

The effect of liquidity risk on the financial stability and profitability of Iran's private banking industry

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Abstract

Considering the relationship between the performance of the banking system and the macroeconomic sectors of the country, any instability and crisis in it can cause fluctuations and disturbances in macroeconomic variables, especially production. Therefore, it is important to emphasize the role of financial mediation, check and ensure the stability and health of the banking system. The financial stability of banks is one of the most important and influential factors in increasing or decreasing the liquidity criterion of banks' shares. If the financial stability of banks is stable on average over a five-year period, we can expect an increase in the growth rate of assets and finally an increase in the liquidity criteria of banks. Banks are seeking to increase their productivity according to their profitability in the short and long term. The main purpose of this research is the effect of liquidity risk on the financial stability and profitability of Iran's private banking industry. The present research is descriptive-correlation type. The data required for this research, including some accounting items, have been collected from the banks' financial statements that are available on their electronic portals. The statistical population of this research consists of 11 private banks out of a total of 22 private banks. The method of testing the hypotheses in the present study is the panel data method, which was done using Eviews 10 software. The results show that liquidity risk has a significant effect on the risk of non-performing loans and net interest margin.

Keywords: liquidity risk, financial stability, profitability, private banking industry of Iran

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1 Introduction

Cash flows are one of the factors that can influence the fluctuations of banks' cash prices. If the stock price fluctuations of banks can be influenced based on the ratio of deposits received, the amount of expected increase in current costs will be affected in the same proportion, and finally it can be expected that the financial stability of banks

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will these criteria are affected [1]. In order to strengthen the global coherence in the issue of monitoring the liquidity risk of banks, it establishes some new standards for the amount of capital, financial leverage and liquidity status of banks. The standards related to capital and reserve capital require keeping more and better capital than the capital that was required in Basel II. Also, the liquidity quality is measured by the liquidity coverage ratio (LCR) and the net stable financing ratio (NSFR). Liquidity ratios are banks' ability to pay short-term debts of less than one month. Obviously, a very low ratio increases the bank's risk, and a very high ratio can be a sign of idleness of bank resources and weak bank management, and the liquidity coverage ratio of this ratio is determined by dividing the assets with high liquidity by the net outflow of banks.

As the most important economic, monetary and financial institution of any country, the banking industry faces many challenges. The conflict between environmental factors and the expectations of the stakeholders makes banks face many risks [5]. The trend of financial stability or instability in the banking sector is not only from the decisions made in the monetary and banking sectors with a direct impact on both the borrowers and the lenders, the amount of savings, cost, profitability, efficiency, and financial ratios of banks are affected, but macroeconomic variables are also the most important factors influencing the financial instability of the banking sector and ultimately the occurrence of financial crisis in countries [6]. Banks usually seek to increase their profitability. If the increase in profitability is accompanied by an increase in capital, the liquidity criterion of banks will increase in the same proportion [8]. Banks that increase their profitability in the long term will experience greater financial stability [8]. In the last decade, the challenges facing the country's banking system, along with the increase in outstanding claims and lack of liquidity, are becoming a national challenge. Specifically, in recent years, the country's banking network has faced an increase in volatile deposits and short-term debt on the one hand, and an increase in income-generating assets on the other hand. This is despite the fact that the banks do not have enough liquid assets to meet their withdrawals. In other words, the country's banking network has short-term obligations that are assigned to long-term assets, and as a result, due to the mismatch between the maturity of assets and liabilities, it may face increased liquidity risk in future periods.

