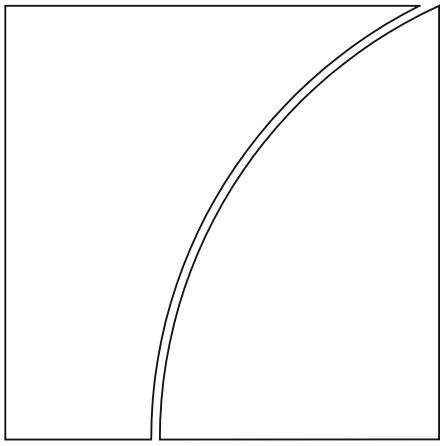


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Ready-to-run global liquidity stress tests for banks and banking systems

by Christian Schmieder, Min Wei and Li Lian Ong

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JEL classification: C63, G01, G17, G21, G28

Keywords: liquidity risk, liquidity stress testing, Basel III, global bank data, Scenario analysis

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Ready-to-run global liquidity stress tests for banks and banking systems

Christian Schmieder,[*] Min Wei,[**] and Li Lian Ong[***] [1]

Abstract

Liquidity risk remains a persistent threat to financial stability, as starkly demonstrated by the 2023 banking turmoil in the United States and Europe. Hence, the ability to quickly gauge banks' liquidity risks could prove useful especially during periods of market stress, but also to assess differences in liquidity buffers across peer economies and banks. Yet, publicly available information on banks' liquidity resilience is patchy: regulatory disclosures are limited in coverage and history, and supervisory liquidity stress tests are typically run by authorities using confidential data. To help fill this gap, our paper introduces a freely available, interactive liquidity stress-testing toolkit [2] for assessing Basel III liquidity coverage ratio-type shocks at the bank and economy level. It covers nearly 13,000 commercial banks across more than 100 economies since 2006, and incorporates pre-calibrated benchmark scenarios, pre-run simulations, and user-defined scenario options. An innovative "breakeven stress factor"—the minimum shock intensity at which a bank's net liquidity turns negative—is the central output metric. Using the tool, we find meaningful cross-country heterogeneity in liquidity resilience and persistent rank ordering over time. We also discuss how rising run-off rates in a digitalised world and growing NBFI linkages challenge existing frameworks.

Keywords: Liquidity risk, Liquidity stress testing, Basel III, Global bank data, Scenario analysis

JEL classification: C63; G01; G17; G21; G28

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[2] This toolkit could be accessed at https://www.amro-asia.org/bank-liquidity-stress-test from the AMRO official website.

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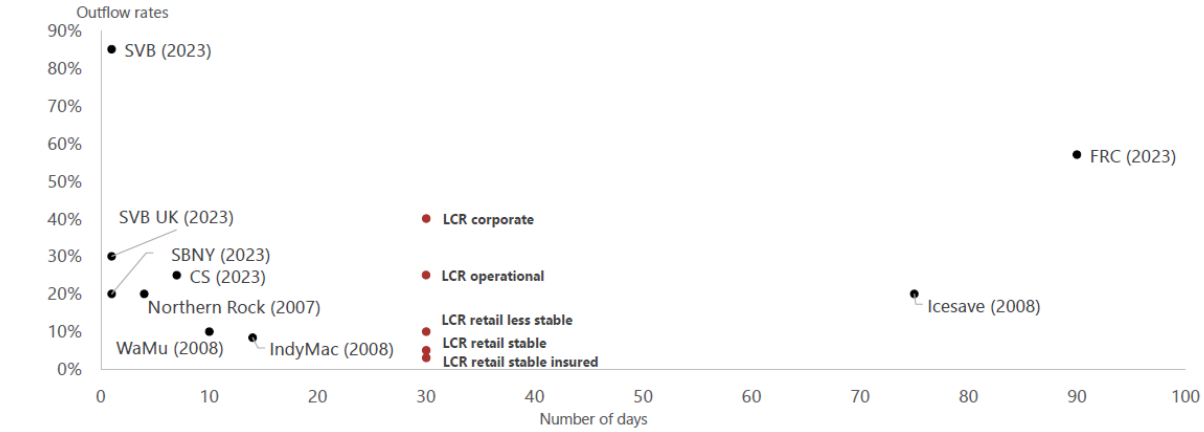
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1 Introduction

Liquidity risk remains a first-order concern for banks and supervisors. During the 2008 Great Financial Crisis (GFC) even well-capitalised institutions faced severe stress as short-term wholesale funding markets froze and bank runs accelerated. The March 2023 failures of Silicon Valley Bank (SVB), Signature Bank, and First Republic Bank in the United States, and the forced rescue of Credit Suisse in Europe, show that the speed and scale of liquidity shocks have not diminished—rather, that digital channels and social media could now compress a classic bank run from weeks and days into hours (Graph 1). These episodes reaffirm that liquidity stress can be immediate, dynamic, and capable of triggering broader solvency concerns and network-wide contagion.

Financial Crises: Distressed Banks and Liquidity Coverage Ratio Outflows — Graph 1



Source: de Cos (2026).

Note: The horizontal axis shows the number of days over which deposit outflows occurred, while the vertical axis shows the corresponding outflow rates. Black dots represent selected distressed banks, and red dots show the Liquidity Coverage Ratio (LCR) run-off rate calibrations over the standardised 30-day stress period for selected bank deposit categories. FRC deposit outflows are a conservative estimate in that they exclude $30bn of deposits placed by banks during Q1/2023. SVB outflows include expected outflows by management for 10 March. SVB = Silicon Valley Bank; SVB UK = Silicon Valley Bank UK; SBNY = Signature Bank; CS = Credit Suisse; WaMu = Washington Mutual; FRC = First Republic Bank.

A systemic pattern of correlated risk-taking compounds individual bank vulnerabilities. Bonfim and Kim (2012) document significant herding in pre-GFC liquidity risk management among large banks, driven by competitive pressures, common funding structures, and implicit government guarantees. Such herding limits the effectiveness of microprudential regulation and strengthens the case for macroprudential overlays and pre-positioned emergency liquidity facilities.

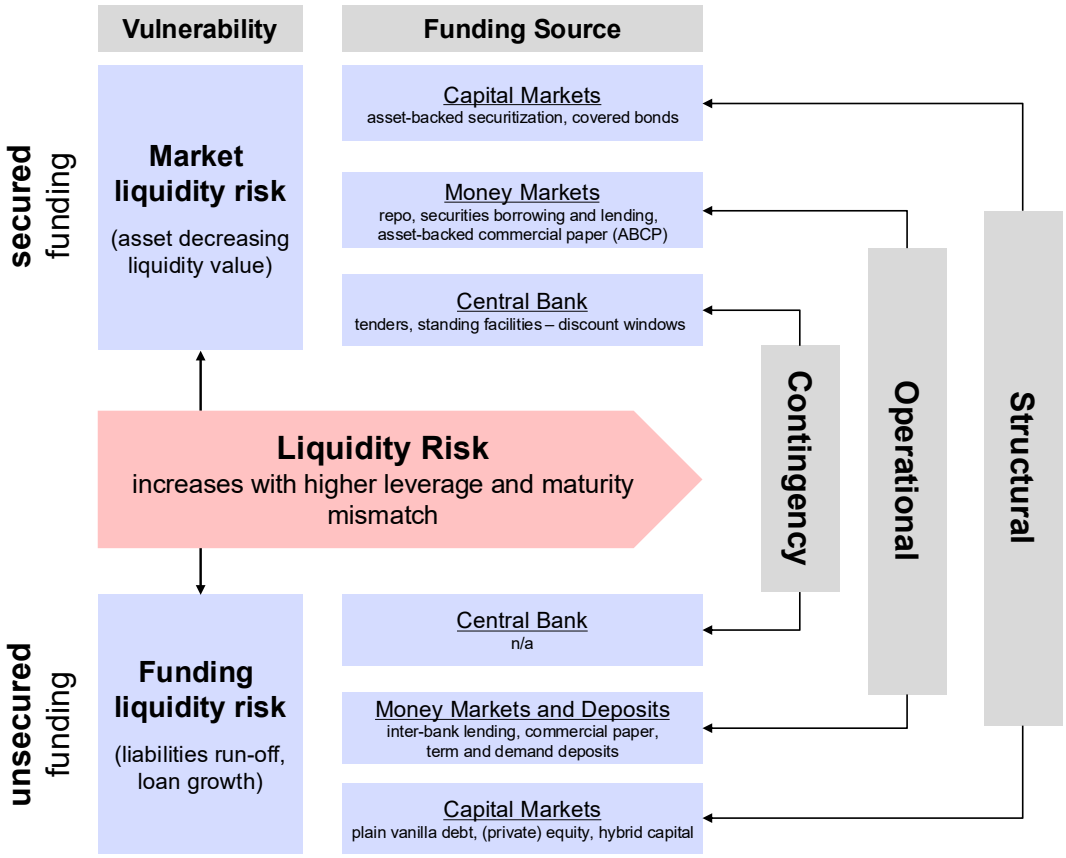
Post-2023 policy assessments reinforce these concerns. BCBS (2024) calls for the adequacy of the liquidity coverage ratio (LCR) to be re-examined, particularly its outflow calibration, given that digital channels and social media enable deposit withdrawals at speeds that the 30-day stress horizon was never designed to capture; it also emphasises the need for improved high-frequency monitoring and concentration analysis at the entity level. FSB (2024) highlights the reinforcing interaction between solvency and liquidity risks and the role of technology in altering depositor behaviour. FINMA (2023), drawing on the Credit Suisse experience, advocates for stricter entity-level requirements, more timely liquidity forecasting, and resolution planning that explicitly embeds fast digital bank-run scenarios.

At the bank level, liquidity management has both tactical and strategic dimensions. Hahn (2025) distinguishes between day-to-day net cash-flow management and structural preparedness through contingency planning and scenario analysis. Copestake, Kirti, and Liu (2023) show that advanced-economy banks remain more exposed to combined market and funding liquidity risks—owing to thinner buffers and greater wholesale reliance—than their emerging market and developing economy

peers, despite post-GFC improvements. Consequently, the authors recommend active buffer management alongside enhanced supervisory data access.

Rapid, comparable liquidity stress tests are essential for banks and supervisors alike. Jobst, Ong, and Schmieder (2020) illustrate the reinforcing interaction between funding and market liquidity (Graph 2) and emphasise assessing whether institutions can meet short-term obligations under stress by reviewing liquidity buffers, funding structures, and maturity mismatches. Routine stress testing can help shape both strategic planning and operational contingency preparation.

Conceptualisation of Liquidity Risk — Graph 2



Source: Jobst, Ong, and Schmieder (2020).

However, the tools needed to conduct such assessments across banks and countries remain limited. Supervisory liquidity stress tests draw on rich, confidential cash-flow data, but their results are rarely published and are typically not comparable across jurisdictions. Top-down liquidity stress tests, such as those conducted in IMF Financial Sector Assessment Programs (FSAPs), are run episodically for designated banking systems (Jobst, Ong, and Schmieder 2020). Public LCR disclosures, where available, are (1) largely confined to larger, internationally active banks, starting only in the mid-2010s, and (2) report a single regulatory ratio rather than banks' resilience to shocks of varying degrees of severity. As a result, there is no publicly-available, ready-to-run tool—to our knowledge—that allows analysts to compare the liquidity resilience of individual banks and entire banking systems on a consistent basis, across economies and over a period that includes the GFC.

Existing analytical frameworks fill this gap only partly. Notably:

- The Excel-based implied cash-flow framework of Schmieder et al. (2012), on which our toolkit builds, offers a transparent and flexible template, but users have to collect, clean and input bank-level data themselves, which limits its use for large cross-country samples.

- Integrated solvency–liquidity frameworks, such as the Bank of Canada's MacroFinancial Risk Assessment Framework (Anand, Bédard-Pagé, and Traclet 2014; Fique 2017) and the liquidity-at-risk approach of Cont, Kotlicki, and Valderrama (2020), capture feedback effects that we do not model, but they rely on granular, largely supervisory data and are typically applied to a single banking system at a time.
- Simple information on liquidity indicators, such as liquid-assets-to-total-assets or loan-to-deposit ratios, are widely available but are uni-dimensional and not linked to explicit stress assumptions.

Our paper further fills this gap. We have developed an open-access, top-down liquidity stress-testing toolkit, which combines broad coverage of such indicators with the scenario-based logic of stress tests, to assess vulnerabilities to short-term liquidity stress. It:

- applies one consistent methodology to pre-cleaned, consistently-categorised financial data published by thousands of banks from the near-universe of countries in the world;
- makes the results available through a web-based platform without any need for data collection by the user; and
- summarises resilience in a single metric, the breakeven stress factor.

The aim is to make systematic, cross-country and cross-bank liquidity assessments tractable for both supervisors and other stakeholders (from the private sector, public policy, and academia). Consistent with the public-good approach adopted by Ong, Schmieder, and Wei (2023), our tool is freely available to support global financial stability analysis. Major contributions of the tool include:

- Access to aggregated system-wide and bank-specific liquidity stress test outputs for a substantial share of global banking assets[3] using:
    - embedded data—consistent with contractual license obligations—that allow users to run scenarios on aggregated inputs without requiring raw data;
    - cleaned, standardised global dataset from Moody's Analytics BankFocus (hereafter "BankFocus") covering select financial information for around 13,000 commercial banks in more than 100 economies at annual frequency from 2006 onward;
- Shock scenarios with the option to tailor assumptions to specific needs, comprising:
    - pre-calibrated liquidity shock scenarios;
    - automatically updated, pre-run simulations for all banks in the pre-defined universe; and
    - flexibility for customisable stress scenarios.

Relative to existing approaches, our toolkit adds value in three ways. First, it applies a single, consistent methodology to thousands of banks in advanced, emerging market, and developing economies alike, making cross-bank and cross-country comparisons meaningful. Second, its long-time dimension, starting before the GFC, allows users to distinguish persistent, structural features of liquidity profiles from cyclical movements. Third, the breakeven stress factor turns the question, "Does a bank pass a given scenario?" into, "How severe a shock can a bank absorb?", summarising liquidity resilience in a single, intuitive number that can be compared across banks, countries and time.

Our toolkit is not meant to replace supervisory stress tests based on granular, confidential data. Rather, it offers a transparent first-pass assessment and common benchmark against which such exercises can be compared. It is best viewed as an indicator of structural liquidity vulnerability, suited to screening and peer comparisons, rather than a definitive measure of whether a particular bank could survive an

[3] Total banking assets covered for 2025 amount to approximately USD 170 trillion.

actual, fast-moving liquidity event. Like the LCR, it measures liquidity resilience vis-à-vis a pre-defined shock and is not designed as an early-warning indicator (Section 4).

The paper comprises two components: (1) Explanation of the methodology underlying the toolkit, and (2) illustration, through a set of use cases, the insights generated across our extensive dataset. The operational aspects of the toolkit are documented in the appendix section. The rest of this paper is organised as follows. Section 2 presents the conceptual framework, the data, the scenario design and the output metrics. Section 3 discusses our empirical analysis using the toolkit, centred on long-run liquidity trends, drivers of change, rank-order persistence, and the 2023 bank failures. Section 4 acknowledges the caveats and limitations vis-à-vis both our toolkit specifically and liquidity stress testing in general. Section 5 concludes with suggestions for future research in the development of liquidity stress tests. A guide to the toolkit's interactive modules is detailed in Appendix 1.

