

# ***Bankruptcy Research and Enlightenment of Silicon Valley Bank***

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**Abstract:** Silicon Valley Bank went bankrupt in March 2023 and was overtaken by the Federal Deposit Insurance Corporation (FDIC), announcing its entry into bankruptcy liquidation proceedings. This event has aroused strong market attention and extensive discussion. Based on the history of the construction of Silicon Valley Bank, the characteristics of the bank, and the reasons for its failure, we have sorted out and studied the reasons for the failure of Silicon Valley Bank. This article proposes effective management measures for strengthening risk, management and asset allocation of Silicon Valley Bank through analysing its risk management and asset allocation from four aspects: credit risk, liquidity risk, market risk and operational risk. The reasons for the failure of Silicon Valley banks is analyzed in terms of liquidity, lending, markets and decision-making. We hope that through this research, managers can improve relevant financial loopholes in a more timely manner to avoid similar incidents from happening again.

**Keywords:** Silicon Valley Bank, risk, risk management

## **1. Introduction to Silicon Valley Bank**

### **1.1. History and Development of Silicon Valley Bank**

Silicon Valley Bank (SVB) USA. It was established in 1983 and went public on NASDAQ in 1988. In 1993, SVB began a new business strategy, focusing on providing various financial services to technology, innovation and start-up companies including commercial loans, deposits, wealth management, venture capital, and international banking [1]. This made it the most influential commercial bank in the emerging technology market in the United States.

In 1996, SVB expanded its business to 15 states in the United States. In 2004, it established branches in four countries worldwide. In 2005, it established a branch in China, namely, the Shanghai Pudong Development Bank Silicon Valley Bank. As a bank in the technology innovation field, SVB has more than 30 years of successful operation experience and a mature business model, closely cooperating with VC/PE and technology innovation enterprises [2].

Through Figure 1, it shows that in 1991, Silicon Valley Bank mainly focused on four categories: consumer loans, housing loans, real estate loans and commercial loans, of which commercial loans accounted for 67%, accounting for the largest proportion.

In 2015, as it showed in Figure 2, compared with 1991, Silicon Valley Bank's business classification increased significantly, adding life sciences and health, high-end wine, Internet software and hardware. In contrast, PE and VC still account for the most significant proportion.

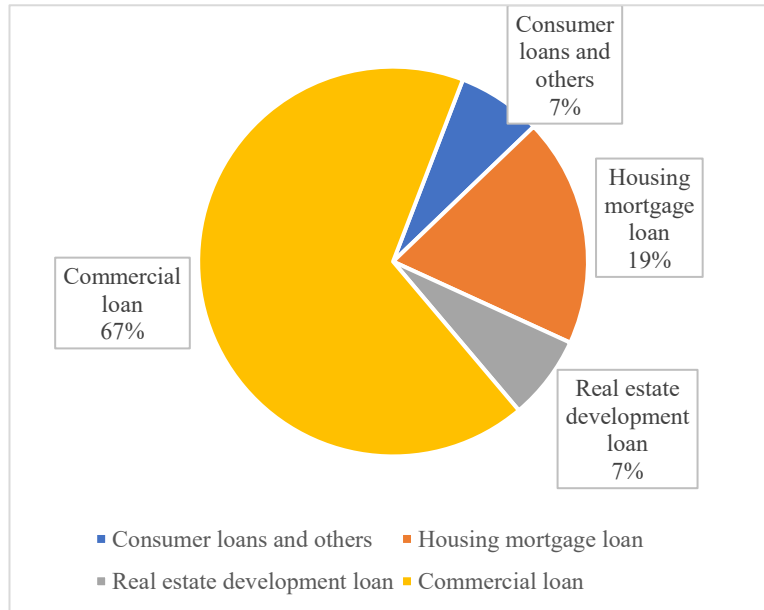


Figure 1: Business classification of SVB in 1991.

