Box 3
Resilience of the Colombian Financial System: Analysis Based on the Recent Period of Banking Stress in the U.S.

The U.S. financial system experienced a period of stress during March 2023 in which several regional banks including First Republic Bank, Silicon Valley Bank, Signature Bank, and Silvergate Bank, etc., were affected.[1,2] The collapse of these institutions had multiple causes and exposed the potential effects of a strong relaxation of the financial regulation to which these institutions were subject. This was reflected in the balance sheet structure of the entities where there was a high exposure to Treasury bonds that were carried on the books as held-to-maturity securities within the assets of these institutions,[3] a position that was mainly funded through demand deposits highly concentrated in U.S. technology companies. On the asset side, these entities held securities that had been devalued as a result of the Federal Reserve (Fed) funds rate hike while, on the liability side, they had demand deposits whose depositors were institutional clients who accounted for a significant amount of funds and for whom there were no restrictions on making withdrawals at any time. In addition, these institutions did not have minimum liquidity requirements measured by the short-term liquidity risk indicator (LCR) and the net stable funding ratio (NSFR) that are designed to limit exposure to massive withdrawals in periods of stress. These types of regional banks were not subject to compliance with liquidity and capital adequacy standards in accordance with international guidelines, known as the Basel III principles. In the case of the United States, requirements of this type are applicable to the largest financial institutions. The public's loss of confidence in the respective institutions also led to massive withdrawals which, in turn, led to the insolvency of the affected institutions.

In Colombia, unlike what is established in the financial regulation for these regional banks, all credit institutions (CIs) must comply with Basel standards, without exception. These standards serve as a reference for proper banking regulation and supervision.[4] They also constitute a set of minimum standards that countries follow and which are used and monitored by the International Monetary Fund (IMF) to periodically measure the situation of each country's financial system as well as the quality of regulation and supervision.[5] In the case of Colombia, for example, securities held to maturity do not represent a significant share of CIs' assets,[6] and liabilities are diversified between demand deposits and longer-duration securities such as CDs and others, and this reduces exposure to liquidity risk.

---

1 The assets of these banks were USD 229,100 million (b) for First Republic Bank, USD 209,026 m for Silicon Valley Bank, USD 110,364 m for Signature Bank, and USD 11,353 m for Silvergate Bank.

2 For more details on the situation that led to the collapse of these entities, see Box 3: "Financial Stress in the U.S. Banking System and a Stress Test of Credit Institution Capital Adequacy," published in the Financial Stability Report for the first half of 2023.

3 In accordance with Colombian regulations, CIs have the possibility of accounting the bonds they acquire as held-to-maturity securities. This means that the value of the security is registered based on the valuation made at the time of purchase, and the gains produced by the yields of the security are accounted for on the maturity date instead of registering it as a negotiable security. In this situation, the CI has to value the security based on the interest rate in effect in the market and periodically assume the losses or gains resulting from variations in the market rate.

4 The Basel principles serve as a reference for proper banking regulation and supervision. They constitute a set of minimum standards followed by countries and which are used and monitored by the International Monetary Fund (IMF) to measure and supervise the financial risks incurred by countries in different jurisdictions. For more information on the application of this regulation in the case of Colombia, see the document "Road to Basel: Strengthening Financial Regulation in Colombia", available at: https://www.asobancaria.com/2023/06/13/edicion-1380-road-to-basel-fortaleciendo-la-regulacion-financiera-en-colombia/

5 These standards are monitored by the IMF in its specialized reviews, called financial system stability assessment reviews (FSAP), in which local regulation is evaluated.

6 According to Colombian regulations, banks, financial corporations, financial cooperatives, and finance companies are defined as CIs.

This box presents several exercises that suggest that, in the event of a scenario similar to the one seen in the United States, the Colombian banking system would be resilient enough to face these risks. In other words, CIs would have the necessary funds to meet the requirements of their clients and capital losses in the event of a negative scenario. This is due, in large part, to the high standards in terms of financial regulation that allow Colombia to have a proper financial stability framework and a conservative balance of CIs.

The results show that, in the Colombian regulatory environment where CIs must comply with the regulatory limits established under Basel III standards: 1) the potential impact of reclassifying some investments, which would imply valuing them on a daily basis and not simply when purchased, would be low in terms of CI capital, and this would keep them above the regulatory minimums; 2) liquidity levels are sufficiently high to withstand a strong outflow of demand deposits by the main customers of each financial institution given the adoption of short-term and structural liquidity indicators; and 3) there has been a decrease in the exposure of CIs to the interest rate risk of the trading book in the last six months, which means that increases in interest rates have had less impact on the balance sheet of the CIs. In general, it can be seen that the liquidity and insolvency risks that were exacerbated in some regional banks in the United States are limited by the financial regulation governing CIs in Colombia.

