Research on the Asset Liability Management Mechanism of Commercial Banks - Taking Silicon Valley Bank as an Example

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Abstract
Since 2023, the bank bankruptcy incidents in the United States, represented by Silicon Valley Bank, have continued to ferment, causing bank runs and capital market turmoil, and spreading panic in the financial market. This article takes Silicon Valley Bank as an example to review the beginning and end of the bankruptcy event caused by the liquidity crisis, and analyzes the reasons for its bankruptcy from internal factors such as bank asset liability maturity mismatch, weakened capital adequacy ratio, and lack of risk management measures, as well as external environmental factors such as the Federal Reserve's aggressive interest rate hike and the cold winter of Silicon Valley technology industry, On this basis, suggestions are proposed for optimizing asset liability structure management and strengthening risk warning and regulatory mechanisms in China's banking industry risk management. Based on the strategic orientation of promoting high-quality development of the financial industry in China, this article provides industry insights from the analysis of the bankruptcy events of Silicon Valley banks, which has certain practical value for strengthening risk management and supervision of banking institutions in China.

1. Introduction

From October 30 to 31, 2023, the Central Financial Conference was held in Beijing. The conference emphasized that "finance is the bloodline of the national economy and an important part of the core competitiveness of the country. We should accelerate the construction of a powerful financial country." The meeting pointed out that various contradictions and problems in the financial field are intertwined, and there are many hidden dangers of economic and financial risks.Prevention and control of risks is the eternal theme of financial work. The financial system should effectively improve its political position, insist on and strengthen the overall leadership of the Party, strengthen its mission and responsibility, and be determined to fundamentally solve these problems, so as to help build a strong country with high-quality financial development.

1.1 literature review

Regulatory policy

According to the statistics of the State Administration of Financial Regulation, by the end of 2023, the total domestic and foreign currency assets of China's banking financial institutions reached 417.3 trillion yuan, up 9.9% year on year. As a core component of China's financial system, the risk management level of commercial banks has a direct impact on China's financial stability and the development of the real economy. With the deepening of China's financial market-oriented reform, commercial banks are actively exploring the development and transformation, establishing a diversified business system and a multi-level risk management system, improving their own asset and liability management mode, and strengthening the risk management ability.

Against the background of increasing global economic uncertainty, domestic and international regulators pay more and more attention to the risks and regulations of commercial banks. In terms of domestic, in 2017, the People's Bank of China incorporated the off-sheet financial management of commercial banks into the macro-prudential assessment system to strengthen the supervision of its risk management. Since 2018, the release of important documents such as the Guidance on Standardizing the Asset Management Business of Financial Institutions and the Measures for the Supervision and Administration of Financial Management Business of Commercial Banks has marked that China has officially entered the era of strict supervision of the asset management industry. In November 2023, the State Administration of Financial Supervision issued the Measures for Capital Management of Commercial Banks, which will lead the construction of a differentiated capital supervision system to refine the management of commercial banks of different asset sizes to match the corresponding regulatory requirements; at the same time, comprehensively revise the risk-weighted asset measurement rules to ensure the application of risk weights. Prudence, strengthen supervision and inspection, steadily carry out information disclosure, further improve the capital supervision rules of commercial banks, improve information transparency and market binding, and strengthen the risk management level of the banking industry.

On the international side, the revised Basel III: Final Plan for Post-Crisis Reform (referred to as Basel III) was released in December 2017 and officially implemented in 2023. Basel III attaches special importance to the prevention of financial systemic risks, and clarifies the supervision of systemic risks in terms of counter-cyclical adjustment, leverage and concentration[Ba, S., & Liu, X. (2023)]. The Basel III framework proposes to combine macro-prudential supervision with micro-prudential supervision. Regulatory authorities should strengthen the supervision of systemic important financial institutions, and strengthen the regulatory requirements for leverage ratio, liquidity coverage, weighted calculation of off-balance sheet high-risk assets and dynamic provision. Debt management sets stricter standards. At the same time, by supervising financial institutions with strong correlation in the financial market, the spread of risks within the financial system can be effectively prevented [Xu, M. (2022)].