2 Theoretical foundations and research background

2.1 Liquidity risk

Lack of efficiency in bank liquidity management leads to liquidity risk. Liquidity risk is the risk of lack of cash to repay obligations and is known as two types of asset liquidity risk and financing liquidity risk [17]. Asset liquidity risk, which is also known as product market liquidity risk, appears when the transaction cannot be carried out at the expected price. This risk changes among the types of assets and in time depending on the market conditions. Some assets, such as major currencies or bonds, have their own markets and are easily liquidated in most cases with a slight fluctuation in price, but this is not true for all assets. Funding liquidity risk, which is known as cash flow risk, refers to the lack of ability to pay obligations. According to the types of liquidity risk, risk management is trying to implement a set of policies related to banking risk, leading to the timely fulfillment of due obligations and reducing the possibility of creating an adverse financial situation [16]. Paying attention to the importance of liquidity risk has caused the Basel Committee, as the highest international body involved in banking supervision, to focus on creating a solid framework for managing liquidity risk in banks and to oblige bank managers to ensure a favorable level of liquidity, they should continuously follow the process of identifying, measuring, monitoring and controlling the liquidity risk [15]. One of the most important factors affecting the liquidity of banks is the focus on the sources and uses of cash [14], a huge part of the resources is provided by the deposits of the depositors, hence the decision of the depositors regarding the type and amount of the deposit. Investments can have a significant impact on the volume of deposits and the quality of bank resources. Loans and bank facilities are also among expenses, and changes in the amount of loans and facilities granted by banks can have important changes in investment, production and in general the real sector of the economy [4].

2.2 Financial stability

Financial stability is the proper functioning and strength of all components of a financial system. All the components of a financial system in the economy are related to each other and if one of these components is imbalanced, the whole system will become unstable. In this definition of financial stability, all components of the system have been used and the relationship between the stability of the financial system and all activities related to this system has been proposed. Geri-e-Zohani [10] defined financial stability as preventing the main elements of the financial system from entering into a series of imbalances that periodically threaten economic efficiency. He assessed financial stability as a necessary condition in the economy. He knows the correct identification and management of credit financial risk

(liquidity and market) in order to maximize economic efficiency. One of the main indicators for checking financial stability is the ratio of non-current claims, the correct and fast circulation of banks' resources and expenses indicates the health of the banking system and the efficiency of its implementation methods. For this purpose, providing and equipping the financial resources, how to consume the absorbed resources and how to return them again is of special importance. The absorbed resources are considered as inputs of the banking system and the payment facilities or consumption of the absorbed resources are considered as the output of the banking system. Certainly, any malfunction or problem in any of these parts will cause problems in the system process. Receipt of granted facilities within the specified period of time indicates the implementation of correct methods and the use of resources for the necessary facilities in order to expand economic activities and direct resources to the correct investment locations. One of the basic problems that the country's banks are facing today is the problem of non-current claims and their uncollected facilities. Customers take the bank's resources, and as a result, the bank's profitability decreases. Although taking collateral is a necessary condition for granting facilities, it is not a sufficient condition. In fact, the existence of high non-current claims in the banking system indicates the ineffectiveness of this method in repaying the granted facilities. Among the factors that create non-current claims can be mentioned the existence of stagnation in the real sector of the economy. The stagnation prevailing in the economic sectors has caused the inability of the production sector to repay the received facilities. This has increased non-current claims. In fact, the presence of non-current claims will block an important part of the bank's resources that could be used in the production sector, as a result of which the ability of the production sector to repay received loans has decreased, the continuation of this trend will aggravate the non-current claims in future courses [19].

