# The Influencing Factors of Liquidity Risk in Commercial Banks: A Case Study of the Bankruptcy of Silicon Valley Bank

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**Abstract.** Bank liquidity risk is the core issue of financial system stability, and its essence comes from the term conversion mechanism of commercial banks supporting long-term assets with short-term liabilities. The bankruptcy of Silicon Valley Bank (SVB) in 2023 reflects the rapid evolution of liquidity risk in the context of interest rate hike cycle and digital finance, and provides an important case for identifying the key factors affecting bank liquidity risk. This paper systematically analyzes the causes, measurement methods, and influencing factors of SVB liquidity risk. In terms of methodology, the liquidity mismatch index (LMI) framework is introduced, and combined with multiple regression analysis, empirical tests are carried out from the dimensions of interest rate level, uninsured deposit structure, asset liability maturity mismatch and capital adequacy ratio. The study found that the interest rate shock caused by the Fed's interest rate hike is the core external cause of risk outbreak, the maturity mismatch of assets and liabilities is the endogenous basis of risk accumulation, and the high proportion of uninsured deposits significantly amplifies the risk of runs. The discussion further pointed out that the existing studies had shortcomings in dynamic thresholds, risk contagion and regulatory response. In the future, digital run mechanism and social media public opinion indicators need to be included. The research shows that the traditional liquidity risk theory is not suitable for the digital and highly synchronous financial environment, and needs to change to the dynamic risk analysis framework.

**Keywords:** Silicon Valley Bank; Liquidity risk; Maturity mismatch; Factors; Digital run

## 1 Introduction

Bank liquidity risk is the core issue of the stable operation of the modern financial system, and its essence stems from the term conversion mechanism of commercial banks supporting long-term assets with short-term liabilities. In a normal environment, this mechanism helps to improve the efficiency of capital allocation; However, when interest rates rise rapidly or market confidence wavers, the vulnerability of bank asset liability structure will be rapidly magnified. When a large number of deposits flow out

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of the country, banks may face serious liquidity pressure in a short period of time, and even trigger the risk of runs. Therefore, identifying the key factors affecting bank liquidity risk is of great significance for understanding bank stability and preventing systemic financial risks.

Subsequent paragraphs, however, are indented. Studies have systematically analyzed the factors affecting liquidity risk from the micro and macro levels. Antony pointed out that internal characteristics such as capital adequacy ratio, bank size and leverage level significantly affect bank liquidity risk, among which higher capital level can effectively reduce liquidity vulnerability [1]. Kasana team further found that liquidity risk is not only affected by internal factors of banks, but also by macroeconomic environments such as interest rate level, GDP growth and deposit structure [2]. Jiang team took the Silicon Valley banking crisis as an example, revealing that the interaction between the impact of interest rate hikes and the structure of uninsured deposits will significantly increase the probability of rapid bank runs [3]. The above research shows that bank liquidity risk is the result of the joint action of internal structure and external environment.

Based on this, this paper introduces the liquidity mismatch index (LMI) framework and combines the multiple regression model to systematically analyze the factors affecting bank liquidity risk from the dimensions of interest rate level, capital adequacy ratio and deposit structure, to reveal the formation mechanism and transmission path of liquidity risk under the background of monetary policy tightening.

## 2 Theoretical Basis and Statistical Methods

### 2.1 Theoretical Basis

Commercial banks realize term conversion by absorbing short-term deposits and allocating long-term assets, which not only creates liquidity, but also makes banks naturally face liquidity risks. Basel III proposes regulatory indicators such as liquidity coverage (LCR) and net stable financing ratio (NSFR) to measure bank liquidity.

Douglas pointed out that banks create liquidity through term conversion, but also have natural liquidity vulnerability [4]. When depositors are worried about the solvency of banks, centralized withdrawals may occur and trigger the risk of runs. The SVB crisis is reflecting the concentrated exposure of bank liquidity vulnerability in the context of interest rate hikes.

SVB crisis is essentially a liquidity crisis caused by asset liability maturity mismatch. Banks support long-term asset allocation with short-term liabilities. Under the background of the Federal Reserve's continuous interest rate hike, the value of long-term fixed income securities has declined significantly, resulting in floating losses in a large number of long-term securities assets held by banks. When the bank's unrealized losses continue to expand, depositors worry about the bank's solvency, which leads to the outflow of deposits, and banks are forced to sell long-term securities assets, thus further expanding losses and exacerbating liquidity risk.

