Silicon Valley Bank and
Banks' Vulnerability to Runs
March 21, 2023

The General Problem

Banks are inherently vulnerable to runs. Their primary liabilities, deposits, are short term, while their assets, largely loans and investments in securities, are long term. If something causes depositors or other providers of short-term funds to withdraw unexpectedly large sums, the bank may have difficulty meeting these demands, as it takes time to liquidate long term assets and realize their full value. Forced to move quickly, the bank may suffer losses on security and loan sales. Efforts to collect funds prematurely from borrowers are likely to be ineffective, as well as disruptive for the borrowers.

Deposit withdrawals are often triggered by concerns about a bank's solvency and doubts about whether assets exceed liabilities by a sufficient margin. But problems at one institution can generate questions about others that seem to share similarities. Thus, even banks that have been well run are vulnerable to runs and can face the challenge of how to meet a wave of withdrawals, with assets that pay off in the future.

Why do we allow banks to be in the vulnerable position of borrowing short and lending long? Because banks are performing two important functions. And most of the time, the system works well. First, bank deposits provide liquidity to households and businesses. Bank deposits are a very convenient way of storing funds for emergency use and making payments. Second, bank loans are a critical source of financing for investment and consumption, particularly for smaller businesses and households. If we did not have banks, these functions would be performed by other entities. To some degree, they already are. The shadow banking system is a term used to describe a web of institutions and markets that provides loans and deposit-like accounts similar to those offered by banks. However, the shadow banking system is more oriented to larger actors, and it shares banking's vulnerabilities. Indeed, the shadow banking system was at the core of the 2008 Global Financial Crisis.

Preventing Runs

Banks' vulnerability to runs is generally addressed in three ways. First, the central bank is prepared to function as lender of last resort. Second, the government provides deposit insurance. Third, banks are regulated.

Taking these in reverse order, banks in the United States and most other countries are subject to many rules that are intended to keep them safe and sound and prevent bank runs. There are rules about how much equity a bank must have, rules about the ratio of liquid to total assets, rules about loan concentrations. Banks are also supervised and inspected on a regular basis to ensure they comply with the rules.

The government may also provide deposit insurance, so that depositors are protected if their bank fails. Usually, deposits are covered up to some limit. In the United States, deposits are insured up to $250,000. Many countries, including the United States, increased the limit on insurance in the Global Financial Crisis; some countries that did not have insurance introduced it. Deposit insurance protects smaller depositors from loss, but more importantly for the authorities overseeing the banking system, insurance removes the incentive for depositors to withdraw their funds from a bank at the first sign of trouble. Indeed, if the probability of contagion is high, the authorities may insure all deposits – not just those under the insurance ceiling.

The third element of protection is the central bank's ability to serve as lender of last resort. The central bank can lend a bank facing a run the liquid assets needed to meet withdrawals. If the beleaguered bank can meet withdrawal requests and avoid disposing of assets at a loss, depositors will be reassured and the run will peter out. The central bank's ability and willingness to serve as lender of last resort should be public knowledge and loans should be restricted to solvent institutions, so as to maintain confidence in the banking system. However, in a financial crisis, with many banks perceived as vulnerable and dumping assets to meet withdrawal demands, the line between a shortage of liquidity and insolvency becomes blurry. Even well managed institutions çan find themselves selling into a collapsing market and receiving only a fraction of what the asset would normally be worth.

SVB's Asset-Liability Mismatch

Silicon Valley Bank (SVB) had made its name as a lender and service provider to high technology companies and the private equity and venture capital "community." Many clients were startups and early-stage companies. In 2020 and 2021, financing for start-ups soared and SVB captured much of their banking business. However, this contributed to a pronounced mismatch of assets and liabilities.

Liabilities

SVB's liabilities consisted primarily of uninsured business deposits. These grew very rapidly in 2020 and 2021, as companies that had secured venture financing put their funds with SVB. Over 90 percent of SVB's deposits were uninsured versus about 50 percent at the average bank. These uninsured deposits represented hot money. Depositors were at risk of losing their money – in some cases, tens of millions of dollars – if the bank failed.

Of course, failure seemed an extremely remote possibility when the funds were deposited with SVB. But exposed to bad news, uninsured depositors want to take no chances and will likely move their funds elsewhere. Further, as tech-savvy businesses, SVB's uninsured depositors had the personnel and technology resources to make such transfers in an instant. Further, given the extensive interconnections among Silicon Valley technology and VC companies, exposed depositors would learn of problems at the same time and react in the same way. In contrast, individual insured deposit accounts are a very stable source of funding.

