

Box 6: Liquidity Risk Management in Foreign Reserves

Banco de la República, in fulfillment of its constitutional mandate to manage foreign reserves, conducts this activity in accordance with the criteria of safety, liquidity, and return established by Law 31 of 1992. This box aims to explain liquidity risk and its management in foreign reserves.

First, liquidity is defined as the ability to convert an asset into cash in the shortest possible time and at the lowest possible cost. In this context, liquidity risk refers to the difficulty of converting an asset into cash or the likelihood of incurring a loss in the process. Liquidity risk represents a constant challenge for portfolio managers, particularly for those who need to maintain liquid resources at a specific moment. The main causes of this type of risk include:

- *Asset type*: The nature of each asset largely determines its degree of liquidity. For an asset to be considered liquid, it must be traded in a market with a large number of available buyers and sellers, tight bid-ask spreads, and low transaction costs. Additionally, the transfer of ownership must occur in a secure manner and without significant operational frictions. Among the most liquid assets are cash and financial instruments that can be converted into cash immediately, such as short-term securities issued by developed-country governments, particularly U.S. Treasury bonds. On the other hand, the least liquid assets include real estate, private equity, and hedge funds.
- *Deterioration of market conditions and economic slowdown*: The socioeconomic environment and market conditions influence how easily assets can be traded. During periods of stability and economic growth, investors typically buy or sell assets with minimal price impact, supported by active market participation. Conversely, in contexts of economic contraction, especially during financial crises, market participants tend to withdraw due to increased volatility and uncertainty. This leads to wider bid-ask spreads and lower trading volumes, thereby impairing asset liquidity.

1. Liquidity Risk Management in Foreign Reserves by Banco de la República

Banrep designs and implements specific policies to maintain low liquidity risk across its investments. Accordingly, from a liquidity perspective, the investment portfolio is divided into two segments: working capital and the investment tranche.

- Working capital refers to the most liquid portion of the portfolio and is intended to cover short-term liquidity needs. In this segment, securities must be able to be liquidated within one day, except for those issued by governments or quasi-governments with the highest credit rating, which may be held for up to forty days.
- Regarding the investment tranche, eligible securities with maturities greater than one month traditionally have a broad secondary market. Additionally, a substantial portion of the reserves is invested in instruments defined as high-quality liquid assets (HQLA) in accordance with the Basel Committee on Banking Supervision (BCBS) standards. Furthermore, restrictions are applied to the various portfolios comprising the investment tranche. In general, the issuance amount of eligible securities must exceed the minimum issuance threshold required for inclusion in the Bloomberg Global Aggregate Index. This requirement varies by currency and instrument type and is intended to ensure that selected assets have sufficient market depth and liquidity. The purchase of private issuances is not permitted, and only money market instruments with maturities of less than one hundred days and CDs under forty days are held until maturity. Finally, purchases on an issuance are limited to 10% of the

total amount issued, preventing excessive concentration in individual instruments and facilitating their potential sale without significantly affecting prices.

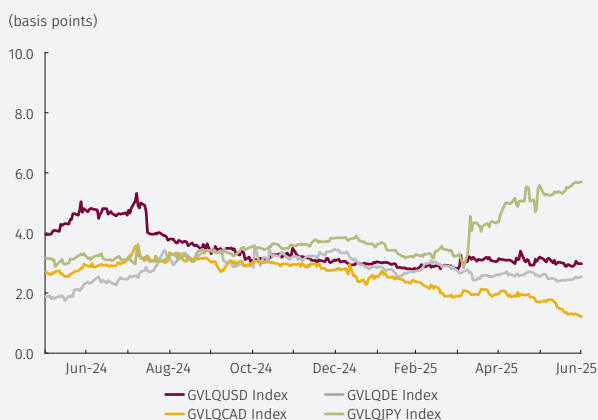
Since the COVID-19 pandemic, the rebound in volatility has translated into a marked deterioration in global fixed-income market liquidity conditions, even in traditionally deep segments. Credit spreads widened, and transaction costs increased, causing abrupt movements in asset prices. Thus, liquidity has declined to levels not seen in recent history, as reflected in various indicators, many of which have yet to return to pre-pandemic values. In response to these pronounced changes in liquidity, the International Investments Department created a team dedicated to monitoring the market’s liquidity, responsible for overseeing key liquidity indicators, analyzing publications from other central banks and international institutions, tracking and measuring the impact of proposed or approved regulatory changes across different jurisdictions, and synthesizing market-relevant news. This multidisciplinary team, with expertise in trading, risk, and regulatory analysis, ensures the dissemination of timely, data-driven information, thereby strengthening proactive risk management and strategic decision-making in an environment where stable market functioning has become a key determinant of investment portfolio performance.