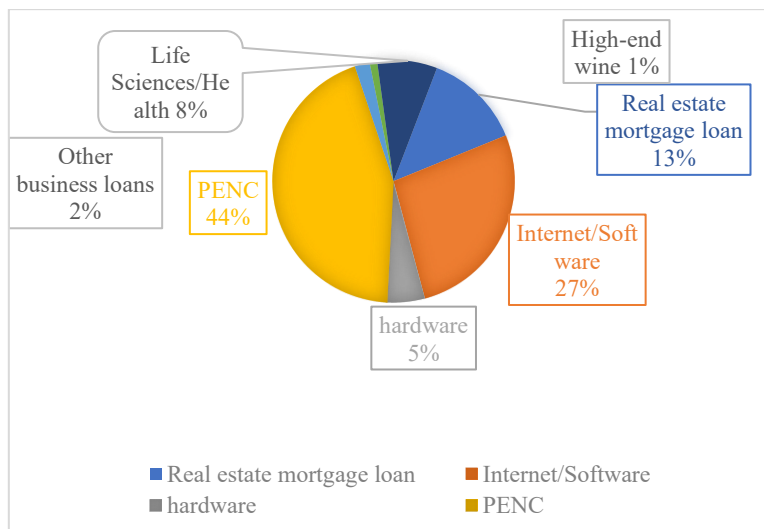


Figure 2: Business classification of SVB in 2015.

By the end of 2021, Silicon Valley Bank's total assets will reach US\$32.7 billion, total deposits will reach US\$25.3 billion, and total loans will reach US\$30 billion. Silicon Valley Bank has branches in the United States, Europe, Asia and Israel to provide customers with global financial services [3].

## 1.2. Operational characteristics of Silicon Valley Bank

### 1.2.1. Focus on serving the innovation economy

Silicon Valley Bank is positioned as a "Partner for the innovation economy" (Partner for the innovation economy), focusing on serving customers in the fields of technology and life sciences/health care industries, private equity/venture capital funds [4]. The vineyards and wine estates in Napa Valley (Napa Valley), a high-end wine-producing area near Silicon Valley, are also the key customers of Silicon Valley Bank. According to information on the Silicon Valley Bank website, 88% of the companies on the Forbes "future unicorn" list in 2022 are customers of Silicon Valley Bank, and 50% of US venture capital-backed technology and life science companies have partnerships with Silicon Valley Bank. 44% of U.S. venture-backed companies with successful IPOs in 2018 were clients of Silicon Valley Bank. Over 790 technology and healthcare companies valued at over \$1 billion choose Silicon Valley Bank as their long-term financial partner [5].

### 1.2.2. Group business linkage

Silicon Valley Bank Financial Group provides financial products and services in four major sectors through a diversified financial service platform.

Figure 3 shows global commercial banking accounted for 94.3% of total asset which accounts for the largest share. And Figure 4 shows international retail banking accounted for 91.6% of pre-tax revenue. These three parts are divided according to customer groups and financing methods.

Silicon Valley Bank mainly provides commercial banking services such as credit solutions, fund management, trade settlement and trade financing for technological innovation companies at different stages of development. SVB Private Bank (SVB Private) mainly provides private banking and wealth management services, and most of its customers are private equity/venture capital professionals, as well as the executives of start-up companies it supports. SVB Capital (SVB Capital) is mainly venture capital investment management, Directly invest in start-up companies, or invest in other venture capital funds in the form of funds of funds. SVB Securities (SVB Security) is an investment banking sector that provides clients with services such as capital raising, mergers and acquisitions consulting, structured financing, equity research, and sales transactions. Investment-loan linkage is the core business model of Silicon Valley Bank, which is mainly operated through "bank loans + direct equity investment of subsidiaries", "bank loans + enterprise warrants" and "bank loans to PE/VC, and then indirect investment in enterprises" and other methods.

