

## Box 3: Financial Stress in the U.S. Banking System and a Stress Test of Credit Institutions' Capital Adequacy

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After the 2008 financial crisis, the U.S. Federal Reserve (Fed) drove the benchmark interest rate to historically low levels that became more pronounced in the wake of the covid-19 pandemic. At the same time, starting in March 2020 several measures to provide the market with liquidity were adopted, including the expansion of the asset purchase program in treasury and mortgage-backed securities. As a result, the Fed's balance sheet rapidly enlarged.<sup>1</sup> Given this expansionary monetary policy stance, the global financial system experienced high levels of liquidity until 2021. However, in a context of a global recovery in output and employment during 2021 and 2022 in which inflation levels and expectations for it exceeded policy targets, a sustained increase in global benchmark interest rates has been seen. Specifically, the Fed moved the rate from a range of 0% to 0.25% in March 2022 to a range of 4.75% to 5.0% in the same month in 2023. It also reduced liquidity facilities gradually by reducing the value of asset purchases as of the end of 2021 and beginning the process of reducing its balance sheet as of April 2022.<sup>2</sup> This rapid tightening of monetary policy has been accompanied by destabilizing events in regional banks in the United States due to the materialization of interest rate and market risks associated with the devaluations of their portfolios.

This box recounts the events that led to the closure of Silicon Valley Bank (SVB), Signature Bank (SB), Silvergate Bank (SGB), and First Republic Bank (FRB) in the United States. Following this, it delves into the direct and indirect consequences that said banking stress events had and could have on the Colombian financial system. Finally, a static stress test of the capital adequacy of credit institutions (CIs) in Colombia is presented to assess their resilience to the materialization of losses associated with interest rate and market risks similar to the ones that occurred in the abovementioned U.S. banks. In conclusion, when the problems of the regional banks in the United States materialized in March 2023, the CIs in Colombia were not highly exposed directly. Nevertheless, there could be indirect effects on the financial markets that might affect them. The static stress test of capital adequacy, which assumes losses due to the valuation of held-to-maturity TES at market prices in the case of a hypothetical need for liquidity on the part of CIs, shows that the system is resilient. This result is related to the fact that all CIs maintain a low exposure to TES at maturity in their portfolios since, as of February 2023, these securities only represent 6.3% of the assets of the entities exposed to these investments. Furthermore, these exposed entities represent only 19.2% of the total assets of CIs. Notwithstanding the above, the impact on the local financial system should continue to be monitored in the coming months in case of further disruptions to the international financial market.

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1 The process of balance sheet expansion through asset purchases is popularly known as quantitative easing (QE).

2 The process of balance sheet reduction is popularly known as quantitative tightening (QT).

## 1. Banking stress in the United States

Prior to the bank failures of SVB and SB, the U.S. bank SGB, which had USD 11.353 billion (b) in assets at the end of 2022,<sup>3</sup> announced the closure of their operations and their voluntary liquidation as of 08 March 2023 (Silvergate Capital Corporation, 2023a). This bank, which had specialized in the crypto sector, faced problems during the last quarter of 2022 due to losses of USD 1.049 b (9.2% of its assets).<sup>4</sup> This was mainly due to the sale of held-to-maturity debt securities at market prices to obtain liquidity<sup>5</sup> in a context of unfavorable results in the crypto-asset markets, the bankruptcy of FTX,<sup>6</sup> and the massive outflow of depositors given the reduced confidence in this institution that resulted from these disruptions. Total deposits from digital asset clients went from USD 11.9 billion (b) in the third quarter to USD 3.8 b in the fourth quarter. In addition, during that period, approximately USD 150 m of the entity's deposits belonged to customers who had filed for bankruptcy (Silvergate Capital Corporation, 2023b).

As for SVB, their assets amounted to USD 209.026 b as of December 2022 thus making it the sixteenth largest bank in the United States (Federal Reserve System, 2022). Compared to the last quarter of 2020 when the assets registered USD 113.839 b (Federal Reserve System, 2020), the December 2022 value represented a significant growth that was accompanied by an increase in holdings of long-term treasury bonds and mortgage-backed securities, which accounted for about 55.0% of its assets at the end of 2022 (Silicon Valley Bank, 2023a). The asset trend was driven by the increase in deposits which totaled USD 175.4 b at the end of 2022 (Federal Deposit Insurance Corporation, 2023). The growth in deposits, in turn, was explained by the strong performance of SVB's depositors who were mostly non-traditional clients, such as technology-related startups and venture capital firms. However, less favorable results in the technology and cryptocurrency sector, the drying up of venture capital funding for this sector and the increased liquidity needs of depositors in a context of high interest rates resulted in the entity facing an accelerated process of bank withdrawals.