Recent literature review

The existing research on the supervision of commercial banks mainly focuses on the formulation of regulatory rules and the impact of regulatory policies on banks and other financial institutions. As an important medium of the financial market, banks play an important regulating role in the efficiency of social capital and resource allocation. Extending from financial institutions to the operation and investment efficiency of physical enterprises, Liu Jianhan (2023) pointed out that commercial bank supervision generally improves the investment efficiency of enterprises and suppresses over-investment by reducing the total amount of enterprise debt financing and improving the quality of information disclosure, and does not cause insufficient investment [Liu, J. (2023)].On the other hand, shadow banks have long played the role of "bank-like" in the financial system, free from the traditional financial system, causing potential regulatory arbitrage risks. General Li and other scholars (2023) used visualization analysis methods to make a graph reproduction of the research literature related to shadow banks in the past ten years, pointing out that the regulatory level mainly focuses on the expansion of the scale of shadow banks, which causes distortion of the market pricing mechanism and exacerbates the vulnerability of the financial system. At the same time, the role of shadow banking in the real economy has two aspects. On the one hand, shadow banking has broadened the financing channels of enterprises, but also increased the financing cost of the real economy and exacerbated the "emptiness" of the real economy [General, L., Liang, R., Han, S., et al. (2023)]. At present, China is facing the increasing scale of shadow banking and the complexity of business types. Liu Qian (2023) pointed out that we should use big data, cloud computing and other digital financial technologies to improve the quality and transparency of shadow banking information disclosure, break down the barriers to data transmission, and include the connection between shadow banking and other institutions. Control the scope, strictly define the shadow banking fund business, form an innovative new regulatory model, and prevent systemic risks [Liu, Q. (2023)].

2. Research Methods

As a special enterprise with operating risks, the core of modern commercial banks's operation and management is asset and liability management. Commercial banks should balance and coordinate safety, liquidity and profitability goals in asset and liability management. Through asset and liability management, commercial banks can appropriately optimize and adjust the quantity, scale, price, structure and rhythm of various asset and liability businesses under their own risk preferences and capital restrictions. For example, by optimizing the structure of deposits and loans, they can reasonably allocate funds and control capital costs to realize the comprehensive and dynamic of commercial banks. Business planning and risk control enhance the profitability of commercial banks on the one hand, and promote the sustainable development of commercial banks on the other hand.

Asset and liability management of commercial banks is a comprehensive management work, which includes a number of basic principles [Ji, F. (2023)], as shown in Table 1. When commercial banks are unable to provide financing for debt reduction or asset increase, liquidity pressure will cause commercial banks to be unable to increase liabilities or realize assets at a reasonable cost to obtain funds, thus affecting their profitability. Therefore, the basic principles in the asset and liability management of commercial banks interact and restrain each other; and the establishment of an asset and liability management mechanism of commercial banks, such as improving the asset and liability management system, clarifying the asset and liability structure control requirements, improving the asset and liability risk management mechanism, etc., can ensure the safety of commercial bank assets and liabilities. Under the premise of operation, reduce risks as much as possible, improve the efficiency of capital utilization, and improve the competitiveness and management level of commercial banks.

Table 1 Basic Principles of Asset and Liability Management of Commercial Banks

Fundamental principle	Content
The principle of matching the term of assets and liabilities	Commercial banks should ensure that the maturity income of assets can cover the maturity payment of liabilities, so as to reduce liquidity risk and interest rate risk.
Principle of risk control of asset and liability interest rates	Commercial banks should control the interest rate risk of assets and liabilities to avoid the significant impact of interest rate changes on the bank's net profit and capital.
The principle of capital adequacy	Commercial banks should ensure that they have sufficient capital to cope with the risks posed by the unfavorable economic environment and market fluctuations.
The principle of risk diversification	Commercial banks should realize risk diversification and reduce centralized risks and specific risks by investing assets and liabilities in multiple industries and regions.
The principle of profitability	Commercial banks should improve their profitability and maximize economic benefits through asset and liability management.

