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LIQUIDITY IMPACT ON BANKS PROFITABILITY IN THE REPUBLIC OF SRPSKA

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ABSTRACT

Banks, as the primary goal have profit maximization, but because of its importance for the overall economic system there is a huge number of stakeholders from depositors to government who are vitally interested in how banks operate, i.e. maximize profits. Our aim is to establish and examine relationship between banks profitability and liquidity. We will look at 16 interdependencies between liquidity indicators: liquid assets by total assets, liquid assets towards short-term financial liabilities on the one hand and profitability indicators: returns on average assets, return on average capital, net interest income according to total income, non-interest expense according to the total income etc. We constructed solvency model for banks in the Republic of Srpska according to factors which are mostly correlated on state level. We used the data available for the banking system of Republika Srkska to form the model. The model captures 70% of linear relationship between predictor variables and response variable. We can conclude that significant variables are interest cost, capital to asset ratio, dividends, and membership to a group. However, our model caputre 70% of relationship and give us satisfactory level to conduct politics in order to increase bank profitability and creditworthines.

Introduction

Banks, as well as all other economic entities, as the primary goal have profit maximization, but because of its im importance for the overall economic system there is a huge number of stakeholders from depositors to government who are vitally interested in how banks operate, i.e. maximize profits. Liquidity policy management cannot be separated from management in other bank business segments, and in particular from profitability management with which it is in reverse relationship. Theoretically and practically in banking, achieving the target rate of profitability implies balancing among other fundamental principles of banking activity (liquidity, solvency, capital adequacy and risk mitigation, risk appetite, etc.). According to empirical facts, the business of banks is based on security, liquidity and profitability principles, in that order, because only a liquid and stable bank can perform its target function and maximize shareholder profits in a sustainable way. The theoretical ratio of liquidity and profitability is a "zero-sum game": higher liquidity entails a lower profit potential, while lower liquidity implies a higher earning capacity of the bank, therefore, according to the principle of causality, a bank that does not respect the principle of liquidity threatens the target function of profitability.

Unlike capital regulation which was always in extensive focus both regulators and academic scrutiny, liquidity regulation is new and has run ahead of research (Diamond & Kashyap, 2016). These authors emphasize that when it comes to liquidity regulation we do not even know what to argue about. The research we conducted aims to contribute to the clarification of the liquidity and profitability relationship in the Republic of Srpska and give new evidence for this phenomenon. Paper of Adelpo et al. (2022)

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investigate relationships between capital, liquidity and profitability of European banks in post crises period and bring additional light to this issue.

The basic hypothesis of our research is that by establishing adequate liquidity management policies and models applicable to our market conditions, we will preserve and improve the bank's creditworthiness.

We have confirmed the basic hypothesis through theoretical and empirical research. The basic hypothesis in this paper was concretized with the help of two auxiliary hypotheses. Defining clear liquidity management criteria has a positive impact on strengthening the creditworthiness of the bank. Creditworthiness of the bank brings greater stability and profitability.

The stability of the bank is the final expression of various factors that are roughly divided into internal and external. Internal factors imply factors that are characteristic of a particular bank's operations, and which can be influenced by management. Internal factors affecting the stability of the bank are: market share, the ratio of net approved loans to clients and short-term financing of the bank (primarily deposits), the ratio of joint stock capital to the total assets of the bank, the ratio of operating costs and total assets of the bank, and the ratio of "non-performing" assets to total assets of the bank. External factors are those environmental factors that the bank's management does not have the ability to control, but can predict their changes, and adjust their business in time. Since the relationship between stability and profitability is clear the causal relationship in which stability precedes, it is clear why it is believed that the bank will achieve an appropriate level of profit through the realization of the other two principles.

1. Literature review

As resources are more willing to cover demand for liquid assets, expected profitability is lower. Liquidity buffers play a dual role first as an implicit tax on liquidity transformation and second as costly mitigator of liquidity risks (Sundaresan and Xiao 2023)

Creating and maintaining liquidity is one of the main bank roles. This process means confrontation of demands and expectations by depositors on one side, and long term financing of non-liquid assets by debtors on other side (Jiang, L 2022). However maintaining liquidity buffer incurs at least two negative impacts since managerial efforts cost and that is not offset by liquid by liquid assetss low rate of return additionally dealing with liquidity diverts their attention from from core business function (Raz et al 2022).

