Bank of Japan Review

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Foreign Currency Liquidity Risk Management at Japanese Major Banks: Efforts and Enhancement

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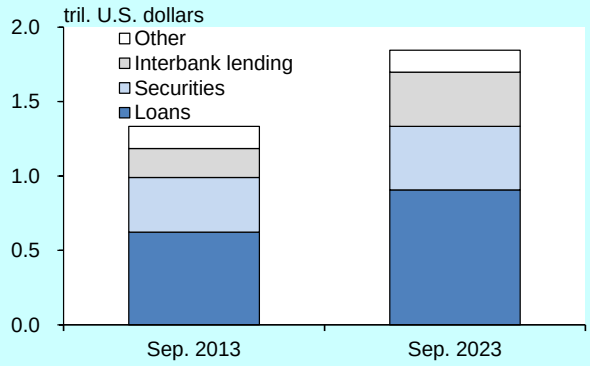
Securing stable foreign currency liquidity is one of the most important issues for Japanese major banks, as it is the basis of the expansion of their overseas businesses. The March 2023 banking turmoil in the United States and Switzerland shed new light on the importance of liquidity risk management. Against this background, Japanese major banks have been enhancing their risk management through foreign currency liquidity stress testing based on more conservative and appropriate stress scenarios, early warning frameworks, and prompt and accurate liquidity data management. The Financial Services Agency and the Bank of Japan have supported these efforts through initiatives including joint surveys. As a result, Japanese major banks' resilience to foreign currency liquidity risk has steadily improved. However, there remains room for further enhancement. Going forward, banks are expected to continue their efforts to further enhance their risk management in line with changes in the risk profiles of their overseas businesses and the external environment.

Introduction

Japanese major banks (henceforth major banks) have expanded their overseas businesses in search of opportunities for higher profits particularly in the commercial banking business, leading to an increase in their presence abroad. In line with this development, the foreign currency balance sheets of major banks have also grown substantially (Chart 1).

[Chart 1] Major Banks' Foreign Currency Balance Sheet Assets



Note: Covers internationally active banks.
Source: BOJ.

Expanding overseas investment and loans requires stable foreign currency funding. Changes in the external environment surrounding foreign currency funding represent a top risk for major banks and securing stable foreign currency liquidity to support large-scale overseas businesses is regarded as one of banks' most important management and strategic priorities. Unlike their yen funding, where they can rely on an ample and sticky domestic deposit base, the foreign currency funding structure associated with their current business model relies on large wholesale deposits that are not covered by deposit insurance (i.e., uninsured deposits) and on market funding. This structure is a source of foreign currency liquidity risk.

Against this background, major banks have been enhancing their foreign currency liquidity risk management. Partly due to these efforts, major banks did not face any major issues in securing foreign currency liquidity even during the March 2020 market turmoil triggered by the outbreak of the COVID-19 pandemic, the sharp global monetary tightening since 2022, or the March 2023 banking turmoil in the United States and Switzerland.[1] On the other hand, the March 2023 banking turmoil, during which several banks including Silicon Valley Bank (SVB) and Credit Suisse experienced deposit outflows of unprecedented speed, shed new light on the importance of liquidity risk management. These events are attributed to factors such as the concentration of depositors with common characteristics, the immediate spread of viability concerns on social media, and the rise of online banking.[2]

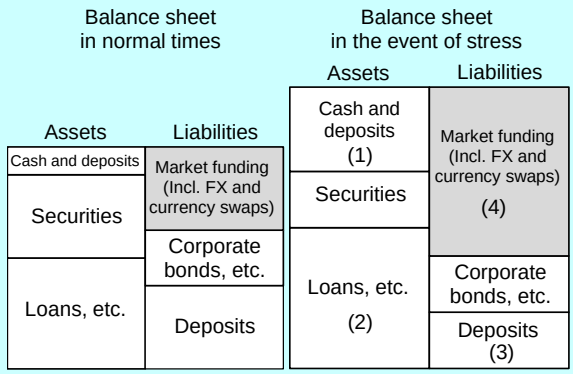
This report describes the characteristics of foreign currency liquidity risk profiles at major banks and provides an overview of the foreign currency liquidity stress testing that forms the core of their risk management. Moreover, it outlines their efforts to enhance foreign currency liquidity risk management, as observed through the monitoring activities of the Financial Services Agency (FSA) and the Bank of Japan (BOJ), and looks at some areas for further enhancement going forward.