2 Concepts for liquidity shock scenarios

2.1 Framework

The idea behind the toolkit is a simple one. Under a liquidity stress, a bank loses part of its funding within a short period and must meet outflows by selling or pledging its assets. It survives the stress if the cash it can raise from its assets (or from other sources of borrowing) exceeds the funding it loses. The toolkit therefore compares two quantities over a 30-day horizon: (1) liquidity *inflows*, i.e., the cash a bank can generate by monetising its liquid assets or generating liquidity through other channels, after deducting fire-sale haircuts and excluding assets that are already pledged (encumbered) and thus unavailable; and (2) liquidity *outflows*, i.e., the funding that is withdrawn or not rolled over, obtained by applying run-off rates to each type of funding. *Net liquidity*, the difference between the two, is the bank's liquidity surplus or shortfall under stress. Note that the term "inflows" in this paper refers to this counterbalancing capacity—the capacity to generate liquidity from the stock of assets in the face of outflows, rather than contractual cash inflows as in the LCR.

This toolkit builds upon the frameworks of Schmieder et al. (2012) and Jobst, Ong, and Schmieder (2020). It implements an Implied Cash Flow Analysis—a streamlined analogue to the Basel III LCR—projecting cash inflows and outflows under stress using bank balance-sheet data. The toolkit is consistent with the broader IMF surveillance framework for systemically important financial systems described in Jobst, Ong, and Schmieder (2020), comprising four design dimensions:

- **Scope:** Our toolkit enables top-down tests across many banks using publicly available information.[4] It should capture institutions that are systemically important from a liquidity perspective, but would ideally also include other banks, depending on the respective country coverage.
- **Methodology:** We adopt a stock-based approach using balance-sheet data. On the liability side, run-off and rollover assumptions are applied by funding type. On the asset side, monetisation capacity incorporates haircuts and encumbrance rates. Liquidity and solvency interact in practice—weaker solvency raises funding costs and reduces market access—but this link is not modelled.[5]
- **Scenarios:** Scenarios should be "extreme but plausible," covering both idiosyncratic and system-wide shocks, specifying run-off rates, asset haircuts, contingent outflows, and (for longer horizons) rollover assumptions. Sensitivity and reverse stress testing help identify breakeven thresholds. We use pre-calibrated scenarios reflecting GFC-type events, capturing the range of stress experienced

[4] Top-down stress tests typically use supervisory or public aggregate data; bottom-up tests rely on banks' own internal cash-flow data, capturing institution-specific strategies but require non-public inputs.

[5] See Schmieder et al. (2012).

by banks (on both sides of the balance sheet per Schmieder et al. 2012) during major financial disruptions (Graph 1), with tailoring options for the user.

- **Outputs / metrics:**
    - The main output metrics are liquidity shortfalls, counterbalancing capacity, ratio-style indicators proxying the LCR (the so-called breakeven ratio), peer comparisons, and failure identification. We focus on the 30-day horizon and report net liquidity relative to total assets, liquid assets, and total funding.
    - A key innovation is the introduction of the "breakeven stress factor" as a central summary metric for assessing the maximum liquidity resilience capacity of an individual bank or an entire banking system. It is the minimum shock intensity (expressed as a multiple of our baseline Scenario 1 calibration) at which a bank's net liquidity falls to zero (Section 2.4).

2.2 Data

Consistent with Ong, Schmieder, and Wei (2023), our tool ingests items from annual consolidated financial statements published by BankFocus. Specifically, the dataset:

- uses consolidated data; if unavailable, substitutes with unconsolidated data;
- includes individual banks back to pre-GFC,[6] data gaps are filled via linear interpolation;
- carries forward prior-year values for late current-year reporting and auto-updates when available; does not extend data series if reporting ceases for more than a year; and
- aligns with the calendar year to harmonise reporting periods as follows:
    - For banks with fiscal year end in January–March (Q1): assigns to previous calendar year (e.g., February 2021–January 2022 as 2021)
    - For banks with fiscal year end in April–November: assigns to following calendar year (e.g., November 2021–October 2022 as 2022)
    - For banks with fiscal year end in December: no adjustment;

Stress simulations utilise two data approaches:

- The **basic approach**, which applies a single assumed haircut and encumbrance rate to aggregate reported liquid assets, and a single outflow rate to total funding liabilities—suitable when granular data are absent, but also to have a "leverage ratio" type benchmark for banks' liquidity profiles[7],
- The **granular approach**, which assigns category-specific haircuts, encumbrance rates, and run-off rates to individual asset and funding categories, yielding more refined estimates but requiring richer reporting.

Running the two approaches side by side serves two purposes. The basic approach can be applied to almost every bank in the sample, while the granular approach is more accurate where more detailed breakdowns are reported. Comparing the two provides a consistency check and supports assessments as to whether apparent vulnerabilities reflect genuine weaknesses or data limitations. Specifically, the two approaches treat inflows and outflows in the following manner:

- For inflows:

---

[6] The sample of banks is gathered as the set of commercial banks based on BankFocus categorisations. The number of banks in each economy used for this analysis could be different from the official number of banks.

[7] For bank solvency, there is an equivalent framework: a granular, risk-weighted asset metric and an aggregate metric that compares total assets to regulatory capital.

- The **basic approach** applies an assumed haircut rate and encumbrance rate to total liquid assets, approximated using the reported liquid-assets-to-total-assets ratio and total assets.
- The **granular approach** aggregates across asset categories (e.g., cash, government securities, bank bonds) with category-specific haircuts and encumbrance rates per equations (1) and (2) (Appendix Table 2.1); no haircut is applied to highly liquid assets (e.g., cash); haircuts of up to 100 percent may be imposed on illiquid assets (e.g., certain asset-backed securities or loans).

(1) $$Inflow = \sum(Asset \times Unencumbered\ Liquid\ Rate)$$

where,

(2) $$Unencumbered\ Liquid\ Rate = (1 - Haircut\ Rate) \times (1 - Encumbered\ Rate)$$

- For outflows:
  - The **basic approach** applies an assumed overall outflow rate to total reported funding liabilities.
  - The **granular approach** assigns distinct outflow rates to funding liability categories (e.g., demand and customer deposits, short-term wholesale funding), as shown in Appendix Table 2.2.

Last but not least, bank-level financial statements are filtered to exclude outliers and derive a "clean" dataset for stress testing. These outliers could consist of: (1) statements with poor data availability; (2) general outliers; and/or (3) statements with significant discrepancies between basic and granular data (Appendix 3).

2.3 Scenario design

Given that the scenarios are benchmarked against the Basel III LCR, it is useful to recall what the LCR assumes. The LCR requires banks to hold a stock of unencumbered high-quality liquid assets (HQLA) at least equal to their total net cash outflows over a 30-day stress period (BCBS 2013). Stress assumptions enter in two places:

- On the asset side, Level 1 assets (cash, central bank reserves and high-quality sovereign securities) count in full, whereas Level 2A and Level 2B assets are subject to haircuts of 15 percent and 25–50 percent, respectively, and Level 2 assets may make up at most 40 percent of the stock.
- On the liability side, run-off rates rise with the perceived flightiness of the funding source: 3–5 percent for stable retail deposits, 10 percent for less stable retail deposits, 25 percent for operational deposits, 40 percent for unsecured funding from non-financial corporates and public sector entities, and 100 percent for unsecured funding from financial institutions.[8]

Three pre-defined scenarios that differ by stress severity and empirical plausibility are run. They reflect global liquidity stress conditions observed over the past 20 years jointly on the assets and liabilities sides, notably, during the GFC and subsequent idiosyncratic episodes (per Schmieder et al. 2012 and Graph 1). For each scenario, we specify haircut and encumbrance rates for the inflow categories, and outflow rates by funding liability category, such that,

- **Scenario 1 (Adverse):** A rare event meant to be manageable in severity, slightly less onerous than the LCR, [9] and with clear historical precedents.

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[8] Appendix 4 maps these assumptions to the tool's scenario parameters; given that the tool relies on public balance-sheet data, its categories are necessarily substantially coarser than those of the LCR.

[9] In Scenario 1, the haircut rates are set at 0 percent for cash, 1.25 percent for government securities, 12.5 percent for corporate bonds, and 7.5 percent for covered bonds (see Appendix 4 for details).

- **Scenario 2 (Severe adverse):** At least as severe as the LCR calibration, which itself was designed around a combined idiosyncratic and market-wide shock informed by the GFC (BCBS 2013). Haircuts and outflow rates double those of Scenario 1; encumbrance rates are also doubled.
- **Scenario 3 (Highly severe adverse):** At least twice the LCR calibration, corresponding to stress experienced by the most affected banks and systems during the GFC, such as Northern Rock, Washington Mutual and IndyMac (Graph 1).[10] Haircuts and outflow rates are four times of those in Scenario 1; encumbrance rates are also quadrupled.

The three scenarios are therefore nested. Scenario 1 provides a baseline calibration of every haircut, encumbrance and run-off rate (Appendix 2), and Scenarios 2 and 3 multiply each of these rates by 2 and 4, respectively. Because the relative severity across asset and funding categories is the same in all three scenarios, they can be viewed as three settings of a single stress "dial", which allows us to summarise results in one number—the breakeven stress factor (Section 2.4). It should be emphasised that doubling the parameters does not simply double the loss in counterbalancing capacity—because haircut and encumbrance rates enter multiplicatively (equation 2), scaling them up reduces counterbalancing capacity non-linearly and less than proportionally, while outflows change proportionally with the assumed outflow rates.

The Scenario 1 parameters draw on Schmieder et al. (2012). We calibrate haircuts, encumbrance and run-off rates on the liquidity stress observed during the GFC, which are set such that each parameter lies close to, or somewhat below, the LCR assumptions for the most comparable categories (Appendix 4). Comparisons with the LCR hold in an overall sense rather than on an individual parameter basis. Because the toolkit's categories are much coarser than those of the LCR, there are instances in which parameters remain lower than their LCR counterparts even in Scenario 3, given the different levels of aggregation. For instance, the 50 percent run-off rate on short-term wholesale funding (both secured and unsecured) used in Scenario 3 is lower than the 100 percent for unsecured funding from financial institutions under the LCR. Likewise, we do not consider contractual inflows (given that such data are not available), which the LCR recognises up to 75 percent of total outflows.

2.4 Output metrics

For each of the three pre-defined scenarios (Scenarios 1–3), the toolkit reports inflows, outflows, and net liquidity. These outputs are normalised in three ways—as a share of: (1) total assets; (2) total liquid assets; and (3) total funding liabilities. Each normalisation answers a slightly different question:

- Net liquidity relative to total assets shows the size of the surplus or shortfall vis-a-vis the balance sheet;
- Net liquidity relative to liquid assets shows how much of the liquidity buffer would remain after the stress; and
- Net liquidity relative to funding liabilities shows how large the remaining buffer is compared with the funding that could run.

Definitions of total assets, total liquid assets and total funding liabilities follow the basic approach to ensure internal coherence between basic and granular approaches. Economy-level aggregation uses either a simple or weighted average. For the weighted approach, stock variables (e.g. liquid assets, funding) are first aggregated up to the economy level before ratio metrics are recomputed from the totals—avoiding the mechanical distortions of averaging ratios directly and better reflecting the underlying balance-sheet composition.

[10] The calibration is informed by the most severe liquidity stress events experienced by banks during the GFC episode. As shown in Graph 1, this level of stress is equivalent to those experienced by Northern Rock, Washington Mutual and IndyMac.

The breakeven stress factor builds directly on the pre-defined scenarios, which answer the question of whether a bank can withstand shocks of a given severity. The breakeven stress factor turns this question around and asks how severe a shock a bank can withstand before its liquidity is exhausted, i.e., a reverse stress test. To elucidate:

- We treat the Scenario 1 calibration as the unit of stress and introduce a scalar, *f*, that multiplies all Scenario 1 haircut, encumbrance and run-off rates by the same amount to measure severity on a single scale. For example, $f = 0.5$ would halve every Scenario 1 parameter and $f = 3$ triples each of them, while the relative severity across asset and funding categories remains unchanged.
- Because Scenarios 2 and 3 are constructed as exactly two and four times the Scenario 1 parameters (Section 2.3), they correspond to the points $f = 2$ and $f = 4$ on this scale. In other words, the values 1, 2 and 4 are not results of the stress test; they simply locate the three pre-defined scenarios on the stress scale.

Although there is no perfect correlation in the severity of the different inflow and outflow categories in reality, evidence from the GFC shows that there are common patterns. Hence, it is our view that the simulation broadly resembles what might happen under stress, as documented in Schmieder et al (2012).

The breakeven stress factor is thus estimated under the simplifying assumption that haircut, encumbrance and outflow rates move proportionally as the level of stress changes. In practice, different types of liquidity stress do not necessarily move together proportionally: a rapid deposit run with functioning markets differs from a closure of wholesale funding markets, a collateral shock, or a system-wide asset sell-off. The breakeven stress factor is designed to be: (1) a single indicator of the relative position of a bank's or banking system's maximum liquidity capacity against pre-defined, internally-consistent stress scenarios; and (2) a consistent benchmark for assessing changes in liquidity profiles over time. It should therefore be read mainly as a comparative and screening measure rather than a precise estimate of the maximum stress a bank could actually survive. The user-defined stress test module (Appendix 1) complements this approach by allowing users to design alternative scenarios and to adjust individual assumptions independently.

Specifically, the breakeven stress factor is the value of *f* at which inflows exactly equal outflows (i.e., net liquidity is zero) under this uniform scaling of all haircuts, encumbrance rates, and run-off rates. Formally, it solves equation (3), in which all rates are the Scenario 1 rates reported in Appendix 2:

$$\sum asset_i * (1 - haircut\ rate_i * f) * (1 - encumbered\ rate_i * f) = \sum funding\ liability_j * outflow\ rate_j * f \quad (3)$$

Unlike the scenario markers, the breakeven stress factor is an outcome of the analysis—it is computed bank by bank and takes continuous values. It can be read as the multiple of the Scenario 1 shock that a bank can absorb. For instance, a factor of 2.5 means that the bank's monetisable liquid assets would just cover its outflows under a shock 2.5 times as severe as Scenario 1. The higher the factor, the more resilient the bank. Economy-level factors are obtained by aggregating bank-level results using the simple or weighted approaches described above. Comparing a bank's breakeven stress factor with the scenario markers links the two types of output, such that,

- a factor below 1 means that the bank has negative net liquidity even under Scenario 1;
- a factor between 1 and 2 means that it withstands Scenario 1 but not Scenario 2;
- a factor between 2 and 4 means that it withstands Scenario 2 but not Scenario 3; and
- a factor above 4 means that it withstands all three scenarios.

Put another way, a bank with a breakeven stress factor of 4 or above should be able to withstand outflows and haircuts of the magnitude faced by the hardest-hit banks during the GFC. By contrast, the deposit outflows at SVB, Signature Bank, First Republic Bank and Credit Suisse in 2023 exceeded even

the Scenario 3 run-off rates, in some cases within days (Graph 1)—a reminder that the scale does not cap the severity of real-world events.

