



Liquidity risk and credit risk on the stability of public and private banks and providing a suitable model

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ABSTRACT

Today, economists believe that a stable financial system is a prerequisite for sustainable economic growth, and the prerequisite for the stability of the financial system is the adjustment and regulation of the banking system by reducing the probability of bank bankruptcy, and in other words, improving the financial stability of the banking system. Financial stability in the banking system is one of the main features for successful world economies. Financial institutions, especially the banking system, play an irreplaceable and pivotal role in the economic system; From the point of view that their performance on the one hand can provide the grounds for economic growth and development and on the other hand the conditions of disorder and collapse of an economic system. In this regard, the purpose of this research is to consider the effect of liquidity risk and credit risk on the stability of public and private banks and provide a suitable model. The final sample of the research was taken as a census equal to the accepted 14 banks in the Tehran Stock Exchange. Research questions were investigated using regression tests with panel data. The results of research questions showed that there is an inverse relationship between liquidity risk and the index of financial health and stability of banks. There is an inverse relationship between credit risk and banks' financial health and stability index. Credit risk, government debt, inflation rate and interest rate have a direct impact on banks' liquidity risk.

Keywords: liquidity risk, credit risk, bank stability, government debt, inflation rate, interest rate

1. Introduction

Banks are closely related to people's daily life and activities. They are getting a salary, paying bills, buying a house, building savings, and getting a loan, which all involve banking activities. Businesses also rely on the banking system to settle their transactions and meet other financial needs. Banks also interact in an international network to provide financial services to their foreign and local customers. The interconnectedness of banks and the fact that banking stability is fundamentally based on public trust means that one bank's problems can quickly spread to other banks and financial institutions. Any significant disruption in banking operations will affect the entire community. Therefore, banking stability is critical to minimize the widespread disruptive economic and social impacts that may lead to problems in various industries. The failure of a bank can have significant consequences for the economies in which it operates. During the recent financial crisis, the government had to inject funds to prevent the collapse of some financial institutions and even banks. The banking sector in emerging economies has witnessed essential developments in the development of financial markets. The recent financial crisis of 2007-2008 occurred worldwide and led to economic structural changes. The banking system and financial institutions have faced problems maintaining operational activities, eliminating losses, and needing liquidity. Financial stability and sustainable development have become the key to global social and economic development (Adusei, 2015; Ali and Puah, 2018; Dao et al., 2020; Shair et al., 2021; Yin, 2019)¹.

Many types of research have also shown that the banking system has played a significant role in human, social and economic development (Van den Berg, 2016)². A healthy bank can disburse more loans and reduce transaction fees. In contrast, an unstable and financially unhealthy bank has high transaction costs in bank fees, overheads, and customer service. The financial dimension reduces the profitability and economic performance of the business, and the spiritual dimension reduces human and social development (Nguyen, 2020)³. This study helps

identify the factors that determine and affect the stability of banking in Iran in terms of financial risks, which is essential. The risks that have been investigated in this research are liquidity risk and credit risk. Liquidity is the bank's ability to meet its cash and collateral obligations without incurring unacceptable losses. Liquidity risk refers to how a bank's inability to meet its obligations (either real or perceived) threatens its financial position or existence. This risk mainly comes from the asset and debt structure of the banks, and its primary source is the time mismatch between the incoming and outgoing flows to the banks; therefore, liquidity risk can be divided into two categories: liquidity risk of assets and resources. Asset liquidity risk refers to banks' inability to sell their assets to meet unexpected cash needs. The liquidity risk of resources also comes back to the lack of absorption of resources by the bank in the usual way (such as absorption of deposits and using the facilities and credit lines of banks) (Arab Mazar Yazdi et al., 2013)⁴. Credit risk is also related to the repayment of credit debts (such as loans). Credit risk originates from the contracting party's inability or will not fulfill its obligations. According to the Ball committee, credit risk is the possibility of default of the borrower or the bank's counterparty in fulfilling its obligations. This risk is one of the classic risks of banks and can lead to liquidity problems for banks. Despite innovation in financial markets, credit risk is still the leading cause of bank bankruptcy (Khemakhem and Boujelbene, 2018)⁵.

Most of the country's banks have been indifferent to the category of risk in general and liquidity and credit risk in particular. They have not taken any measures to control the overall risk of the bank's assets and liabilities. The consequences of establishing a judicial system for granting credits in the country's banking system are the high volume of reserves and doubtful claims and, as a result, the decrease in the efficiency of banks. The existence of government monopoly in the country's banking system has caused few innovations in their traditional system. Today, most of the country's banks lack risk management in their organizational structure. If there is a risk management unit, they have not taken severe measures to control and manage risk.

1 . Adusei, 2015; Ali and Puah, 2018; Dao et al., 2020; Shair et al., 2021; Yin, 2019

2 . Van den Berg

3 . Nguyen

4 . Arab Mazar Yazdi et al

5 . Khemakhem and Boujelbene

On the other hand, bank efficiency and value are important factors that can affect the relationship between liquidity risk and credit risk with the bank's health and stability index (Tan, 2016)⁶. Banks, as one of the most critical commercial units, are seeking to increase their wealth, and considering that increasing wealth is the result of the commercial unit's desired performance, improving the commercial unit's value and performance is very important for banks. By improving the performance and increasing the value of the bank, it can be expected that the index of bank health and stability will improve to a great extent (Valverde et al., 2016)⁷. Also, bank efficiency can be one of the practical and essential factors in determining the level of bank health and stability. Banks always want to achieve more efficiency and see it as a means to achieve more profit or benefit. From the economic point of view, efficiency is the concept of optimal allocation of resources, maximum use of resources, and bearing minimum cost with existing technology. Today, calculating efficiency in various organizations and industries is one of the necessary measures to compare the level of competitiveness in a country's domestic and foreign scenes, and banks are no exception to this rule. In general, improving the efficiency index of banks increases the company's value, which can increase the financial stability of banks (Hao and Wong, 2021)⁸. According to the contents stated in this research, the relationship between liquidity risk and credit risk with the index of bank health and stability will be investigated, taking into account the efficiency and value of the bank. This issue is unique, and so far, no internal or external research has investigated the effect of bank efficiency and value on the relationship between liquidity risk and credit risk with the bank's health and stability index. Therefore, conducting this research can reduce the gap in this field and help clarify the dimensions of the banking health and stability index and the factors affecting it. Also, from a practical point of view, conducting this research can be helpful for Iranian banks, which in recent years have faced comprehensive international sanctions and the spread of the Covid-19 pandemic, and see their stability and financial health at risk.

6 . Tan

7 . Valverde et al

8 . Hao and Wong

Understanding Liquidity Risk and Credit Risk

Liquidity Risk refers to a bank's inability to meet its short-term obligations due to a lack of liquid assets. It occurs when there is a mismatch between a bank's short-term liabilities and the available cash or easily sellable assets to cover those liabilities. Liquidity risk can arise due to sudden withdrawals of deposits, market shocks, or disruptions in the interbank market, among other factors.

Credit Risk, on the other hand, is the risk that a borrower will not be able to meet their obligations in full or on time. For banks, this primarily concerns loans and advances made to borrowers, as defaults or delays in repayment can lead to financial losses. Credit risk is closely linked to the quality of a bank's lending portfolio, borrower creditworthiness, and the economic environment.

While both liquidity and credit risk are individually significant, together they can have a compounded effect on the stability of banks, influencing their solvency, profitability, and overall resilience to economic shocks.