2.3 Profitability

One of the most important factors in capital structure is profitability. The equilibrium theory states that profitable companies have more income to support themselves, so they should use debt as a tax shield in order to have a higher level of leverage. On the other hand, the hypothesis states that financial managers always prefer to use internal financing instead of external financing, as a result of which most profitable companies have to use their undivided profits in other financing projects [2, 13]. Profit is one of the most valuable data in economic decisions. Profit as a guide for paying dividends, a means of measuring and measuring the effectiveness of management and a means of measuring decisions, has always been used by investors, managers and financial analysts. Considering that parameters such as industry type, company size, lifespan, capital-to-asset ratio, debt-to-asset ratio, and the company's advertising cost have been verified in this project as factors affecting profitability, the studies related to each of the mentioned parameters are briefly expressed [21, 18]: considering the value and importance of the country's current economic problem, which expresses the recessionary conditions on the one hand and the low predictability of macro variables on the other hand. The decrease in interest rates on deposits, increase in inflation and the growth of the efficiency of parallel markets (currency and gold) cause banks to face problems in obtaining new sources and attracting deposits, which in turn creates conditions of confusion for the management of bank assets and liabilities and ultimately leads to a decrease in profit. On the other hand, the profitability of a bank should be coordinated with other financial goals such as income growth and increasing the quality of assets. In this regard, in addition to considering the conditions of the bank's balance sheet, such as increasing the capital adequacy ratio and the annual return on capital, one should also pay attention to the environmental conditions of the macroeconomic environment. To achieve these goals, increasing the level of confidence and reducing risk in the banking system by using the results of stress tests, minimizes the losses caused by financial crises. Considering the importance of the country's current economic issue, which indicates the recessionary conditions on the one hand and the low predictability of macro variables on the other hand [9].

Rostami et al. [20], in a research titled investigating the relationship between liquidity risk and institutional ownership of banks and financial institutions admitted to the Tehran Stock Exchange, found that this research examines the relationship between liquidity risk and institutional ownership of banks and financial institutions admitted to the Tehran Stock Exchange. The purpose of this research is to examine the relationship between liquidity risk and institutional ownership of banks and financial institutions admitted to the Tehran Stock Exchange. According to the results obtained from the data, it can be said that the main hypothesis of the relationship between liquidity risk and institutional ownership of banks and financial institutions has been confirmed. Also, the sub-hypotheses of the research were confirmed. Esadi et al. [3], in a research titled investigating the effects of liquidity and credit risk on banking stability in Iran, using the Z-score index of the scientific journal of economic policy, found that considering the importance of bankruptcy and banking crises, the main goal of the current research is to investigate the effects of liquidity and credit risk on banking stability in Iran using the Z-Score index without distortion. The findings of this study show that liquidity and credit risk have significantly reduced banking stability, but the interactive effect of the two mentioned risks on banking stability was not statistically significant. In addition, the increase in capital ratio has improved banking stability, but inefficiency, efficiency (based on the concept of risk-return trade-off), facility

growth rate, GDP per capita (based on Minsky's financial instability hypothesis) and sanctions have led to a decrease in stability financed by banks. Guaidi [12] states that the banking industries of Southeast European countries are the main channel for the distribution of financial resources throughout the region and have witnessed deep structural changes such as privatization, consolidation and cross-border acquisitions in the past decades. The purpose of this study is to clarify how the concentration, competition and financial stability of these banking industries have changed over time. In addition, this study examines how concentration and competition in SEE banking industries affect the financial stability of SEE banks. Using alternative measures of market concentration and competition, the results indicate a decrease in the degree of concentration as well as market structures characterized by monopolistic competition. The use of several measures of financial stability, the reduction of non-performing loans and the reduction of the probability of bankruptcy of banks in Southeast Asian countries were observed. When analyzing the effects of concentration or competition measures on the financial stability of banks in Southeast Asian countries, this study shows that increasing market concentration leads to a decrease in the ratio of non-performing loans, thus indicating greater financial stability of banks in Southeast Asian countries. On the other hand, using the Lerner index as a measure of competition, the findings presented in this study show that increasing the market power of banks has an effect on increasing the ratio of non-current loans of banks in Southeast Asian countries. Finally, by separating banks in Southeast countries based on ownership (i.e., domestic vs. foreign ownership) and size (large vs. small banks), this study provides different results regarding the impact of concentration and competition criteria on the financial stability of SEE banks.

Brest et al. [7] investigated the relationship between liquidity risk and credit risk and capital adequacy ratio in banks. The results of data analysis using multivariate regression (OLS) at the 95% confidence level show that there is a direct and significant effect between liquidity risk and credit risk of banks, and there is an inverse and significant effect between liquidity risk and capital adequacy ratio.