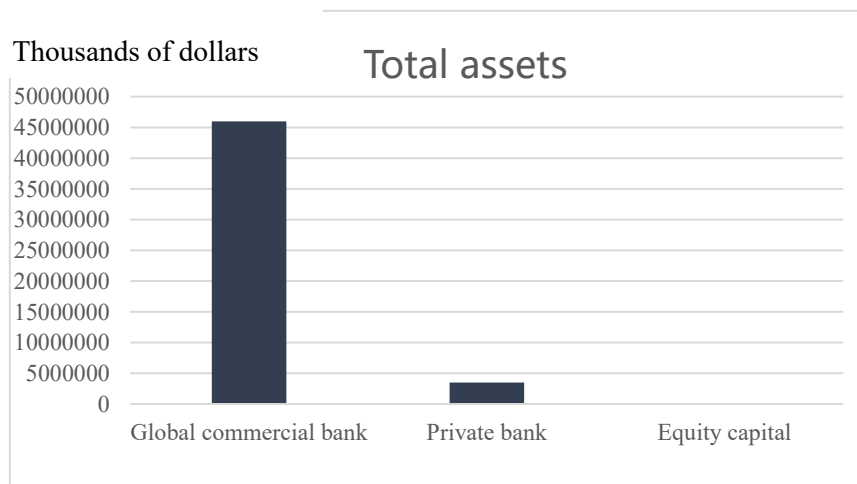


Figure 3: Total assets

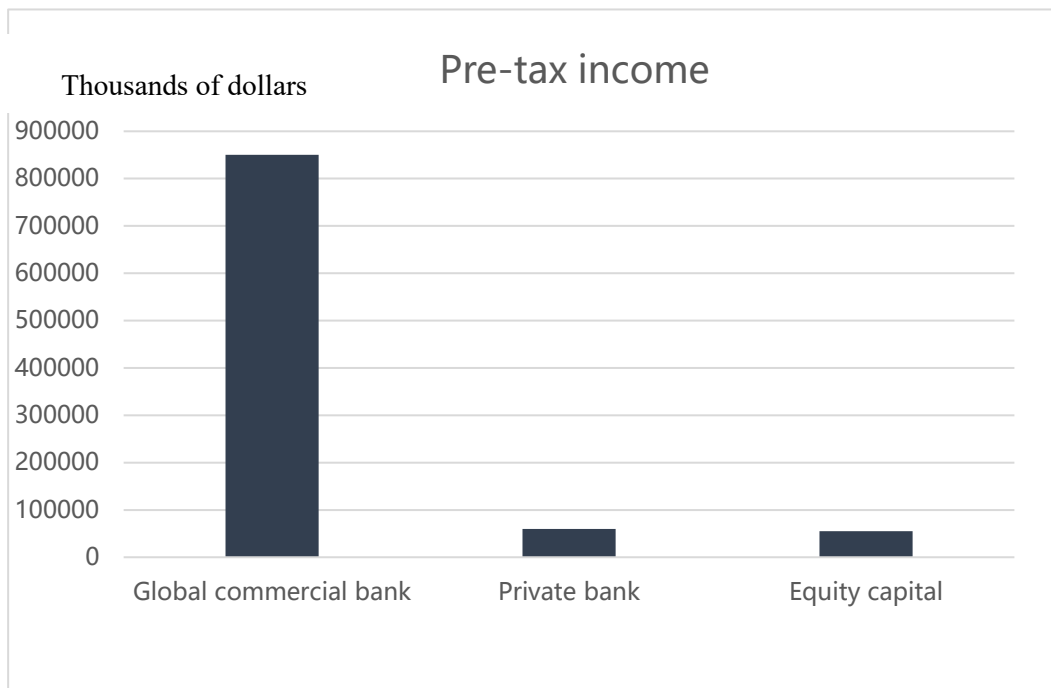


Figure 4: Pre-tax revenue

### 1.2.3. Integrate into different stages of the enterprise

Silicon Valley Bank provides differentiated financial support and solutions for different development stages of enterprises. For start-up or early-stage technology companies (annual revenue less than US\$5 million), Silicon Valley Bank focuses on providing loan support. It uses a team of technology experts to provide business guidance, venture capital solutions, consulting and other services. For technology companies in the growth stage (annual revenue of US\$5 million to US\$75 million), Silicon Valley Bank mainly provides financing solutions, fund management solutions and international business solutions. For mature or stable high-tech companies (annual revenue of more than 75 million US dollars), Silicon Valley Bank mainly provides services such as cash management, fund management and M&A guidance.