Ghenimi et al. (2017) look at banks fragility and creditworthiness as product of liquidity and credit risk. Those risks influence bank stability and interaction between them contribute to bank instability.

Roy et al. (2019) define bank liquidity as the assurance banks have on ensuring that they can invest in assets and at the same time cover their required commitments at the right time and at rational spending levels. Yusuf et al. (2019) describe bank liquidity as the holding of monetary fundsor the easy conversion of assets to monies. Therefore, liquidity is the ability of banks to ensure holders of bank accounts that they can easily access their funds at any time and the guarantee banks provide to ensure all required commitments can be settled through possessing a high proportion of liquid assets. The expansion and profitability of an organization largely depend on the liquidity levels and how they are managed. However, profitable organization is not always liquid, and liquidity does not necessarily guarantee profitability (Adelpo et. al. 2022)

Banks (2014) argues that to achieve effective liquidity management and profitability, there must be an uninterrupted endeavour of ensuring that a balance exists between liquidity, profitability and risk. This view is supported by Landskroner and Paroush (2011) who argues that in managing assets and liabilities the period of uncertainties in cash flows, cost of funds and return on investments, banks must establish the trade-off between risk, return and liquidity.

Several studies have been conducted on the nexus between liquidity and bank performance, but the findings have been mixed with some inconclusive. Some of the studies include: Olagunju, David and Samuel (2012) finds a positive significant relationship between liquidity and profitability and concluded that there is a bi-directional relationship between the variables where the profitability in commercial banks is significantly influenced by liquidity and vice- versa. In contrast, Molyneux and Thornton (1992) finds an inverse relationship between bank profitability and liquidity arguing that banks hold liquid assets as an obligation to the requirements imposed by regulatory authorities.

Shen, Chen, Kao, and Yeh (2010) finds that in market-based financial system liquidity risk is positively related to net interest margin an indication that banks with high levels of illiquid assets receive higher interest income. This was in contrast with their earlier finding on the relationship with net interest margin

that liquidity risk is negatively related to return on average assets and inversely related to return on average equity. They argue that banks with illiquid assets incur higher funding cost in the market in raising money to meet the funding gap. They found no relationship between liquidity risk and performance of banks because of the intermediation role they play and are therefore not affected by liquidity risk.

Demirgüç-Kunt and Huizinga (1999) found positive relationship between loans to total assets and the net interest margins and also established an inverse relationship between the net interest margin and before tax profits. Though their results were inconclusive.

Ben Naceur and Kandil (2009) finds that banks' liquidity does not determine returns on assets or equity significantly in their study on cost of intermediation in the post capital regulation period which they which include; higher capital-to-assets ratios, an increase in management efficiency, an improvement of liquidity and a reduction in inflation.

2. Metodology

Our methodology is quite simply. Our aim is to establish and examine relationship between banks profitability and liquidity. We will look at 16 interdependencies between liquidity indicators: liquid assets by total assets, liquid assets towards short-term financial liabilities, loan deposits ratio, short-term financial liabilities on the one hand and profitability indicators: return on average assets, return on average capital, net interest income according to total income, non-interest expense according to total income etc. Selected variables are variables that possess longest time series for domestic market and variables that are recognized as financial soundness indicators for Bosnia and Herzegovina and are consistent with the 2019 FSIs Guide (Financial soundness indicators compilation guide – IMF 2019). Variables are available in Bosnia and Hercegovina regular publication.