The Impact of Liquidity and Credit Risk on Bank Stability

Public Banks

Public banks, typically owned and operated by the government, often have access to support from the central bank or the government in times of financial stress. However, they also face challenges in terms of governance and operational inefficiencies, which may affect their ability to manage liquidity and credit risks effectively.

Liquidity Risk: Public banks may experience liquidity risk due to the political pressure to provide financial support to government projects or to maintain stable lending to underserved sectors. This may result in an increased exposure to non-performing loans (NPLs) and a lower ability to handle short-term liquidity shortages, especially if there are delays in receiving government support. Public banks may also struggle with inefficient asset management, which makes them more vulnerable to sudden liquidity crises.

Credit Risk: Credit risk in public banks often arises due to the political incentives to lend to certain sectors or borrowers that may not have the necessary creditworthiness. These loans can lead to a higher

proportion of non-performing loans, especially during economic downturns when the borrowers' ability to repay is compromised. In times of economic stress, these banks may also face increased pressure to restructure or delay loan repayments, further affecting their balance sheets.

Private Banks

Private banks, by contrast, are owned by private individuals or entities and are primarily driven by profit motives. These institutions are typically more market-driven in their approach to lending and managing liquidity. However, this does not make them immune to risks.

Liquidity Risk: Private banks are often more exposed to liquidity risk due to their dependence on the interbank market and the volatility of financial markets. A sudden withdrawal of deposits or a disruption in the credit markets can severely impact their liquidity positions. Since private banks tend to maintain a higher proportion of market-driven assets (such as stocks, bonds, and other financial instruments), they are also more susceptible to market fluctuations that can impair their liquidity.

Credit Risk: In private banks, credit risk is often managed more rigorously, but it can still be significant, particularly if the bank has concentrated its lending in high-risk sectors or borrowers. The risk of borrower defaults or delayed payments can impact private banks' profitability and capital adequacy. Additionally, during economic downturns or market shocks, private banks may face higher default rates among their borrowers, which can lead to substantial write-offs or provisions for bad loans.

Comparative Analysis: Public vs Private Banks

The resilience of public and private banks to liquidity and credit risks differs due to several factors:

- **Risk Appetite:** Private banks tend to have a higher risk appetite in search of higher returns, making them more prone to credit risk. In contrast, public banks may have a lower risk appetite, but their exposure to liquidity risk is heightened by political and regulatory factors.
- **Government Support:** Public banks often benefit from implicit or explicit government support, which provides a safety net in times of

liquidity crises. Private banks, however, must rely on market solutions, making them more vulnerable to sudden liquidity shocks without external intervention.

- **Risk Management Practices:** Private banks generally have more sophisticated risk management systems due to their focus on profitability and shareholder value. Public banks, however, may have weaker risk management frameworks, particularly in terms of credit risk, due to political influence in lending decisions.
- **Economic Exposure:** Public banks are more likely to be exposed to political risks, including lending to sectors or projects that may not be economically viable. Private banks, on the other hand, are more exposed to market and economic risks, especially during recessions or market crises.

A Suitable Model for Assessing Liquidity and Credit Risks

To assess and manage the combined impact of liquidity and credit risks on both public and private banks, a robust risk management framework is necessary. A suitable model should integrate the following elements:

- 1) **Stress Testing:** Stress testing is crucial to simulate adverse scenarios such as economic downturns, sudden liquidity shortages, or spikes in loan defaults. By modeling different stress scenarios, banks can assess the impact on both liquidity and credit risks. Stress tests can help identify vulnerabilities in liquidity management and exposure to credit losses under extreme conditions.
- 2) **Risk-Weighted Asset (RWA) Models:** Risk-weighted asset models are useful for assessing the capital adequacy of a bank, factoring in both credit risk and liquidity risk. These models assign different weights to various types of assets based on their risk profiles, helping banks understand their exposure to these risks and how much capital is needed to maintain stability.
- 3) **Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR):** These regulatory ratios, established under the Basel

III framework, help banks ensure they have enough high-quality liquid assets to meet short-term obligations (LCR) and stable funding sources for longer-term sustainability (NSFR). These ratios are essential tools in managing liquidity risk.

- 4) Credit Risk Models (Credit Scoring and Default Probability Models): Banks can use credit scoring systems and default probability models to assess the likelihood of borrower defaults. These models help in identifying the creditworthiness of borrowers, setting loan loss provisions, and managing exposure to bad loans. Advanced machine learning models can also be incorporated to predict defaults with greater accuracy.
- 5) Integrated Risk Management Systems: An integrated risk management system that combines liquidity and credit risk analysis can help banks monitor both risks in real-time. This allows for quicker adjustments in lending policies or liquidity management strategies in response to changing market conditions.

Research background

Laki, Zahra (1402)⁹ conducted a research to investigate the role of economic sanctions on the interaction of banking health index and banks' profitability. In this research, the effect of economic sanctions on the relationship between the banking health index and the profitability of banks during the period of 1390 to 1400 has been studied with the panel data regression method. In addition to this effect, some macroeconomic variables such as economic growth, inflation and Liquidity has been investigated on the health of banks and the results showed that sanctions have had a negative and significant effect on the relationship between the banking health index and the profitability of banks, and other macroeconomic variables, except for liquidity, have had a positive and significant effect on the profitability of banks.

Roudpashti et al (1401)¹⁰ deals with the comparative study of banks' credit risk from the perspective of stakeholders through two models based on accounting information and financial stability index and a model based on market information. The

purpose of this article is to evaluate the effectiveness of models that estimate the bank's credit risk either from historical accounting data or based on share price information. The share price is either extracted from market information or estimated based on Gordon's model. In Merton's model, according to the price or estimated value of each share, the value of equity is determined, and by estimating the current value of assets according to the model and comparing it with the value of liabilities, the bank's credit risk is determined. In the logit model, changes in the bank's non-current claims ratio are compared with the mentioned ratio in the industry, and credit risk is considered as a dual variable of zero (low risk) and one (high risk). In the Z score model, changes in the ratio of return on assets and the ratio of equity to total assets and the standard deviation of the return on assets are used, and if the aforementioned ratios are high and the standard deviation of the return on assets is low, the bank has higher financial stability. Using the experiences of other researchers, the independent variables of the research are divided into five groups: leverage ratios, management efficiency, profitability quality, financial health and liquidity. In this research, a sample of banks was selected during the period from the end of 1386 to 1396, and according to the results of the Rock statistic test, all three models of Merton, logit and Z score are above the median (0.5) and are efficient, and their efficiency is respectively It is 48.99%, 38.98% and 68.92%. The result is that the prospective model is more efficient compared to the retrospective models.

Nobakht, Javad (1401)¹¹, did a research on identifying the factors affecting financial stability and strengthening the banking system and providing policy solutions. In this research, the effective components of financial stability and status building of the banking system were identified using a mixed (qualitative-quantitative) method. In the first stage, using the qualitative method, which means obtaining the opinion of academic and banking experts, the effective components are identified and divided into two groups of environmental or external factors such as: macroeconomic conditions, the government and upstream institutions, the central bank, and internal and specific banking factors, including financial health and strengthening resources. Income, administrative health

9 . Laki, Zahra

10 . Roudpashti et al

11 . Nobakht, Javad

and corruption control, intelligentization and innovative management of services and products, distribution and Cronbach's alpha coefficient were calculated and presented. The results of confirmatory factor analysis in two stages showed that each of the components with a larger factor load has a higher impact on the financial stability of the banking system, and in this regard, the component of financial health and strengthening of income sources as an internal factor with the highest factor load is prioritized. It is placed first and has the greatest impact on the financial stability and strengthening of the country's banking system.