The various output metrics available for the pre-defined scenario stress testing reveal the sources of liquidity vulnerabilities, including whether they arise primarily from the asset or funding side of the balance sheet. Breakeven analysis estimates the maximum counterbalancing capacity and facilitates consistency checks between results derived from the basic and granular approaches. Where these two approaches produce materially different net liquidity metrics or breakeven stress factors, more thorough examination of the underlying data and balance-sheet components is needed to distinguish between genuine balance-sheet weaknesses or data availability issues (Box 1).

Interpretation of Inconsistent Breakeven Stress Factors Using Basic and Granular Data

Breakeven stress factors below unity flag potentially vulnerable banks. However, one should assess whether the weakness reflects genuine balance-sheet fragility or reporting inconsistencies in the underlying data—particularly between the granular data and basic data used in the two aforementioned approaches—before drawing conclusions on observed risks. To do this, we compare three ratios between granular and basic data estimates using the full sample and sample with vulnerable banks only: (1) the breakeven stress factor ratio (granular or basic), (2) the inflow ratio; and (3) the outflow ratio.

Under consistent and complete data reporting, total liquid assets and total funding capabilities estimated from basic and granular datasets should broadly align. Although the breakeven stress factors estimated under the two approaches may differ in level as a result of differences in assumption design and banks' asset and liability structures, they should generally provide a consistent assessment of banks' relative liquidity vulnerabilities. In other words, a bank identified as relatively vulnerable under one approach should not generally be assessed as relatively healthy under the other.

Accordingly, the distribution of the ratio between the two breakeven estimates should remain broadly similar between the full sample and the subset of vulnerable banks, given that the same two approaches are applied consistently across all banks. In practice, the stress factor ratios for banks with breakeven stress factors below unity are markedly lower and more dispersed than for the full sample (Box Table 1.1), and their inflow ratios are strongly left-skewed (Box Table 1.2)—pointing to inflow-side data inconsistencies as the primary driver of discrepancies. Outflow ratios are broadly consistent across both groups. This pattern suggests that apparent vulnerabilities at some banks may partly or wholly reflect incomplete or inconsistent inflow (i.e., liquid asset) reporting rather than structural liquidity weakness. Breakeven stress factors below unity should therefore be interpreted with caution, while banks should enhance reporting granularity and accuracy to improve reliability of liquidity metrics.

To illustrate these dynamics more concretely, four sample bank-year observations are identified to represent distinct reporting and data-quality scenarios. Differences between basic and granular data can materially change measured total inflows, total outflows, and therefore the breakeven analysis, with estimates ranging from below 1 to above 4, implying very different assessments of liquidity resilience under severe stress that could alter a supervisory assessment entirely (Box Graph 1.1). To mitigate potential distortions arising from reporting inconsistencies, this paper takes an additional step to screen and adjust observations with material inflow or breakeven misalignment between the two data approaches (step 4 in Appendix 3). This additional data-cleaning procedure aims to identify and exclude banks that appear "vulnerable" primarily due to incomplete or inconsistent data reporting, while retaining banks whose identified vulnerabilities reflect their underlying liquidity positions for subsequent analysis.

Distribution of Stress Factor Ratios Using Basic and Granular Data

Box Table 1.1

(Index)

Sample \ Percentile	10	20	30	40	50	60	70	80	90
Full	0.67	0.94	1.10	1.22	1.30	1.38	1.47	1.60	1.95
Vulnerable banks	0.09	0.18	0.26	0.37	0.52	0.79	1.36	2.87	5.37

Sources: Moodys Analytics BankFocus; and authors' estimates.

Note: The numbers show the distribution of breakeven factors obtained under the granular approach divided by breakeven factors under the basic approach. Red numbers indicate relevant similar ratios for the full sample and the sample of vulnerable banks (i.e., those with a breakeven stress factor below 1). Percentiles are generated using BankFocus data downloaded at the end of February 2026 for one-time analysis, which could be changed as new data points become available.

Distribution of Scenario 1 Inflow and Outflow Ratios Using Basic and Granular Data Box Table 1.2

(Index)

Ratio	Percentile / Sample	10	20	30	40	50	60	70	80	90
Inflow	Full	0.44	0.65	0.78	0.88	0.95	1.00	1.04	1.21	1.76
	Vulnerable banks	0.06	0.12	0.20	0.32	0.51	0.83	1.07	2.82	6.16
Outflow	Full	0.48	0.52	0.55	0.58	0.61	0.65	0.72	0.83	1.14
	Vulnerable banks	0.49	0.54	0.59	0.66	0.75	0.91	1.22	1.78	2.73

Sources: Moodys Analytics BankFocus; and authors' estimates.

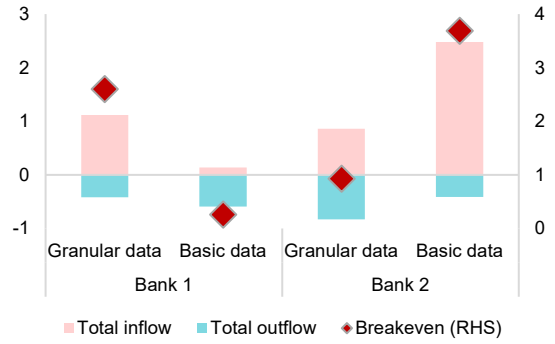
Note: The numbers show the distribution of the inflows and outflows obtained under the granular approach divided by the respective inflows and outflows under the basic approach. Red numbers indicate relevant similar ratios for the full sample and the sample for vulnerable banks (i.e., those with a breakeven stress factor below 1). Percentiles are generated using BankFocus data downloaded at the end of February 2026 for one-time analysis, which could be changed as new data points become available.

Illustration of Discrepancies in Metrics across Selected Banks Using Basic and Granular Data

Box Graph 1.1

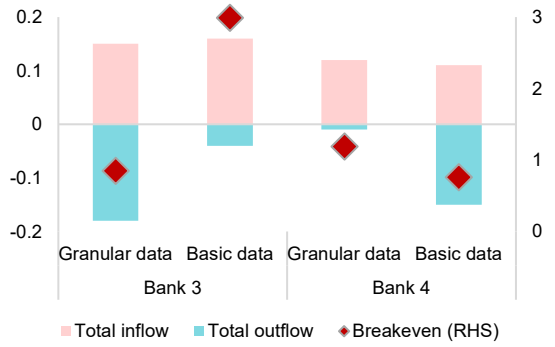
Breakeven Stress Factor Differences Driven by Inflows

(Billions of US dollars; index)



Breakeven Stress Factor Differences Driven by Outflows

(Billions of US dollars; index)



Sources: Moodys Analytics BankFocus; and authors' estimates.

1/ "Full sample" refers to the sample before step 4 filtering in Appendix Graph 3.1, and vulnerable banks are bank-year observations with breakeven stress factors below unity using either the basic or granular approach in this full sample.

3 Empirical analyses: use cases to assess banks' liquidity buffers

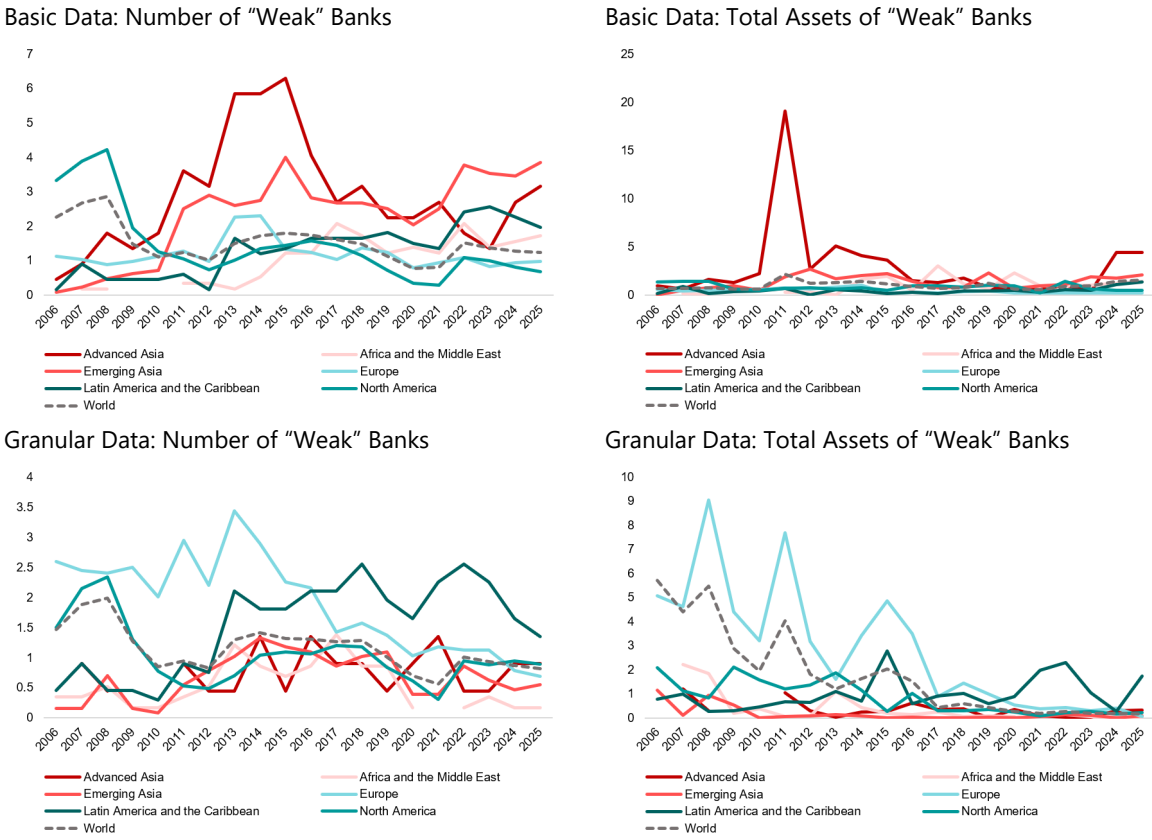
3.1 Identification of weak banks

The tool may be used to identify "weak" banks, which we define as those whose breakeven stress factors are below unity, i.e., banks that would run short of liquidity even under the mildest scenario. There appears to be considerable variation in the incidence of weak banks across regions and over time, with the basic and granular approaches also revealing somewhat different patterns:

- Under the **basic approach**, the share of weak banks generally remains low but varies considerably across regions and episodes (Graph 3, upper panels). In North America, the share by number of banks peaked during the GFC before declining substantially thereafter. Advanced Asia recorded a marked increase in the share of banks during the early-to-mid-2010s. At the same time, the corresponding asset shares remained contained, except for a sharp spike in Advanced Asia in 2011, which was driven by a single large bank whose breakeven stress factor fell slightly below unity. Overall, improvements in liquidity profiles over time appear relatively limited in most regions, in terms of both the share of the number of banks and the share of total assets; at the same time, there is no clear evidence of any increase in the share of larger banks among the weak banks.
- Under the **granular approach**, the differences in liquidity profiles become more visible (Graph 3, bottom panels). In Europe, the share of weak banks was elevated around the GFC and European sovereign debt crisis. North America shows a similar pattern to that under the basic approach. In Latin America and the Caribbean, the share of weak banks has increased more recently, particularly in terms of total assets, indicating that relatively larger banks have contributed to the recent rise. Overall, there is a stronger trend towards improvements in liquidity profiles, particularly when measured by bank size, and specifically for European banks. It is evident that the share of total assets "at risk" is lower and that larger banks and banking systems tend to be more liquid—features that are obscured by the basic approach. Persistently elevated shares in some regions reflect structural funding vulnerabilities and thinner liquidity buffers, pointing to areas where further policy attention may be warranted.

Shares of "Weak" Banks by Region — Graph 3

(Percentage of banking system)



Sources: Moodys Analytics BankFocus; and authors' estimates.

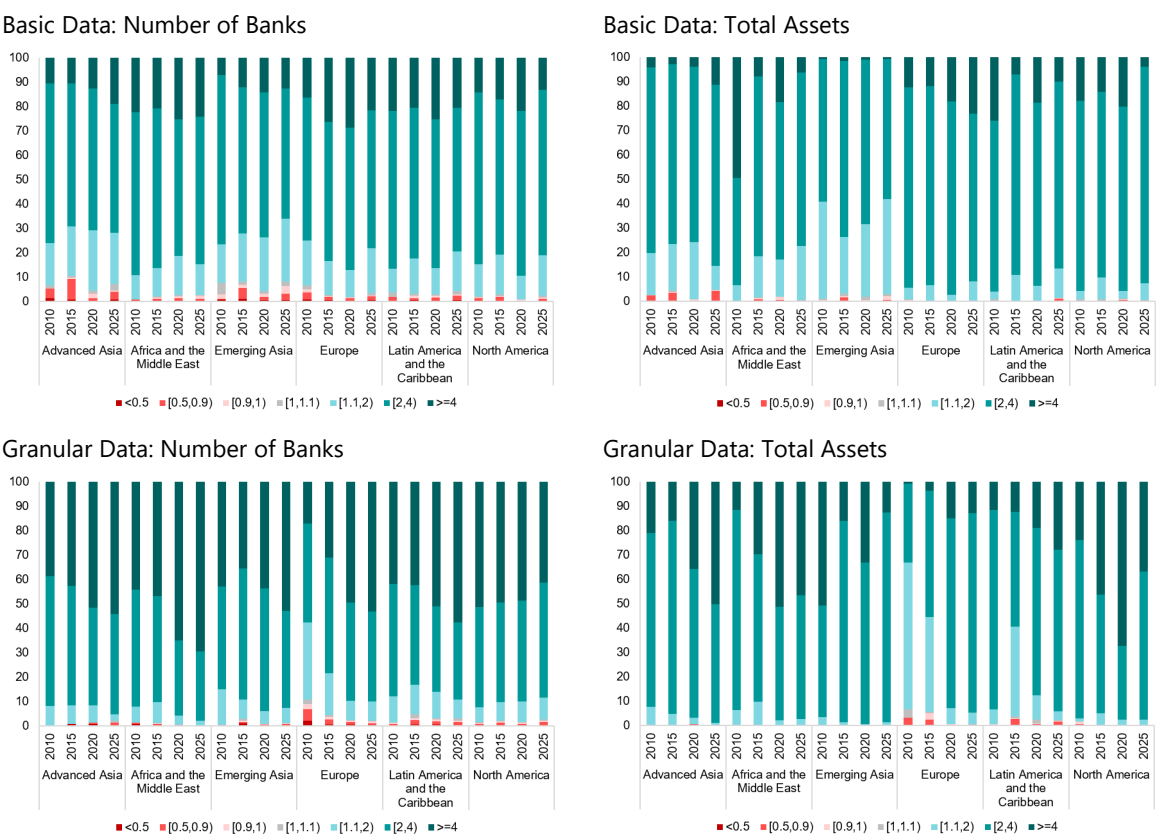
Note: The spike in the top-right chart is driven by one bank with large total assets whose breakeven stress factor fell to just below 1 in 2011.

Although an examination of identified "weak" banks could signal vulnerabilities at the bank or banking system level, a more holistic assessment considers the distribution of breakeven stress factors across banks and over time. While a breakeven stress factor below one may be a warning signal, a bank falling temporarily below this threshold in any given year may be less vulnerable than one with a persistently low breakeven stress factor at or slightly above one. For instance, a regional distribution of banks across breakeven stress factor ranges, measured by both the number of banks and their total assets may be used to support such analysis (Graph 4). In this example, most banks and banking assets have stress factors above two, albeit resilience varies across regions and over time. The granular approach generally shifts more banks and assets towards higher ranges than the basic approach, suggesting that incorporating more detailed inflow and outflow information provides a more refined assessment of banks' liquidity buffers. Overall, the distribution complements the binary measure of "weak" or "strong" banks by showing the degree of vulnerability across the distribution of banks and their capacity to withstand progressively more severe liquidity shocks.