We conducted empirical research in order to confirm or reject the hypotheses that liquidity is precognition to profitability and solvency in bank mangement. Starting from the main hypothesis that the establishment of adequate liquidity management policies and models, applicable to our market conditions, improves the creditworthiness of the bank, we searched for the conclusion whether and to what extent it is possible to confirm this empirically. For this purpose, we used two secondary hypotheses, which claim that defining clear criteria for bank liquidity management has a positive effect on creditworthiness and that good creditworthiness brings greater stability and profitability. In order to empirically confirm our hypotheses, we based our research on clear, exact data available in BiH and Republika Srpska.

We will observe the correlation coefficients, for the purposes of this research we will use the generally accepted correlation relationship, which is shown in the Table 1.

Table 1: Correlation coefficients, correlation strength and correlation type

Correlation coefficient	Correlation strength	Type of correlation
-0.7 to -1	Very strong	Negative
-0.5 to -0.7	Strong	Negative
-0.3 to -0.5	Moderate	Negative
0 to - 0.3	Weak	Negative
0	There is no correlation	Zero
0 to 0.3	Weak	Positive
0.3 to 0.5	Moderate	Positive
0.5 to 0.7	Strong	Positive
0.7 to 1	Very strong	Positive

Source: Author calculation, 2023.

After that we constructed solvency model for banks in the Republic of Srpska according to factors which are mostly correlated on state level. From the correlation analysis we will get sense about relationships between factors and this knowledge will help us to describe problems we have in establishing solvency model in order to grade bank creditworthiness. Problem we are aiming to solve is to empirically test our main hypothesis that establishing adequate liquidity management policies and models applicable to our

market conditions, we will preserve and improve the bank's creditworthiness. We operated bank creditworthiness as return on equity because higher profitability leads us to higher level of capital.

3. Results and discussion

We will begin the empirical testing by observing variables at the macro level, that is, at the level of the banking sector, where we observe standard indicators (indicators) of financial health. Given that we determine the interdependence between liquidity, capital and profitability as a source of creditworthiness, our chosen variables are:

Capital indicators:

- Basic capital according to the total amount of risk exposure
- Regulatory capital according to the total amount of risk exposure
- Capital to total assets

Liquidity indicators:

- Liquid assets to total assets
- Liquid assets according to short-term financial obligations
- Deposits against loans
- Short-term financial to total financial obligations

Profitability indicators:

- Return on average assets
- Return on average capital
- Net interest income to total income
- Non-interest expenses according to total income

According to empirical test we can conclude that:

1. Relatshionship between capital indicators and liquidity indicators, lead us that:
   - Greater exposure to risk leads to greater needs for liquid assets,
   - A higher level of capital implies a lower participation of liquid funds,
2. The conclusions that arise when looking at the relationship between profitability and capital points to the following:
   - A higher level of profitability implies a greater need for capital that is exposed to risk
   - A higher share of net interest income implies a higher share of capital in total assets
3. After analyzing the interdependence of profitability and liquidity, several conclusions are imposed on us:
   - A higher level of profitability is achieved at a higher level of liquidity,
   - A higher level of profitability enables a higher level of liabilities

Regarding our previous findings we can conclude relathionship between variable on agregate level. For empirical investigation on bank level we have colected data from banks balance sheet and build matrix 19 x 100 to build the model. According from findings at macro level. Structure of model is as folowed:

Model 1 The Republic of Srpska creditworthines model

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0,70
R Square	0,49
Adjusted R Square	0,45
Standard Error	0,04
Observations	100

ANOVA

	df	*SS*	*MS*	*F*	*Sig. F*
Regression	6	0,15	0,03	14,67	0,00
Residual	93	0,16	0,00		
Total	99	0,31			

	Coefficients	*SE*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,09725	0,02652	3,66669	0,00041	0,04458	0,14992	0,04458	0,14992
Interest cost	-1,52783	0,56239	-2,71667	0,00786	-2,64464	-0,41103	-2,64464	-0,41103
Capital to asset ratio	-0,37618	0,14235	-2,64258	0,00965	-0,65886	-0,09349	-0,65886	-0,09349
% of liquid asset in TA	-0,08170	0,08016	-1,01922	0,31074	-0,24089	0,07748	-0,24089	0,07748
% of liabilities in TA	0,03855	0,03603	1,06973	0,28751	-0,03301	0,11010	-0,03301	0,11010
Dividends	0,05745	0,01054	5,45324	0,00000	0,03653	0,07837	0,03653	0,07837
Member of group	0,01557	0,01104	1,41120	0,16152	-0,00634	0,03749	-0,00634	0,03749

Source: Author calculation, 2023.