Kohi Lilan (1400)¹², in a research to examine the factors affecting the stability of the banking system in selected countries of the MENA region. The method of the current research is descriptive and applied, and the data was analyzed using descriptive and inferential methods, and then the obtained results were analyzed. To identify the impact of credit and liquidity risks on banking stability based on the data of 15 selected member countries of the MENA region in the 13-year period during 2006-2018 using the soft panel transition regression (PSTR) model, which is one of the prominent regime change models. has been used The results of parameter slope estimation showed that the speed of adjustment from one regime to the second regime was equal to 0.194, which indicates the speed of their mild adjustment. In the first regime before the threshold limit, i.e. the linear part of the PSTR model, the variables of credit risk, payment facilities, inflation and crisis and shocks on the countries have a negative and significant effect on the banking system. On the contrary, the variables of loan-to-deposit ratio, liquidity risk, bank size, return on assets, bank efficiency and GDP have a positive and significant effect on the banking system. In the second regime, i.e. the non-linear part of the PSTR model, the variables of facility-to-deposit ratio, bank size, inflation, capital-to-asset ratio, facilities and crises and shocks that hit a country have a negative and significant effect on the banking system. On the contrary, the variables of liquidity risk, credit risk, return on assets, efficiency of banks, gross national product and payment facilities of banks have a positive and significant effect on the banking system.

12 . Kohi Lilan

Smail et al. (2023)¹³, studied the impact of unsystematic financial risk such as liquidity risk, credit risk and operational risk on the financial stability of banks admitted to the Jordanian stock exchange. Understanding and managing these risks is very important to protect investors, maintain financial stability, encourage foreign investment and strengthen the banking sector in Jordan. This research, with a descriptive approach, examined the five-year data from 2016 to 2021 in the form of a panel to establish cause and effect relationships between the study variables, while controlling other related factors that may affect this relationship. The findings of this research show that liquidity risk and operational risk do not have a definite effect on the financial stability of banks, but it is necessary to manage and pay attention to them. It also indicated that credit risk has a negative effect on the financial stability of banks and the importance of credit risk management strategies. It highlights the effectiveness of maintaining a stable financial system. In general, this research shows that unsystematic operational risks can have important consequences for financial institutions and their stability, and it also emphasizes the importance of comprehensive risk management strategies to reduce the negative impact of unsystematic financial risk on the financial stability of banks.

Abdeslam et al. (2022)¹⁴, in a research, investigated the impact of credit risk and liquidity risk on the probability of bank default, taking into account managerial ability during the period from 2006 to 2017. They used data envelopment analysis and a Tobit model to measure banks' efficiency. The results of the research showed that both risks significantly affect the probability of bank default and the high skill of managers does not reduce this effect.

Kasraoui et al. (2022)¹⁵, in a research, investigated the effect of credit risk and liquidity risk on the profit margin of banks during economic fluctuations in the countries of the Middle East and North Africa region. For this purpose, they used the annual balanced data set including 30 conventional banks and 14 Islamic banks from 9 countries during the period of 2004-2020. Their findings show the importance of the two factors of credit risk and liquidity risk in determining

13. Smail et al

14 . Abdeslam et al

15 . Kasraoui et al

the cost of intermediation of banks. The most interesting result is that their effects on bank profit margins are sensitive to economic fluctuations. In particular, both credit risk and liquidity risk factors have a significant effect on the price-cost margin in good economic times. One of the important implications of their findings is that officials and policymakers should pay more attention to liquidity and risks during boom times.

Yahaya et al. (2022)¹⁶, conducted a research titled liquidity risk and bank financial performance. The purpose of this study is to investigate the impact of liquidity risk on the performance of deposit money banks (DMB) in sub-Saharan Africa. This study also tests the interaction effect of liquidity risk and non-performing loans on the performance of DMBs in sub-Saharan Africa. This study uses a generalized two-stage system approach to test the impact of liquidity risk on the performance of DMBs in sub-Saharan Africa. A sample of 50 listed banks was collected in six African countries including Nigeria, Ghana, South Africa, Zambia, Kenya and Tanzania. Bank performance proxies used are return on assets and return on equity, while net profit margin was used to examine robustness. The findings of this study show a significant and negative relationship between liquidity risk and bank performance. Also, the relationship between non-current loans and bank performance is negative and significant. In addition, the mutual effect of liquidity risk and non-performing loans on bank performance is significantly negative for two bank performance indicators.

Mati (2021)¹⁷, in a research, investigated the impact of liquidity risk and bank credit risk on bank stability in Ghana. Data analysis was done using panel regression through fixed effects mode, with Hausman test. This study confirms the inverse relationship between liquidity risk and bank stability and emphasizes the need to direct unused funds to profitable securities to consolidate bank profits. Although the results further indicate that there is an insignificant negative relationship between credit risk and bank stability, it reiterates the need to implement the policy recommendations provided by banks. Banks should tighten credit requirements and also ensure that

loan repayment history is monitored to benefit customers in a favorable (credit-wise) situation.

Al-Hosseini and Jeddah (2021)¹⁸, in a research, investigated the effect of liquidity risk and credit risk on bank performance. For this purpose, information on 18 private commercial banks that were active in the Iraqi Stock Exchange for six years for the period from 2010 to 2020 was collected and analyzed. This paper uses a dynamic panel model using generalized methods (GMM) regression of panel data fixed effects models. The findings showed that liquidity risk has a positive and significant relationship with bank profitability. Meanwhile, credit risk has a negative and significant relationship with bank profitability.

An and Fung (2021)¹⁹, in a study, investigated the effect of credit risk on the financial stability of Vietnamese commercial banks. This article uses the Z score to show the financial stability of banks. They used data from 27 Vietnamese commercial banks in BankScope, during 2010-2019. The results of the analysis show the negative impact of non-performing loans on the financial stability of banks. When commercial banks have more non-performing loans, financial stability is less. In addition, bank-specific variables such as equity ratio, return on equity, bank size, and a set of macroeconomic variables affect bank financial stability.

Divinanda and Sollistivati (2021)²⁰, in a research, investigated the effect of credit risk and liquidity risk on bank stability. For this purpose, the information of 437 observations that were selected using the purposeful sampling method from the list of banking companies in the Stock Exchange and the Financial Services Organization of Indonesia from 2013 to 2017 were collected. The research results showed that both credit risk and liquidity risk have a significant negative effect on banking stability. This is while the control variables, gross domestic product and interest rate do not affect the stability of the bank.

Jibali and Zaghodi (2020)²¹, in a research, investigated the effect of liquidity risk and credit risk on bank stability. This paper studies the relationships between liquidity and credit risk on bank stability for a panel data set of 75 conventional banks belonging to 11 countries in the Middle East and North Africa

16 . Yahaya et al

17 . Mati

18 . Al-Hosseini and Jeddah

19 . An and Fung

20 . Divinanda and Sollistivati

21 . Jibali and Zaghodi

region observed during the period 1999-2017. The estimation results showed that the relationship between bank stability risk-credit risk and bank stability-liquidity risk is non-linear and it is determined by the presence of two optimal thresholds, which are equal to 13.16% for credit risk and 19.03% for liquidity risk. Credit risk and liquidity risk, contrary to their positive effects below this optimal threshold, are harmful for bank stability in the high regime .