Markus proposes that the core of bank liquidity risk lies in the liquidity mismatch between assets and liabilities [5]. Bai team further applied the LMI model to the study

of liquidity risk in the banking industry, emphasizing the important impact of asset liability structure on liquidity risk [6].

The evolution path of SVB liquidity risk can be summarized as follows: Interest rate hike → decline in the value of long-term fixed income securities → expansion of banks' unrealized losses → depositors' concerns → deposit outflow → liquidity deterioration → outbreak of run on risk.

In addition, the SVB crisis also reflects obvious digital run risk characteristics. The spread of social media, the concentration of uninsured deposits and the convenience of online transfer have accelerated the spread of risk information and the outflow of deposits, which eventually led to a liquidity crisis for banks in a short period of time.

Douglas believes that the risk of runs is essentially a self fulfilling crisis driven by depositors' expectations. When depositors expect that banks may have liquidity problems, centralized withdrawal behavior will further aggravate bank liquidity pressures [4]. Cookson's research on digital bank runs further points out that social media communication and online payment tools improve the spread of risk information, making modern bank runs show faster and stronger risk contagion characteristics [7].

## 2.2 Statistical Methods

Traditional liquidity indicators such as deposit loan ratio and liquidity coverage ratio (LCR) can reflect the short-term liquidity situation of banks, but it is difficult to dynamically measure the risk of maturity mismatch. The LMI (liquidity mismatch index) model can dynamically measure the degree of maturity mismatch by weighted matching bank assets and liabilities according to liquidity strength, so as to assess the level of liquidity risk more comprehensively.

$$LMI = \sum \lambda_a A_a - \sum \lambda_l L_l \tag{1}$$

Among them, $A_a$ represents the asset item, $L_l$ represents the liability item, and $\lambda_a$ and $\lambda_l$ represent the asset liquidity weight and liability stability weight respectively. Weights typically range from 0 to 1. For assets, a higher weight means that the liquidity of assets is strong; For liabilities, a higher weight means that the stability of liabilities is weak and the risk of capital loss is high. By measuring the liquidity gap between assets and liabilities, LMI measures the risk of bank maturity mismatch, which is more suitable for analyzing the liquidity risk under the background of high proportion of SVB long-term securities assets.

Bank liquidity risk is usually affected by macroeconomic environment, asset structure, liability structure and other factors. Multiple regression analysis provides a quantitative basis for identifying the impact of various factors. Gujarati provides a theoretical basis for multiple regression analysis [8]. Aslı Demirgüç-Kunt team pointed out that factors such as interest rate level, asset structure and deposit stability may have an important impact on the banking crisis [9].

Combined with the research on liquidity risk of existing banks and considering the characteristics of SVB asset liability structure and deposit structure, variables such as federal funds rate, the proportion of uninsured deposits and the proportion of long-term

securities can be selected to analyze the factors affecting liquidity risk. Among them, LMI model is used to measure the level of bank liquidity risk, and multiple regression model is used to identify key factors. The combination of the two helps to systematically analyze the formation mechanism and risk transmission process of bank liquidity risk.

# 3 Case Study

In order to deeply understand the formation mechanism and influencing factors of liquidity risk of Silicon Valley Bank (SVB), this section selects three representative studies for analysis. The three literature studies from different perspectives such as single bank time series, industry panel data and single case mechanism identification, which complement each other in research methods and analysis, and provide a more complete theoretical and empirical basis for explaining the SVB crisis.

## 3.1 Single Case Time Series Analysis Based on LMI Model

In order to analyze the formation mechanism and key factors of liquidity risk of Silicon Valley Bank (SVB), ye Yiyun conducted a single case time series analysis based on LMI model [10]. The study uses the progressive analysis framework of "traditional liquidity index LMI index multiple regression". First, the deposit loan ratio and liquidity ratio of SVB from 2013 to 2022 are calculated and compared with the five major banks in the United States; Subsequently, the standardized liquidity mismatch index (LMI) is constructed according to the method of Brunnermeier and Bai, and the liquidity weights are set for each item of the balance sheet [5,6,10].

In terms of theoretical basis, this study is based on liquidity risk management theory, term mismatch theory and LMI model, focusing on the impact of changes in SVB asset liability structure on liquidity risk [10]. Finally, taking the standardized LMI as the dependent variable, macro variables (CPI, effective federal funds rate R, M2) and micro variables (total asset size AAS, asset liability ratio Dar, total asset return ROA, primary capital ratio T1AR) are selected to establish a multiple linear regression model, and the robustness test is carried out [10].