Distribution of Banks by Breakeven Stress Factor Range

Graph 4

(Percentage of banking system)



Sources: Moodys Analytics BankFocus; and authors' estimates.

Note: Percentages are calculated based on individual bank breakeven stress factors in each region, using either the basic or granular approach.

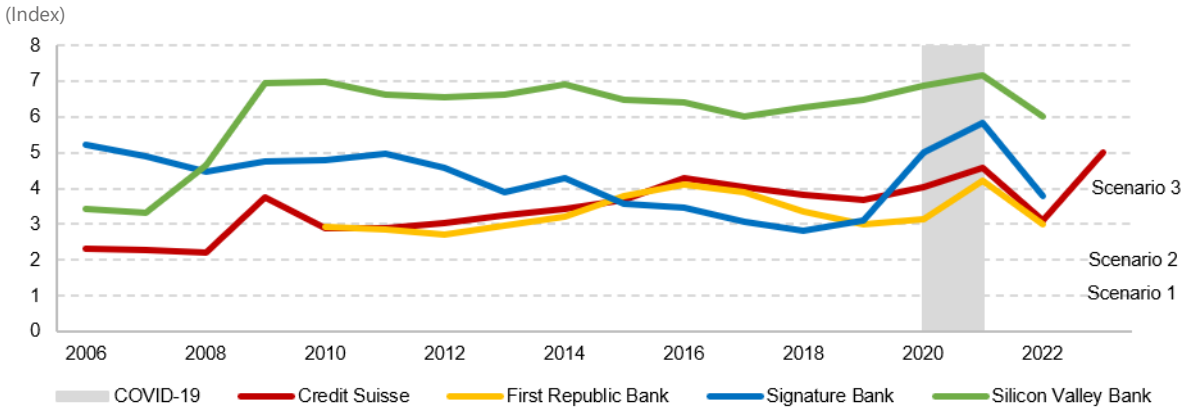
3.2 Analysing structural liquidity profiles

The tool may also be used to analyse, ex post, the structural liquidity profiles of banks that come under stress. For example, the liquidity profiles of banks that failed in 2023—notably SVB, Signature Bank, and First Republic Bank in the United States, and Credit Suisse in Europe—show deceptive improvements in the years leading up to the turmoil. The breakeven stress factors for this group rose in 2020 and 2021, reaching levels consistent with being able to withstand Scenario 3 (highly severe adverse) shocks (Graph 5). However, closer examination of the banks' balance sheets indicates that this apparent strengthening was primarily driven by sharp increases in liquid assets as pandemic-era deposit inflows were invested in government and agency mortgage-backed securities, while the twin threats of rising interest rates and duration mismatches were obscured.

Importantly, the banks' liquidity profiles deteriorated sharply in 2022. As interest rates rose, the market value of longer-duration securities declined, reducing effective counterbalancing capacity. Simultaneously, funding run-offs accelerated, particularly for uninsured deposits that proved highly sensitive to market sentiment and social media amplification. The result was a rapid collapse in measured liquidity adequacy—breakeven stress factors fell back to around, or below, their pre-pandemic levels, but generally remained either between the Scenario 2 and Scenario 3 markers or above Scenario 3 levels (Graph 5). In other words, the annual structural metric did not clearly signal the imminent failures. The banks' buffers proved insufficient against deposit outflows that, in some cases, reached 20–25 percent of total deposits within days, well beyond the Scenario 3 run-off rates.

This outcome confirms that, like the LCR, the toolkit measures structural liquidity resilience and is not designed as an early-warning tool. Given that data are limited to annual frequencies, i.e., geared towards structural liquidity profiles and relative positions among peers, rapid changes in trends will not be visible. More granular tests at high frequencies are needed to detect the point-in-time liquidity profiles of banks. One option is to use sensitivity analysis, to illustrate how sharply and rapidly bank liquidity profiles can deteriorate once a severe deposit run materialises.

2023 Bank Failures: Breakeven Stress Factors of Affected Banks — Graph 5



Sources: Moody's Analytics BankFocus; FDIC; and authors' estimates.

Note: Sample includes Silicon Valley Bank, Signature Bank, First Republic Bank (United States) and Credit Suisse (Switzerland). Breakeven stress factors are computed using granular data. Shaded area indicates 2020–21 COVID-19 liquidity build-up period. Text tags of "Scenario 1", "Scenario 2", and "Scenario 3" refer to the dashed horizontal gridlines, which are the corresponding stress levels in these pre-defined scenarios.

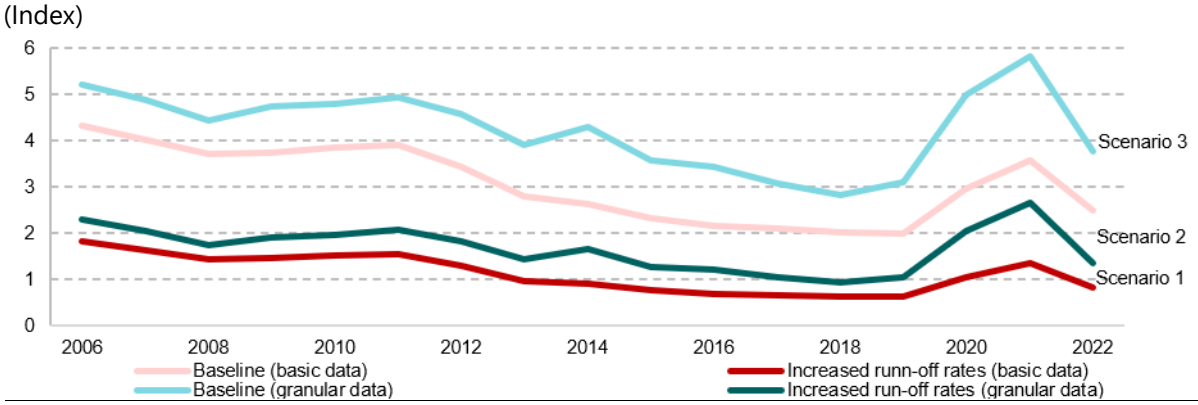
We simulate what might happen in the near term during stress periods by applying elevated funding run-off rates, while keeping the haircut rates and encumbrance rates unchanged. In other words, funding run-off rates are raised from Scenario 1 (adverse) to Scenario 3 (highly severe adverse) levels, while haircuts and encumbrance rates are kept at Scenario 1 levels. This scenario would mimic the deposit flight experienced by SVB and be consistent with the social-media-amplified bank run dynamics

flagged by BCBS (2024) and FINMA (2023). The resulting outcomes are immediate with large downward shifts in breakeven stress factors. For illustration purposes, we run a sensitivity analysis for Signature Bank to simulate the impact of higher run-off rates during, and post-GFC (Graph 6). Although the bank's liquidity position looks sufficiently comfortable against the occurrence of Scenario 1 for both the basic data and granular approaches, more severe funding outflows akin to Scenario 3, while leaving inflows unchanged, reduces the liquidity buffer significantly.

Our tool also offers practical ways to simulate peer comparisons. There appears to be significant heterogeneity in liquidity resilience within banking systems, which is masked by economy-level averages (Graph 7). Based on granular data,

- The within-system dispersion (measured as the ratio between the 25th percentile of the breakeven distribution and the median) varied somewhat across regions in 2024. Particular attention is warranted if banking systems exhibit both moderate median breakeven factors and wide internal dispersions, indicating the presence of a vulnerable tail of banks even in systems that appear resilient at the aggregate level, as seen in the European example (Graph 7.A).
- Following the vulnerable period from 2008 to 2011, median liquidity buffers of European banks improved gradually over time (Graph 7.B), including in the context of Basel III implementation. These characteristics underscore the importance of complementing system-level stress tests with distributional analysis to identify vulnerable pockets within otherwise resilient banking systems.

Sensitivity Analysis: Increase in the Run-Off Rate for Signature Bank — Graph 6

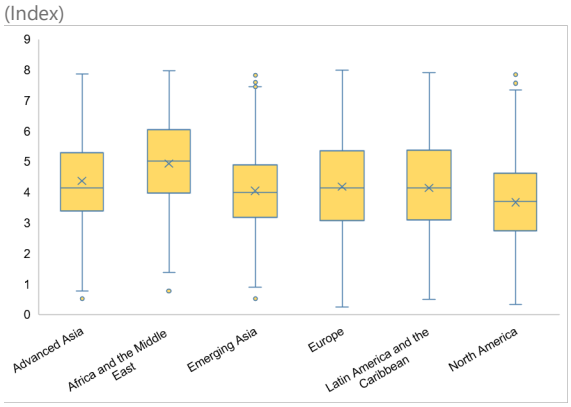


Sources: Moody's Analytics BankFocus; and authors' estimates.

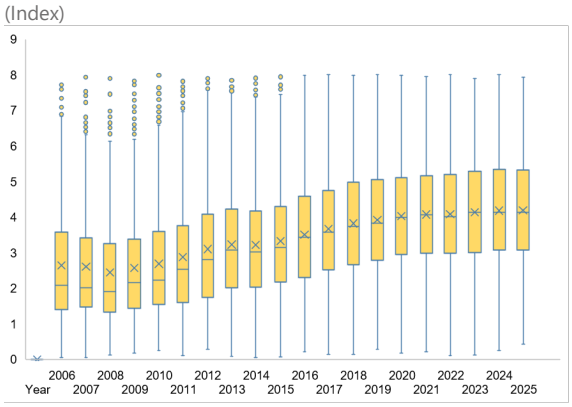
Note: The Y-axis shows the breakeven stress factors. The Baseline corresponds to Scenario 1 (adverse stress); The sensitivity analysis (red and dark green lines) simulates an increase in the run-off rates according to the most severe scenario (i.e., Scenario 3), while keeping inflow assumptions unchanged. Text tags of "Scenario 1", "Scenario 2", and "Scenario 3" refer to the horizontal gridlines, which are the corresponding stress levels in these pre-defined scenarios.

Heterogeneity of Liquidity Profiles within Banking Systems — Graph 7

A. Distribution of Bank-Level Breakeven Stress Factors by Region, 2024



B. Distribution of European Banks' Breakeven Stress Factors by Year



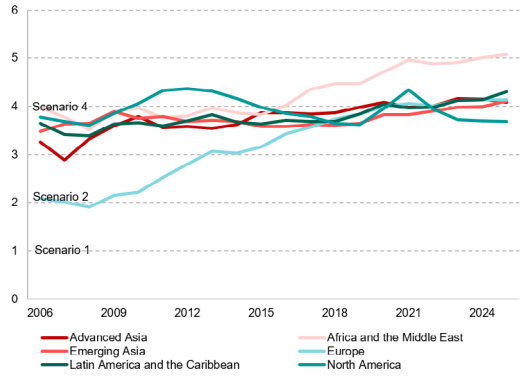
Sources: Moody's Analytics BankFocus; and authors' estimates.

Note: Y-axis shows the breakeven stress factors

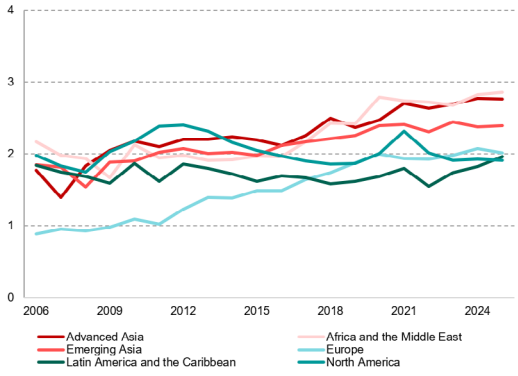
Encouragingly, the general trend across most regions suggests that liquidity profiles have improved since the introduction of Basel III. This development is evidenced by the rising breakeven stress factors over time (Graph 8). The weakest 10 percent of banks globally would now be able to withstand Scenario 2 (severe adverse) shocks, and median banks in all regions are close to being able to withstand Scenario 3 (highly severe adverse) shocks. Improvements appear less pronounced in Asia and North America, simply because pre-Basel III liquidity buffers were already relatively comfortable. Regional differences in the relative ranking of inflow capacity versus outflow stability suggest heterogeneous structural drivers of liquidity resilience. The example of Greece in the next section illustrates how the toolkit can be used to trace these drivers.

Percentiles of Bank-level Breakeven Stress Factors over Time by Region (Index) — Graph 8

Median banks



Banks at 10th percentile



Sources: Moody's Analytics BankFocus; and authors' estimates.

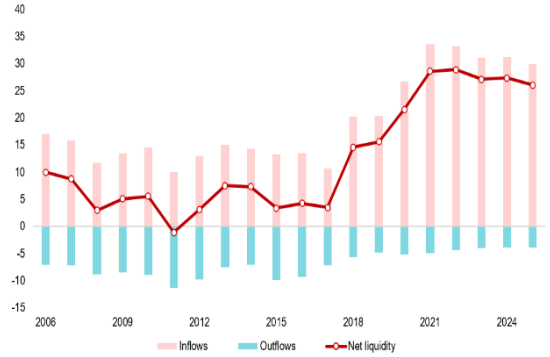
Note: Y-axis shows the breakeven stress factors. Percentiles are calculated based on the distribution of bank-level breakeven stress factors using granular data.

We illustrate the toolkit's diagnostic power to analyse the impact of changes in structural liquidity profiles on both the asset (impacting inflows) and liability (impacting outflows) sides using the example of Greece. Greek banks' liquidity profiles improved sharply from 2017 under both the adverse and highly

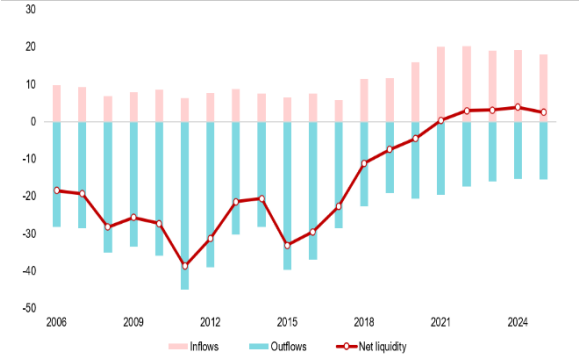
severe adverse scenarios (Graph 9, upper panels), driven by both stronger inflow capacity (growing cash and government bond buffers) and more stable funding (rising customer deposit shares, declining short-term wholesale reliance) (Graph 9, bottom panels). Banks would now pass even the highly severe adverse scenario, having faced significant shortfalls up until 2016.

Greece: Liquidity Analysis with Granular Data at Banking System Level — Graph 9

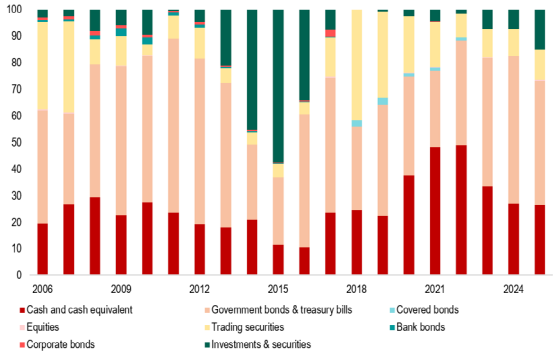
A. Adverse Scenario: Inflow, Outflow and Net Liquidity
(Relative to Total Assets, Percent)



B. Highly Severe Adverse Scenario: Inflow, Outflow and Net Liquidity
(Relative to Total Assets, Percent)



C. Adverse Scenario: Composition of Inflows
(Percent of total)



D. Adverse Scenario: Composition of Outflows
(Percent of total)



Sources: Moody's Analytics BankFocus; and authors' estimates.