Abdulaziz et al. (2020)²² conducted a study titled investigating the relationship between credit risk, liquidity risk and bank profitability in the Middle East and North Africa (MENA) countries. They selected the data related to a sample of conventional banks observed in the period of 2004-2015 and used the regression method in the experimental part. The overall results indicated that the profitability of Middle East banks is negatively and significantly sensitive to the increase in credit risk and/or liquidity. This negative effect was confirmed for both the separate effects or the interaction of these two risks. Also, the findings indicated that the profitability of the bank significantly reduces the level of credit risk and liquidity. Also, other results showed that law and order as an institutional quality increases the profitability of MENA banks and reduces credit risk and liquidity.

Hassan et al. (2019)²³ conducted a research titled liquidity risk, credit risk and stability in Islamic and conventional banks. The purpose of this paper is to provide a comprehensive assessment of the liquidity risk of Islamic banks (IBs) compared to conventional banks (CBs). Using a simultaneous structural equation approach, on a comprehensive dataset of 52 selected banks of the Islamic Cooperation countries for the period of 2007-2015, the results showed that credit risk and liquidity risk have a negative relationship. Other results showed that there is only a negative relationship between liquidity risk and stability. Finally, it was shown that the performance of Islamic banks in risk management is better than conventional banks.

Farhi et al. (2018)²⁴ conducted a research titled credit risk and banking stability: a comparative study between Islamic and conventional banks. The purpose of this article is to evaluate the credit risk of Islamic

and conventional banks and its relationship with capital in 14 countries of the Middle East and North Africa region. For this purpose, a sample consisting of 58 Islamic banks and 89 conventional banks was used in the period from 2014 to 2015. The results showed that the conventional model has a higher credit risk than the Islamic model. These results also showed that the bigger an Islamic bank is, the higher its credit risk will be to approach conventional banks.

Research questions

Anecdotal evidence of bank failures during the global financial crisis further supports these theoretical and empirical results. According to the official reports of FDIC and OCC, the biggest failure of commercial banks during the recent financial crisis is caused by the co-occurrence of liquidity and credit risks. Dearmain (1986)²⁵ found that since liquidity risk is perceived as a cost of profit reduction, loan defaults increase this liquidity risk due to reduced cash flow and consequential cautions. Therefore, according to the literature, liquidity and credit risk are positively correlated. However, during the crisis, banks moved from the risk of withdrawing deposits or even from bank credits to the risk of stagnating other funding sources, especially the interbank market (Borio, 2010; Huang and Ratsofsky, 2011)²⁶. On the other hand, due to information asymmetry in the loan market, banks were exposed to credit risk (Haider et al., 2009)²⁷. Therefore, mutual reinforcement between credit risk and liquidity has been seen due to bank failures. In this context, it seems that liquidity problems, even self-reinforcing between liquidity and credit risks, have played a major role in strengthening bank failure. . Considering these facts, it seems that the effect of interdependence between liquidity and credit risks on the stability of banks should be considered. In addition, some researchers show that liquidity and credit can be regulated jointly. Tirol (2011)²⁸ and Acharya et al. (2011)²⁹ suggest that liquidity should be regulated explicitly. However, when banks are highly dependent on the interbank market, the capital increase requirement can be interpreted as a prudent measure regarding bankruptcy and liquidity risk.

25 . Dearmain

26 . Borio, Huang and Ratsofsky

27 . Haider et al

28 . Tirol

29 . Acharya et al

22. Abdulaziz et al

23 . Hassan et al

24 . Farhi et al

According to the proposed content, the research questions are as follows.

- How much does liquidity risk and credit risk, inflation affect the stability of state and private banks?
- How much does credit risk affect banks' liquidity risk?
- How much does liquidity risk affect banks' credit risk?

Research methodology

This research is considered as an applied research in terms of its objective, because the results can be used in the decisions of managers, investors and analysts. From the point of view, the way of inference regarding research hypotheses is placed in the descriptive-correlational research group, from the point of view of reasoning, it is hypothetical reasoning. Also, since we will reach a conclusion by testing the available data, our research is in the group of proof theories.

The statistical population of this research is the banks admitted to the Tehran Stock Exchange.

The sample used will also be selected through the method of systematic exclusion from the statistical population, so that the sample consists of all the banks in the statistical population that have the following criteria:

- 1) Their financial period should end on 12/29 every year, so that the data can be put together and used in tabular or consolidated formats (according to the default test results).
- 2) The required data for research variables should be available during the period of 1390 to 1401, so that the calculations can be performed without defects as much as possible.

According to the mentioned content, the selected banks included a total of 14 credit institutions and banks, including National Credit, Bank Ekhtaz Novin, Bank Ansar, Bank Parsian, Bank Pasargad, Bank Tejarat, Bank Hekmat Iraniyan, Bank Saman, Bank Sina, Bank Saderat Iran is Qavamin Bank, Entrepreneur Bank, Mellat Bank and Iran Post Bank.

To collect information, the software of Tehran Stock Exchange Organization was used. In order to analyze the data, regression modeling with 2sls simultaneous system approach and Stata econometric software were used.

Research model and variables

The models used to check the correctness of research assumptions are presented below.

First model:

$$\begin{aligned} Stab_{it} = & \beta_0 + \beta_1 CR_{it} + \beta_2 LR_{it} + \beta_3 (LR_{it} \times CR_{it}) \\ & + \beta_4 Eff_{it} + \beta_5 Lev_{it} + \beta_6 MB_{it} \\ & + \beta_7 Size_{it} + \beta_8 Inf_t + \beta_9 GDPGR_t \\ & + \varepsilon_t \end{aligned}$$

Using the fitting of the above model, the effects of liquidity risk, credit risk, inflation and the interactive effects of both risks on banking stability are investigated.

$$\begin{aligned} LR_{it} = & \beta_0 + \beta_1 CR_{it} + \beta_3 Eff_{it} + \beta_4 Lev_{it} + \beta_5 MB_{it} \\ & + \beta_6 Size_{it} + \beta_7 Inf_t + \beta_8 GDPGR_t \\ & + \varepsilon_t \end{aligned}$$

Using the fitting of the above model, the effect of credit risk on liquidity risk is investigated.

$$\begin{aligned} CR_{it} = & \beta_0 + \beta_1 LR_{it} + \beta_3 Eff_{it} + \beta_4 Lev_{it} + \beta_5 MB_{it} \\ & + \beta_6 Size_{it} + \beta_7 Inf_t + \beta_8 GDPGR_t \\ & + \varepsilon_t \end{aligned}$$

Using the fitting of the above model, the effect of liquidity risk on credit risk is investigated.

In the above model, bank stability with *Stab*, liquidity risk with *LR*, credit risk with *CR*, bank efficiency with *Eff*, financial leverage with *Lev*, bank value with *MB*, bank size with *Size*, inflation rate with *Inf*, savings index with *Saving*, Interest rate is represented by *Interest*, economic growth by *GDPGR* and government debt by *GovDebt*.

Data analysis

Descriptive analysis of variables

Descriptive statistics of research variables are presented in Table 1.

To measure bank stability, the total ratio of return on total assets and the ratio of capital to the standard deviation of return on total assets have been used. Bank stability changes between 0.2171 to 5.0542 and has an average of 2.694. The lowest value of this variable is related to Hekmat Iranian Bank and the highest value is related to Credit Bank of Nations.