3 Research goals

- Determining the impact of liquidity risk on return on assets (ROA) in Iran's private banks.
- Determining the impact of liquidity risk on return on equity (ROE) in Iran's private banks.
- Determining the effect of liquidity risk on the net profit margin (NPM) in Iran's private banks.
- Determining the impact of liquidity risk on financial leverage in Iran's private banks.
- Determining the effect of liquidity risk on the risk of non-performing loans (LLP) in Iran's private banks.

4 Research hypotheses

- Liquidity risk has a positive and significant effect on return on assets (ROA).
- Liquidity risk has a positive and significant effect on ROE.
- Liquidity risk has a positive and significant effect on the net profit margin (NPM).
- Liquidity risk has a positive and significant effect on financial leverage in Iran's private banks.
- Liquidity risk has a positive and significant effect on the risk of non-performing loans (LLP) in Iran's private banks.
- Liquidity risk has a positive and significant effect on the net interest margin (NIM).

5 Research method

The current research is practical in terms of its purpose, and in terms of research method, it is placed in the category of descriptive research; descriptive research includes a set of methods that aim to describe the conditions or phenomena under investigation. The current research is a descriptive-correlation type of research; in correlation studies, the researcher's effort is focused on discovering or determining the relationship between one or more variables. In fact, the goal of this method is to study the limits of changes of one or more variables with the limits of changes of one or more other variables.

5.1 Statistical population and sample size

Due to the fact that some of the banks have recently entered the stock market or there are no written financial statements of them, the statistical population of this research consists of 11 private banks out of a total of 22 private banks.

5.2 Conceptual model and description of how to check and measure variables

The regression model of the current research is derived from the research of Ghonimi et al. [11] in 2017, and the model can be defined as follows:

$$ROA_{it} = \beta_0 + \beta_1 LtDR_{it} + \beta_2 LtAR_{it} + \beta_3 CPR_{it} + \varepsilon_{it} \quad (5.1)$$

$$ROE_{it} = \beta_0 + \beta_1 LtDR_{it} + \beta_2 LtAR_{it} + \beta_3 CPR_{it} + \varepsilon_{it} \quad (5.2)$$

$$NPM_{it} = \beta_0 + \beta_1 LtDR_{it} + \beta_2 LtAR_{it} + \beta_3 CPR_{it} + \varepsilon_{it} \quad (5.3)$$

$$DL_{it} = \beta_0 + \beta_1 LtDR_{it} + \beta_2 LtAR_{it} + \beta_3 CPR_{it} + \varepsilon_{it} \quad (5.4)$$

$$LLP_{it} = \beta_0 + \beta_1 LtDR_{it} + \beta_2 LtAR_{it} + \beta_3 CPR_{it} + \varepsilon_{it} \quad (5.5)$$

$$NIM_{it} = \beta_0 + \beta_1 LtDR_{it} + \beta_2 LtAR_{it} + \beta_3 CPR_{it} + \varepsilon_{it} \quad (5.6)$$

6 Analysis of information

The method of testing the hypotheses in the present study is the panel data method, which was done using Eviews 10 software. In such a way that the data collected using the software (Excel) after the necessary corrections and classification based on the investigated variables were entered into the Eviews 10 software and the final analyses were performed and finally the research hypotheses were confirmed or rejected using the results obtained from Eviews 10 software.

6.1 Descriptive statistics

Table 1: Descriptive indices of research variables

Variables	LR	ROA	ROE	NPM	LEV	LLP	NIM	SIZE	CR	AGE
Average	0.579835	0.025537	0.303388	0.180579	0.910331	0.246446	-0.005702	18.91686	0.036694	11.27273
Middle	0.480000	0.000000	0.050000	0.120000	0.930000	0.200000	0.000000	19.00000	0.010000	11.00000
Maximum	3.020000	0.670000	3.980000	1.730000	1.620000	0.910000	0.000000	21.63000	0.310000	24.00000
Minimum	0.000000	-0.780000	-1.130000	-0.700000	0.200000	0.000000	-0.030000	14.74000	0.000000	1.000000
Std dev	0.556817	0.123099	0.708526	0.390920	0.170655	0.209049	0.008449	1.268535	0.050619	5.518152
Skewness	2.872491	-0.047740	3.257726	0.716925	-1.380072	0.838247	-1.443602	-0.704747	2.439618	0.092576
Kurtosis	10.89416	26.28142	15.71096	5.944484	11.35164	3.227872	4.284754	3.931793	10.41745	2.238219
Observations	121	121	121	121	121	121	121	121	121	121