Note: In the Module 2 and Module 3 online dashboards, customer deposits are decomposed into term deposits, demand deposits and customer deposits (breakdown unavailable) based on data availability.

3.3 Ranking liquidity profiles over time

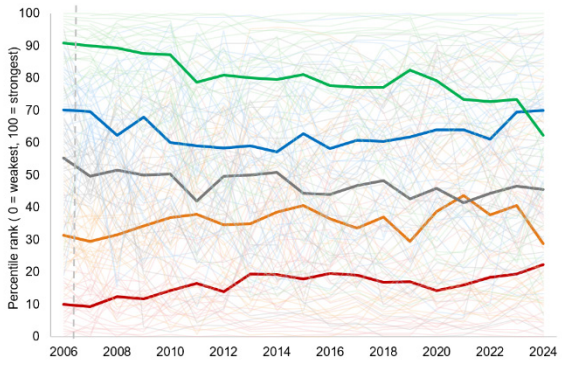
Individual banking system trajectories have partially converged over time, driven by post-crisis improvements in liquidity metrics and regulatory incentives (Basel III). They have led to improvements in liquidity buffers in Europe, while banks in other regions have maintained their relatively stronger positions. Over the 2007–24 period, the weakest quintile of banking systems trended upwards from about the 10th to the 30th percentile, on average, while the strongest quintile moved down from the 90th to the 65th percentile (Graph 10).

Relative Performance of Banking Systems over Time

Graph 10

(Rank-order Statistics)

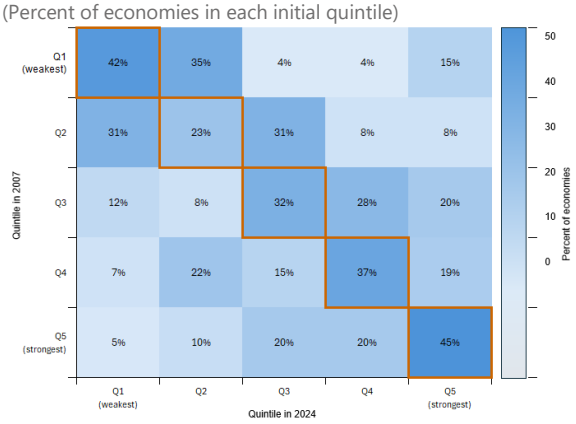
A. Country Rank Trajectories by Initial (2007) Quintile



Note: Thin lines = individual economies; thick lines = quintile median)

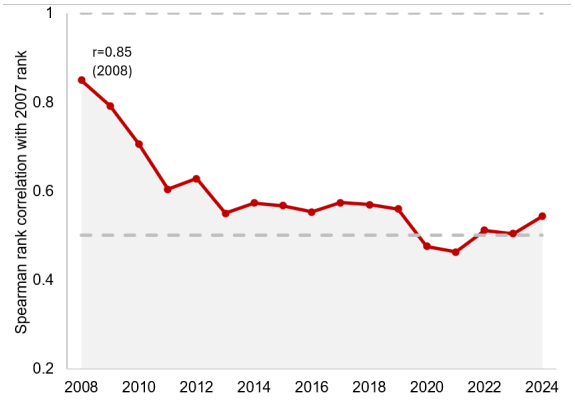
B. Quintile Transition Matrix, 2007 → 2024

(Percent of economies in each initial quintile)



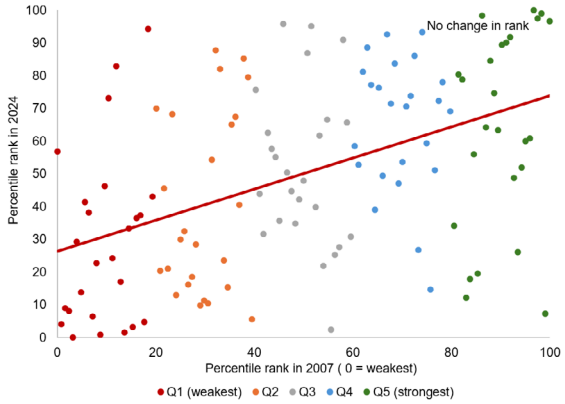
Note: Row percentages sum to 100; orange boxes highlight diagonal (no change in quintile).

C. Country Rankings: 2007 versus 2024



Note: Includes banking systems with data in all years between 2008 and 2024 (N ≈ 112). Each dot represents one banking system; coloured by 2007 quintiles.

D. Persistence of Country Rankings (Spearman correlation versus 2007 ranking)



Note: OLS and Spearman computed on countries with data in both 2007 and 2024 (N ≈ 125).

Sources: Moody's Analytics BankFocus; and authors' estimates.

Note: Basic data; simple average; all economies in sample. Percentile rank assigned within each calendar year (0 = weakest, 100 = most resilient). Quintiles defined by 2007 rank distribution.

However, rank positions appear highly persistent. The relative rankings of liquidity profiles have not changed materially across banking systems since the onset of the GFC in 2007:

- The quintile transition matrix shows that 44 percent of Q1 countries remained in Q1 in 2024, while 40 percent of Q5 countries stayed in Q5, with below-diagonal elements (downward mobility from initial strength) concentrated in adjacent quintiles(Graph 10.A, 10.B and 10.C).
- Consistently, the correlation (Spearman *r*) between the 2007 and 2024 percentile ranks is approximately 0.47—it starts at about 0.87 in 2008 and declines gradually to about 0.47 and has remained at around the 50 percent level since 2012, confirming that the rank order of liquidity profiles has eroded since the GFC but remained relatively stable during the post-crisis years (Graph 10.C and 10.D).

4 Caveats and challenges

Like any top-down exercise based on publicly available data, the toolkit's results need to be interpreted with care. In short, the toolkit is designed to identify structural liquidity vulnerabilities and to support peer comparisons; it does not answer the more operational question of whether a particular bank could survive a rapidly developing liquidity event. We first discuss caveats that are specific to our design choices and data, and then turn to broader challenges that apply to liquidity stress testing in general. Caveats specific to the toolkit include:

- **Benchmark calibration:** Our scenarios are benchmarked against the LCR, which was developed quickly during the GFC and whose design continues to be debated. Commonly cited shortcomings include the scope for banks to "steer" their balance sheets around reporting dates, reporting lags that are long relative to the speed of modern bank runs, and a static design that does not capture system-wide effects such as distress sales (Heuver and Berndsen 2022; Krueger et al. 2024). The LCR may also have shifted some liquidity risk to institutions outside its scope (Sundaresan and Xiao 2024) and towards more opaque assets (Raz, McGowan, and Zhao 2022). Results benchmarked against LCR-type calibrations inherit these limitations, which is one reason why the toolkit allows users to define their own scenarios.
- **Assumptions and calibrations:** Our three pre-defined scenarios offer broad applicability, but environment-, jurisdiction- and institution-specific factors can matter materially—the user-defined module exists precisely to address this issue. Examples include updating assumptions on depositor behaviour, asset liquidity assessments, funding concentration analysis, and run-off calibration to reflect the structural changes brought about by digitalisation (Baudino, de Carvalho, and Svoronos 2024).
- **Liquidity-solvency nexus:** The manifestation of liquidity risks—if sufficiently protracted—could result in solvency problems for banks. Our stress tests focus on liquidity risk but may well be missing the bigger threat posed by its interaction with solvency risk. Based on cross-country experiences during the GFC, BCBS (2015) encourages supervisory authorities to focus on developing integrated liquidity and solvency stress tests rather than just stand-alone liquidity stress tests.[11]
- **Data availability:** Granular cash-flow data remain essential for supervisory-level conclusions; aggregate balance-sheet data, however comprehensive, can never replicate the detail available for bottom-up internal assessments (Appendix 4). Discrepancies between basic and granular results point to gaps in public reporting that limit the precision of top-down tests (Box 1). Hence, parallel approaches are necessary (Jobst, Ong, and Schmieder 2020). Moreover, because our dataset relies on annual financial statements with differing reporting periods, and, in some cases, on interpolation, and carry-forward, empirical findings on trends and persistence should be interpreted with caution. These procedures, together with the treatment of outliers (Appendix 3), are applied consistently across banks to retain broad coverage while limiting distortions.
- **Timing of cash flows:** The toolkit measures a bank's aggregate liquidity position at the end of a 30-day horizon; it does not show whether a bank can meet its obligations day by day through fast-moving stress. A 30-day position can look adequate even if a bank runs out of usable liquidity much

[11] The growing body of work on the liquidity-solvency relationship in the wake of the GFC was led by the Bank of Canada, which developed the MacroFinancial Risk Assessment Framework (MFRAF) to take into account the different sources of risk (solvency, liquidity, spillover effects) and their interactions (Anand et al. 2014, Fique 2017). Research in this area suggests that bank liquidity-solvency interactions could lead to, among other things, non-linear effects from negative shocks that magnify macro-feedback effects (Krznar and Matheson 2017) the amplification of capital losses (Anand et al. 2014, Cont et al. 2020), and protracted liquidity adjustments post-shock (Cuzzola et al. 2023). Following deposit runs in 2023 that resulted in the collapse of Credit Suisse and three banks in the US, analysis by FSB (2024) suggests that institutions such as real estate investors, life insurers and a weak tail of banks are impacted by higher interest rates through the interaction of solvency and liquidity risks that create negative feedback loops, which can then propagate across the system.

earlier, so the survival horizon and the cumulative liquidity position through stress matter as much as the end-of-period position. SVB, with its extraordinarily fast deposit outflows, and Credit Suisse, which came under severe pressure despite apparently comfortable regulatory buffers, illustrate this point (FINMA 2023; BCBS 2024).

- **Refinancing risk:** The stock-based run-off assumptions do not capture the maturity profile and concentration of wholesale funding. Two banks with similar amounts of wholesale funding can face very different risks depending on when that funding matures and how much of it must and can be refinanced when particular markets cease to function—a major feature of the GFC.
- **Realisable versus reported liquidity:** Counterbalancing capacity depends on several factors. It does not only rely on whether assets are unencumbered and notionally liquid, but also on whether they are eligible and pre-positioned for central bank operations, operationally ready, and how much cash can actually be raised against them after stressed haircuts—in a fast-moving event there may not be enough time to turn otherwise good assets into useable liquidity. Even high-quality government securities are not perfect substitutes for cash: long-duration holdings can incur sizeable mark-to-market losses as interest rates rise, as experienced by SVB. Even very deep markets can become much less liquid when many institutions seek to raise cash at the same time, as happened in US Treasury markets in March 2020. The stressed funding value of assets can therefore be materially lower than their reported value.
- **Off-balance-sheet and contingent liabilities:** Liquidity demands can arise from commitments that do not appear in headline balance-sheet numbers, such as undrawn facilities, guarantees, derivative margin and collateral calls, and support for conduits, sponsored vehicles or other legally separate entities. Such obligations tend to be disclosed in the notes to the accounts, which are not captured in the BankFocus dataset used in our toolkit, which pulls the numbers from the vendor's balance sheet template (Appendix 4), hence possibly overstating available liquidity and understating stressed outflows.
- **Depositor concentration:** Headline balance-sheet items cannot capture the concentration and behavioural correlation of depositors. As SVB showed, a deposit base concentrated among a relatively small, interconnected group of uninsured depositors who react to the same information at the same time can behave very differently from a nominally similar but more diverse deposit base.
- **Validation:** We benchmark the breakeven stress factor against disclosed LCRs for the subset of banks that report them in BankFocus (about 12,100 bank-year observations for some 1,800 banks). The two measures are positively and significantly correlated, but only modestly. The Spearman rank correlation is 0.24 for the basic approach and 0.30 for the granular approach ($\rho < 0.01$ in both cases). Median breakeven stress factors rise steadily across LCR quintiles, from 3.4 to 4.5 under the granular approach. However, distributions overlap widely, and only about a quarter of bank-years fall into the same quintile under both measures (Appendix 5). Three features are consistent with the toolkit capturing the same underlying concept:
    - the granular approach aligns more closely with the LCR than the basic approach;
    - the alignment has strengthened over time (from 0.16 in 2015 to 0.31 in 2025, granular approach);
    - results hold for bank-level averages and log-transformed LCRs.

Beyond these toolkit-specific caveats, several challenges are common to all liquidity stress-testing exercises, including ours:

- **Definitional heterogeneity:** Non-standard definitions of liquid assets, encumbrance, maturity buckets, and run-off categories limit cross-country comparability. Detailed contractual or

behavioural cash-flow data, off-balance-sheet items, and exchange rate mismatches are rarely published at the frequency needed for real-time monitoring.

- **Behavioural and feedback dynamics:** Historical run-off rates are poor guides to crisis behaviour. Feedback loops between solvency, funding costs, fire sales, and contagion are hard to model robustly, and their severity depends on pre-existing buffers and market sentiment of the moment.
- **Calibration uncertainties:** Run-off rates, haircuts, and rollover assumptions should be calibrated with a long-term, through-the-cycle perspective. For example, our pre-defined scenarios are deliberately broad but supplementing them with institution- and jurisdiction-specific calibrations would improve relevance and actionability.
- **Dynamic and forward-looking analysis:** Static balance-sheet snapshots can miss rapidly evolving vulnerabilities. Frequent re-runs and reverse stress tests—which identify the shock configuration that would just breach a liquidity threshold—are valuable complements to standard scenario analysis.
- **Cross-border complexity:** Multinational banks face ring-fencing constraints, exchange rate mismatches, and intra-group support arrangements that are often opaque in consolidated data. The market's capacity to absorb simultaneous asset disposals by multiple institutions is inherently uncertain.
- **Flight to quality:** Although the liquidity situation may worsen for some banks in the system during a crisis, it could actually improve for others that are perceived to be "safe". [12] Hence, it is important to run stress tests at the individual bank level to complement those undertaken using system-wide aggregates.

5 Conclusion: what next for liquidity stress testing?

This paper has introduced a freely available toolkit that makes top-down liquidity stress tests ready to run for nearly 13,000 commercial banks in more than 100 economies. Its central metric, the breakeven stress factor, summarises in a single number how severe a shock a bank or banking system can absorb. Applying the toolkit, we find that liquidity buffers have generally improved since the introduction of Basel III, but that resilience remains heterogeneous across and within banking systems, and that the relative ranking of banking systems is persistent over time. The experience of banks that failed in 2023 also shows that annual, structural metrics can look reassuring shortly before a crisis, underscoring the need to complement them with higher-frequency data and sensitivity analysis.