The results show that the effective federal funds rate (R) is significantly negatively correlated with the LMI at the 1% level (coefficient - 1.72) [10]. As the LMI is a reverse indicator (the larger the value, the lower the liquidity risk), raising interest rates will significantly increase the liquidity risk of SVB [10]. Total asset size (AAS) is significantly positively correlated with LMI at the 1% level (coefficient 2.15) [10]. Asset liability ratio (DAR) is significantly negatively correlated with LMI at 5% level (coefficient - 0.78) [10]. CPI, M2, ROA and T1AR all failed the significance test, indicating that inflation and money supply are not direct factors, while the Fed's interest rate hike policy is the key risk transmission channel [10]. This study dynamically depicts the evolution process of SVB term mismatch risk through LMI, and verifies the core role of interest rate shocks in the formation of liquidity risk [10].

### 3.2 Multibank Panel Data and Heterogeneity Analysis

In order to analyze the impact mechanism of asset liability maturity mismatch liquidity risk of U.S. commercial banks and explore the special vulnerability of Silicon Valley Bank (SVB) under this framework, Liu Zhejiang constructed a comprehensive research framework of "theoretical mechanism panel regression case verification" [11]. At the theoretical level, this study combines diamond Dybvig bank run theory, term matching theory, information asymmetry theory and asset liability management theory to analyze the mechanism of term mismatch affecting liquidity risk through interest rate changes, depositor behavior, market confidence and interbank contagion [4,11]. At the empirical level, panel data from 24 U.S. commercial banks from 2013 to 2022 are selected, with liquidity coverage ratio (LCR) as the dependent variable and liquidity mismatch index (LMI) as the core explanatory variable to control GDP growth, federal benchmark interest rate, bad loan rate, capital adequacy ratio, return on assets, asset size, interest rate sensitivity gap, deposit growth rate and stock price growth rate[11]. Fixed effect model is used for regression analysis [11]. At the same time, the heterogeneity was grouped by bank size, and SVB was analyzed separately [11].

The results show that there is a significant negative correlation between LMI and LCR (the coefficient is - 0.327, which is significant at the 1% level), indicating that the higher the maturity mismatch of assets and liabilities of commercial banks, the greater the liquidity risk, and this relationship is valid in the whole industry [11]. Deposit growth rate (DGR) and capital adequacy ratio (car) are significantly positively correlated with LCR (the coefficient is 0.882 and 1.536, respectively, which are significant at the 1% level), indicating that stable core deposits and sufficient capital buffers can effectively alleviate liquidity pressures [11]. The stock price growth rate (SPG) is significantly positively correlated with LCR at the 10% level (coefficient is 0.185), indicating that the decline in market confidence will induce depositor panic and run risk [11]. Interest rate sensitivity gap (IRSG) is significantly negatively correlated with LCR (coefficient - 0.793, significant at 5% level), indicating that interest rate risk will aggravate liquidity problems [11]. Asset size (lnta) is significantly negatively correlated with LCR (coefficient - 0.062, significant at 1% level), indicating that larger banks may face more complex liquidity management challenges [11].

In the analysis of heterogeneity, the absolute value of the negative impact coefficient of SVB's LMI on LCR reached 0.562 (significant at 1% level), which was significantly higher than 0.428 for large banks and 0.357 for medium-sized banks, indicating that the term mismatch problem of SVB has obvious extremes in the U.S. banking industry [11]. The federal benchmark interest rate is not significant in the full sample panel regression, which shows that there are great differences in the sensitivity of different banks to interest rate shocks, and SVB belongs to the type of banks with high interest rate sensitivity [11]. The study uses industry panel data to verify the general relationship between maturity mismatch and liquidity risk, and reveals the special vulnerability of SVB in the U.S. banking system through heterogeneity analysis [11].

### 3.3 A Single Case Study from the Perspective of Interest Rate Shocks and Deposit Structure

To analyze the reasons for the rapid collapse of Silicon Valley Bank (SVB) from "Star Bank", Vo and Le used a single case study framework of "descriptive comparison correlation analysis multiple regression"[12]. Firstly, this study compares the financial indicators of SVB from 2019 to 2022 with the average level of Bank of California and national banks, and finds that SVB is significantly higher than the industry average in terms of the proportion of long-term securities investment, asset duration and deposit concentration [12]. Secondly, the correlation coefficient between federal funds rate, GDP, CPI and SVB unrealized loss indicators is calculated [12]. Finally, a regression model with unrealized losses (unlat, unlc, unlatp, unlcp) as dependent variables and the federal funds rate as the core explanatory variable is constructed to control bank characteristic variables such as bank size, loan ratio, cash ratio, securities ratio and deposit ratio, as well as macro variables such as GDP and CPI [12]. In particular, two key variables, the proportion of insured deposits and the amount of centralized deposit withdrawal, are added [12]. In terms of theoretical basis, this study is based on interest rate risk management theory, diamond Dybvig bank run theory and corporate governance theory, focusing on the impact mechanism of interest rate shocks and deposit structure on SVB crisis [4,12].