Within the market monitoring and analysis framework, the liquidity team continuously tracks a set of indicators that reflect trading conditions across major sovereign bond markets. One of the main indicators is the government securities liquidity index in U.S. dollars (GVLQUSD), along with its equivalents for other markets included in the benchmark index, such as GVLQJPY for Japan, GVLQDE for Germany, among others.

These indices measure liquidity conditions in each country’s sovereign debt market by comparing the effective yield of bonds with maturities greater than one year to the theoretical yield estimated by an adjusted yield curve calculated by Bloomberg. From this comparison, an average deviation (yield error) between the observed yields and the fair-value yields projected by the curve is calculated based on the bonds’ maturities¹. In market conditions with ample liquidity, deviations are corrected through market-maker activity and arbitrage mechanisms, resulting in lower index values. In contrast, under conditions of higher volatility and limited liquidity, deviations tend to persist due to a lack of participants able to arbitrage prices, which is reflected in a higher average yield error and, consequently, a higher index value.

Thus, a high level of the GVLQUSD (or its equivalents in other jurisdictions) indicates a lower-liquidity environment, whereas a low value suggests a market where quotes are aligned with the fair value. Graph B6.1 shows the indicator’s performance across major bond markets over the past year. The United States had been exhibiting a rising trend until August 2024, when it reached a peak of 5.32, a level not seen in decades. This episode of volatility was driven by uncertainty over the future of the global economy, along with fears of a U.S. recession, and by geopolitical tensions in the Middle East. Germany and Canada, in turn, have maintained relatively low and stable levels,

Graph B6.1
Liquidity Indicator for Major Bond Markets



Source: Bloomberg

1 GVLQUSD: Government Securities Liquidity Index, Bloomberg.

suggesting sustained liquidity conditions, although the latter has shown a downward trend so far this year.

A case of particular interest is Japan. In April 2025, the GVLQJPY index exhibited a marked deterioration in liquidity conditions in the Japanese sovereign bond market. After reaching a minimum of 2.85 bps on 4 April, the index spiked sharply on 9 April, marking the start of an upward trajectory that persisted in the following months, reaching a peak of 5.70 bps in June, well above its annual average of 4.08 bps. This performance was driven by a combination of factors, including increased global risk aversion following the announcement of reciprocal tariffs by the United States, the gradual withdrawal of the Bank of Japan from its sovereign bond market interventions, domestic fiscal concerns, and weaker demand from large local holders. The lower market depth amplified yield distortions relative to the curve, hindering efficient price formation, as captured by the index's evolution.

Additionally, the liquidity team monitors the bid-ask spread, defined as the difference between the ask price (the minimum price at which a seller is willing to sell an asset) and the bid price (the maximum price a buyer is willing to pay). This spread represents an implicit transaction cost, as an investor who buys at the ask price and immediately sells at the bid price is likely to incur a loss equivalent to the spread. The size of the spread is a key indicator of market liquidity and efficiency: Narrow spreads indicate high liquidity and competition among participants, with bid and ask prices closely aligned, while wide spreads reflect lower liquidity or greater uncertainty, whether due to a scarcity of active market participants or high volatility conditions.

Liquidity Risk Measurement

The liquidity of a financial market can be analyzed from multiple dimensions, each reflecting key aspects of its functioning:

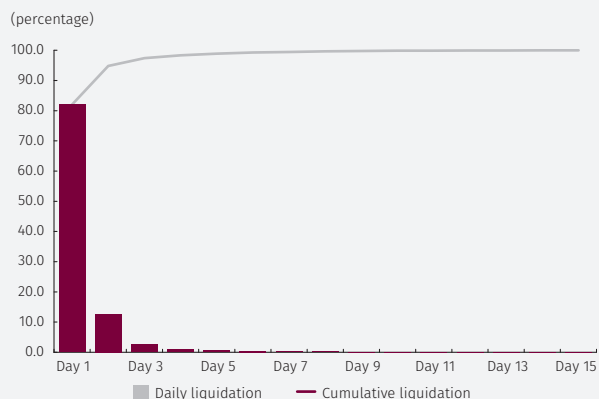
- *Tightness*: The difference between bid and ask prices. A market is more liquid the smaller this spread is.
- *Immediacy*: The speed at which buy or sell orders are executed. The higher the speed, the greater the market liquidity.
- *Depth*: The presence of a significant number of buyers and sellers.
- *Breadth*: The market's capacity to absorb large-volume transactions without causing abrupt price fluctuations.
- *Resilience*: The market's ability to correct imbalances during periods or scenarios of stress.