### 1.3. The influence of Silicon Valley Bank

Silicon Valley Bank is one of the main financial partners of technology, innovation and startup companies, providing capital support and financial services to these companies. Silicon Valley Bank's understanding and support of innovative companies have helped countless start-ups grow into successful companies and become an important force in the Silicon Valley region and the global technology industry. In addition, Silicon Valley Bank also provides a variety of useful resources and tools on its website to help startups understand how to raise funds, manage finances and achieve growth. These resources and tools are widely used in technology and innovation fields worldwide.

### 1.4. Brief introduction to bankruptcy

On March 8, 2023 (Wednesday), Eastern Time, Silicon Valley Bank announced the sale of available-for-sale assets (AFS) in exchange for liquidity. On March 9, Silicon Valley Bank's stock price plummeted by 60%. On March 10, according to a statement issued by the Federal Deposit Insurance Corporation (FDIC), the California Department of Financial Protection and Innovation (DFPI)

announced the closure of Silicon Valley Bank on the same day, which marked the official bankruptcy of Silicon Valley Bank [6].

## **2. Overview of the reasons for bankruptcy**

### **2.1. Liquidity problem**

The assets held by Silicon Valley Bank are mainly long-term equity and bonds of science and technology companies. These assets are difficult to realize when the market fluctuates, which leads to liquidity problems for the bank.

### **2.2. Risk issues**

Silicon Valley Bank mainly serves technology companies. Due to the innovation and uncertainty of the technology industry, its customers generally have relatively high risks. In addition, some of SVB's deposits may not be insured, making it more risky.

### **2.3. Capital issues**

Silicon Valley Bank has purchased a large amount of U.S. bonds, but the rise in U.S. bond yields has led to a decline in the value of the bonds it holds, which in turn has led to a deterioration in the bank's capital position.

### **2.4. Run problem**

As the problem of Silicon Valley Bank was exposed by the media, it triggered a run phenomenon, which further exacerbated the bank's plight.

## **3. Analysis of the Essential Causes of Bankruptcy**

### **3.1. Liquidity problem: liquidity exhaustion**

#### **3.1.1. Single customer group**

Silicon Valley Bank's customer base is highly concentrated in technology start-ups and PE/VC in Silicon Valley, with almost no retail investors. The average deposit balance of Silicon Valley Bank's nearly 40,000 deposit customers is US\$4.616 million, mainly distributed in technology innovation companies and venture capital companies. Deposits in demand deposits and other transaction accounts accounted for 76.7 percent of total deposits (\$173.1 billion). The stability of unit deposits is poor, coupled with a single customer group, weak risk diversification ability, and strong resonance effect. Unstable sources of liabilities pose enormous challenges to asset allocation, which in turn translates into liquidity risk issues [7].

#### **3.1.2. Asset structure mismatch**

Judging from the newly added structure of assets and liabilities in the past three years, Silicon Valley Bank has a severe maturity mismatch problem of "short-term borrowing and long-term investment," which has become the fuse of its bankruptcy in the high-interest dollar environment. On the liability side, in 2022, the Federal Reserve will start an interest rate hike cycle, market interest rates will increase sharply, financing for technology innovation companies will tighten, and customer withdrawal needs will rise. Silicon Valley Bank will reduce its current deposits by US\$45.1 billion, a drop of 36%. To make up for the funding gap, Silicon Valley Bank absorbed USD 29 billion in term

deposits that year, raised over USD 13.5 billion in market financing (mainly short-term), and reduced its bond investment position. On the asset side, during the high growth period of demand deposits from 2020 to 2021, Silicon Valley Bank allocated about 24% of its funds to loans (among them, short-term, low-yield PE/VC loans accounted for more than half). Funds are earmarked for bond investment, especially long-term (more than ten years) mortgage-backed securities (MBS) accounted for 60% of the increase in deposits. Under the circumstances of high-interest dollar and tightening market liquidity, Silicon Valley Bank's asset-liability maturity mismatch problem eventually evolved into bank liquidity risk.