Liquidity risk increasingly extends beyond the banking perimeter. The growth of non-bank financial intermediaries (NBFIs) and their tight linkages with the banking sector represent the next frontier for system-wide liquidity stress analysis. Jobst, Ong, and Schmieder (2020) anticipated this development, and recent evidence makes the case more pressing. NBFIs perform critical intermediation functions but are exposed to liquidity and leverage risks, and their interconnectedness with banks can amplify shocks beyond what the buffers of any individual sector can absorb (Baudino, de Carvalho, and Svoronos 2024; Pascual et al. 2025). The links run in both directions— NBFI deposits can make bank funding more fragile (Darst et al. 2025), while forced asset sales by large NBFIs can transmit stress back to banks that are individually resilient (Pandey 2025).

[12] Demirgüç-Kunt et al. (2006) finds that, across 36 banking crises in 35 countries, banking crises are not accompanied by significant declines in aggregate bank deposits relative to GDP, but that deposits do fall in weaker, less profitable banks suggesting that funds may be redeposited in healthier banks within the system. Similarly, Fecht et al. (2019) observes that deposits in the German banking sector were being reallocated from private to fully-guaranteed public banks during the early part of the GFC, but stopped upon the introduction of blanket state guarantees in October 2008.

The convergence of NBFI growth, technological disruption to funding stability, and the potential for cross-sector contagion calls for the next generation of liquidity stress tools to span the full financial system and not just commercial banks. Our toolkit provides a scalable foundation and springboard—extending it to encompass NBFI balance sheets, intra-system exposure networks, and high-frequency data inputs is a clear priority for future work.

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Appendix 1: Operationalising the toolkit

The toolkit has three components. They consist of: (1) a landing page with background and documentation; (2) a suite of five interactive visualisation modules with pre-defined and user-defined stress tests at bank level and economy level; and (3) bulk data downloads for offline analysis.

A1.1 Landing page

The landing page introduces the toolkit's purpose, use cases, data sources, references, and contact information.

A1.2 Visualisation dashboard suite

Five interrelated modules provide a comprehensive framework for assessing liquidity risk in banks and banking systems:[13]

Module 1: Descriptive statistics

This module presents coverage and sample composition from BankFocus across regions and time, with interactive filters (Appendix Graph 1.1). It includes:

- number of economies and banks covered;
- banking system size by economy (banks, total assets, total liabilities);
- regional distribution (East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, North America, South Asia, Sub Saharan); and
- data availability by output metric.

Module 2: Economy-level stress test

This module generates economy-level results under pre-defined scenarios using both basic and granular data. It enables comparisons of inflows, outflows, and net liquidity across economies and time (Appendix Table 1.1 and Appendix Graph 1.2), comprising:

- **Filters** for scenarios, periods, regions, economies, and aggregation types;
- **Granular mode,** which applies category-specific haircuts, encumbrance, and outflow rates, reporting net liquidity as shares of total assets, total liquid assets, and total funding liabilities, plus inflow and outflow compositions; and
- **Basic mode,** which applies uniform assumptions to aggregate liquid assets and total funding, reporting the same high-level ratios without composition breakdowns

Module 3: Bank-level stress test

This module applies the same analytical framework as Module 2 but at the individual bank-level. Scenarios, methodologies, filter logic, and visualisation designs are identical; the sole distinction is that users select individual banks or bank groups rather than economy aggregates (Appendix Graph 1.3).

[13] Unless otherwise specified, all tables and charts presented in this paper are based on data downloaded from BankFocus as of June 2026.

Module 4: Breakeven analysis

This module moves beyond the three pre-defined scenarios by computing the breakeven stress factor. This metric represents the minimum shock intensity *f* at which a bank's inflows equal outflows when all Scenario 1 haircuts, encumbrance and run-off rates are multiplied by the same factor, such that net liquidity is zero (Section 2.4):

- The module plots the breakeven stress factors alongside inflows, outflows, liquid assets, and funding liabilities in both absolute and normalised terms.
- Bank-level results can be aggregated to the economy-level using simple and weighted approaches (Appendix Graph 1.4).

Breakeven factors below unity signal potential vulnerabilities, but may also reflect data limitations: discrepancies between basic and granular data reporting can distort measured inflows and outflows (see Box 1 in the main text).

Module 5: User-defined stress test

This module allows users to adjust asset haircuts, encumbrance rates, and funding outflow rates within the established framework to dynamically generate bank- and economy-level inflows, outflows, and net liquidity.[14] Assumptions are pre-populated from any of the three pre-defined scenarios and can be modified before execution. Outputs mirror those of Modules 2–3 and include inflow and outflow composition charts in granular mode. The data structure, filter settings, assumption configurations, and chart outputs are consistent with those presented in Modules 2 and 3.

The stress tests may be conducted independently at either the economy- or bank-level:

- In economy-level mode, users select region, economy, aggregation type, data type, scenario, and output metric. Assumptions are pre-populated from the chosen scenario but can be manually changed by the user. Outputs include inflow and outflow comparison table, net liquidity line charts, and (in granular mode) inflow and outflow composition charts. Stress test results are generated by: (1) applying the user-defined assumptions to each individual bank in the selected banking system sample; and (2) aggregating the results to the economy-level using the user-selected aggregation type.
- The bank-level mode offers equivalent functionality for individual banks. For banking systems with large numbers of banks, these calculations may be time-consuming and complex from a computational perspective (which could compromise user experience). Therefore, to manage the computation time, the banking system sample used in this stress test module is a subset of the full sample used in Modules 1–4, covering the 100 largest banks in each banking system by reported total assets in 2024.[15]

To conduct a stress test, users would implement the following steps (Appendix Graph 1.5):

1. **Select the mode.** Choose either the **"Economy Level"** mode for an individual banking sector or the **"Bank Level"** mode for an individual financial institution by switching between two tabs. The default setting is **"Economy Level"**.

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[14] Data from 2019 onwards are included in the user-defined stress testing module to improve computational performance and ensure the relevance of the stress test results..

[15] The threshold sample size reflects the distribution of banking system sizes in the sample— most economies have fewer than 100 banks, with only a handful with larger numbers, notably the United States (over 8,500), Russia (over 600), and China (over 250). Coverage for these countries are 84 percent, almost 100 percent, and 96 percent of sample assets, respectively. The year 2024 is used as reference because it has the most complete reporting coverage to date, while some banks may still be in the process of reporting their 2025 financial statements at the time of this paper's analysis and drafting. This selection ensures that the banks included in the stress test module are represented by the most recent and broadly comparable financial indicators. The reference year will automatically be updated once reporting coverage is sufficiently complete.

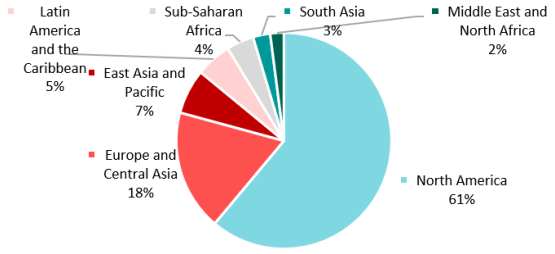
2. **Set the filters in the top horizontal filter panel.** Select the economy or bank to be stress tested. Only a single selection is allowed to ensure manageable online computation and optimal visualisation performance.
    - In "Economy Level" mode, users are required to select values for the "Economy", "Aggregation Type", "Scenario", "Data Type", and "Output Metric" filters.
    - In "Bank Level" mode, the "Aggregation Type" filter is replaced by the "Institution filter", which is also required.
3. **Adjust the assumption values.** A box will appear on the left, below the top horizontal filter panel, displaying assumptions pre-populated from the selected scenario. These assumptions are aligned with those used in Modules 2 and 3 and may be modified and applied to the user-defined stress test scenario.
4. **Run the stress test.** Click the **"Show result"** button below the top horizontal filter panel to execute the user-defined stress test scenario. Once the calculations are complete, the charts will appear in the main plotting area. These include:
    - a table of inflows, outflows, and net liquidity values, measured using the selected output metric, comparing the user-defined scenario with the three pre-defined scenarios over time;
    - a line chart of net liquidity values, measured using the selected output metric, comparing the user-defined scenario with the three pre-defined scenarios over time;
    - a stacked bar chart of inflows and outflows under the user-defined scenario, measured using the selected output metric;
    - a 100 percent bar chart showing the composition of inflows by asset category under the user-defined scenario, if granular data is selected under the "Data Type" filter; and
    - a 100 percent bar chart showing the composition of outflows by funding category under the user-defined scenario, if granular data is selected under the "Data Type" filter.
5. **Download charts or export data.** Users may download an image of each chart or export the underlying data by clicking the **"Export CSV"** button below the top horizontal filter panel. Chart images can also be downloaded by clicking the **camera icon** that appears when hovering over a specific chart.

A1.3 Bulk data downloads

Bulk downloads provide table-based access to economy- and bank-level outputs from pre-defined scenarios (Modules 2–3) and breakeven analysis results (Module 4). Chart-level data can also be exported to support replication and integration with internal workflows.

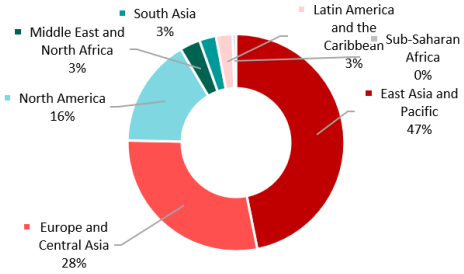
Share of Sample Banks by Region

(Percent)



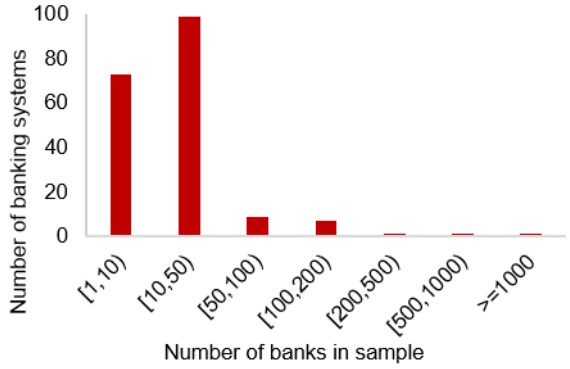
Share of Total Assets by Region, 2024

(Percent)



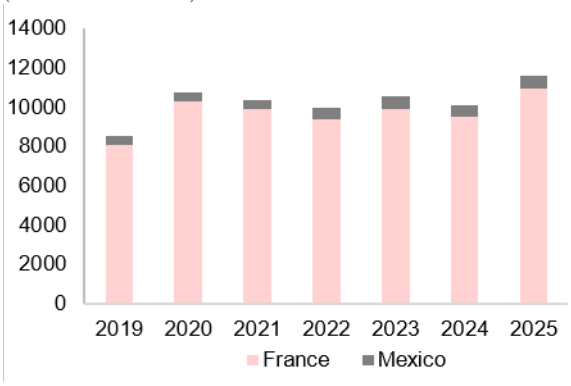
Distribution of Sample Banks across Economies

(Number of banking systems)



Selected Economies: Total Liabilities by Economy

(Billions of US dollars)



Selected Output Metric: Data Availability by Economy and Period

Economy	France				Mexico			
Year	Available Banks	Total Number of Banks	Percent of Banks	Percent of Total Assets	Available Banks	Total Number of Banks	Percent of Banks	Percent of Total Assets
2019	46	82	56.1	100	29	42	69.0	100
2020	50	82	61.0	100	31	42	73.8	100
2021	49	82	59.8	100	30	42	71.4	100
2022	40	82	48.8	100	29	42	69.0	100
2023	38	82	46.3	100	29	42	69.0	100
2024	35	82	42.7	100	31	42	73.8	100
2025	37	82	45.1	100	31	42	73.8	100

Sources: ARTEMIS; and authors' calculations and visualisations.

List of Filters and Corresponding Options for Economy-level Stress Tests

Appendix Table 1.1

Filter	Options	Single/Multiple Selection
Region	Same as Module 2	Multiple
Economy	Same as Module 2	Single
Aggregation Type	▪ Simple average ▪ Weighted average	Single
Data Type	▪ Basic data ▪ Granular data	Single
Scenario	▪ Adverse ▪ Severe adverse ▪ Highly severe adverse	Single
Output Metric	▪ Net liquidity to total assets ▪ Net liquidity to total liquid assets ▪ Net liquidity to total funding	Single

Source: Authors' compilations.

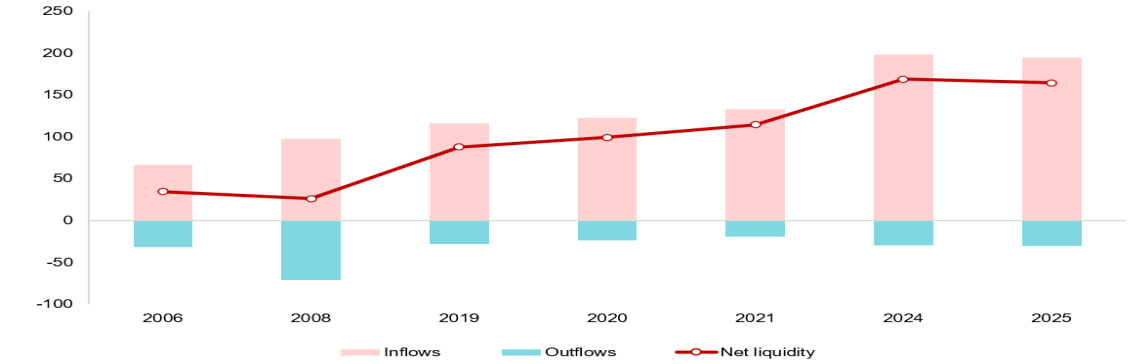
Module 2: Examples of Economy-level Liquidity Stress Test Outputs

Appendix Graph 1.2

Granular Data

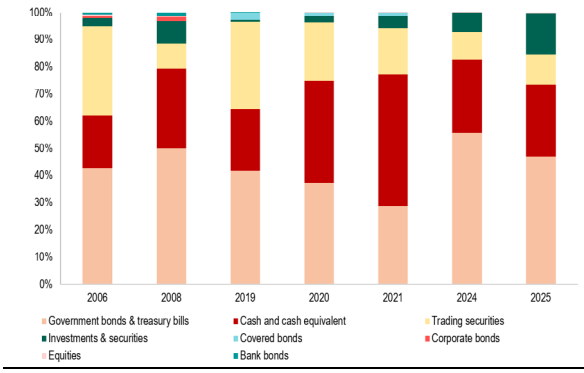
Greece: Inflows and Outflows Relative to Total Liquid Assets

(Percent)



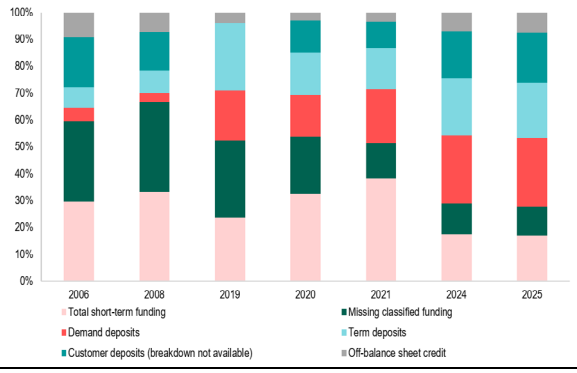
Greece: Composition of Inflows

(Percent of total)



Greece: Composition of Outflows

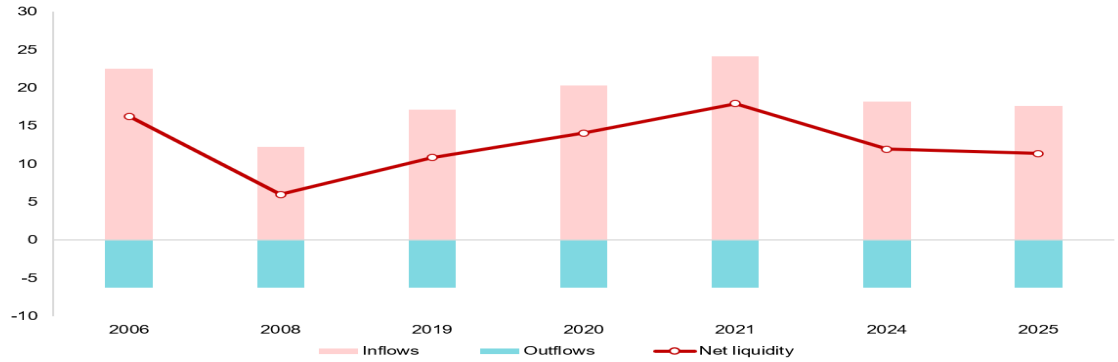
(Percent of total)



Basic Data

Greece: Inflows and Outflows Relative to Total Funding Liabilities

(Percent)



Sources: ARTEMIS; and authors' calculations and visualisations.