1. Capital adequacy risk

According to current regulations, Colombian CIs must comply with a minimum total capital adequacy level of 9.0%. This means that the share of equity they must have on their balance sheet to back their risk-weighted assets (with riskier assets having a higher weight and less risky assets having a lower weight) must be at least that amount. Since the implementation of this regulation in the mid-1990s, CIs have complied with this indicator. In addition, the local regulation integrates the concepts of Core Equity Tier I, Additional Tier I and Tier II that are part of the Basel III recommendations. With the issuance of Decrees 1477/2018 and 1421/2019, in turn, entities had complied with a regulatory limit equivalent to 3.0% on leverage ratio as of January 2021. This restricts the level of risk that can be taken by these entities.

In order to measure the impact of an event similar to the one presented in the United States on the Colombian financial system, a stress test was done for the CIs. The goal was to quantify the effects on capital adequacy risk the entities would face if there were significant changes in market interest rates that would generate devaluations in their portfolios were to 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-negotiable TES (investment at maturity) at market prices.[7]

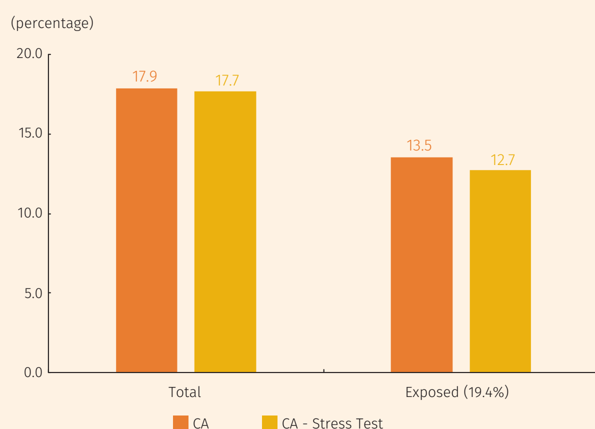
For this exercise, the CI balance sheet information as of March 2023 was used and a devaluation shock was built based on the shift of the zero-coupon TES curve seen during the second half of 2022, a period characterized by historically high devaluations.[8] In this scenario, the CIs experience a devaluation based on the maximum for the period considered (-4.4%).

The results suggest that, based on data from March 2023, in the scenarios analyzed, the aggregate total capital adequacy (TCA) is likely to remain well above the regulatory limit (9.0%, Graph B3.1). This is largely due to the fact that the TCA of the CIs at the beginning of the year is at a level of 17.9% which is almost double the regulatory minimum established in the Colombian regulations. This makes local CIs resilient to these types of shocks. A more detailed analysis of the results of the exercise shows that the TCA indicator in the stress scenario is likely to decline 0.2 percentage points (pp) for all CIs. Moreover, for the group of exposed CIs, the impact would be 0.8 pp 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

7 This would increase the value of the market risk incorporated into the calculation of capital adequacy. Furthermore, the devaluation of the TES that were originally accounted for as held-to-maturity securities would reduce the technical equity of the institutions as a result of their reclassification to marketable securities.

8 For more detail on this exercise see Box 3: "Financial Stress in the U.S. Banking System and a Stress Test of Credit Institution Capital Adequacy" published in the Financial Stability Report for the first half of 2023.

Graph B3.1
Static Stress Test of Capital Adequacy



Source: Financial Superintendency of Colombia; calculations by *Banco de la República.*

assets of the exposed entities (3.6% as of March 2023), and to the fact that these entities represent 19.4% of the total assets of the CIs as of March 2023.

2. Liquidity Risk

Liquidity risk is defined as the possibility that a financial institution will not be able to meet expected and unexpected cash flows within a time horizon (usually thirty days) using the assets at its disposal. In the United States, in the absence of regulations that would require regional banks to measure and manage their liquidity risk, the latter concentrated on illiquid assets, i.e. assets that cannot be easily and immediately exchanged for cash, while their liabilities were mainly made up of demand deposits from institutional clients belonging to the technology sector that, by their nature, could be withdrawn at any time. Given the above, a fragile situation such as that suffered by Silicon Valley Bank in March, when the assets held by the institution were not sufficient to meet the projected withdrawals (and which, consequently, led to losses on securities held to maturity), led to a loss of confidence among institutional depositors who tried to withdraw the funds they had in demand deposits immediately. Since these funds represented large amounts that were not insured by the Federal Deposit Insurance Corporation (FDIC)[9] and were highly concentrated, they ended up exacerbating its situation and finally led this bank to insolvency.