Silicon Valley Bank was founded in 1983. By the end of 2022, Silicon Valley Bank has become the 16th largest bank in the United States, with 17 branches in California and Massachusetts. Its asset-liability structure is shown in Table 2. At the end of 2022, the total assets of Silicon Valley banks were about $21.8 billion, including about $73.6 billion in loans and about 120 billion US dollars in investment securities, accounting for 35% and 57% of total assets respectively; total liabilities were about $19.5 billion, of which deposits were $173.1 billion, accounting for 89% of total liabilities. Relying on the advantages of the gathering of science and technology industries in Silicon Valley, the portrait of the main deposit and loan customers of Silicon Valley banks is relatively similar, which has evolved its science and technology innovation financial business model of investment and loan linkage. By the end of 2022, more than 60% of Silicon Valley Bank's deposit customers came from start-ups or technology enterprises, and 13% came from private equity funds or venture capital institutions. Among the loan customers of Silicon Valley Bank, the proportion of credit granted to private equity funds or venture capital institutions is as high as 57%, while PE and VC financial institutions mainly provide financing for science and technology enterprises in Silicon Valley, and are extremely vulnerable to cyclical changes in the industry of science and technology enterprises [Yu, D. (2023)].

On March 8, 2023, Silicon Valley Bank announced the sale of $21 billion in available securities it held, which is expected to cause a loss of $1.8 billion. At the same time, it raised $2.25 billion by selling common and preferred shares, and increasing term loans from $15 billion to $30 billion to provide liquidity support for banks.This move was interpreted by the market as a panic asset sell-off, triggering a large number of depositors. The stock price of Silicon Valley Bank plummeted by more than 60% and was suspended on the 8th and 9th, and then received withdrawal requests of about $42 billion from investors and depositors. On March 10, Silicon Valley Bank went bankrupt due to lack of liquidity and insolvency, and was then taken over by the U.S. Federal Deposit Insurance Corporation, becoming the largest bank to fail in the United States since the 2008 financial crisis [Liu, S., Guo, S., & Kou, X. (2023)].

Table 2 Balance Sheet of Silicon Valley Banks from 2018 to 2022 (Unit: US Dollar)

Subject		In 2022	In 2021	In 2020	In 2019	In 2018
1	Cash and deposits in the same industry	13.803billion	14.586billion	17.675billion	6.782billion	3.572billion
2	Investment securities	12.54billion	127.959billion	49.307billion	29.72billion	24.219billion
3	Grant a loan	74.250billion	66.276billion	45.181billion	33.165billion	28.338billion
	Loan loss reserve	636million	422million	448million	305million	281million
	Net value of loans	73.614billion	65.854billion	44.733billion	32.860billion	28.057billion
4	Other assets	4.322billion	2.909billion	3.796billion	2.292billion	1.08billion
Total assets		211.793billion	211.308billion	115.511billion	71.05billion	56.928billion
1	Deposit	173.109billion	18.9203billion	101.982billion	61.758billion	49.329billion
2	Short-term borrowing	13.565billion	7.1million	21.10million	17.43million	631million
3	Long-term borrowing	5.466billion	2.662billion	844million	348million	696million
4	Other liabilities	3.358billion	2.763billion	4.231billion	2.261billion	1.06billion
Total liabilities		195.98billion	194.699billion	107.078billion	64.384billion	51.663billion
Total owner's equity		16.295billion	16.609billion	8.433billion	6.621billion	5.265billion
Total liabilities and owner's equity		211.793billion	211.308billion	115.511billion	71.05billion	56.928billion

3. Result and Discussion

Internal factors

From 2018 to 2022, Silicon Valley Bank achieved rapid deposit growth and balance sheet expansion, with its total assets increasing from 56.928 billion yuan to 211.793 billion yuan, due to the bull market in the US technology industry and the Federal Reserve's quantitative easing. Most of the new deposits of Silicon Valley Bank are low-interest demand deposits, and the customer structure is single, mostly private equity funds, venture capital funds and technology-based start-ups in Silicon Valley. The stability of such customers is poor.It is difficult to form deposit precipitation and reduce the ability of Silicon Valley Bank to resist risks.In asset allocation, in order to obtain higher returns, Silicon Valley Bank chooses to concentrate on allocating a large number of long-term bond assets, including long-term U.S Treasury bonds and mortgage bonds. Asset-side financial asset positions are highly concentrated, with an average duration of 6.2 years. When choosing a radical asset-liability management strategy, Silicon Valley Bank tends to adopt a single fragile asset-liability structure and a large-scale strategy of "borrowing short and investing long", ignoring that the term mismatch between assets and liabilities may lead to interest rate risk and liquidity risk, which violates the operating principle of balancing security, liquidity and profitability in the operation of commercial banks.