Overview of Foreign Currency Liquidity Risk Management

Sources of Foreign Currency Liquidity Risk

Major banks have expanded their overseas businesses based on their corporate banking business. As a result, loans account for the bulk of assets on their foreign currency balance sheet (left side of Chart 2). These are funded through deposits and market funding such as corporate bonds and foreign exchange (FX) and currency swaps (where foreign currency is acquired in the FX and currency swap markets using yen as the funding source).

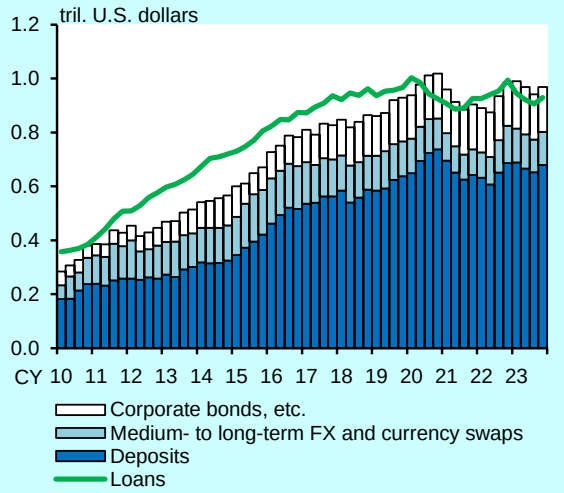
[Chart 2] Foreign Currency Balance Sheets in Normal Times and in the Event of Stress



(1) Increase in precautionary demand for funds such as additional margin calls and reserves at foreign cental banks
(2) Increase in the use of committed lines of credit
(3) Difficulties in raising market funds and outflow of deposits
(4) Additional FX and currency swap funding needs

With the aim to achieve a more stable foreign currency funding structure, major banks have been striving to issue corporate bonds with longer maturities and to obtain settlement deposits and other deposits that are regarded to have a lower risk of outflows than short-term market funding. The loan-to-funding gap, which represents the difference between the outstanding amount of loans and the outstanding amount of relatively stable funding sources, had remained substantially positive until the late 2010s. Since then, the gap has narrowed to almost zero in recent years (Chart 3).

[Chart 3] Loan-to-Funding Gap of Major Banks



Notes: 1. "Corporate bonds, etc." and "Medium- to long-term FX and currency swaps" indicate funding maturing in over 1 year from end-June 2012 onward, with funding maturing in over 3 months prior to that time.
2. Covers internationally active banks. Latest data as of end-December 2023.

Source: BOJ.

However, even when the loan-to-funding gap is closed in normal times, liquidity risk can materialize in the event of stress (right side of Chart 2). In times of stress, where client firms' demand for funding increases, lending can increase substantially through drawdowns of committed lines of credit,[3] as was the case during the pandemic. Moreover, when market volatility increases and interest rates change rapidly, or when a bank's own creditworthiness declines, the asset side of its balance sheet may increase further as the bank faces additional margin calls originating from derivatives transactions with its counterparties. On the other hand, the liability side of the balance sheet will also be affected by factors such as an increase in market funding costs and difficulties in acquiring required amounts of funding during periods of instability in financial markets. In addition, in light of the experience of the March 2023 banking turmoil, it is also important to bear in mind the risk of a significant outflow of deposits if a large share of those deposits consist of uninsured and large wholesale deposits and there are concerns regarding the financial soundness of the bank.

To address such liquidity risks, major banks always hold a certain amount of highly liquid assets, such as foreign bonds and reserves at foreign central banks. In addition, they conduct foreign currency liquidity stress

testing to ensure that they have sufficient liquidity even in the event of outflows of funds or funding difficulties. This stress testing is regarded as one of the most important tools in major banks' foreign currency liquidity risk management.