To raise cash to cover deposit outflows, SVB attempted to raise new capital through a public share offering for an estimated USD 2.25 b on 08 March 2023,<sup>7</sup> but this was not successful. At the same time, the company reported the sale of USD 21 b in fixed-income securities, which represented losses of USD 1.8 b (Silicon Valley Bank, 2023a). In addition, the potential losses for the total securities held-to-maturity if valued at market prices during the fourth quarter of 2022 were estimated to be around USD 15 b (Federal Reserve System, 2023b). This revealed a deficient management of interest rate risks since the entity did not have hedges to mitigate its wide exposure to fixed rate, long-term bonds. This, together with the high concentration of deposits made by wholesale customers, 93.8% of which were not insured by the Federal Deposit Insurance Corporation (FDIC) (Standard & Poor's, 2023),<sup>8</sup> intensified depositors' widespread concern about the institution's liquidity and capital adequacy position. This occurred although, even after the sale of securities for USD 21 b, SVB complied

3 Federal Reserve System (2022). By asset size, the entity ranked 128th in the U.S. banking system.

4 Investing.com (2022). According to Silvergate Capital Corporation (2023b), the sale of assets and derivatives (available-for-sale and held-to-maturity) totaling USD 5.2 b during the fourth quarter represented a loss of USD 718 m.

5 In accordance with Chapter 1, paragraph 3 of the Basic Accounting and Financial Circular (SFBC) of the Office of the Financial Superintendent of Colombia (FSC), "bonds or securities and, in general, any type of investment for which the investor has the intention and the legal, contractual, financial, and operating capacity to hold to maturity are classified as held-to-maturity investments. The purpose for holding the investment corresponds to the positive and unequivocal intention to not dispose of the security." In contrast, available-for-sale securities are those that are available for market transactions and their balance sheet value must be recorded daily in accordance with their market valuation (mark-to-market).

6 FTX, one of the world's largest cryptocurrency trading platforms, entered bankruptcy proceedings in the U.S. court system as of 11 November 2022 after being exposed to liquidity problems due to customer withdrawals in the wake of alleged fraudulent fund handling and risk management deficiencies. In response, the U.S. Securities and Exchange Commission (SEC) charged founder and CEO Sam Bankman-Fried with fraud in a statement issued on 13 December 2022.

7 In SVB's letter to investors (2022b), a public share offering was announced to raise USD 1.750 b between common shares (USD 1.250 b) and mandatory convertible preferred shares (USD 500 m). In addition, the USD 500 m capital increase by the General Atlantic equity fund in common shares was announced.

8 The amount covered by FDIC deposit insurance is up to USD 250,000.

with the regulatory minimum capital adequacy indicators.<sup>9</sup> Thus, according to the IMF (2023), only one day after the two announcements, SVB faced a bank run of around USD 4.2 b via electronic withdrawals by depositors among a wide dissemination of the bank's problems through social networks. In the midst of these problems, the California Department of Financial Protection and Innovation (DFPI) intervened on March 10 and placed SVB under the receivership of the FDIC. Thus, SVB's closure at that time was the second largest bank failure in U.S. history.<sup>10</sup>

The event described above highlights the catalytic role that social networks played in the development and speed of the bank run. This reveals a new channel through which panic events can occur and be amplified given the natural communication and coordination of depositors interconnected through such networks. In this regard, Cookson et al. (2023) found evidence that the pre-existing exposure of U.S. banks in Twitter conversations intensified the effect of market price losses and exposure to uninsured deposits on stock price declines during the SVB bank run. Furthermore, the authors noted that tweets coming from alleged startup community members and their references to possible contagion as well as the negative sentiment of the messages also reinforced the effect not only at SVB but across the U.S. banking industry.

The SVB bankruptcy event and the aforementioned effects of social networks put pressure on the liquidity of other banks with similar business profiles (IMF, 2023). SB in particular, an entity with assets of USD 110.364 b (Federal Reserve System, 2022) that specialized in the crypto sector and had exposure to the technology sector that was also facing withdrawals since the end of 2022, was largely affected by deposit runs on March 10. Faced with a loss of investor confidence in the entity and rapid declines in share value during the same day, the New York State Department of Financial Services closed SB on 12 March 2023 and made it subject to FDIC receivership. This collapse became the third largest bankruptcy in U.S. history at the time.