What we can conclude from Republic of Srpska solvency model is that model capture 70% of linear relationship which indicates a fairly strong linear relationship between predictor variables and response variable. Also we can conclude that significant variables are interest cost, capital to asset ratio, dividends, and membership to a group. Interest cost poses highest beta coefficent. Which give us ground for politics in banking managment. If our aim is higher solvency, and higer profitability lower interest rate costs lead us in that direction. Also higher capital to asset ratio is other significant variable for sound banking managment with relativly high beta coefficient. Dividends and membership to a group are significant variable with relativly low beta coefficient.

Form of a Republic of Srpska solvency model is as folows:

$$Y = 0.097 – 1.52X_1 – 0.376X_2 - 0.08X_3 + 0.038X_4 + 0.057X_5 + 0.015X_6$$

Y – ROE
X_1 – Interest cost
X_2 – Capital to asset ratio
X_3 – % of liquid asset in TA (Total asset)
X_4 – % of liabilities in TA (Total asset)
X_5 – Dividends
X_6 – Member of group

If our aim is to increase creditworthiness of the bank lover levele of interest rate cost contribute to higher creditworthiness. Better ALM managment is one of the crucial elements because higher leverage, and lover liquid asset increase profitability. Group membership lead us to higher creditworthiness as bank who are member of the group have indirect chanel to last resort function from the Central bank.

Conclusion

We conducted empirical research in order to confirm or reject the hypotheses that liquidity is precognition to profitability and solvency in bank mangement. Starting from the main hypothesis that the establishment of adequate liquidity management policies and models, applicable to our market conditions, improves the creditworthiness of the bank, we searched for the conclusion whether and to what extent it

is possible to confirm this empirically. For this purpose, we used two secondary hypotheses, which claim that defining clear criteria for bank liquidity management has a positive effect on creditworthiness and that good creditworthiness brings greater stability and profitability.

In order to empirically confirm our hypotheses, we based our research on clear, exact data available in BiH and Republika Srpska. We performed hypothesis testing on the basis of a series of data on key indicators of financial health in Bosnia and Herzegovina, in order to determine the cause-and- effect relationship between the variables. The data series we used contains a sufficiently long time series of the last ten years on a monthly basis. A sufficiently long series of data provided us with a good basis for the stationarity of the time series. After determining the key interrelationships between the available variables, we used the data available for the banking system of Republika Srpska to form the model. For this purpose, we collected the key AOP (automatic data processing) positions that we needed to determine the bank's creditworthiness model. We based the selection of AOP positions on the determination tests of the variables contained in the indicators of the financial health of the banking system. To confirm our findings, we used the period of the last 11 years for ten banks and formed a 19 x100 matrix. As a vector, we set creditworthiness (ROE) as a dependent variable. Using the regression equation, we created a model of bank creditworthiness in the Republic of Srpska.

The main limitation of the research was the problem of collecting data from the annual reports of banks, because there is no uniformity in the reporting, which is publicly available. Certain newspapers, such as the stress tests of our banks and the results of stress tests, as well as the detailed structure and maturity of the sources of funds, do not have a sufficiently long period of use, in order to determine clear and exact data on their applicability and the level of forecasting error. Therefore, we used AOP data from bank financial statements that are available for a period of 11 years. However our model caputre 70% of relationship and give us satisfactory level to conduct politics in order to increase bank profitability and creditworthines. Main limitation for our model is structural shock in interest rate behavior. We colected data from 2013 till 2022. In that period interest rate were mostly flat without higer deviation from the mean. In the last two year we are witnesing different behavior of interest rate path. Further reaserach need to address structural shock in interest rate path and to increase multipl R coefficent with longer time series in order to capture structural shock and capture additional regresors.

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