Table1. Descriptive statistics of the variables

Variable symbol	mean	median	maximum	minimum	standard deviation	skewness	number of observations
STAB	2/6921	2/7209	5/0542	0/2171	0/8751	-0/1341	180
LR	0/0971	0/0492	0/9328	0/0008	0/1454	4/1011	180
CR	0/0083	0/0081	0/0166	0/0001	0/0029	0/0956	180
EFF	0/4157	0/4265	1/6832	0/315	6/4801	-1/4984	180
GDPGR	1/3231	1/3551	12/101	-8/6091	4/7276	0/1910	180
INF	17/5552	15/4594	39/2663	7/5	8/9896	1/0391	180
INTEREST	13/8970	14/0338	16/9421	11/1615	1/7774	0/0624	180
LEV	0/9494	0/945	3/32	0/01	0/2589	5/0942	180
MB	3/069	2/969	9/047	0/0149	0/3114	1/1602	180
SIZE	8/3348	8/3670	9/8785	5/7055	0/6468	-0/6168	180
GOVDEB	18/1790	15/4594	39/2663	8/5697	8/4591	1/1877	180

Liquidity risk is defined as the difference between the sum of cash and short-term investments and the sum of demand and short-term deposits to the bank's total assets. This variable changes between 0.0008 to 0.9328 and has an average of 0.0971. The lowest value of this variable is related to Qavamin Bank and the highest value is related to Saman Bank.

To measure the credit risk, the ratio of outstanding claims to the total paid loan was used. This variable varies between 0.0001 to 0.0166 and has an average of 0.0083. The lowest value of this variable is related to Bank Mellat and the highest value is related to Iran Post Bank.

The ratio of operating cost to income is used to measure efficiency. This variable varies between 0.315 and 1.683 and has an average of 0.949. The lowest value of this variable is related to Bank Parsian and the highest value is related to Bank Sina.

Financial leverage is defined as the ratio of total debt to total bank assets. This variable varies between 0.01 and 3.32 and has an average of 0.949. The lowest value of this variable is related to Hekmat Iranian Bank and the highest value is related to Qavamin Bank.

The value is calculated using the ratio of the total daily value of shares and debt to the total assets of the bank. This variable varies between 0.014 to 9.047 and has an average of 3.069. The lowest value of this variable is related to Hekmat Iranian Bank and the highest value is related to New Economy Bank.

Bank size is defined as the natural logarithm of assets. This variable varies between 5.705 and 9.878 and has an average of 8.334. The lowest value of this variable is related to Mella Credit Bank and the highest value is related to Mellat Bank.

Economic growth is equal to the growth of gross domestic product (GDP) in the year in question in proportion to its value in a base year. The minimum value of this variable is negative, which indicates that in some years the GDP has decreased compared to the previous year.

Reliability of variables

According to the existing literature on unit root tests, a variable can only be included in a model if it does not have a unit root or is stable. Since most economic series have an underlying growth rate, their mean or variance is continuously increasing, which if included in regression models without eliminating such instability will lead to false regression results. There are several methods to test the unit root of panel data, but the Lin-Chow (2002)³⁰ test is used for this study, and the results of this test are given below.

Table 2. Reliability test results

VARIABLES	TEST STATISTICS	MEANINGFULNESS	RESULT
STAB	-2/21003	0/0136	reliability
SIZE	-5/93643	0/0000	reliability
SAVING	-4/22872	0/0000	reliability
MB	-1/69019	0/045	reliability
LR	-15/291	0/0000	reliability
LEV	-9/10608	0/0000	reliability
INTEREST	-8/10256	0/0000	reliability
INF	-9/52493	0/0000	reliability
GOVDEBT	-3/51182	0/0002	reliability
GDPGR	-15/4258	0/0000	reliability
EFF	-13/5194	0/0000	reliability
CR	-12/8599	0/0000	reliability

30 . Lin-Chow

Because the significance level of the test for all the variables in the research is less than 0.05, the null hypothesis of the test that there is a single root in the series is rejected and as a result the data are stable.

Fit the model to the observations

In this section, the fitting of the model to the observations is discussed in order to check the correctness of the research questions. First, in order to choose one of the methods of panel data or mixed

(cross-sectional) data, Limer's F statistic has been used. If the statistical significance is less than 5%; Panel data method and cross-sectional data method will be used otherwise. Considering the appropriateness of the panel model, the Hausman test was used to choose between the fixed and random effects methods. If the significant value is less than 0.05, the model with fixed effect is fitted to the observations, and otherwise, the model is fitted with random effect.

Table 3. Summary of the results of the model type determination test

Model	result
$Stab_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 LR_{it} + \beta_3 (LR_{it} \times CR_{it}) + \beta_4 Eff_{it} + \beta_5 Lev_{it} + \beta_6 MB_{it} + \beta_7 Size_{it} + \beta_8 Inf_t + \beta_9 GDP_{t} + \varepsilon_t$	The fixed effect panel is suitable
$LR_{it} = \beta_0 + \beta_1 CR_{it} + \beta_3 Eff_{it} + \beta_4 Lev_{it} + \beta_5 MB_{it} + \beta_6 Size_{it} + \beta_7 Inf_t + \beta_8 GDP_{t} + \varepsilon_t$	The fixed effect panel is suitable
$CR_{it} = \beta_0 + \beta_1 LR_{it} + \beta_3 Eff_{it} + \beta_4 Lev_{it} + \beta_5 MB_{it} + \beta_6 Size_{it} + \beta_7 Inf_t + \beta_8 GDP_{t} + \varepsilon_t$	The fixed effect panel is suitable

Table 4. Model fitting results

Dependent variable: health and stability of the bank				
Study period: 1390 to 1401				
Model fitting method: random effects by GLS method				
The first model				
$Stab_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 LR_{it} + \beta_3 (LR_{it} \times CR_{it}) + \beta_4 Eff_{it} + \beta_5 Lev_{it} + \beta_6 MB_{it} + \beta_7 Size_{it} + \beta_8 Inf_t + \beta_9 GDP_{t} + \varepsilon_t$				
variable	Coefficient	Standard deviation	t statistic	significant level
Fixed coefficient	0/680098	0/144596	4/703447	0/0000
Credit risk	-0/329485	0/157706	-2/089240	0/0382
Liquidity risk	-0/395628	0/1497934	-2/642210	0/0090
Credit risk * Liquidity risk	-0/758580	0/267444	-2/836407	0/0051
Efficiency	-0/106401	0/076062	-1/398859	0/1637
Financial leverage	-0/047097	0/073646	0/641091	0/5223
Bank value	-0/028778	0/073413	-0/391998	0/6956
Company size	0/005483	0/73361	0/74743	0/9405
Inflation rate	-0/014606	0/073366	-2/713605	0/0072
Economic growth	0/003285	0/074831	1/916732	0/0582
Coefficient of determination: 0/701237				
Watson camera statistics: 2/124816				

Source: research findings

In terms of the overall validity of the model, the significance of the F statistic (=2.12) at the 5% error level shows that there is a relationship between the variables of the model and the dependent variable, and the fitted model is significant. The value of Durbin Watson's statistic (=2.12) around the number 2 also shows that the fitted model has no autocorrelation. Also, the coefficient of determination R2 (=0.70) shows that 70% of the changes in bank stability are

explained by the explanatory variables selected in the model. However, in terms of the estimated coefficients of the model for the independent variables that indicate the individual effects of each on banking stability, it should be stated that, as expected, liquidity risk (LR_{it}) and credit risk (CR_{it}) both have effects They are negative and significant on banking stability. An increase in credit risk means an increase in the probability of default, and due to the limitation it

creates in the bank's interest income, it will challenge the bank in paying interest to depositors, and therefore it will be a threat to the bank's stability. An increase in liquidity risk means lending more than the capacity of available resources (deposit) or not using proper or less cost-bearing deposits, both of which lead to a reduction in the ability to pay interest to depositors, which threatens the stability of the bank.

