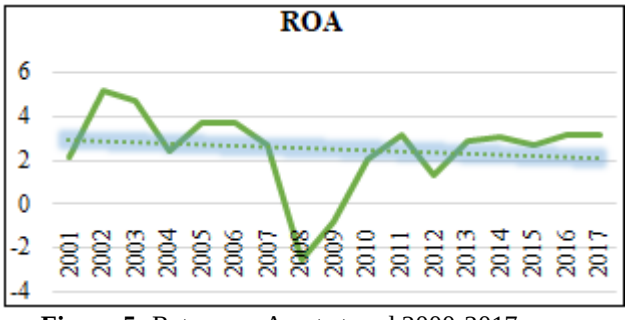

Figure 5: Return on Assets trend 2000-2017 years

From our table 3, our measures of liquidity ratio shows that ratio was 1.05 in 1998. The ratio continued to grow till 2006 year and in 2006 it became 1.49. in 1999 ratio increased by 9% compared to the appropriate data, which was caused by 37% growth of liquid assets and 26% growth of total assets. As for 2000-2001 years, growth trend continued and increased by 7 and 8%. Both components of ratio increased and in 2000 year liquid assets increased by 34% and current assets increased by 25%. In 2001 liquid assets increased by 27% and current assets increased by 17% compared to previous year. In 2002-2004 years, liquidity ratio increased slightly, whereas its components grew importantly by 20%. In 2005 ratio increased by 9%. Liquid assets increased importantly by 64%, total assets increased by 50%.

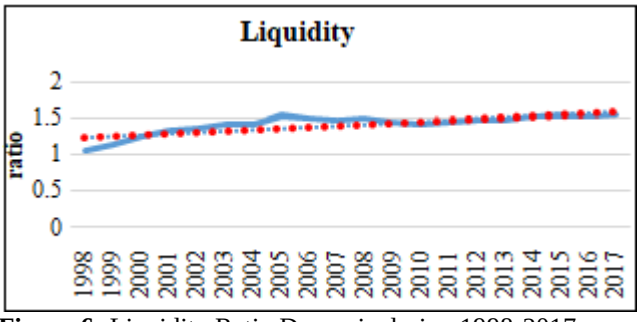

Figure 6: Liquidity Ratio Dynamic during 1998-2017 years

In 2006 (1.49) and 2007 (1.45) years liquidity ratio decreased by 4 and 2%. Liquid assets increased by 60% in 2006 year and total assets by-66%. Both components of the ratio increased in 2007 year: liquid assets-67%, total assets by 71%. In 2008 liquidity ratio increased slightly by 3%, as the liquid assets increased more than current assets and 27% growth was resulted.

In 2009, as a result of 6% decline of total assets and 10% decline of liquid assets, ratio decreased by 4%. After the total assets increased by 27% and liquid assets increased by 26%, ratio increased by 1% in 2010 year.

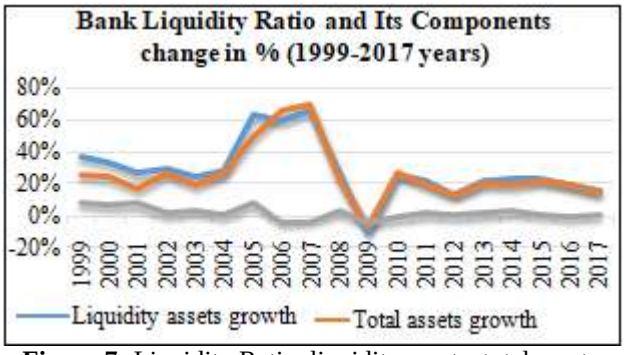

Figure 7: Liquidity Ratio, liquidity assets, total assets growth in % during 1999-2017 years

According to 2011-2017 year, liquidity ratio had growing trend (see fig. 6). In 2011 liquidity ratio equaled to 1.451 and increased by 2%, because total assets increased by 20% and liquid assets increased by 22%. In 2012 ratio was 1.459, its components increased by 14 and 13%. In 2013 year, ratio increased by 2%, in 2014 by 3%, in 2015 by 1% (see fig. 7.).

5. Correlation and Regression Analyses results

We studied bank profitability measures like capital ratio, net interest margin, Return on equity, Return on assets in the above sections. Moreover, we studied bank liquidity ratio from 2001-2017 years. As we can see from table 1, Correlation matrix is for the five variables. The results show that there are positive relationship between Liquidity ratio and NIM, ROE and ROA.From the results of the correlation

coefficients, we can conclude, that correlation coefficient between liquidity and net interest margin is weak positive 0.49. Correlation between liquidity and ROA is weaker 0.23. Liquidity has positive relationship with ROE, but the coefficient is not strong, it is 0.26. As the ROE, ROA and NIM increases liquidity increases and conversely (see table 1).