### 3.1.3. Insufficient reserve requirements

Silicon Valley Bank allocated most of its assets to MBS and low-risk U.S. bonds. In contrast, its holdings of U.S. bonds grew rapidly from 4 billion to 16 billion in 2021, and MBS holdings increased from more than 20 billion to 100 billion. Commercial banks generally require holding about 20% of cash and deposit reserves to ensure deposit withdrawal and compensate for liquidity difficulties caused by the loss of deposits. Driven by interests, Silicon Valley Bank increased leverage, cash and maturing deposits accounted for only 5.27% of total deposits, and the reserved reserve was far from enough to cover liquidity risk [8].

Table 1: Financial index of SVB.

| Financial index                           | 2019Q4 | 2022Q1  | 2022Q4  |
|---|--------|---------|---------|
| Total assets                              | 710.05 | 2203.55 | 2117.93 |
| Cash and cash equivalents                 | 67.82  | 206.06  | 138.03  |
| Net loan                                  | 328.6  | 682.44  | 736.14  |
| Portfolio investment                      | 290.72 | 1273.03 | 1200.54 |
| Among them: available-for-sale securities | 140.15 | 259.91  | 26.64   |
| Maturity securities held                  | 138.43 | 987.07  | 913.21  |
| Total liabilities                         | 643.84 | 2039.95 | 1954.98 |
| Total deposit                             | 617.58 | 1981.34 | 1731.09 |
| Among them: non-interest bearing deposits | 408.42 | 1279.97 | 807.53  |
| Interest-bearing deposit                  | 209.16 | 701.37  | 923.56  |
| Short-term loan                           | 0.17   | 0.99    | 135.65  |
| Long-term loan                            | 3.48   | 28.17   | 53.7    |
| Owner's equity                            | 66.21  | 163.6   | 162.95  |

Table 1 shows the performance of key financial indicators of Silicon Valley Bank at three important times: 2019Q4 (before the implementation of quantitative easing monetary policy in the United States), 2022Q1 (before the current round of interest rate hikes in the United States), and 2022Q4 (before the thunderstorm of Silicon Valley Bank). During the monetary easing period of 2019Q4~2022Q1, the total deposits of Silicon Valley banks increased from US\$61.758 billion to US\$198.134 billion, an increase of 220.82%. During the monetary tightening period of 2022Q1~2022Q4, the total deposits of Silicon Valley banks decreased by 12.63%.

### 3.1.4. The accounting method is unreasonable

US GAAP requires that investments in bonds held by listed companies be measured in AFS (Bonds Available for Sale) or HTM (Bonds Held to Maturity), in which bonds recorded in AFS are directly reflected in the profit and loss of financial statements as market value fluctuations, and changes in asset value under HTM accounting are not reflected in the balance sheet of banks. Silicon Valley

Bank absorbed a large number of HTM holding maturing bonds in 2021, poor liquidity, the Fed's interest rate hike measures led to a decline in the value of U.S. bonds. Assets measured in HTM have a large number of hidden floating losses, this bookkeeping method hides the actual volatility of the market, once the sensitive nerve line of the market is triggered, it is easy to produce a run.

### **3.2. Market risk issues: technology companies are ushering in a cold winter**

From the second half of 2022, Tesla, Facebook, Microsoft... A large number of US technology companies began to lay off employees, the industry encountered an unprecedented winter, and the chain of "financing-investment-financing" of science and technology companies was broken: the US government frequently implemented science and technology restriction policies, not only implementing large-scale sanctions for science and technology companies, restricting the export of technology enterprises and investment and mergers and acquisitions in the technology industry, but also successively implementing the "Chip and Science Act" and "Inflation Reduction Act," etc., seriously damaging the ecology of scientific and technological innovation, the cost of loan financing became high, and there was no mature and stable revenue channel. Science and technology companies have to consume the deposits deposited in SVB to continue research and development.