In Colombia, among different aspects of liquidity regulation in the economy, there is the Liquidity Risk Management System (Sistema de Administración del Riesgo de Liquidez, SARL) that CIs, brokerage firms, and collective investment funds (FICs) must follow and comply with. Specifically, CIs must comply with the short-term liquidity risk indicator (LCR) and with a structural liquidity indicator or net stable funding ratio (NSFR). While the LCR requires the financial institution to manage its liquidity risk over a horizon of up to thirty days, the NSFR requires management to take into account more detailed characteristics of the entity's balance sheet (terms, counterparties, amounts, liquidity or uncertainty) in order for CIs to maintain a stable funding profile with respect to the breakdown of their assets, which is why it is recognized as a structural liquidity indicator.[10] In addition, both indicators follow Basel guidelines, the international benchmark for financial regulation standards.

The situation seen in the United States underscores the relevance of having an active liquidity risk regulation that allows for the monitoring of CIs in order to detect any kind of vulnerability or warning signal. Specifically, it turns out to be important to analyze the diversification of CIs' deposits. In the case of Silicon Valley Bank, the share of deposits held by institutional clients was close to 90%. In Colombia, on the other hand, the demand deposit concentration of CIs' five main clients represents 6.7% of liabilities, on average, and when the top fifty demand deposit clients are considered, they represent 12.3% of liabilities, on average.

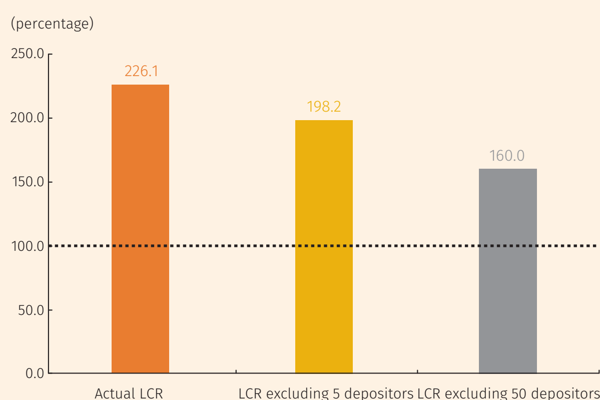
9 The FDIC is a U.S. government institution that fulfills the role assigned to Fogafin in the Colombian institutional framework and serves as an insurer of the deposits of U.S. financial consumers and protects their balances up to a maximum of USD$250,000.

10 *Banco de la República* also has indicators that measure liquidity risk by the CIs' currency (EI and IEC).

In order to assess the resilience of the CIs, a stress test was done in which the LCR of each institution as of 26 May 2023 was taken and their new levels were determined under two hypothetical stress scenarios: 1) withdrawal of the five largest clients' demand deposits, and 2) withdrawal of the fifty largest clients' demand deposits.[11] Only CIs with an actual LCR of less than 400% are considered in this exercise.[12] The results of the exercise show that the CIs' average LCR, which initially stood at 226.1%, would be 198.2% in the first scenario and 160% in the second scenario (Graph B3.2). Thus, the aggregate indicator in both cases would probably be above the regulatory minimum of 100%. This is evidence that the CIs have sufficient liquidity margins to face the adverse scenario considered.

In spite of the fact that the LCR, by construction, poses a stress scenario for demand deposits by making CIs assume a heavy withdrawal of these deposits within the calculation of unanticipated funds outflows, these results show the importance of monitoring the performance of the main counterparties of CIs, especially during transitory episodes of financial stress that are accompanied by the high uncertainty that economic agents are experiencing.

Graph B3.2
LCR Stress Test (withdrawal of demand deposits)



Note: the dotted line represents the regulatory minimum (100%).
Source: Financial Superintendency of Colombia; calculations by *Banco de la República.*

3. Trading Book Interest Rate Risk

The Basel regulation has issued instructions on the measurement and regulation of interest rate risk on the trading book (RTILB in Spanish) since 2019. This risk faced by financial intermediaries refers to the potential loss that entities may assume when there is an increase in short-term interest rates. Given that financial intermediation is based on raising short-term funds through deposits and placing them on the market for a longer term through credit operations, a natural mismatch is generated in CIs. This natural difference in terms means that the sensitivity of the value of assets to changes in the interest rate of assets will be greater than it is for liabilities. Assuming everything else is constant, an increase in interest rates could lower the net interest margin (the difference between the return on assets versus the cost of liabilities), a risk that materialized in the case of Silicon Valley Bank when the Fed raised interest rates starting in 2022 to contain inflation.