Even without bad news, SVB faced the prospect of losing deposits. With the boom in venture financing seemingly over, startup companies with deposits at SVB needed those deposits to finance their operations. For many startups, revenues from product sales were far in the future.

Assets

On the asset side, at the end of 2021, loans made up roughly a third of SVB's portfolio. The loan share had been higher in the recent past; but making loans – particularly to new companies with unproven, if cutting edge, technologies and strategies - takes time. Also, most of the new depositors did not need loans right away; they had plenty of money for the present. Instead, SVB invested in securities, primarily mortgage-backed securities issued by U.S. government sponsored enterprises and U.S. Treasury securities. Cash and equivalents were about 7 percent of assets.

Investing in securities backed by the U.S. government may have seemed prudent at the time. As these were obligations of the federal government, they had no credit risk. They would always pay off principal and interest as specified. Thus, they were highly liquid in the sense that there would be ready buyers who did not need time to evaluate creditworthiness, as they would if considering purchasing private securities or loans. But there is another risk element in lending long - interest rate risk. SVB's securities were predominantly long term, maturing in more than 5 years. They were acquired at a time – 2020 and 2021 when interest rates were low. The yield was less than 2 percent.

Over the course 2022, interest rates rose sharply. As of February 2023, the interest rate on a five-year Treasury bond was close to 4 percent. As a consequence, the market value of SVB's government securities fell substantially relative to their face value. While there might be buyers aplenty, they would only buy at a discount.

Thus, SVB's liabilities were largely uninsured deposits. Their assets were largely longer-term government-backed securities with a market value less than face value and hard-to-value loans.

Equity

What of equity? Equity provides creditors, including depositors, a cushion of protection against losses. Being "well capitalized" and creating a well capitalized banking system have been goals of banks and their regulators going back to the failures of the 1990s, if not before. SVB's equity was 8 percent of assets at the end of both 2022 and 2023. In banking speak, it had a leverage ratio of 8 percent, versus a required ratio of 4 percent. Regulators tend not to focus on the leverage ratio because some banks with high ratios of capital to assets have a riskier mix of assets than others. Regulators prefer risk-based capital ratios in which the different asset categories in the denominator have different weights. Risky assets have higher weights than low-risk, thereby increasing the denominator and lowering the ratio. By these measures, SVB looked solid; total capital was

16 percent of risk-based assets, compared to a requirement (including capital conservation buffer) of 10.5 percent. A problem with the risk weights, however, is they reflect only credit risk – not interest rate risk. SVB's government-backed securities had no or very low risk weights.

The Run[1]

In early 2023, Moody's rating service recognized that SVB's securities were substantially overvalued relative to their market value and at the beginning of March, Moody's told SVB that it was likely to downgrade SVB's rating. In response, SVB devised a plan whereby it would sell some of its securities and offset the expected loss by raising new equity. A couple of prospective investors were identified. SVB consulted Goldman Sachs, which agreed to buy just over $20 billion in securities. Although these were securities that had been marked to market, SVB still suffered a loss of $1.8 billion on the sale. Goldman also agreed to help SVB raise equity from the public. However, as luck would have it, Silvergate Bank, a small bank focused on cryptocurrency, failed as these negotiations were taking place. This seems to have spooked potential investors. At the same time, word got out that SVB had lost $1.8 billion. Uninsured investors began to pull their funds. Whether they panicked or just acted out of an abundance of caution, the run was on. Over $40 billion in deposits was pulled in a day. The state regulator swiftly closed SVB and the Federal Deposit Insurance Corporation took over as receiver.

Lender of Last Resort

Absent from this discussion is the lender of last resort. The Federal Reserve can lend to solvent institutions that are experiencing liquidity problems, buying time in which corrective steps can be taken and depositors' panic subsides. The regional Reserve Banks fill this role and in SVB's case, this was the Federal Reserve Bank of San Francisco (FRBSF.). The FRBSF was also SVB's primary federal supervisor and the CEO of SVB sat on the Reserve Bank's board of directors. What the FRBSF could and should have done to prevent the debacle will be explored and debated at length in the coming months.