The regression results show that there is a significant positive correlation between the federal funds rate and unlat at the 1% level (the coefficient is 1.345), indicating that for every 1 percentage point increase in interest rates, the proportion of unrealized losses of SVB in total assets increases by 1.345 percentage points, and the interest rate increase is the direct cause of huge book losses[12]. The proportion of insured deposits is significantly negatively correlated with unlat at the 1% level (coefficient - 0.523), indicating that the lower the proportion of insured deposits, the easier it is for banks to be forced to convert Book floating losses into actual losses due to centralized withdrawals by depositors [12]. There is a significant positive correlation between centralized deposit withdrawal and unlat at the 1% level (coefficient is 0.129), indicating that the coordinated withdrawal of large amounts of funds not subject to depositors will directly force banks to sell assets at a low price and turn floating losses into real losses [12]. There is a significant negative correlation between GDP growth and unlat at 10% (coefficient - 0.029), indicating that the economic downturn will exacerbate bank losses [12].

Traditional indicators such as bank size, cash ratio and securities ratio do not show significant significance in the model, indicating that in SVB cases, interest rate shocks and deposit structure can better explain the risk outbreak mechanism than traditional liquidity indicators [12]. This study accurately reveals the transmission relationship between interest rate shocks, uninsured deposit structure and run risk, and provides direct evidence for understanding the digital run mechanism in the SVB crisis [12].

### 3.4 Comprehensive comparison of three studies

The three papers are obviously complementary in research level and analysis method. Ye Yiyun focuses on the dynamic measurement of liquidity risk under the single bank time series [10]. Liu Zhejiang used industry panel data to verify the general relationship between maturity mismatch and liquidity risk [11]. Vo&Le (2023) further identifies the specific transmission mechanism of SVB crisis from the perspective of interest rate shocks and deposit structure [12].

Based on the research results of three papers, the formation of SVB liquidity crisis is mainly affected by the term mismatch of internal assets and liabilities and the rapid rise of external interest rates [10-12]. Term mismatch is an endogenous factor for the continuous accumulation of risk; Interest rate hikes further exacerbate bank liquidity pressures by depressing the price of long-term fixed income securities and expanding unrealized losses [10-12]. At the same time, the high proportion of uninsured deposits and the high concentration of deposits significantly magnify the risk of runs, which makes the liquidity crisis deteriorate rapidly in a short period of time [12]. In addition, the insufficient capital buffer capacity and the failure of interest rate risk management have further weakened the ability of banks to withstand liquidity shocks [12]. There is an obvious interactive amplification effect between the above factors, which jointly promotes the outbreak and spread of SVB liquidity crisis [10-12]. These studies not only reveal the formation logic of SVB crisis, but also provide an important reference for bank liquidity risk supervision and asset liability management [10-12].

## 4 Discussion

### 4.1 Discussion on Risk Formation Mechanism

This section reviews the limitations of existing studies and points out future directions. Jiang pointed out that when banks have a high proportion of unrealized losses and uninsured deposits at the same time, their vulnerability to runs increases significantly [3]. Although Ye Yiyun and Liu Zhejiang use the LMI model, the weight is based on historical data and fails to reflect the asset discount under the sudden change of interest rate in real time [10,11]. The sample period of Vo and&Le ends at the end of 2022 and does not cover the critical moment of the run [12]. In the future, it should develop dynamic monitoring indicators of interest rate sensitivity and pay attention to the interaction between unrealized losses and uninsured deposits.

### 4.2 Discussion on Risk Contagion Mechanism

This section focuses on the Risk Spillover path and transmission mode of SVB crisis to other banks. Choi team found that the SVB crisis spread through "signature based signaling": investors screened similar banks according to balance sheet characteristics and sold them collectively [13]. This shows that the modern banking crisis has evolved from offline runs to a digital and networked risk communication mode. Existing studies

focus on SVB itself and do not analyze risk spillover. In the future, it should build a bank feature similarity network and introduce social media public opinion as a leading indicator.