Table 1: Correlation matrix

	Liquidity percent change	Net Interest Margin percent change	ROA percent change	ROE percent change
Liquidity percent change	1			
Net Interest Margin percent change	0.499076	1		
ROA percent change	0.237045	-0.16066	1	
ROE percent change	0.260871	-0.15462	0.997832	1

We have made regression for liquidity ratio percent change and Net Interest capital ratio percent change, where liquidity is independent variable and NIM is dependent variable. As the multiple R is 0.5, there is a linear relationship. From table 2, we can see that Coefficient of Determination R square is 25.88%. T statistics for intercept is 2.211275 and is greater than p-value, which is 0.044157. Wereject the null hypothesis at level .05 since the p-value is less than 0.05. Also, significance F is 0.04415. Coefficient is 1.55831 for liquidity. Regression equation will be as follows: y = 1.5583x - 0.022.

Table 2: Regression analyses for NIM and Liquidity Ratio

Regression Statistics	
Multiple R	0.50878
R Square	0.258857
Adjusted R Square	0.205918
Standard Error	0.122738
Observations	16

ANOVA					
	df	*SS*	*MS*	F	Significance F
Regression	1	0.073662	0.07366	4.88974	0.044157
Residual	14	0.2109047	0.01506		
Total	15	0.2845667			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.022038	0.0321099	-0.6863	0.50372	-0.09091	0.046831	-0.0909	0.04683
Liquidity percent change	1.558318	0.7047147	2.21127	0.04416	0.046855	3.069781	0.04686	3.06978

We have made regression for liquidity ratio percent change and Return on Assets ratio percent change, where liquidity is independent variable and ROA is dependent variable. As the multiple R is 0.229, there is a linear relationship. From table 3, we can see, that Coefficient of Determination R square is 5.25%. T statistics for intercept is 0.8815 and is greater than p-value, which is 0.39288. We do not reject the null hypothesis at level .05 since the p-value is greater than 0.05. Also, significance F is 0.39288. Coefficient is 5.986132 for liquidity. Regression equation will be as follows: y = 5.9861x - 0.3193.

Table 3: Regression analyses for ROA and Liquidity Ratio

Regression Statistics	
Multiple R	0.229336356
R Square	0.052595164
Adjusted R Square	-0.01507661
Standard Error	1.18261357
Observations	16

ANOVA					
	df	*SS*	*MS*	F	Significance F
Regression	1	1.08699	1.08699	0.7772	0.39288
Residual	14	19.58	1.39857		
Total	15	20.667			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.31925473	0.30939	-1.0319	0.3196	-0.98282	0.344315	-0.9828	0.3443
Liquidity percent change	5.98613172	6.79012	0.8816	0.3929	-8.57722	20.54948	-8.5772	20.549

We have made regression for liquidity ratio percent change and Return on Equity ratio percent change, where liquidity is independent variable and ROE is dependent variable. As the multiple R is 0.25, there is a linear relationship. From table 4, we can see, that Coefficient of Determination R square is 6.36%. T statistics for intercept is 0.9752 and is greater than p-value, which is 0.3459. We do not reject the null hypothesis at level .05 since the p-value is greater than 0.05. Coefficient is 6.991627 for liquidity. Regression equation will be as follows: y = 6.9916x - 0.2737.

Table 4: Regression analyses for ROE and Liquidity Ratio

Regression Statistics	
Multiple R	0.2522293
R Square	0.0636196
Adjusted R Square	-0.0032647
Standard Error	1.2485631
Observations	16

ANOVA					
	df	*SS*	*MS*	F	Significance F
Regression	1	1.4828181	1.4828	0.95119	0.345969
Residual	14	21.824736	1.5589		
Total	15	23.307554			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.2736696	0.3266406	-0.8378	0.4162	-0.97424	0.4269049	-0.974244	0.4269049
Liquidity percent change	6.9916265	7.168772	0.9753	0.34597	-8.38386	22.367113	-8.3838602	22.367113

6. Conclusion

The central objective of the study is to find out relationship between bank profitability and liquidity of Georgian banks form 1998-2017 year. Therefore it rightfully attracts more and more attention from researcher all over the world. Our study results demonstrated that liquidity management has some impact on the profitability of banks. Liquidity and profitability both are crucial for banking sector because it can influence on banks future. Based on our quantitative research, which included correlation and regression analyses, impact of liquidity on profitability was studied.

According to our results suggested above, there are positive relationship between Liquidity ratio and NIM, ROE and ROA. Based on regression analyses net interest margin and liquidity, where liquidity is independent variable coefficient is valid whereas in other cases coefficient is not valid.

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