Meanwhile, the negative and larger coefficient (in absolute terms) of the cross effect of both mentioned risks ($LR_{it} \times CR_{it}$) compared to their individual coefficients indicates that the increase in credit risk aggravates the negative effect of liquidity risk on Bank stability will be effective; There is a similar analysis regarding the role of liquidity risk in intensifying the negative effect of credit risk on banking stability. Obviously, a bank that faces an increase in credit risk (liquidity risk) and as a result, a decrease in the ability to pay interest on deposits, will face a higher problem in responding to depositors in the conditions of expansion of liquidity risk (credit risk). Also, as expected, inflation has had a negative effect on the bank's stability. In general, the effect of inflation rate (Inf_t) on the financial performance of banks is one of the important and complex issues; Because the main concern of investors, shareholders and managers in their plans is to get more returns in the future;

Therefore, the existence of uncertainty leads to inefficiency in the allocation of resources. Inflationary uncertainty, meaning price uncertainty in the future, originates from several factors, which are very difficult to measure because they are unobservable. In empirical studies, the effect of inflation rate and economic growth on variables such as the financial stability of banks is usually considered uncertain. The impact of inflation on When inflation is predicted, the effect of inflation on profitability and ultimately stability should be positive (Perry, 1992), but if it is unexpected, it will have a negative effect on bank stability. Considering the nature of inflation in the country, which is usually unpredictable, inflation should have a negative effect on the stability of the bank due to inefficiency in pooling and allocating resources. Also, economic growth ($GDPR_t$) by creating prosperity in the macroeconomic environment, increases the financial resources available to the bank as well as the demand for facilities from the bank for the purpose of investment; Therefore, the dynamics of the banking system is strengthened and its stability increases. Finally, it should be noted that no significant results were obtained in relation to other explanatory variables of the model.

Table 5. The fitting results of the second model

Dependent variable: liquidity risk				
Study period: 1390 to 1401				
Model fitting method: random effects				
The second model:				
$LR_{it} = \beta_0 + \beta_1 CR_{it} + \beta_2 Eff_{it} + \beta_3 Lev_{it} + \beta_4 MB_{it} + \beta_5 Size_{it} + \beta_6 Inf_t + \beta_7 GDPR_t + \varepsilon_t$				
variable	Coefficient	Standard deviation	t statistic	significant level
Fixed coefficient	0/466026	0/104393	4/464140	0/0000
Credit risk	0/175103	0/080861	2/165487	0/0288
Efficiency	-0/208855	0/081671	-2/557271	0/0058
Financial leverage	0/003181	0/0914977	0/040186	0/9680
Bank value	-0/27395	0/77201	-0/355683	0/7225
Company size	0/045974	0/073604	0/624617	0/5331
Inflation rate	0/174243	0/076537	2/276579	0/0182
Economic growth	-0/142976	0/76708	-1/863894	0/0969
Coefficient of determination: 0/655862				
Watson camera statistics: 2/196257				

Source: research findings

In the above modeling, the effect of credit risk on liquidity was measured. As expected, an increase in credit risk will increase liquidity risk because with an

increase in credit risk, the probability of default and non-current claims of the bank will increase and the bank's ability to fulfill its obligations to depositors will

increase; In this situation, the bank may turn to granting new facilities beyond its capacity so that it can increase its accountability to depositors through interest income, which will result in an increase in the bank's liquidity risk. In relation to other explanatory and effective variables on liquidity risk, it should be stated that only efficiency, inflation and economic growth have a significant effect on liquidity risk. Increasing efficiency in banks by offering banking products including improving profitability and minimizing costs will increase the ability to manage risks in the bank so as to provide the possibility of

reducing risks. An increase in inflation by creating higher instabilities in the macroeconomic environment and the movement of financial resources towards real goods and parallel bank deposit markets, which usually have higher yields, will have a negative effect on the bank's liquidity, as a result, the liquidity risk will increase. Also, the economic growth and the boom in production and the increase in the level of income will reduce the non-current claims of banks and increase the liquidity of banks, which will reduce their liquidity risk.

Table 6. Results of fitting the third model

Dependent variable: credit risk				
Study period: 1390 to 1401				
Model fitting method: random effects				
The third model:				
$LR_{it} = \beta_0 + \beta_1 CR_{it} + \beta_3 Eff_{it} + \beta_4 Lev_{it} + \beta_5 MB_{it} + \beta_6 Size_{it} + \beta_7 Inf_t + \beta_8 GDP_{t} + \epsilon_t$				
variable	Coefficient	Standard deviation	t statistic	significant level
Fixed coefficient	0/516058	0/114195	4/519069	0/0000
Credit risk	0/153498	0/077411	1/982893	0/0551
Efficiency	-0/171223	0/078626	-2/177688	0/0382
Financial leverage	-0/00953	0/076716	-0/129733	0/8969
Bank value	-0/101249	0/075975	-1/332662	0/1844
Company size	0/144716	0/144716	0/144716	0/0364
Inflation rate	0/1622499	0/76554	2/119400	0/0265
Economic growth	-0/051285	0/078769	-0/651080	0/5159
Coefficient of determination: 0/630474				
Watson camera statistics: 1/895366				

Source: research findings

In relation to the above modeling, the effect of liquidity risk on credit was measured. As expected, an increase in liquidity risk will lead to an increase in credit risk, because an increase in liquidity risk means providing facilities beyond the capacity of available resources (deposits) or not using proper or less than the cost-bearing deposits, both of which lead to a reduction in the ability to pay interest to depositors. will be Over-lending is likely to increase default rates and hence credit risk. In the case of using less than the limit of cost-generating deposits, in order to reduce the cost pressure, accelerated measures may be taken in granting facilities (not paying enough attention to validation, etc.), which will increase the probability of default and risk of fraud In relation to other explanatory and effective variables on credit risk, it should be stated that only efficiency, inflation and size have a significant effect on credit risk. Increasing

efficiency in banks by offering banking products including improving profitability and minimizing costs will increase the ability to manage risks in the bank so as to provide the possibility of reducing risks. The increase in inflation by creating higher instabilities in the macroeconomic environment will reduce the purchasing power of the society and the ability to fulfill the obligations of the recipients of the facilities, as a result, the credit risk will increase. Also, the size of the bank with the increase in the volume and space of the bank's activities will increase the probability of the occurrence of various types of risk.

Conclusion

Liquidity risk and credit risk are essential determinants of the stability of both public and private banks. While public banks are often shielded by government support, they still face significant challenges in

managing these risks, especially in politically influenced lending. Private banks, though more market-oriented, remain vulnerable to liquidity shocks and economic downturns. A comprehensive risk management framework incorporating stress testing, capital adequacy models, liquidity ratios, and credit risk assessments is crucial for enhancing the resilience of banks in both sectors.

By adopting these risk management tools, banks can better anticipate potential risks and implement strategies to safeguard their stability, ensuring that they can weather financial shocks while continuing to support economic growth.