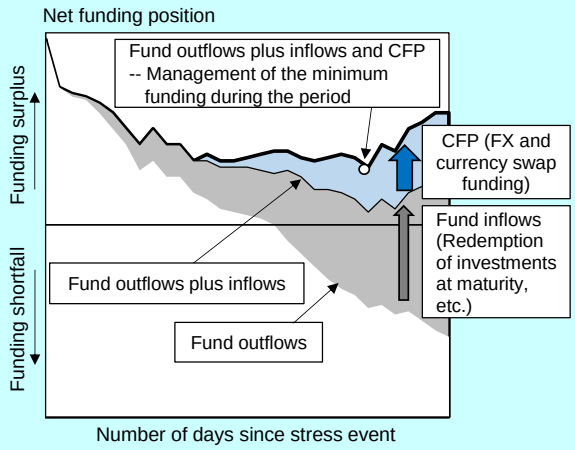
Overview of Foreign Currency Liquidity Stress Testing

Foreign currency liquidity stress testing consists of three main steps. First, stress scenarios are established. Generally, major banks construct three types of scenarios: a bank-specific stress scenario, in which stress is caused by a deterioration in a bank's own creditworthiness; a market stress scenario, in which stress is caused by a deterioration in the market environment; and a combined stress scenario, which is the combination of the two scenarios. For bank-specific stress scenarios, it is often assumed that a bank is downgraded by rating agencies. In market stress scenarios, the Global Financial Crisis and the March 2020 market turmoil are often used as reference. Combined stress scenarios are the most severe since they assume the simultaneous occurrence of both bank-specific and market stress.

Next, for each relevant balance sheet item, specific assumptions regarding the level (or rate) of outflows or inflows are made. Different assumptions are made for each scenario. Outflow items consist mainly of deposits, market funding by type, such as FX and currency swaps, drawdowns of committed lines of credit, and additional margin calls for derivative transactions. Outflow rates for some items are set on a more granular level. For example, given that the outflow rate (or the degree of stickiness) for deposits differs by type of deposits (such as demand vs. time deposits) and type of depositor (such as non-financial corporate customers vs. financial corporate customers), the assumed outflow rates for the stress testing are generally set taking these distinctions into account.[4] On the other hand, items assumed to register inflows include the redemption of market investments and securities investments at maturity. The stress testing also account for inflows arising from the execution of contingency funding plan (CFP) measures. On the asset side, CFP measures mainly include the use of highly liquid assets such as foreign bonds and reserves at foreign central banks as well as the collection of loans. On the funding side, CFP measures include additional efforts to obtain foreign currency funding, such as through FX and currency swap transactions. When setting the assumptions on outflow and inflow rates, it is important to ensure that they are sufficiently conservative in view of not only past stress events but also the possibility that the severity of stress may be greater in a future stress event. In addition, it is important to verify the appropriateness of the assumed outflow and inflow rates on a regular basis.

Finally, for each scenario, the net funding position is calculated for each day during the time horizon of the stress testing. This position is the sum of the funding inflows and outflows as well as the net inflow arising from the execution of CFP measures (Chart 4). In this example, the initial net funding position declines as a result of an accumulation of net outflows resulting from the assumed stress. The accumulation of net outflows is then offset by the increase in funding inflows arising from asset sales and the execution of CFP measures. The result is a positive net funding position throughout the stress time horizon. In practice, it is important to assess the net funding position under different stress scenarios and the impact of a change in the scenario on the duration and size of the position.

[Chart 4] Stress Testing Results (Illustration)



The results of foreign currency liquidity stress testing are used in banks' day-to-day foreign currency funding management and are also reported to senior management on a regular basis to inform important management decisions. For example, in order to prevent a funding shortfall for a certain period of time after an event of stress, major banks set thresholds regarding their net funding position among other key indicators as part of their risk appetite frameworks. They manage liquidity on a day-to-day basis to ensure that their funding position does not fall below acceptable levels.

Efforts to Enhance Liquidity Risk Management

Major banks have been improving the stability of their foreign currency funding bases by acquiring highly sticky deposits, increasing the maturity of their market funding, and diversifying their funding methods. Moreover, major banks have utilized stress testing to examine in advance the validity of their plans on foreign currency balance sheets during the process of formulating one-year business plans and medium-term strategic plans. Furthermore, major banks have been working to enhance their foreign currency liquidity risk management through stress testing using more conservative and appropriate scenarios, based on the experience of the various financial shocks in the past. They have also been reviewing their early warning frameworks and have been taking steps towards more prompt and accurate liquidity data management. The FSA and the BOJ have been supporting the efforts of major banks through inspections, on-site examinations, and routine offsite monitoring. The FSA and the BOJ have been assessing, among other things, whether the foreign currency liquidity stress testing conducted by major banks is based on sufficiently reasonable assumptions regarding funding inflows and outflows. In particular, the FSA and BOJ have been conducting a joint survey on the foreign currency liquidity risk management of major banks classified as globally systemically important banks (G-SIBs) and, through ongoing dialogue, confirmed whether these banks are steadily improving their foreign currency liquidity risk management (see the Box below for details).