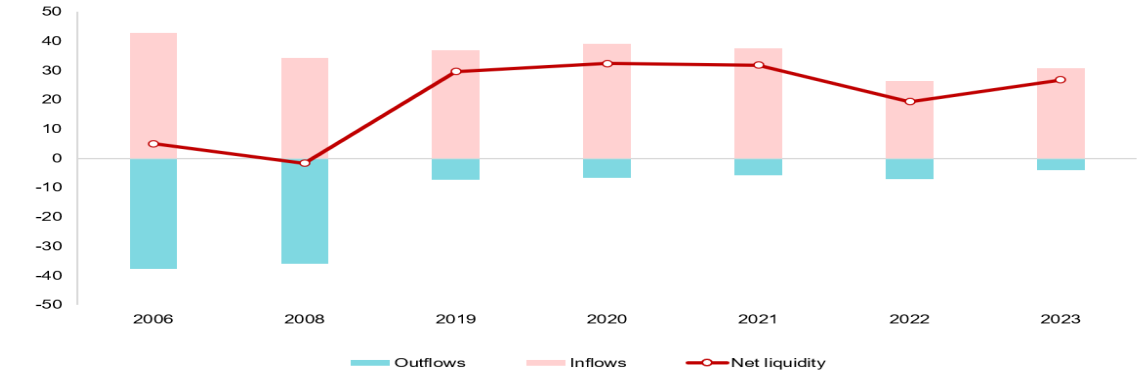
Module 3: Examples of Bank-level Stress Test Outputs

Appendix Graph 1.3

Granular Data

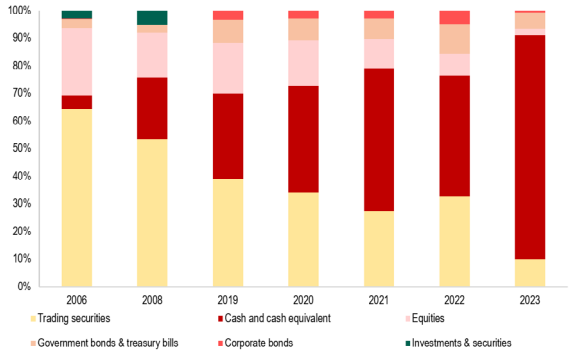
Credit Suisse: Inflows and Outflows Relative to Total Liquid Assets

(Percent)



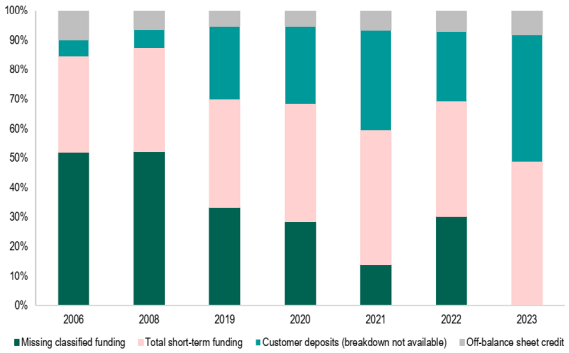
Credit Suisse: Composition of Inflows

(Percent of total)



Credit Suisse: Composition of Outflows

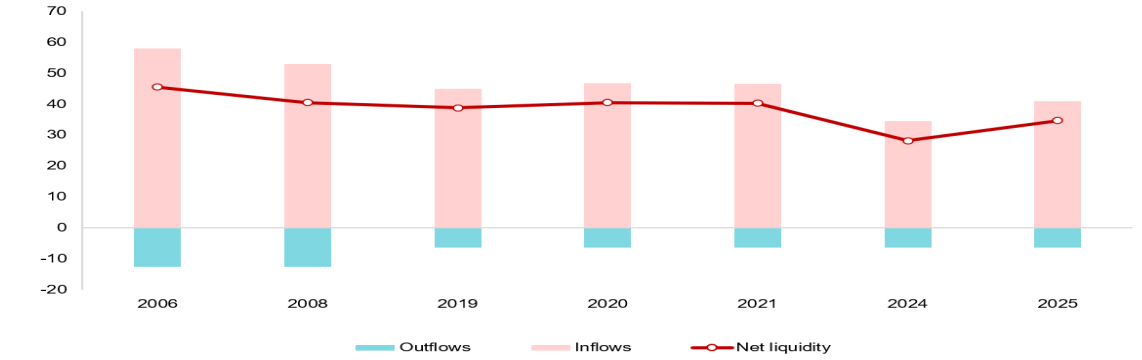
(Percent of total)



Basic Data

Credit Suisse: Inflows and Outflows Relative to Total Funding Liabilities

(Percent)



Sources: ARTEMIS; and authors' calculations and visualisations.

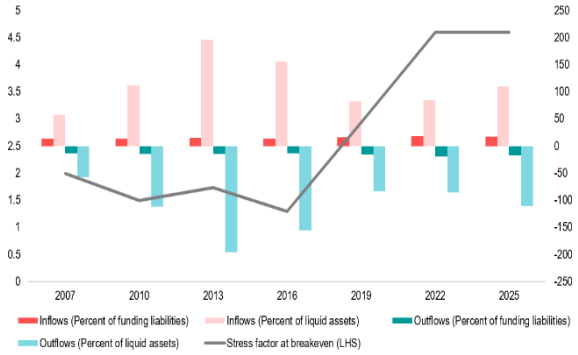
Module 4: Examples of Breakeven Analysis Outputs

Appendix Graph 1.4

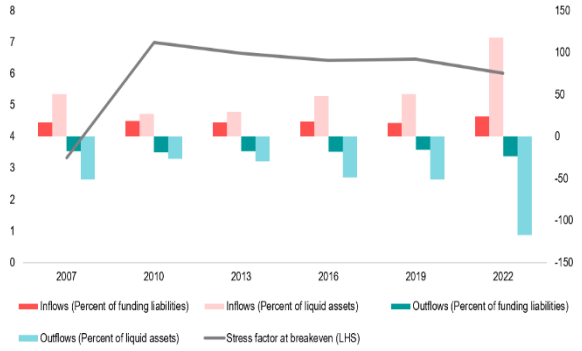
Breakeven Stress Factor, Inflows and Outflows Relative to Total Liquid Assets and Total Funding Liabilities

(Index; percent)

Greece (Simple average)



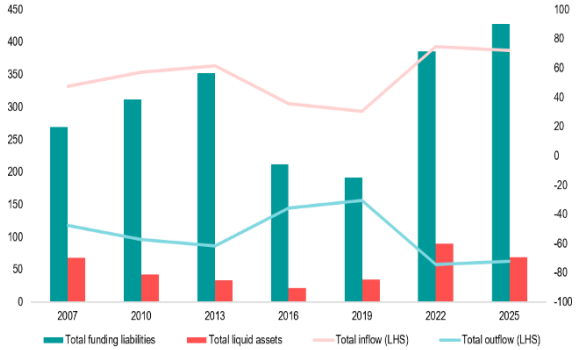
Silicon Valley Bank



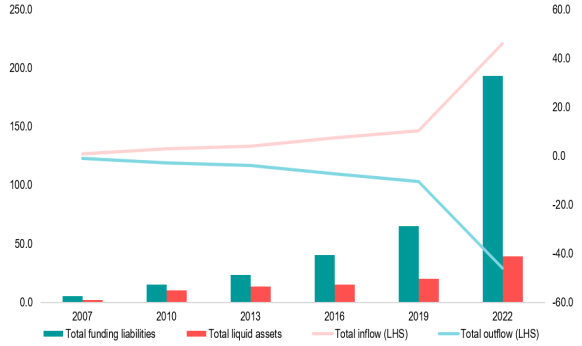
Inflows, Outflows, Total Liquid Assets and Total Funding Liabilities

(Billions of US dollars)

Greece

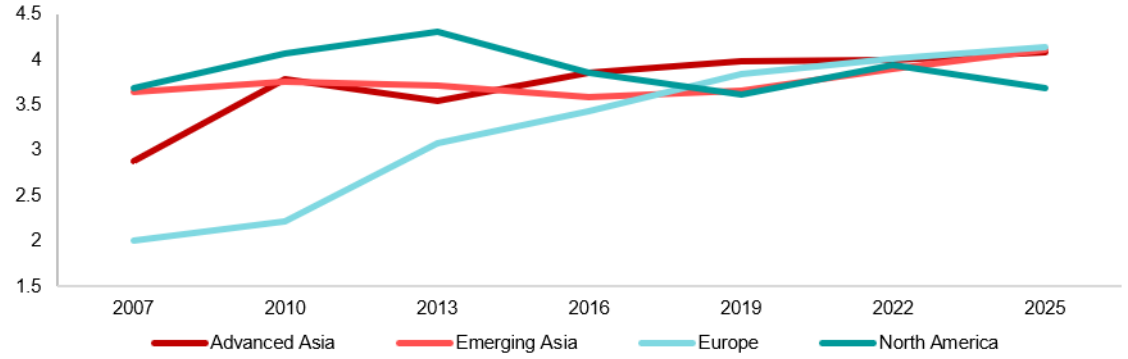


Silicon Valley Bank



Fiftieth Percentiles of Bank-level Breakeven Stress Factors over Time by Region

(Index)

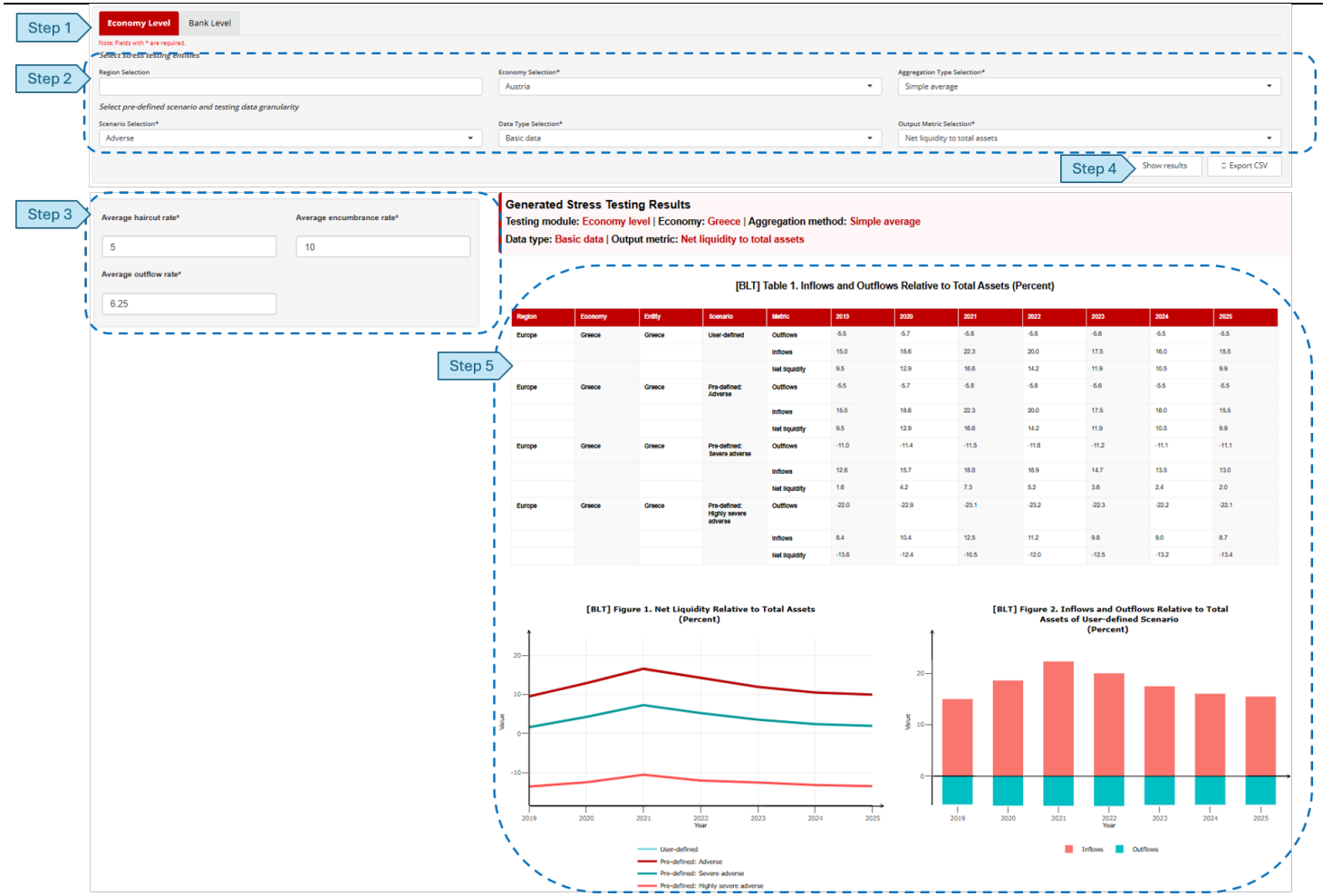


Sources: ARTEMIS; and authors' calculations and visualisations.

Note: Granular approach used.

Module 5: User-defined Stress Test—Overview of Filters and Outputs

Appendix Graph 1.5



Sources: ARTEMIS; and authors' calculations and visualisations.

Note: Basic data is used for presentation purposes. It can be switched to use granular data under the "Data Type" filters. The box on the left will be populated with all assumptions used with granular data, and additional charts will be generated as described in step 4 of this section.

Appendix 2: Liquidity shock scenarios

Shocks to Liquid Assets for Pre-Defined Shocks

Appendix Table 2.1

(Percent)

Inflows	Scenario 1		Scenario 2		Scenario 3	
	Haircut Rate	Encumbrance Rate	Haircut Rate	Encumbrance Rate	Haircut Rate	Encumbrance Rate
Cash and cash-equivalent	0	10	0	20	0	40
Government securities	1.25	10	2.5	20	5	40
Trading securities	7.5	10	15	20	30	40
-- Equities	7.5	10	15	20	30	40
-- Covered bonds	7.5	10	15	20	30	40
Investment securities	12.5	10	25	20	50	40
-- Corporate bonds	12.5	10	25	20	50	40
-- Bank bonds	12.5	10	25	20	50	40
Derivatives	12.5	10	25	20	50	40
Other and unassigned assets	100	0	100	0	100	0
-- Loans	100	0	100	0	100	0
-- Intragroup loans and commitments	100	0	100	0	100	0
Asset backed assets	100	0	100	0	100	0
Not assigned	100	0	100	0	100	0
Residual assets	100	0	100	0	100	0
General assumptions	5	10	10	20	20	40

Source: Authors' compilations.