6.2 Correlation matrix of research variables

Table 2 shows the correlation between research variables at the level of ($sig \leq 0.01$) and ($sig \leq 0.05$). For example, the probability of the correlation coefficient between return on equity (ROE) and net profit margin (NPM) is 0.0069, which is significant at the error level of 0.05.

Table 2: Correlation matrix of research variables

Correlation	LR	ROA	ROE	NPM	LEV	LLP	NIM	SIZE	CR	AGE
LR	1.000000									
Probability	—									
ROA	0.017934	1.000000								
	0.8452	—								
ROE	0.074763	0.513091	1.000000							
	0.4151	0.0000	—							
NPM	-0.191232	-0.136111	0.244483	1.000000						
	0.0356	0.1366	0.0069	—						
LEV	0.045296	-0.277014	0.007296	0.091309	1.000000					
	0.6218	0.0021	0.9367	0.3192	—					
LLP	-0.160469	0.172919	-0.009539	-0.081981	-0.145819	1.000000				
	0.0787	0.0579	0.9173	0.3714	0.1105	—				
NIM	-0.151837	-0.069546	-0.137490	0.071909	0.083971	-0.397531	1.000000			
	0.0964	0.4485	0.1326	0.4332	0.3598	0.0000	—			
SIZE	0.142013	-0.223021	0.000617	0.090532	0.407687	-0.416376	0.245580	1.000000		
	0.1202	0.0139	0.9946	0.3234	0.0000	0.0000	0.0066	—		
CR	0.147928	-0.018971	-0.021666	-0.083539	0.104023	-0.437241	0.306300	0.396827	1.000000	
	0.1054	0.8364	0.8135	0.3623	0.2562	0.0000	0.0006	0.0000	—	
AGE	0.190299	-0.180250	-0.220776	-0.327047	0.245647	-0.355874	0.339299	0.526709	0.448674	1.000000
	0.0366	0.0479	0.0150	0.0003	0.0066	0.0001	0.0001	0.0000	0.0000	—

6.3 Examining the validity of research variables

After collecting the relevant information, one should be sure of their significance and non-significance, so that there is no false regression using panel data; the test related to the significance of the data is different from individual time series data such as DF, ADF, PP. During the last decade, several researches have been conducted on the unit root test of tabular data.

Table 3: Mean test of research variables

Variable	Statistics	Probability	Result
LR	-3.63832	0.0001	(unit root)
ROA	-3.93122	0.0000	(unit root)
ROE	-4.72596	0.0000	(unit root)
NPM	-2.79708	0.0026	(unit root)
LEV	-4.60987	0.0000	(unit root)
LLP	-2.05227	0.0201	(unit root)
NIM	-2.55980	0.0052	(unit root)
SIZE	-3.78895	0.0001	(unit root)
CR	-2.42554	0.0076	(unit root)
AGE	-20.2881	0.0000	(unit root)

As can be seen in Table 3, all the research variables in the unit root test have a P-value or probability less than 0.05, showing that they are stationary at the zero order.

6.4 Inferential statistics

Collinearity test. Collinearity basically means the existence of a complete or exact linear relationship between all or some of the explanatory variables of the regression model. According to the results obtained from Table 4, all variance inflation factors of the variables were less than 10, so we conclude that there is no collinearity problem among the variables of this research.