In the wake of SVB's failure, the FDIC initially announced that only those deposits that were insured would be protected. However, given the latent possibility of a contagion effect on the rest of the system, the Treasury Department, the Fed, and the FDIC designed a joint package of measures to address the stress scenario. Initially, the authorities declared a "systemic risk exception," which allowed the FDIC to protect all SVB and SB deposits—Treasury Department, Federal Reserve System, and Federal Deposit Insurance Corporation (2023). Subsequently, the Fed, to mitigate market risk, introduced the USD 250 b Term Bank Funding Program which makes liquidity available to institutions based on the par value of their fixed income portfolio as collateral (e.g., Treasury bonds and mortgage-backed assets), for a maximum term of one year (Federal Reserve System, 2023a).<sup>11</sup>

The stress events described above have generated an environment of uncertainty that has manifested itself in additional disruptions to the international financial system. For example, Credit Suisse, a systemically significant institution at the global level, faced a loss of public confidence.<sup>12</sup> This, coupled with other factors, such as corruption scandals and losses as a result of poor business decisions led to its closure and subsequent acquisition by UBS, one of its main competitors, for a total of USD 3.25 b on 19 March 2023.

9 Capital adequacy indicators as of 2022 adjusted by the impact of the 08 March 2023 sale of available-for-sale securities were above regulatory limits (Silicon Valley Bank, 2023a): common equity tier 1 (13.88% vs. 7.0%), tier capital (13.88% vs. 8.5%) and total capital (14.68% vs. 10.5%). In terms of liquidity risk management, in turn, SVB was not required to comply with the regulatory limit of 100% liquidity coverage ratio (LCR) under the Dodd-Frank Act.

10 The largest U.S. bankruptcy was the failure of Washington Mutual bank in September 2008. While SVB's fall in March 2023 was the second largest, it was recently surpassed by First Republic Bank's fall on 01 May 2023.

11 Using the par value of the securities, the guarantee granted is higher than what might be seen with the market prices that these securities currently have.

12 Credit Suisse experienced a significant loss of confidence after Saudi National Bank, the bank's largest shareholder (with a 10% stake) said they would not increase their investment. This resulted in a significant drop in the value of the shares (up to 30%). To support the entity, the Swiss National Bank provided emergency liquidity.

Finally, on 01 May 2023, First Republic Bank (FRB), an entity that had USD 229.1 b in assets<sup>13</sup> and USD 103.9 b in deposits as of April 13 (Federal Deposit Insurance Corporation, 2023), was closed by the DFPI and placed under the receivership of the FDIC, which entered into a purchase agreement with JPMorgan Chase Bank. This institution, which suffered the second largest bank failure in U.S. history, was highly exposed to deposit withdrawals due to the fear of contagion from the events at SGB, SVB, and SB upon the rest of the U.S. banking system. Specifically, excluding the USD 30.000 b that the entity received on 16 March 2023 in uninsured deposits from large US banks to strengthen its liquidity position, FRB faced a USD 102.024 b drop in its deposits during the first quarter of 2023 (First Republic Bank, 2023).

The stress conditions in the United States reflect the vulnerabilities to which the global financial system may be exposed in an environment of rising monetary policy rates. Although the events described above did not have a direct impact on most emerging countries, and thus contagion seems limited, the need for greater supervision and monitoring by regulatory entities to strengthen risk management and ensure confidence in the system is evident given the context of high interest rates and the catalytic role of social networks (IMF, 2023).

## 2. Impacts on the Colombian financial system

As for the direct impact on the Colombian financial system, Colombian banks did not have direct equity investments in the affected entities in the United States. The available information also indicates that the portfolio granted to foreign financial sector entities,<sup>14</sup> where U.S. companies would be classified, is low. Specifically, this portfolio amounts to COP 3.4 billion (b) as of December 2022, which represents 1.0% of the commercial portfolio of CIs.<sup>15</sup> The CIs' foreign funding, in turn, had no lines of credit with any of the affected entities in the United States as of 31 March 2023,<sup>16</sup> and no significant deposits related to these entities were identified. Last of all, non-banking financial institutions had no direct investments in anything issued by the affected banks in the U.S. as of March 2023.<sup>17</sup> In summary, the direct impact of SVB, SB, and SGB bankruptcies is small.

However, it is possible that the disruptions seen in the U.S. financial market may have an indirect impact on the Colombian system through second-round effects on market conditions, on other foreign entities, or on increased risk aversion. Financial instability events have affected expectations about the Fed's rate hike cycle which could affect future market conditions. With respect to the second-round effects on other financial institutions, the announcements of support by the authorities in the United States have made it possible to limit such effects. Regarding the possible increase in the perception of risk, the results of the Survey of external debt and credit lines done by *Banco de la República* focused on a representative sample of banks that contract foreign debt, showed that local banks continued to perceive that foreign institutions were highly willing to grant them credit during the first quarter of 2023.<sup>18</sup> Moreover, in this version of the survey, entities were asked whether they perceived any effect on market liquidity in March due to the events in the United States and Europe. In response, 87.5% of those surveyed stated that they were not affected. Nonetheless, this is a situation that should be continuously monitored in the com-

13 The bank had USD 212,639 m in assets at the end of December 2022, which made it the fourteenth largest bank in the United States (Federal Reserve System, 2022).