Creation of liquidity and delegated supervision are among the main roles of banks, which are expressed by the theory of financial intermediation. Banks create liquidity for customers by providing sufficient financial resources. Also, banks change risk by expanding risk-free deposits to finance high-risk loans while obtaining returns from risk transfer functions. Therefore, the liquidity provision of banks requires banks to maintain a reasonable amount of liquidity to meet their obligations promptly. Banks ensure rapid and continuous liquidity creation by protecting against liquidity deficits by maintaining cash and cash equivalents. Although banks are required to maintain a liquidity buffer to reduce liquidity risk and guarantee against liquidity shocks, But it is argued that maintaining a high level of asset liquidity can increase bank risk, and even regular liquidity risk has been the main cause of bank failure in crisis periods. Liquidity risk through regular and indirect channels can lead to banking instability. On the other hand, due to information asymmetry in the loan market, banks were exposed to credit risk, and mutual reinforcement between credit risk and liquidity has been seen due to bank failures. In this context, it seems that liquidity problems, even the self-reinforcing relationship between liquidity and credit risks, have played a major role in strengthening bank failure. Considering these facts, it seems that the effect of interdependence between liquidity and credit risks on the stability of banks should be considered. Therefore, in the present study, the relationship between liquidity risk, credit risk and bank stability was investigated using the simultaneous regression model. In the following, the results obtained from each question are explained in detail.

First question: How much does liquidity risk and credit risk, inflation affect the stability of state and private banks?

Liquidity risk affects the performance and reputation of a bank, and if credit is not provided on time, the bank may lose the trust of its account holders and the central bank may impose fines on the banks. Therefore, it is necessary for banks to manage their liquidity and prevent possible risks at every stage of their activity. Liquidity risk has recently been a serious challenge for banks, and their fierce competition in attracting customer deposits through the wide offering of innovative products and services in the field of electronic services has led. In this regard, banks have changed their financial structure and priorities for managing the risks they face. Also, the literature on bank stability pointed out; Liquidity, by affecting systemic risk, has a direct relationship with banking stability. For example, the ability of banks to trade assets with each other can lead to risk contagion because it creates information contagion and facilitates mutual credit. Interbank diversification can also increase systemic risk by making banks less risk-averse and thus encouraging banks to maintain less liquidity. Banks' ability to sell assets may also lead to risk shifting between more fragile sectors (banking sector) and less fragile sectors, thus changing the overall fragility of the financial system. Increased asset liquidity can also have unusual stability implications by increasing the market orientation of the financial system. According to this article, in this study, we investigated the effect of liquidity risk on banking stability, and the results indicated that there is no direct relationship between liquidity risk and banking stability index.

As expected, inflation has had a negative effect on the stability of the bank. In general, the effect of the inflation rate on the financial performance of banks is one of the important and complex issues; Because the main concern of investors, shareholders and managers in their plans is to get more returns in the future; Therefore, the existence of uncertainty leads to inefficiency in the allocation of resources. Inflationary uncertainty, meaning price uncertainty in the future, originates from several factors, which are very difficult to measure because they are unobservable. In empirical studies, the effect of inflation rate and economic growth on variables such as the financial stability of banks is usually considered uncertain. The

impact of inflation on the bank depends on whether it is anticipated or unexpected. When inflation is expected, the effect of inflation on profitability and ultimately stability should be positive (Perry, 1992)³¹, but if it is unexpected, it will have a negative effect on bank stability. Considering the nature of inflation in the country, which is usually unpredictable, inflation should have a negative effect on the stability of the bank due to inefficiency in pooling and allocating resources.

Hassan et al. (2018)³² in a research entitled "Credit risk, credit risk and sustainability in Islamic and conventional banks" comprehensively evaluates the liquidity risk of Islamic banks compared to conventional banks, which shows the negative relationship between liquidity risk and credit risk in management. liquidity and credit risk, they showed that Islamic banks perform better than conventional banks in managing liquidity and credit risk. The purpose of this article was to provide a complete assessment of the liquidity risk of Islamic banks compared to conventional banks. They first examined the relationship between liquidity and credit risk. Using the simultaneous structural equation approach, on the comprehensive data set of 52 ibs and cbs, from the selected organization of member countries of the Organization of Islamic Cooperation in the time period of 2007-2015, they found that there is a negative relationship between credit risk and liquidity risk. Then they examined the relationship between liquidity risk and stability and found a negative relationship only for ibs. The results of the present research are different from their research in terms of the relationship between liquidity risk and credit risk. It is also consistent with their research in terms of the relationship between liquidity risk and credit risk with bank stability.

Second question: How much does credit risk affect banks' liquidity risk?

An increase in credit risk will increase liquidity risk because with an increase in credit risk, the probability of default and non-current claims of the bank will increase and the ability of the bank to fulfill its obligations to depositors will increase; In this situation, the bank may turn to granting new facilities

beyond its capacity so that it can increase its accountability to depositors through interest income, which will result in an increase in the bank's liquidity risk.

Ali et al. (2015)³³ investigated the relationship between credit risk and liquidity and its effect on liquidity capital risk of 19 Malaysian banks during the period of 2002-2011 using dynamic panel data model (GMM) and concluded that there is a relationship between credit risk and liquidity. There is a positive relationship and the relationship between these two with the liquidity risk of banks is non-linear and U-shaped. That is, it first decreases and then increases. The results of the present research are consistent with their research in terms of the significant relationship between liquidity risk and credit risk.

Third question: How much does liquidity risk affect banks' credit risk?

The theory of financial intermediation implicitly states that there is a relationship between liquidity and credit risk, and the growing literature, especially after the financial crisis, emphasizes the positive relationship between these two risks. Therefore, in this study, the mutual relationship between credit risk and liquidity risk was tested. The results showed that in examining the effect of liquidity risk on credit risk, the value of the regression coefficient is equal to 0.016 and the significance value of the test is equal to 0.041, which indicates a positive and significant effect of liquidity risk on credit risk. In examining the effect of liquidity risk on credit risk, the regression coefficient value is 1.64 and the significance value of the test is 0.041, so it can be said that an increase in liquidity risk leads to an increase in credit risk. Therefore, it can be said that when banks face a liquidity crisis, to cover their liquidity crisis, they enter into contracts with customers who may impose a high risk on the bank in the continuation of the contract and fail to fulfill their obligations. And this leads to an increase in the bank's credit risk. On the other hand, when the banks have customers who do not fulfill their obligations on time and the outstanding claims of the bank increase, in this case the banks will face a liquidity crisis. Therefore, the considered hypothesis is accepted.

31. Perry

32 . Hassan et al

33 . Ali et al

Imbirovich and Rauch (2014)³⁴ investigated the relationship between liquidity and credit risk in American banks for the period of 1998 to 2010. They found a very weak and positive relationship between liquidity and credit risk using specific bank criteria, and the results of the present study are consistent with them. Karenta et al. (2011)³⁵ argue that there is a mutual relationship between credit risk and liquidity risk, and the results of the present study are consistent with them. Erickson and Renault (2005)³⁶ investigated the relationship between credit risk and liquidity risk by using the structured bond valuation model and concluded that liquidity risk causes the financial market to deviate and also bond yields can increase liquidity risk. That is, there is a two-way relationship between credit risk and bond yield. The results of the present research are consistent with their research in terms of the significant relationship between liquidity risk and credit risk. Donbar (2008)³⁷ has analyzed the effect of monetary policies and liquidity risk on credit risk using the VAR model during the period of 2007-2007 for the United States and concludes that there is a positive relationship between credit risk and monetary policies, but between risk there is a negative relationship between credit and liquidity. When expansionary monetary policy is applied, this policy increases liquidity and liquidity reduces credit risk. The results of the present study contradict their research in terms of the relationship between liquidity risk and credit risk. Al-Sharif (2016)³⁸ by studying the relationship between liquidity and credit risk in 20 Bank Mellat branches in Kermanshah province using two parametric and non-parametric mathematical optimization models during the period of 1991-1992, he comes to the conclusion that between credit risk and liquidity risk there is no significant relationship in Bank Mellat branches of Kermanshah province. The results of the present study contradict their research in terms of the existence of a relationship between liquidity risk and credit risk.