Examination of heterogeneity of variance. One of the assumptions of linear regression using the ordinary least squares (OLS) method is that all residual terms have equal variance. In this research, the Breusch–Pagan test is used to test the heterogeneity of variance in the regression models. This test examines the dependence of the variance of the residuals obtained from the linear regression on the values of the explanatory variables of the model.

Table 4: Results of the collinearity test (VIF) of hypotheses

Variables	VIF	Result
LR	1.044220	Absence of collinearity
SIZE	1.450470	Absence of collinearity
CR	1.315638	Absence of collinearity
AGE	1.547617	Absence of collinearity

Table 5: Results of heterogeneity test (Breusch–Pagan test)

Hypothesis	Statistic	d.f.	Probability	Result
First	0.625340	F(4,116)	0.6454	No heterogeneity of variance
Second	1.217394	F(4,116)	0.3073	No heterogeneity of variance
Third	0.142765	F(4,116)	0.9658	No heterogeneity of variance
Fourth	0.935817	F(4,116)	0.4458	No heterogeneity of variance
Fifth	7.744207	F(4,116)	0.0000	Heterogeneity of variance present
Sixth	3.637535	F(4,116)	0.0079	Heterogeneity of variance present

According to the results of this test given in Table 5, for the fifth and sixth hypotheses the calculated probability is less than 0.05. Therefore, the final estimation of these two hypotheses is carried out using the GLS method so that the assumption of homogeneity of variances is maintained in the regression analysis and the heterogeneity-of-variance problem is corrected.

7 Testing hypotheses

Hypothesis 1 – Liquidity risk has a positive and significant effect on asset returns.

Table 6: Results of regression model analysis – ROA

Variable	Coefficient	Std. dev.	<i>t</i> -statistic	Sig.
C	1.494202	0.346037	4.318045	0.0000
LR	0.006814	0.020708	0.329026	0.7428
SIZE	-0.088551	0.021797	-4.062481	0.0001
CR	0.146855	0.273533	0.536880	0.5925
AGE	0.017485	0.007224	2.420469	0.0172
Fisher's F statistic: 2.549176		Sig. of F statistic: 0.003469		
Adjusted R^2 : 0.153071		Durbin–Watson: 2.263473		

As seen in Table 6, the significance level (Prob.) of the independent variable (liquidity risk) is equal to 0.7428. According to the *t*-statistic and *p*-value of this variable, the results show that there is no significant relationship at the 5% error level. These findings show that liquidity risk does not have a significant effect on asset returns, and as a result, the first research hypothesis is rejected.

Hypothesis 2 – Liquidity risk has a positive and significant effect on ROE.

As seen in Table 7, the significance level (Prob.) of the independent variable (liquidity risk) is equal to 0.3706. According to the *t*-statistic and *p*-value of this variable, the results show that there is no significant relationship at the 5% error level. These findings show that liquidity risk does not have a significant effect on the return on shareholders' equity, and as a result, the second research hypothesis is rejected.

Hypothesis 3 – Liquidity risk has a positive and significant effect on the net profit margin (NPM).

Table 7: Results of regression model analysis – ROE

Variable	Coefficient	Std. dev.	<i>t</i> -statistic	Sig.
C	-1.301726	1.999827	-0.650919	0.5165
LR	0.107604	0.119679	0.899109	0.3706
SIZE	0.103128	0.125972	0.818661	0.4148
CR	0.899696	1.580813	0.569135	0.5705
AGE	-0.039135	0.041749	-0.937381	0.3507
Fisher's F statistic: 2.467146		Sig. of F statistic: 0.004670		
Adjusted R^2 : 0.146151		Durbin-Watson: 1.772512		

Table 8: Results of regression model analysis – NPM

Variable	Coefficient	Std. dev.	<i>t</i> -statistic	Sig.
C	-1.092904	0.789148	-1.384917	0.1690
LR	-0.009834	0.047226	-0.208240	0.8354
SIZE	0.071973	0.049710	1.447876	0.1506
CR	-0.094374	0.623802	-0.151289	0.8800
AGE	-0.006996	0.016475	-0.424635	0.6720
Fisher's F statistic: 12.05337		Sig. of F statistic: 0.00000		
Adjusted R^2 : 0.563235		Durbin-Watson: 1.699623		

As seen in Table 8, the significance level (Prob.) of the independent variable (liquidity risk) is equal to 0.8354. According to the *t*-statistic and *p*-value of this variable, the results show that there is no significant relationship at the 5% error level. These findings show that liquidity risk does not have a significant effect on the net profit margin, and as a result, the third research hypothesis is rejected.