Based on the discussions held during this joint survey, the following section presents the progress made in major banks' foreign currency liquidity risk management, including (1) the use of more conservative and appropriate stress scenarios; and (2) efforts toward further enhancement.

More Conservative and Appropriate Stress Scenarios

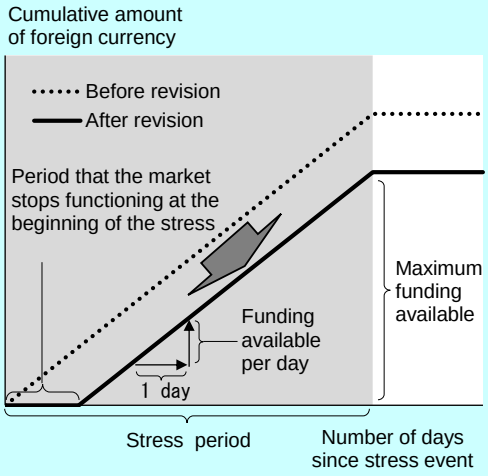
Funding Secured through Additional FX and Currency Swaps under Stress

A key assumption in major banks' stress testing is that in the event that market funding becomes difficult due to stress, in addition to securing funds by drawing down deposits with overseas central banks and monetizing foreign bonds, they will also secure foreign currency through additional FX and currency swap transactions. However, in the event of stress, the additional foreign currency funding available through FX and currency swaps may be more limited than in normal times due to a decline in the functioning of the FX and currency swap market. Thus, estimating a conservative and appropriate amount of additional funding that could be raised through FX and currency swaps in the event of stress is an important issue in the management of foreign currency liquidity risk, and major banks have strived to address the issue for some time.

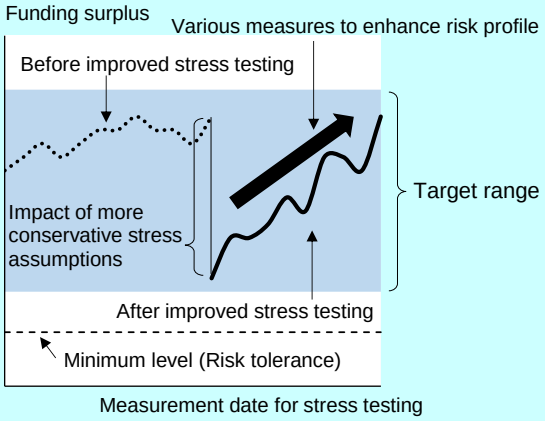
In general, the amount of additional FX and foreign currency swap funding available is often estimated based on stress events in the past. Estimates are typically based on banks' actual transactions during a past stress event, such as the Global Financial Crisis or the recent COVID-19 pandemic, as well as statistics on market-wide transactions during such an event. However, during stress events in recent years, a significant and prolonged decline in the functioning of the FX swap market was avoided, due in part to the U.S. dollar swap arrangements agreed by the major central banks and the rapid and extensive implementation of U.S. dollar funds-supplying operations by the BOJ using these swap lines. Therefore, estimates that simply set the amount of additional funding available based on the past would factor in the effects of these various central bank measures. However, U.S. dollar swaps may not necessarily be always available in a scenario such as bank-specific stress. From the perspective of setting risk tolerance at a level that allows liquidity risk to be managed without excessive reliance on central bank support, it is desirable to set the assumptions for the scenarios in a way that removes the effects of past central bank measures as much as possible.