The literature addresses various metrics for assessing market liquidity, which are often complementary and grouped based on the dimension they aim to capture. These include—bid-ask spread, traded volume, turnover rate, the Hui-Huebel liquidity index, and market efficiency coefficient (MEC), among others.

While these metrics allow for the general assessment of market liquidity, the Bank internally implements specific indicators to characterize the liquidity profile of the investment portfolio in the context of foreign reserves:

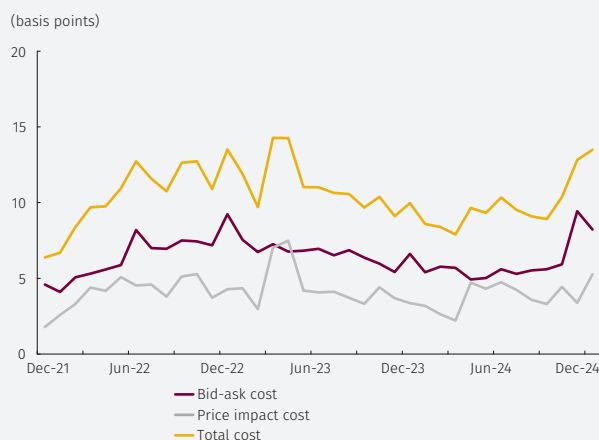
- *Portfolio liquidation time*: This aims to estimate how many days it would take to fully liquidate the investment portfolio and to determine what share of it could be sold over different time horizons. Securities in the portfolio are grouped into categories according to the market in which they are traded and their maturity. Each category is assigned, based on expert estimates, a maximum daily sale amount that can be executed without disrupting normal market conditions. Using this information, the number of days required to sell the total exposure in each security is calculated, based on the maximum

Graph B6.2
Portfolio Liquidation Time



Source: Banco de la República.

Graph B6.3
Portfolio Liquidation Cost



Source: Banco de la República.

allowed daily volume and position size. The results are then aggregated across all securities to obtain the liquidity profile of the entire portfolio. Graph B6.2 shows that, as of late December 2024, the foreign reserves investment portfolio could be liquidated under normal conditions in an estimated of fifteen days: during the first three days, approximately 97% of the portfolio could be sold (82.05% on the first day, 12.74% on the second day, and 2.61% on the third day). In this regard, the total portfolio exhibits a relatively short liquidation time, reflecting its high liquidity, and minimizing significant disruptions in market prices.

- *Portfolio liquidation costs:* This is estimated by summing up the individual liquidation costs of all assets in the portfolio. This cost accounts for the bid-ask spread of each security and potential variations in its valuation associated with the time it remains in the portfolio before being sold. The latter reflects the risk that the entire position cannot be liquidated in a single day, thereby exposing the portfolio to adverse price fluctuations. The liquidation cost is expressed as follows:

$$\text{Liquidation Cost} = \sum_{i=1}^N \sum_{t=1}^T s_i \cdot \alpha_{it} + (\alpha_{it} \cdot \sigma_i \cdot \sqrt{t}) \quad (1)$$

Where i represents each security in the portfolio, N is the total number of securities, T is the total time to liquidate each security, s_i is the bid-ask spread, α_{it} is the amount sold on day t of the security, i , t is the day on which the security is sold, and σ_i is the daily price volatility of each security. Graph B6.3 presents the evolution of the total liquidation cost, disaggregated into the bid-ask spread component and the market movement cost. It can be observed that the cost of liquidating the portfolio has remained moderate. After peaking near 15 bps in 2022, it declined to a range of 8–11 bps in 2023 and rose again to 13–14 bps at the end of 2024, still below historical stress levels.

Finally, the dominant component is the bid-ask spread, which accounts for most of the variations, while the cost due to price fluctuations remains stable below 5 bps.

It is worth noting that, in the event of liquidity needs, it is not always necessary to sell the assets comprising the portfolio, as Banrep has external contingent lines that complement liquidity risk management, such as the Federal Reserve Repurchase Agreement (Repo) Facility (FIMA) and the liquidity facility provided by the Bank for International Settlements (BIS).

In conclusion, as is the case with Banrep, effective liquidity risk management strengthens resilience to external shocks that may impact trade and financial flows by ensuring the necessary backing for the balance-of-payments required from the Bank. Likewise, controlling this type of risk helps maintain the confidence of international investors, who consider the level of reserves as an indicator of the country's ability to meet its foreign currency obligations, thereby facilitating access for both the government and the private sector to international capital markets. Additionally, it reinforces Banrep's credibility and the effectiveness of monetary policy. Finally, it ensures the availability of tools, such as foreign exchange intervention, should they be required.

References

Banco de la República (2021). Box 1: “Liquidity Indicators of Foreign Reserves.” Foreign Reserves Report, International Investment Department.

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