Hypothesis 4 – Liquidity risk has a positive and significant effect on financial leverage.

Table 9: Results of regression model analysis – Financial leverage

Variable	Coefficient	Std. dev.	<i>t</i> -statistic	Sig.
C	-2.581590	0.400640	-6.443658	0.0000
LR	-0.001947	0.023976	-0.081189	0.9354
SIZE	0.210268	0.025237	8.331775	0.0000
CR	-0.081019	0.316696	-0.255825	0.7986
AGE	-0.042722	0.008364	-5.107899	0.0000
Fisher's F statistic: 6.938822		Sig. of F statistic: 0.000000		
Adjusted R^2 : 0.409285		Durbin-Watson: 1.664609		

As seen in Table 9, the significance level (Prob.) of the independent variable (liquidity risk) is equal to 0.9354. According to the *t*-statistic and *p*-value of this variable, the results show that there is no significant relationship at the 5% error level. These findings show that liquidity risk does not have a significant effect on financial leverage, and as a result, the fourth research hypothesis is rejected.

Hypothesis 5 – Liquidity risk has a positive and significant effect on the risk of non-performing loans.

As seen in Table 10, the significance level (Prob.) of the independent variable (liquidity risk) is equal to 0.0109. According to the *t*-statistic and *p*-value of this variable, the results indicate a significant relationship at the 5% error level. These findings show that liquidity risk has a significant effect on the risk of non-performing loans, and as a result, the fifth research hypothesis is accepted.

Table 10: Results of regression model analysis – LLP

Variable	Coefficient	Std. dev.	<i>t</i> -statistic	Sig.
C	0.421118	0.469306	0.897321	0.3716
LR	-0.054629	0.021067	-2.593106	0.0109
SIZE	0.009978	0.028200	0.353815	0.7242
CR	-1.473156	0.221883	-6.639351	0.0000
AGE	-0.024634	0.006595	-3.734913	0.0003
Fisher's F statistic: 20.05316		Sig. of F statistic: 0.000000		
Adjusted R^2 : 0.689717		Durbin–Watson: 1.735473		

Hypothesis 6 – Liquidity risk has a positive and significant effect on the net interest margin (NIM).

Table 11: Results of regression model analysis – NIM

Variable	Coefficient	Std. dev.	<i>t</i> -statistic	Sig.
C	0.026432	0.013141	2.011494	0.0468
LR	-0.001978	0.000901	-2.195949	0.0303
SIZE	-0.002530	0.000843	-3.001573	0.0033
CR	0.029264	0.011508	2.542854	0.0124
AGE	0.001401	0.000303	4.629277	0.0000
Fisher's F statistic: 7.972450		Sig. of F statistic: 0.000000		
Adjusted R^2 : 0.448566		Durbin–Watson: 1.710034		

As seen in Table 11, the significance level (Prob.) of the independent variable (liquidity risk) is equal to 0.0303. According to the *t*-statistic and *p*-value of this variable, the results indicate a significant relationship at the 5% error level. These findings show that liquidity risk has a significant effect on the net interest margin, and as a result, the sixth research hypothesis is accepted.