### 4.3 Inadequate Supervision and Improvement

This section combs the regulatory defects exposed by the crisis and corresponding improvement suggestions. BCBS (2023) pointed out three defects: insufficient supervision of interest rate risk, vacuum of supervision of medium-sized banks, and lack of digital run response mechanism. The 2018 US regulatory reform raised the regulatory threshold for systemically important banks, freeing SVB from more stringent liquidity stress tests. Recommendations include resuming stress testing for midsize banks, including unrealized losses in capital adjustments, and establishing a market sentiment monitoring mechanism based on the spread of social media information.

## 5 Conclusion

Based on three studies, this paper analyzes the causes of liquidity risk of Silicon Valley banks. Case analysis shows that asset liability maturity mismatch is the endogenous basis of risk accumulation; The Fed's interest rate hike is the core external cause of the risk outbreak; The high proportion of uninsured deposits significantly amplifies the risk of runs. The LMI model can dynamically measure term mismatch, and multiple regression identifies key variables such as the federal funds rate, deposit structure and capital adequacy ratio. The discussion pointed out that the existing studies had shortcomings in dynamic thresholds, risk contagion and regulatory response. The Silicon Valley banking crisis shows that the traditional liquidity risk theory is no longer suitable for the digital financial environment.

This paper is a literature review without empirical test of first-hand data. The sample period of the three core documents all ended at the end of 2022, which failed to cover the long-term effect of post crisis regulatory adjustment. The case study focuses only on one Silicon Valley Bank, and the conclusion should be cautious in promoting to other small and medium-sized banks. The discussion part pointed out that the existing studies did not include digital variables such as social media public opinion. Future studies should extend the sample period to test the effect of regulatory reform, build a digital run behavior model and incorporate public opinion indicators, and carry out multi case comparative analysis to enhance the external effectiveness of the conclusions.

The theoretical contribution is to combine the traditional liquidity risk theory with the characteristics of the digital financial environment, and to put forward a comprehensive analysis framework integrating interest rate shocks, deposit structure and risk contagion. At the practical level, it can provide academic reference for regulators to optimize liquidity stress testing and improve the deposit insurance system,

and help to enhance the ability of small and medium-sized banks to cope with digital runs.

## References


1. Antony, T.M.: Determinants of liquidity risk: Empirical evidence from Indian commercial banks. Banks and Bank Systems 18(3), 101 (2023)
2. Kasana, E., Chauhan, K., Sahoo, B.P.: Investigation of Bank Liquidity of Macroeconomic and Bank-Specific Determinants–A Panel Data Approach. The Economics and Finance Letters 9(2), 221–234 (2022)
3. Jiang, E.X., Matvos, G., Piskorski, T., Seru, A.: Monetary tightening and US bank fragility in 2023: Mark-to-market losses and uninsured depositor runs? Journal of Financial Economics 159, 103899 (2024)
4. Diamond, D.W., Dybvig, P.H.: Bank runs, deposit insurance, and liquidity. Journal of Political Economy 91(3), 401–419 (1983)
5. Brunnermeier, M., Gorton, G., Krishnamurthy, A.: Liquidity mismatch measurement. In: Risk Topography: Systemic Risk and Macro Modeling, pp. 99–112. University of Chicago Press, Chicago (2013)
6. Bai, J., Krishnamurthy, A., Weymuller, C.H.: Measuring liquidity mismatch in the banking sector. The Journal of Finance 73(1), 51–93 (2018)
7. Cookson, J.A., Fox, C., Gil-Bazo, J., Imbet, J.F., Schiller, C.: Social media as a bank run catalyst. Journal of Financial Economics 176, 104218 (2026)
8. Gujarati, D.N.: Basic Econometrics. McGraw-Hill, New York (2004)
9. Demirgüç-Kunt, A., Detragiache, E.: The determinants of banking crises in developing and developed countries. Staff Papers 45(1), 81–109 (1998)
10. Ye, Y.: A Case Study of the Bankruptcy of Silicon Valley Bank from the Perspective of Liquidity Risk, https://doi.org/10.27029/d.cnki.ggdgu.2024.002124, last accessed 2026/05/27
11. Liu, Z.: Research on the Impact of Asset-Liability Maturity Mismatch on Liquidity Risk in U.S. Commercial Banks, https://doi.org/10.27787/d.cnki.ghrbs.2024.000397, last accessed 2026/05/27
12. Van Vo, L., Le, H.T.T.: From hero to zero: The case of Silicon Valley Bank. Journal of Economics and Business 127, 106138 (2023)
13. Choi, D.B., Goldsmith-Pinkham, P., Yorulmazer, T.: Contagion effects of the silicon valley bank run (No. w31772), https://www.nber.org/papers/w31772, last accessed 2026/05/27

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