### **3.3. Capital issues**

#### **3.3.1. Relaxation of capital regulatory policies**

U.S. President Donald Trump has sharply raised the threshold for "systemically important banks" from \$50 billion to \$250 billion, and "small and medium-sized" banks with assets below that threshold are exempted from regular liquidity stress tests and maintaining a certain liquidity coverage ratio. Considering that the total assets of Silicon Valley Bank at the end of 2022 were \$211.8 billion, just below the threshold of \$250 billion, some people believe that the Silicon Valley Bank incident is the inevitable result of the "regulatory regression" in 2018. Since the end of 2019, in response to the impact of the new crown epidemic, the United States has implemented quantitative easing, relaxed the requirements for bank deposit reserves, did not force Silicon Valley banks to conduct stress tests, and the market risk-free interest rate is close to 0. Instead of putting money in the Fed's reserve account to charge extremely low interest, Silicon Valley Bank should buy a large amount of MBS (mortgage-backed bonds) and long-term US Treasury bonds to earn interest spreads and hedge their exposure. Many of these risk-free treasury bonds are long-term holding maturity bonds, while depositors' deposits are mostly short-term deposits, and this excessive mismatch of liquidity makes it very easy to break the bank's capital chain when encountering a black swan event.

#### **3.3.2. Insufficient capital**

With the glut of money brought about by monetary easing during the pandemic, start-ups have expanded their financing. Silicon Valley Bank took deposits from start-ups, and the balance of deposits at the end of March 2022 increased by 60% from the same period a year earlier to \$198 billion. While deposits increased, loans to start-ups that had received sufficient financing through equities were limited, so the funds were used to purchase marketable securities such as residential mortgage securitization (MBS). As the Fed raised interest rates, potential losses inflated, and by the end of 2022, the group reached US\$15.1 billion, exceeding the combined "CET1" core equity capital of common stock and internal retained US\$13.6 billion. This means essentially falling into a lack of capital [9].

### 3.4. Run issues

At the beginning of 2022, as the Fed continued to raise interest rates and future cash flows remained unchanged, the market value of existing bonds and MBS fell and the SVB book value shrank rapidly. The interest rate curve has inverted, banks need to reverse interest to depositors, and the interest on extensive holdings of maturing bonds cannot flow back in time, forcing banks to sell \$21 billion worth of bonds (AFS) for sale to recover funds, resulting in a post-sale loss of \$1.8 billion. This has raised concerns among depositors and investors about the bank, as the move reflects liquidity and capital adequacy issues in the eyes of customers [10]. On March 9, 2023, Eastern time, the share price of Silicon Valley Bank plunged 60%, and depositors and investors ran on \$42 billion in one day, causing Silicon Valley Bank's cash balance to directly turn to -\$958 million on the same day.

Based on the analysis of the above reasons, we propose the following relevant solutions.

## 4. Solution

### 4.1. Asset structure

Under the changing trend of falling market interest rates, insufficient ability to manage the cost of liabilities, and regularization of deposits, commercial banks should maintain a high degree of dynamic monitoring and forward-looking management of asset and liability maturity mismatch risks. Specifically, commercial banks should maintain sensitivity to changes in market factors, and make full use of stress tests, scenario simulations and other means to proactively examine the mismatch risk. Banks should dynamically and reasonably balance mismatch risk and return targets, which requires them to comprehensively consider macro and microeconomic variables, counterparty credit changes, assess banks' sensitivity to liquidity stagnation in the short term, and resolve asset-liability maturity mismatches in the medium and long term [10].