Shocks to Funding for Pre-Defined Shocks

Appendix Table 2.2

(Percent)

Outflows	Scenario 1	Scenario 2	Scenario 3
Demand deposits	-5.00	-10.0	-20
Term deposits	-2.50	-5.0	-10
Total customer deposits	-3.75	-7.5	-15
Total short-term wholesale funding	-12.50	-25.0	-50
Central Bank funding	0.00	0.0	0
Long-term funding	0.00	0.0	0
Missing classified funding	-12.50	-25.0	-50
Contingent liabilities	-2.50	-5.0	-10
General assumptions	-6.25	-12.5	-25

Source: Authors' compilations.

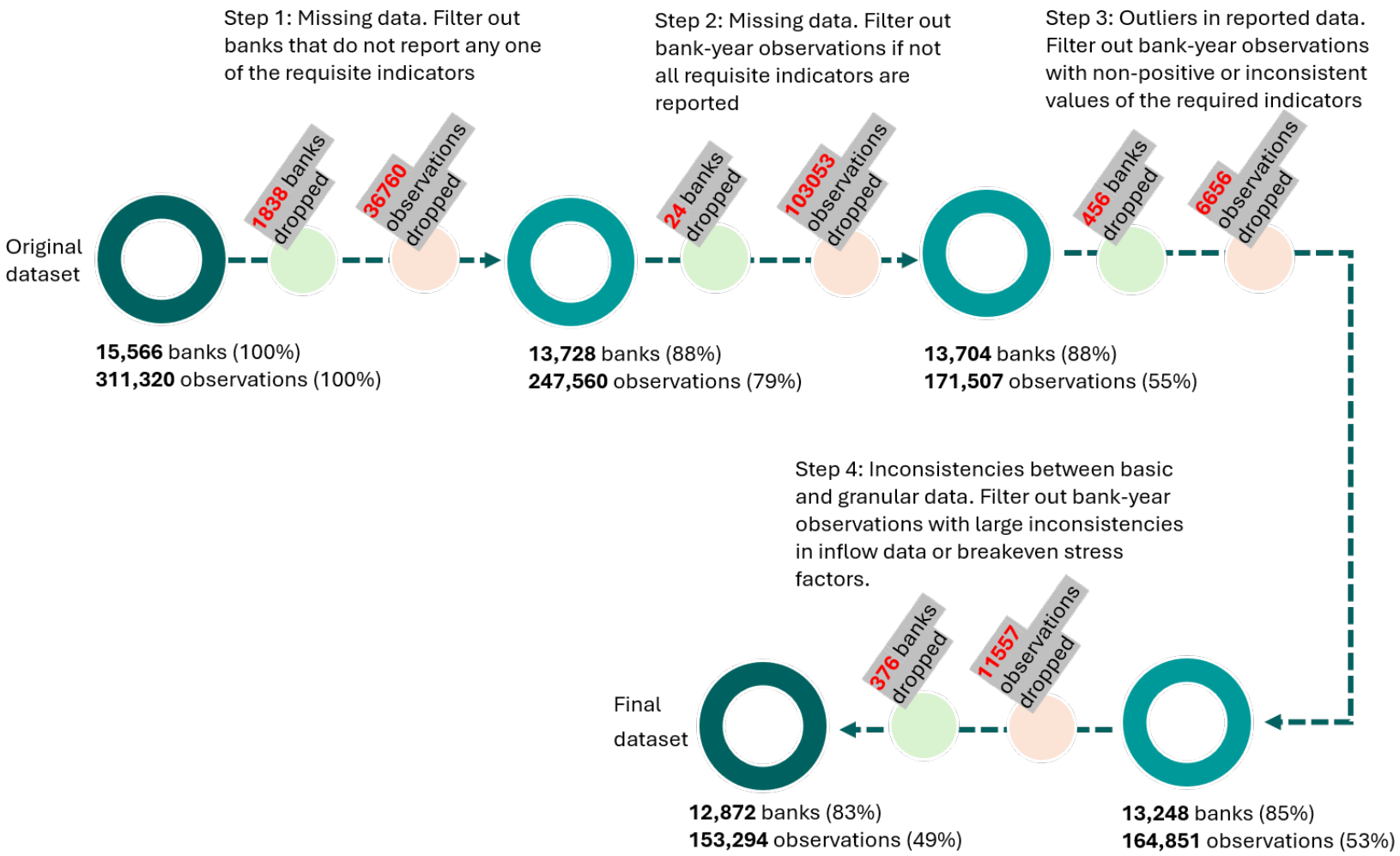
Appendix 3: Filtering the bank dataset

Filters are applied to bank-level financial statements to produce a suitable dataset for stress-testing. They are implemented in the following manner:

- **Step 1 (bank-level exclusion):** Exclude banks that are missing any of the following requisite indicator: (1) cash and cash equivalents; (2) sum of financial assets; (3) customer deposits; (4) total assets; (5) liquid assets as a percent of total assets.
- **Step 2 (bank-period exclusion):** Exclude bank-years that are missing any requisite indicator following linear interpolation and conversion to calendar year as described in Section 2.2.
- **Step 3 (outliers):**
  - ***Non-positive values:*** Exclude bank-years with zero or negative values for the requisite indicators.
  - ***Accounting inconsistencies:*** Exclude bank-years where reported total financial assets, total cash and cash equivalents, or total customer deposits exceed total assets.
- **Step 4 (basic versus granular inconsistencies):**
  - ***Inflows:*** Exclude bank-years where granular inflows are less than 25 percent or more than 10 times basic inflows under Scenario 1.
  - ***Breakeven stress factor:*** Exclude bank-years where the granular breakeven stress factor is less than 25 percent or more than 10 times the basic estimate.

Data Filtering and Impact on Bank Sample

Appendix Graph 3.1



Source: Authors' compilations and visualisation.

Note: Number of banks and observations are compiled using data downloaded from BankFocus as of end-February 2026.

Appendix 4: Granularity of bottom-up versus top-down LCR shocks

Shocks to Cash Flows: Comparison of Pre-Defined Tool Scenarios to LCR Requirements — Appendix Table 4.1

(In percent)

Cash Flow Item	LCR	Scenario: Adverse (Stress Factor = 1)		Severe Adverse (Stress Factor = 2)		Highly Severe Adverse (Stress Factor = 4)	
		Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance
Stock of HQLA							
A. Level 1 assets:							
• Coins and bank notes	100	0.00	10	0.0	20	0	40
• Qualifying marketable securities from sovereigns, central banks, PSEs, and MDBs	100	1.25	10	2.5	20	5	40
• Qualifying central bank reserves	100						
• Domestic sovereign or central bank debt for non-0% risk-weighted sovereigns	100						
B. Level 2 assets (maximum of 40% of HQLA):							
Level 2A assets							
• Sovereign, central bank, MDBs, and PSE assets qualifying for 20% risk weighting	85						
• Qualifying corporate debt securities rated AA– or higher	85	12.50	10	25.0	20	50	40
• Qualifying covered bonds rated AA– or higher	85	7.50	10	15.0	20	30	40
Level 2B assets							
• Qualifying RMBS	75						
• Qualifying corporate debt securities rated between A+ and BBB–	50						

Cash Flow Item	LCR	Scenario					
		Adverse (Stress Factor = 1)		Severe Adverse (Stress Factor = 2)		Highly Severe Adverse (Stress Factor = 4)	
		Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance
• Qualifying common equity shares	50	7.50	10	15.0	20	30	40
Total value of stock of HQLA							
Cash outflows							
A. Retail deposits:		–3.75		–7.5		–15	
Demand deposits and term deposits (less than 30 days maturity)							
• Stable deposits (deposit insurance scheme meets additional criteria)	3						
• Stable deposits	5						
• Less stable retail deposits	10						
Term deposits with residual maturity greater than 30 days	0	0.00		0.0		0	
B. Unsecured wholesale funding:		–12.50		–25.0		–50	
Demand and term deposits (less than 30 days maturity) provided by small business customers							
• Stable deposits	5						
• Less stable deposits	10						
Operational deposits generated by clearing, custody, and cash management activities	25						
• Portion covered by deposit insurance	5						
Cooperative banks in an institutional network (qualifying deposits with the centralised institution)	25						
NFCs, sovereigns, central banks, MDBs, and PSEs	40						
• If the entire amount fully covered by deposit insurance scheme	20						

Cash Flow Item	LCR	Scenario					
		Adverse (Stress Factor = 1)		Severe Adverse (Stress Factor = 2)		Highly Severe Adverse (Stress Factor = 4)	
		Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance
Other legal entity customers	100						
C. Secured funding							
• Secured funding transactions with a central bank counterparty or backed by L1 assets with any counterparty	0						
• Secured funding transactions backed by LA assets, with any counterparty	15						
• Secured funding transactions backed by non-L1 or non-L2A assets, with domestic sovereigns, MDBs, or domestic PSEs as a counterparty	25						
• Backed by RMBS eligible for inclusion in L2B	25						
• Backed by other L2B assets	50						
• All other secured funding transactions	100						
D. Additional requirements							
Liquidity needs (e.g., collateral calls) related to financing transactions, derivatives and other contracts	3-notch downgrade						
Market valuation changes on derivatives transactions (largest absolute net 30-day collateral flows realised during the preceding 24 months)	Look back approach						
Valuation changes on non-Level 1 posted collateral securing derivatives	20						
Excess collateral held by a bank related to derivative transactions that could contractually be called at any time by its counterparty	100						

Cash Flow Item	LCR	Scenario					
		Adverse (Stress Factor = 1)		Severe Adverse (Stress Factor = 2)		Highly Severe Adverse (Stress Factor = 4)	
		Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance
Liquidity needs related to collateral contractually due from the reporting bank on derivatives transactions	100						
Increased liquidity needs related to derivation transactions that allow collateral substitution to non-HQLA assets	100						
ABCP, SIVs, conduits, SPVs, etc.:							
• Liabilities from maturing ABCP, SIVs, SPVs, etc. (applied to maturing amounts and returnable assets)	100						
• ABS (including covered bonds) applied to maturing amounts	100						
Currently undrawn committed credit and liquidity facilities provided to:							
• Retail and small business clients	5						
• NFCs, sovereigns and central banks, MDBs, and PSEs	10 for credit 30 for liquidity						
• Banks subject to prudential supervision	40						
• Other financial institutions (including securities firms, insurance companies)	40 for credit 100 for liquidity						
• Other legal entity customers, credit and liquidity facilities	100						
Other contingent funding liabilities (such as guarantees, letters of credit, revocable credit and liquidity facilities, etc.)	National discretion	–2.5		–5.0		–10	
• Trade finance	0–5						
• Customer short positions covered by other customers' collateral	50						

Cash Flow Item	LCR	Scenario					
		Adverse (Stress Factor = 1)		Severe Adverse (Stress Factor = 2)		Highly Severe Adverse (Stress Factor = 4)	
		Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance
Any additional contractual outflows	100						
Net derivative cash outflows	100						
Any other contractual cash outflows	100						
Total cash outflows							
Cash inflows							
Maturing secured lending transactions backed by the following collateral:							
L1 assets	0						
L2A assets	15						
L2B assets							
• Eligible RMBS	25						
• Other assets	50						
Margin lending backed by all other collateral	50						
All other assets	100						
Credit or liquidity facilities provided to the reporting bank	0						
Operational deposits held at other financial institutions (include deposits held at centralised institution of network of co-operative banks)	0						
Other inflows by counterparty:							
• Amounts to be received from retail counterparties	50						
• Amounts to be received from non-financial wholesale counterparties, from transactions other than those listed in above inflow categories	50						

Cash Flow Item	LCR	Scenario					
		Adverse (Stress Factor = 1)		Severe Adverse (Stress Factor = 2)		Highly Severe Adverse (Stress Factor = 4)	
		Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance	Haircut/Outflow	Encumbrance
• Amounts to be received from financial institutions and central banks, from transactions other than those listed in above inflow categories	100						
Net derivative cash inflows	100						
Other contractual cash inflows	National discretion						
Total cash inflows		Total inflows		Total inflows		Total inflows	
Total net cash outflows = Total cash outflows minus min [total cash inflows, 75% of gross outflows]		Total outflows		Total outflows		Total outflows	
LCR = Stock of HQLA / Total net cash outflows		Net inflows		Net inflows		Net inflows	

Sources: Annex 4, BCBS (2013); and authors' compilations.

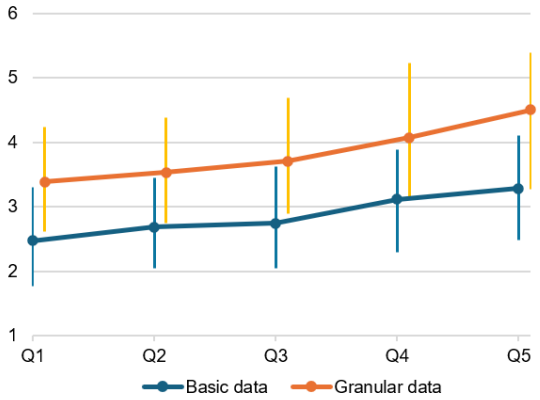
Note: Blank fields indicate that the tool does not specify parameters for the more granular LCR elements. ABCP = asset-backed commercial paper; ABS = asset-backed securities; FIs = financial institutions; L = level; LCR = liquidity coverage ratio; MDB = multilateral development bank; NFC = nonfinancial corporate; PSE = public sector entity; RMBS = residential mortgage-backed securities.

Appendix 5: Comparison of breakeven stress factors versus disclosed LCRs

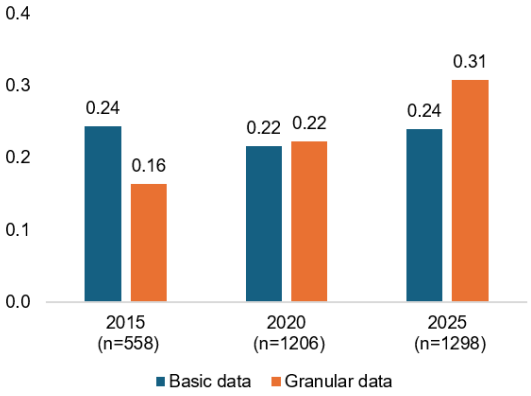
Breakeven stress factor versus disclosed LCR

Appendix Graph A5.1

A. Breakeven stress factor by LCR quintile



B. Spear rank correlation with LCR



Note: Breakeven stress factors versus LCRs as reported in BankFocus. Panel A: median and interquartile range of breakeven stress factors by LCR quintile, with quintiles computed within each year, all years from 2006 to 2025. Panel B: Spearman rank correlation by year. Years are selected for illustration purpose. The Pearson correlations for the raw breakeven stress factors and LCRs are lower compared to the Spearman rank correlations (0.13 for the basic data and 0.12 for the granular data compared to 0.24 and 0.30 respectively, using full-year observations) because of some extreme LCR values.

Sources: Moody's Analytics BankFocus; and authors' estimates.