8 Conclusion

In explaining the results related to liquidity risk and return on assets (ROA), it can be said that in order to improve liquidity management, each of the mentioned factors should be considered according to the existing risks, because risk is one of the factors that can cause problems in the performance of companies and their efficiency. On the other hand, according to the inflation rate, the price always fluctuates, so it can be said that the expected return may fluctuate with the price fluctuation. In explaining the results related to liquidity risk and ROE, it can be said that the optimal level of liquidity can be determined according to the market conditions, the company's current debt conditions, development plans, the liquidity of assets, etc., and each company has its own conditions. Keeping the liquidity level low as well as keeping it higher has its own risks, disadvantages, and also its own advantages, which should be determined for each company according to its special and exclusive conditions. Liquidity problems affect the income and capital of banks, and in acute situations can cause bank bankruptcy. Banks may be forced to borrow cash from the market at a relatively high interest rate during a liquidity crisis. This ultimately leads to a decrease in the income of banks. In addition, excessive borrowing by banks also puts their capital at risk. This problem also increases the debt-to-equity ratio and increases the efforts of banks to maintain the optimal capital structure.

In explaining the results related to liquidity risk and net profit margin (NPM), it can be said that the liquidity risk of banks arises from the long-term financing of bank assets with the benefit of short-term debts, and thus the debt of banks (bank deposits) must either be renewed continuously or these debts must be refinanced. Liquidity risk in each bank usually has a unique nature; but in certain cases, it may coincide with the liquidity problems of the financial system. Considering the unique characteristics of each financial institution, the correct definition of liquidity policy in terms of work methods and expertise is considered the first responsibility of the management of each bank. Bank deposits generally have much shorter contractual maturities than bank loans, and in addition to covering different

maturities of assets and liabilities of banks, liquidity management should have a protection or safety margin to cover the risk of withdrawals from bank deposit accounts. Liquidity management is the effective ability to equip, provide and maintain deposits as well as reduce debts (deposits), finance the increase in loans and items below the bank's balance sheet. The cash flow of financial institutions is usually classified in different time horizons based on the possible future behavior of assets, liabilities and off-balance-sheet items of the institutions. Liquidity risk is not only related to asset and debt management of financial institutions, but also to other aspects of the financial structure of financial institutions, such as interest rate and market risks, profitability and health of financial institutions; however, interest rate risk may be named as market risk or refinancing (reinvestment) risk due to the mismatch of maturities or the dates of adjustment and extension of interest rates. Also, in spite of all these risks, banks move the maturity of their assets, thereby affecting the yield of resources and the profit from the institution's activity. Maintaining a certain amount of liquid assets, and adjusting the timing of the flow of assets and liabilities of banks, although it leads to the improvement of liquidity risk, also affects the profitability of banks' resources. This relationship usually works in the opposite direction, in the sense that high-yield lending in an irregular process may have a negative effect on the bank's profitability and liquidity, because the expected cash flow may not materialize. In addition, these considerations are also related to the health and financial strength of the bank, because more capital of the institution (more fixed assets) reduces liquidity capacity, but enables greater strength to face financial crises.

In explaining the results related to liquidity risk and financial leverage, it can be said that the lack of bank liquidity causes debt payment problems because the non-cash assets (loans) of banks are financed through short-term debts; as a result, a general lack of liquidity may lead banks to bankruptcy. Conditions of severe financial stress make liquidity and solvency directly related to each other, and each can cause the other. These problems may force the financial institution to liquidate assets, and in this case the risk of asset liquidation and the risk of providing cash by the bank will jointly and simultaneously put the bank in a situation where it is forced to sell assets at a very low price (asset fire sales). In such a situation, if the leverage ratio of the bank's portfolio is high, the forced sale of assets may create a positive feedback loop between decreasing asset prices and additional forced asset sales, as well as increasing the bank's marginal funding rate. Liquidity risk can be controlled by controlling the concentration and density of the bank's assets, the relative size of the bank's portfolio in the market according to the asset's liquidity risk, creating diversification and establishing credit security lines along with predicting other means of providing funds and limiting the cash flow gap.

In explaining the results related to liquidity risk and the risk of non-performing loans (LLP), it can be said that recent economic research and experience have determined that a boom in lending is one of the causes of financial and banking crises.

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