### 4.2. Strengthen market risk supervision

The various mismatches presented in the asset and liability management process of Silicon Valley Bank are the embodiment of its insufficient ability to predict and predict. Silicon Valley Bank has inaccurately judged the direction of macro policies, wrongly predicted inflationary pressure and interest rate hikes, underestimated the difficulty of deposit restructuring and the strength of capital outflow, and failed to take necessary measures to stabilize deposits early. This warns small and medium-sized banks that they must strive to improve their macroeconomic analysis capabilities and economic cycle research capabilities, and strengthen their cross-cycle business philosophy. The collapse of Silicon Valley Bank also warns financial authorities that monetary policy adjustments should avoid large ups and downs in a short period and prevent unbearable impacts on the market risks and liquidity risks of small and medium-sized financial institutions.

Establish a good reputation. The announcement issued by Silicon Valley Bank was intended to release a positive signal to the market to improve the structure of assets and liabilities and enhance liquidity. Still, due to the lack of accurate judgment of market panic, underestimating the response strength of investors, depositors and other stakeholders, coupled with insufficient response plans, the market failed to take adequate measures to enhance market confidence after market fluctuations, resulting in a sharp decline in stock prices and rapid spread of runs, and operational risks eventually transformed into reputational crises. This warns small and medium-sized banks to strengthen the construction of reputation risk management mechanisms, attach great importance to the management of market expectations, and build a firewall between reputational risks, liquidity risks, market risks and other risks.



### **4.3. Strengthen capital supervision policies**

In 2023, the controversy caused by the successive local banking crises in Europe and the United States lies in the disposal procedures and moral hazard of bankruptcy. In 2023, Feds released the Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank, pointing out that SVB's regulatory standards are too low, its supervision is not solid and urgent enough, and the risk of bankruptcy spreads beyond the Fed's regulatory framework. Fernando (2023), President of the BIS Financial Stability Institute, believes that EU deposit insurance coverage is small and the bank insolvency administration framework is relatively weak and recommends restructuring the EU deposit insurance framework to promote financial stability. Therefore, European and American banking regulators still need to strengthen regulatory communication and coordination in the process of bank bankruptcy and bankruptcy disposal in the future.

### **4.4. Effectively deal with the problem of runs**

#### **4.4.1. Change financing channels**

Finding diverse and stable sources of financing can help deal with runs. The reasons are, first, that a variety of financing channels can increase commercial British Airways' assets, and in addition, it can allow multiple combinations of liabilities to reduce risk. However, the financial market is constantly changing, so the stability of the financial market is relatively lacking. Therefore, commercial banks should not only strive to diversify financing channels but also stabilize market financing.

#### **4.4.2. Optimize the deposit insurance system**

Since Roosevelt established the Federal Deposit Insurance Corporation in the 1930s, crises such as bank panics have rarely occurred in the United States. Because the Federal Deposit Insurance Corporation protects the interests of ordinary depositors and people do not panic too much in a crisis, the deposit insurance system is widely regarded as the source of bank stability. One of the factors that determines whether a deposit insurance system is beneficial is the strength of protection, i.e. the size of the amount paid to depositors. Banks should protect the public and their interests, make companies and financial institutions transparent about their transactions and data, and use deposit insurance systems to build public confidence [11].

#### **4.4.3. Pay more attention to the company's status, make timely analysis and adjustment**

Always pay attention to the capital adequacy ratio, asset quality, risk management ability and other conditions of the financial institutions or enterprises in which you invest. Keep abreast of market changes, allocate funds well, and avoid excessive concentration of investment in one institution or enterprise to diversify risks. If a problem is found in the investee, take timely action.

## **5. Conclusion**

Currently, Silicon Valley Bank is urgently taken over by the FDIC, which created a new entity, the Santa Clara Deposit Insurance National Bank (DINSC), and injected all of Silicon Valley Bank's deposits into this new entity.

The collapse of Silicon Valley Bank reflects the lack of ability and contempt of banks in liquidity risk management, asset allocation management, market risk management, and run response problems since 2018, and reflects the loopholes in government policies, which banks and financial enterprises should take as a lesson to actively correct and adjust management plans to avoid similar incidents from happening again.

## Acknowledgements

Mian Zheng, Yuqing Xia, Pei Chen Lim and Mohan Shen contributed equally to this work and should be considered co-first authors.

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