The H.4.1 statistical release, Factors affecting Reserve Balances, shows that FRBSF did not provide any new loan support in the week ending March 8. The release does show that FRBSF lent heavily in the week March 9 to March 16, but individual borrowing banks are not identified. Thus, we do not know whether FRBSF lent to SVB on March 9 or whether the lending shown for that week all went to other banks caught in the outwash from SVB's failure. SVB seems to have had sufficient collateral to meet deposit withdrawals. But perhaps everything happened too fast for SVB to borrow from the FRBSF or perhaps the FRBSF did not have confidence in bank management or SVB's underlying solvency.

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[1] This discussion draws heavily on Dorothy Neufeld's article "Timeline: The Shocking Collapse of Silicon Valley Bank" in Visual Capitalist, March 12,2023 (https://www.visualcaptalist.com/timeline-shocking-collapse-of-silicon-valley-bank/) and various newspaper accounts, especially "How Goldman Sachs' Plan to Shore Up SVB Crumbled," *Wall Street Journal,* March 16, 2023.

Newspaper accounts[2] have said that supervisors at the FRBSF were concerned about SVB's risk management well before the bank's failure and had conveyed their concerns to officers at SVB. If so, the supervisors were striking ineffective in influencing behavior as evidenced by the fact that SVB did not have a chief risk officer for most of 2022. In contrast, Moody's warning of a rating downgrade prompted an immediate response, even if the outcome was not as desired.

Lessons

The first lesson is one that I thought supervisors all knew: rapid growth is a red flag. Institutions that are growing rapidly should be looked at with particular care. A rapidly growing institution is doing something different from what it did before. This is not necessarily bad, but it is potentially risky and should trigger increased scrutiny. At one time, a decline in the leverage ratio, the ratio of capital to total assets, was considered a warning signal of rapid growth. Today the leverage ratio tends to be ignored in favor of risk-based capital ratios, which may not pick up the growth in certain asset categories. A fast-growing bank is often resistant to advice. The stock price may be rising rapidly - at least in the early stages - and management is self-confident.

I think too much emphasis is placed on risk-based capital measures and too much reassurance is taken from banks being "well capitalized." Risk-based capital measures were developed to distinguish between banks that have asset portfolios composed of risky investments, such as commercial construction loans, and ones with assets carrying little credit risk and to penalize the former relative to the latter. The ratios provide valuable information but being "well capitalized" is commonly used to indicate that banks and banking systems are well-managed and low risk. As SVB's failure shows, the risk-based measures do not capture interest rate risk or risk on the liability side of the balance sheet. More generally, bank capital ratios, however measured, tend to be low compared to what can go wrong in a crisis.

Despite supervision's apparent failure in the case of SVB, I think we need stronger, more focused prudential supervision, rather than more regulations. We need to ensure that banks follow practices and policies that limit the risks posed to depositors' funds and to borrowers. Supervisors must exercise their judgment and possess both expertise and the clout to deal with senior bank executives. At the same time, supervisors cannot run the bank. Achieving the right balance is a big challenge. I fear that adding more regulations and giving banks more obligations will distract them from identifying and managing key banking risks and shift the focus to covering all bases.

I think most people favor market discipline in concept. We do not want to encourage excessive risk-taking by protecting banking customers, and sometimes bank management, from adverse outcomes. Nevertheless, for a long time, we have been willing to protect individual depositors - up to some limit - and to spare them from the need to evaluate the

[2] In the *Wall Street Journal* (Andrew Ackerman and Dave Michaels, March 20, 2023) and *New York Times* (Jeanna Smialek, March 19, 2023.)

soundness of their banks. We have looked to the stock market, institutional lenders, and large depositors to exert discipline. We have expected that banks with good risk-management practices will be rewarded with strong growth and high stock prices, while banks taking big risks will be deprived of funds and will fade away – gradually. But as SVB's experience shows, market discipline can be brutal and collateral damage can be extensive. This was also the case in the Global Financial Crisis. The problem then was runs on the shadow banking system via the repo market, more than withdrawals of deposits from banks. But the essentials were the same. Investment banks that had relied on short term loans to finance longer-term assets, found large, sophisticated lenders deserting them en masse when these assets became less liquid. In today's world, the larger and more sophisticated institutions may be the first to see problems and the first to flee.

Are there alternatives to the current banking system? That topic is beyond the scope of this observation. But as noted at the outset, banks play valuable roles in making liquidity available to depositors and providing loans to households and smaller and medium-sized businesses. Alternative approaches have to address these needs.