In Colombia there have been advances in the measuring and regulation of this risk. The Office of the Financial Superintendent of Colombia (FSC) issued the RTILB regulation in 2022 to be implemented in 2024 following the Basel guidelines. Currently, CIs quantify RTILB using internal models.

One of the indicators used to quantify the RTILB is the WATM gap. This indicator measures the difference between the duration of assets and of liabilities that are sensitive to changes in interest rates weighted for different periods. In Graph B3.3 the calculation of the WATM gap for the CIs from June 2015 to June 2023 is presented. The indicator is negative and thus suggests that an increase in interest rates nega-

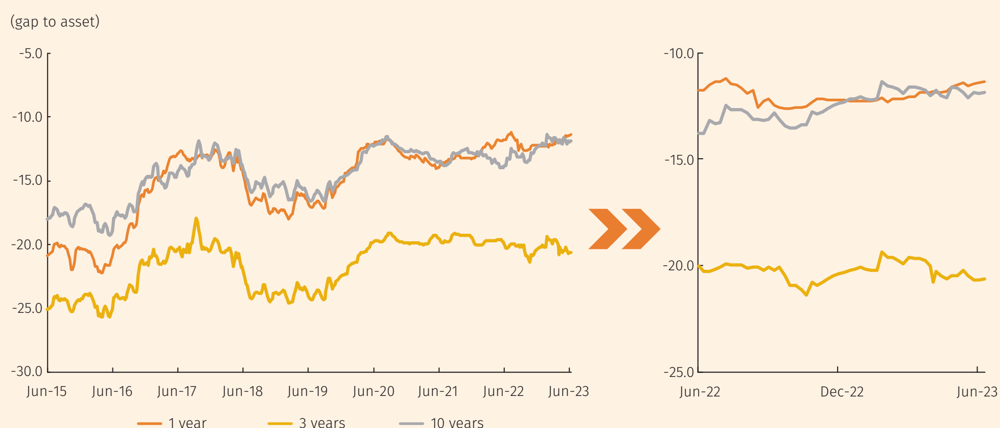
11 The behavior of each depositor over the last two years is taken into account, in terms of the variation of their stock. Thus, the shock per depositor is assumed to be a withdrawal in a proportion equivalent to the 5th percentile of the distribution of withdrawals during this period. This means that the depositors withdraw 64.0% of their balance in the first scenario and 68.6% in the second scenario.

12 Since those institutions with a higher LCR have a business structure that makes them more robust in terms of liquidity.

tively affects the CIs' intermediation margin. Note that since mid-2019, CIs have gradually reduced the WATM gap which suggests a lower exposure to RTILB. This reduction is mainly due to a decrease in the duration of assets and a lengthening of the duration of liabilities, largely due to the implementation of the NSFR. This reduces the maturity mismatch of CIs and, therefore, their sensitivity to future increases in interest rates.

Note that the CIs have adjusted the duration and make-up of their balance sheet in line with the monetary policy rate cycle since June 2022 which reduces their exposure to the RTILB. This is due to the fact that under a negative WATM gap, an increase in interest rates reduces the net interest margin. This performance is also largely the result of compliance with liquidity risk regulations (LCR and the stable funding ratio) that encourage CIs to maintain a level of liquid assets that exceeds net requirements in the short term.

Graph B3.3
WATM gap by Maturities



Note: corresponds to the total value for the CI. 4-week moving average.
Source: Financial Superintendency of Colombia; calculations by *Banco de la República.*

4. Conclusions

The period of stress experienced by the U.S. financial system during March 2023 revealed the effects of the easing of financial regulation enjoyed by regional banks. In Colombia, the financial system has a conservative balance sheet structure in addition to local regulations that measure and regulate capital adequacy and liquidity risks. This regulation includes the implementation of the NSFR and the valuation at market prices of all deposits subject to compliance with local liquidity risk indicators. The FSC also issued a regulation on measuring the interest rate risk of the trading book to be implemented in 2024. This incorporates, along with other items, interest rate shocks along the yield curve and quantifies this risk in terms of capital and net interest margin, which will allow for a more accurate and prospective measurement. Because of local regulation, local entities are resilient in a stressful situation such as the one seen in the United States.