14 Defined as companies belonging to the sector and without a TIN in Colombia.

15 Information from format 341, "Individual Report by Debtor: Active Credit Transactions" of the FSC as of December 2022.

16 In accordance with External Circular 025/23 April 2002 issued by the FSC, financial entities must report their foreign debt to *Banco de la República* by counterparty.

17 Information from format 351, SFC's "Breakdown of investment portfolio" as of 31 March 2023.

18 See the Report on the recent change in the foreign indebtedness of Colombian banks for March 2023 at the following link: <https://www.banrep.gov.co/es/informe-sobre-evolucion-reciente-endeudamiento-externo-bancos-colombianos-marzo-2023>.

ing months in case of new disturbances in the international financial market.<sup>19</sup>

### 3. Static Stress Test of CI Capital Adequacy

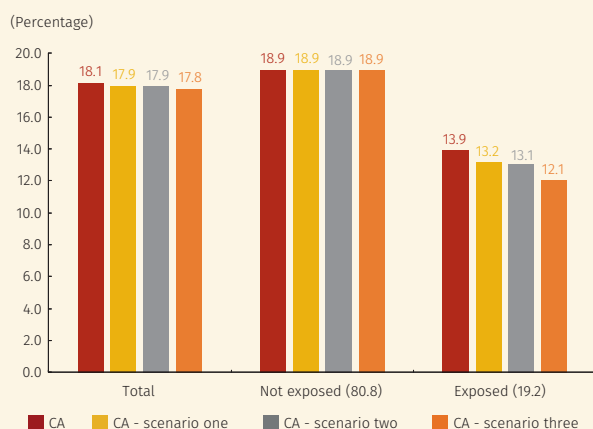
In line with the bank failures in the United States and the financial uncertainty in a context of high interest rates, a static stress test was done for CIs to quantify the impact on total capital adequacy in the event that interest rate and market risks materialize. Specifically, three adverse scenarios of varying intensity were considered in which the entities had to realize the losses caused by the valuation of non-tradable TES (investment at maturity) at market prices. This would increase the value of the market risk incorporated into the calculation of total capital adequacy. Furthermore, the devaluation of securities caused by the effect of their transfer to the accounts of marketable securities would affect the equity level. For this exercise, the CI balance sheet information as of February 2023 was used as were devaluation shocks that were built based on the shift of the zero-coupon TES curve seen during the second half of 2022, a period characterized by historically high devaluations. The scenarios of devaluation of TES holdings along the curve are as follows:

- Scenario 1: The CIs experienced a devaluation in line with the average seen in the period under review (-3.0%).
- Scenario 2: The CI's devaluation is in line with the maximum for the period under consideration (-4.4%).
- Scenario 3: The CIs experienced a devaluation of 15.0%. This scenario is the most severe and represents an unlikely event.

The results suggest that, in the scenarios analyzed, the aggregate total capital adequacy (CA) is likely to remain well above the regulatory limit (9.0%, Graph B3.1). With respect to the most adverse scenario this might represent only a slight drop of 0.3 percentage points (pp) in the indicator. For the group of exposed CIs, the impact would be 1.8 pp in the most severe scenario and would remain above the regulatory limit. The above results are due to the low participation of held-to-maturity TES with respect to the assets of the exposed entities (6.3% as of February 2023) and to the fact that these entities represent 19.2% of the total assets of the CIs as of February 2023.

These results reflect the low exposure of CIs to these types of assets, which has been consistent with liquidity risk management because held-to-maturity investments are not part of the liquid assets that are quantified for the calculation of short-term liquidity through the liquidity risk indicator (LCR) and structural liquidity through the net stable funding ratio (NSFR). Thus, CIs have less incentive to increase their investments to maturity in TES since these do not favor their liquidity position.

**Graph B3.1**  
Total Capital Adequacy of CIs in the Context of Non-negotiable TES Devaluations (February 2023)



Note: "Exposed entities" refers to the CIs that had held-to-maturity TES within their asset portfolio as of February 2023. The percentage of assets the entities hold with respect to the total number of CIs classified in the "Not exposed" and "Exposed" groups is shown in parentheses.

Source: Office of the Financial Superintendent of Colombia; calculations by Banco de la República.

19 See the "Market risk" section in Chapter 2 of this Report.

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