Silicon Valley Bank lacks the flexibility to adjust its investment strategy flexibly in different cycles in the judgment of interest rate trends. Bond prices are highly sensitive to interest rates. In the face of long-term bond interest rate risk exposure, Silicon Valley Bank has not developed an effective interest rate risk model and adopted appropriate hedging strategies, such as using derivatives such as interest rate swaps and treasury bond futures to reduce the impact of interest rate hikes on the impairment of bond assets, resulting in the continuous amplification of interest rate risk and the failure of risk strategies.

In 2018, the Federal Reserve revised the regulatory standards for financial institutions based on the Economic Growth,Regulatory Deregulation and Consumer Protection Act,which relaxed the regulation of capital requirements for banks with total assets of less than $250 billion, represented by Silicon Valley Bank, so that Silicon Valley Bank no longer needed to set counter-cyclical capital buffers. Exclude accumulated other comprehensive income items from the accounting requirements of Tier 1 regulatory capital [Yu, L., & Liu, L. (2023)]. The item of accumulated other comprehensive income includes the floating gain or loss of the financial instrument before the disposal, after deducting this item from the Tier 1 regulatory capital, even if Banks can also create the illusion of high capital adequacy ratio when they have floating losses.

After the COVID-19 epidemic ended, the US economy weakened, a large number of technology -based enterprises began to scale down, and Silicon Valley Bank faced a large loss of demand deposits, which took the way of increasing corporate customer time deposits and interbank lending to make up for the funding gap. In the third quarter of 2022, Silicon Valley Bank was actually insolvent, and the implied valuation loss of its bonds plus the actual loss exceeded the owner's equity, resulting in a "technical bankruptcy". However, the internal risk management of Silicon Valley Bank is not perfect, the chief risk officer has been absent for a long time, and the company management lacks risk management. The dynamic adjustment of the management system weakens the accuracy and objectivity of information disclosure, resulting in the continued fermentation of the crisis.

External factors

Since the subprime mortgage crisis in2008, the Federal Reserve has maintained a loose monetary environment. In response to the COVID-19 epidemic in 2020, the Federal Reserve lowered interest rates to close to 0.25% to inject liquidity into the real economy and the financial system. Since 2022, the Federal Reserve has adopted a fast-paced policy of raising interest rates in response to high inflation. As shown in Figure 1, in just one year, the US federal funds efficiency rate has increased from 0.25% to 4.5%. At the same time, the impact of the tight money supply in the macro monetary environment was rapidly transmitted to the science and technology innovation enterprises, which made the science and technology innovation enterprises relying on external financing face difficulties such as rising financing costs, cash flow shortage and declining valuation, and improved their large-scale withdrawal demand .

The sharp easing and tightening of monetary policy by the US authorities has led to a sudden change in the financial market environment. In the process of the Federal Reserve's radical interest rate hike, the seriously unbalanced balance sheet of Silicon Valley Bank is facing the huge risk of falling bond prices and the pressure of rising deposit costs on the liability side, which leads to the accumulation of losses. In this process, the internal risk management system of Silicon Valley Bank did not dynamically adjust the risk analysis model, capture the unstable factors of the market, identify risks and take timely risk prevention measures, nor did Silicon Valley Bank adjust its risk preferences in real time.And the actual capital adequacy ratio is lower than regulatory requirements.When Silicon Valley Bank was unable to provide sufficient capital support for the reduction of liabilities, Silicon Valley Bank had to sell bonds at a discount to confirm losses, which aggravated market panic, triggered bank runs, broke through core capital and led to bank bankruptcy.