Suggestions

Considering the mutual relationship between liquidity risk and credit risk, it is suggested:

- 1) In order to reduce credit risk, banks use credit rating techniques of bank customers such as RFM, LRFM or LRFMD, which separate customers into separate risk classes, and banks can separate profitable from unprofitable customers. and banks to bear less risk.
- 2) Banks should use electronic systems to regularly notify customers of overdue claims to prevent the accumulation of claims, and if borrowers do not pay attention to the judicial authorities, they should follow up to collect the claims.
- 3) The government should provide financial and judicial support to the lending banks to collect their claims.
- 4) Banks can insure their credit risk by using loan insurance contracts and reduce the imposed credit risk.
- 5) Banks should pay close attention to the financial statements of customers when granting facilities and ensure reasonable assurance of timely return of capital and proportionality of the customer's income with the amount of the facility.
- 6) Banks should strengthen their expert staff or allow the use of the services of financial and investment consulting companies.
- 7) Banks should obtain the necessary information to identify and validate customers before granting them credit in order to ensure debt collection on maturity.
- 8) Banks should prevent rent and closely monitor lenders' requests when providing facilities to them.

Resources

- Asadi, Venus; Yavari, Kazem; Heydari, Hassan. (2019). Investigating the effects of liquidity and credit risk on banking stability in Iran using the Z-score index. *Economic Policy*, Volume 12, Number 23, pp. 1-31.
- Ahmadian, Azam; Kianvand, Mehran. (2014). Analysis of the central bank's role in reducing the probability of liquidity risk in the country's banking network. *Economic Research Journal*, Volume 15, Number 59, pp. 57-93.
- Ahmadi, Mohammad Ramadan; Haysanzadeh, Mohammad Hossein; Rad, Seyed Hossein; Seyed Mohammad Nejad Hosseini (2013).

³⁴ . Imbirovich and Rauch

³⁵ . Karenta et al

³⁶ . Erickson and Renault

³⁷ . Donbar

³⁸ . Al-Sharif

- The relationship between asset growth and liquidity with returns in the developed model of Fama and French. Islamic Azad University, Fereydoun branch. Accounting Department, Isfahan, Iran.
- Main, Sholeh, (2016) "Credit risk management with the model of payment of facilities in other countries". Tehran: Department of Research and Risk Control of Sepeh Bank of Iran. pp.: 1-34.
- Grand Asl, Musa; Barzideh, Farrokh; Samadi, Mohammad Taghi. (2017). Investigating the simultaneous relationship between liquidity and credit risks and investigating their impact on the financial stability of banks; Quantile regression approach. *Investment Knowledge*, Volume 7, Number 25, pp. 299-316.
- Grand Asl, Musa; Barzideh, Farrokh and Mohammad Taghi Samadi (2016). "Investigating the relationship between liquidity risk and credit risk and its effect on financial instability in Iran's banking industry". *Quarterly journal of monetary-banking researches*. Volume 10. Number 33. pp. 531-509.
- Beqaei Hosseinabadi, Ali. (1380). Risk, theoretical foundations, applications and the necessity of understanding it, *Tehran, Management Development Magazine*, November 2018, No. 31, P. 44.
- Leki, Zahra; Bagheri Parmehar, Sholeh. (1402). Investigating the role of economic sanctions on the interaction of the banking health index and banks' profitability, *Quarterly Journal of Studies in Banking Management and Islamic Banking*, No. 22, pp. 101-124.
- Rahnamai Roud Pushti Fereydoun, Amini Mohammadreza, Shamsi Hasan, Rezaei Masoumeh (2018) Designing a composite risk index in banks - multi-layer data coverage analysis approach (case study: member banks of the stock exchange), *Journal of Research in Operations and Its Applications* p. pp. 113-97
- Nobakht, Javad; Ahmadi, Seyyed Mohammad Mehdi; Gholami, Elham. (1401). Identifying the factors affecting financial stability and strengthening the banking system of Iran and providing policy solutions, *Quarterly Journal of Studies in Banking Management and Islamic Banking*, No. 21, pp. 13-36.
- Kohi Lilan, Babak; Dabbagh, Rahim; Kialahosseini, Seyyed Ziauddin; Leader, Farhad. (1400). Investigating factors affecting the stability of the banking system in selected countries of the MENA region. *Development and Capital*, Volume 6, Number 1, pp. 1-18.
- Abdesslem, R. B., Chkir, I., & Dabbou, H. (2022). Is managerial ability a moderator? The effect of credit risk and liquidity risk on the likelihood of bank default. *International Review of Financial Analysis*, 102044.
- Kesraoui, A., Lachaab, M., & Omri, A. (2022). The impact of credit risk and liquidity risk on bank margins during economic fluctuations: evidence from MENA countries with a dual banking system. *Applied Economics*, 1-18.
- Yahaya, A., Mahat, F., Yahya, M. H., & Matemilola, B. T. (2022). Liquidity risk and bank financial performance: an application of system GMM approach. *Journal of Financial Regulation and Compliance*
- Matey, J. (2021). Bank Liquidity Risk and Bank Credit Risk: Implication on Bank Stability in Ghana. Available at SSRN 3864105
- Al-Husainy, N. H. M., & Jadah, H. M. (2021). The Effect of Liquidity Risk and Credit Risk on the Bank Performance: Empirical Evidence from Iraq. *iRASD Journal of Economics*, 3(1), 58-67.
- Anh, N. Q., & Phuong, D. N. T. (2021). The impact of credit risk on the financial stability of commercial banks in Vietnam. *HO CHI MINH CITY OPEN UNIVERSITY JOURNAL OF SCIENCE-ECONOMICS AND BUSINESS ADMINISTRATION*, 11(2), 67-80.
- Deleidi, M. (2020). Post-Keynesian endogenous money theory: Horizontalists, structuralists and the paradox of illiquidity. *Metroeconomica*, 71(1), 156-175.
- Ji, X., Zhang, Y., Mirza, N., Umar, M., & Rizvi, S. K. A. (2021). The impact of carbon neutrality on the investment performance: Evidence from the equity mutual funds in BRICS. *Journal of Environmental Management*, 297, 113228.
- Abdelaziz, H., Rim, B., & Helmi, H. (2020). The interactional relationships between credit risk, liquidity risk and bank profitability in MENA region. *Global Business Review*, 0972150919879304

- Hassan, M. K., Khan, A., & Paltrinieri, A. (2019). Liquidity risk, credit risk and stability in Islamic and conventional banks. *Research in International Business and Finance*, 48, 17-31.
- Ismail, S., & Ahmed. (2022, March). The impact of liquidity risk, credit risk, and operational risk on financial stability in conventional banks in Jordan. Available at *GrowingScience*, 433-442
- Ferhi, A. (2018). Credit risk and banking stability: A comparative study between Islamic and conventional banks. *International Journal of Law and Management*