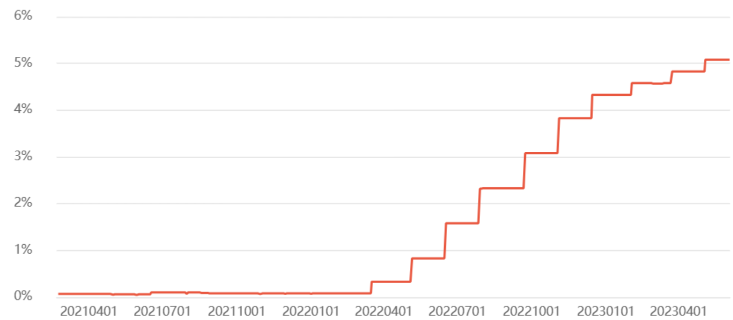

Table 3 US Federal Funds Effective Rate

4. Conclusions

Due to the different social financial structure, represented by the asset-liability structure of Silicon Valley Bank, the financial market in the United States is guided by capital market and equity financing, while the financial system in China is dominated by bank credit, and the rapid and stable increase in the scale of bank credit meets the demand for capital for China's economic growth. At present, China has become an important financial power in the world, with the largest banking system in the world, the second largest insurance, stock and bond markets, the largest foreign exchange reserves in the world, and inclusive finance in the forefront of the world. China's commercial banks the quality of credit assets is stable, and in the face of global political and economic uncertainties, the growing size of assets and the accumulated level of leverage may create potential risks. 0n November 20, 2023, the meeting of the Central Financial Committee clearly emphasized that in order to promote high-quality financial development, financial supervision should be strengthened in an all-round way, stock risk resolution should be strengthened continuously, and risk prevention, early warning and disposal mechanisms should be improved. Therefore, the Silicon Valley Bank incident has enlightening value for China to strengthen the risk management and supervision of banking institutions.

Asset quality is closely related to the trend of interest rates. The internal cause of the bankruptcy of Silicon Valley Bank is the pro-cyclical use of leverage in the low interest rate environment, the long-term allocation of long-term bonds, and the neglect of interest rate risk in order to obtain high returns. In the asset-side selection, the banking industry should pay attention to diversification of investment, flexible allocation,comprehensive evaluation of asset allocation strategy from the profitability, liquidity and capital consumption of financial assets, form portfolio investment thinking, and weigh its own trading ability and risk preference. In terms of asset-liability matching, banks should pay attention to the diversification of debt structure, such as diversification of customer types, diversification of term structure, diversification of deposit types, minimize "short-term debt and long-term investment", and take the initiative to prevent payment risks. By improving the counter-cyclical control mechanism, we can effectively control leverage and risk accumulation. On the basis of the soundness of China's monetary policy, we will focus on the five themes of "science and technology finance", "green finance", "inclusive finance", "pension finance" and "digital finance", explore the economic spillover of major emerging strategic areas, and manage risks from the source control, reduce the concentration of assets, disperse risks, and achieve orderly and stable economic development.

The Silicon Valley Bank incident exposed the flaws in the Federal Reserve's regulatory regime for important banks, relaxed the liquidity stress test requirements for banks with total assets of less than $250 billion, represented by Silicon Valley Bank, and led to the rapid accumulation and spread of risks. In order to mitigate the impact of cyclical fluctuations on business, commercial banks should give full play to the role of risk management departments, enhance the awareness of cross-cycle operation, normalize the management of macro-risk, structural risk and term risk of assets and liabilities, improve the internal risk detection and early warning mechanism, Parameters are incorporated into the risk monitoring and early warning system to enhance the comprehensive ability to identify, detect and prevent financial risks, so as to cope with different macro-environments and achieve cross-cycle sound operation.

Asset expansion of commercial banks is based on capital, and asset expansion without capital constraints is a water without a source and a tree without a root. After the Central Financial Work Conference, the Measures for Capital Management of Commercial Banks was promulgated to further clarify the construction of a differentiated capital management system, matching different capital regulatory schemes according to the size and complexity of banks. The refinement of supervision will promote banks to strengthen risk management level, guide banks to better serve the real economy, and support China's economic growth and high-quality development.

Interest rate cuts by many central banks in 2024 are expected to have a positive impact. It is predicted that the Federal Reserve will adjust the direction of monetary policy and end interest rate hikes due to slowing economic growth, inflation and risk factors. Interest rate cuts by central banks in many countries are expected to trigger spontaneous callbacks and repairs in global financial markets, and a stable exchange rate environment will help China further release monetary policy space and create a stable financial environment. General Secretary Xi Jinping emphasized in the 40th collective study of the Political Bureau of the CPC Central Committee: "Finance is active, economy is active; finance is stable, economy is stable." High quality of finance quantitative development is related to the overall situation of Chinese-style modernization construction, anchoring the goal of financial power, comprehensively enhancing the ability of risk prevention, firmly holding the bottom line of financial security, and comprehensively promoting the construction of a strong country with Chinese-style modernization and contributing to the great cause of national rejuvenation.

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