Taking this into account and learning from practices abroad, major banks have made their scenarios more conservative by assuming that the FX swap market stops functioning and that they cannot conduct any additional FX and currency swap transactions for a certain period of time. In addition, banks have been reviewing the appropriateness of their scenario assumptions from both a stock and flow perspective. Specifically, they have re-estimated the maximum funding available (the stock) of FX and currency swaps based on lines of credit and other measures over the whole stress time horizon, and also reviewed the funding available per day (the flow) available at each point in time over the stress time horizon (Chart 5).

[Chart 5] The Additional Funding Available Through FX and Currency Swaps (Illustration)



[Chart 6] Stress Testing Results (Net Funding Positions)



Strengthening Funding in Response to More Conservative Stress Testing

All else equal, a more conservative stress scenario results in a larger decline in banks' net funding position in the event of stress. Therefore, to maintain their overseas businesses at their current scale and ensure that their stress testing results are within the level of their risk tolerance, banks need to manage their foreign currency funding operations in a more conservative manner in order to increase their liquidity buffer or stable funding.

Based on these considerations, to manage foreign currency funding at a sufficiently comfortable level, major banks have secured sufficient and stable funding positions and improved the resilience of their risk profiles. Specifically, they have taken various measures, such as extending the duration of their funding, expanding emergency foreign currency funding agreements with other banks, increasing relatively stable deposits such as settlement deposits, and increasing funding through corporate bonds. These measures with the aim to ensure a sufficient and stable funding surplus have contributed to the improvement of the resilience of their risk profiles (Chart 6). As a result, major banks are now in a position where they can secure a funding surplus for several months even under severe stress assumptions.

Efforts toward Further Enhancement

The unexpected speed of deposit outflows during the March 2023 banking turmoil shed new light on the importance of liquidity risk management. The following section presents ongoing efforts by major banks to further enhance their liquidity risk management as well as the challenges going forward.

Assumptions on the Outflow Rates of Deposits

In the wake of the banking turmoil including SVB's bankruptcy, major banks have adopted stricter assumptions regarding the outflow rates of deposits in their liquidity stress testing at their overseas entities. Some major banks have also proactively incorporated the experience of other banks by utilizing external data to be able to address risk events they have not experienced themselves. Moreover, they have further refined the classification of their deposits by subdividing them into even smaller groups based on the type of deposits and customer characteristics, and by using highly granular data to better grasp the characteristics of their deposit portfolios.

Some major banks also re-examined their global stress testing. For example, in light of the recent events abroad, assumptions on the outflow rates of deposits were re-examined based on an analysis of the stickiness of deposits for different types of customers. While major banks were already examining their assumptions on deposit outflow rates prior to the recent banking turmoil, updating the severity of scenarios and reviewing the appropriateness of data on a regular basis, the March 2023 banking turmoil prompted them to reconsider their deposit outflow assumptions in light of

the rise of online banking and social media. Going forward, banks will need to continue to examine the validity of their assumptions regarding deposit outflow rates in the event of stress, taking changes in the external environment into account.

Early Warning Frameworks

Major banks have put in place early warning frameworks to quickly identify changes in the foreign currency funding environment and to flexibly make decisions regarding whether to change their level of alertness with respect to the tightness in funding and whether to activate their CFPs. As part of these efforts, they have set up a framework in which they select a number of early warning indicators, set individual thresholds for these indictors, and monitor them (Chart 7). For example, early warning indicators include the cost of FX and currency swaps and repo rates as indicators of the overall foreign currency funding market environment, banks' own stock price and credit default swap spreads as indicators of their own creditworthiness, and the rate of change in deposits and the drawdown rate of committed lines of credit as indicators of changes in funding requirements due to customer factors. Moreover, the indicators are reviewed on a regular basis and, in the review process, past stress events such as the Global Financial Crisis and the COVID-19 pandemic are used as test cases to confirm that the revised indicators violate their thresholds at the appropriate time.

[Chart 7] Major Banks' Early Warning Indicators (Example)

Item	Indicator Example
Sovereign credit rating	Japanese government bond ratings
Banks' own creditworthiness	Banks' own credit rating, stock price, CDS spreads
Similar banks' creditworthiness	Similar banks' CDS spreads
Indicators of overall external market environment	FX and currency swap rates CD/CP rates Corporate bond spreads Repo rates Money market fund amount outstanding
Internal indicators with regard to customers	Rate of change in deposits Drawdown rate of committed lines of credit Share of large borrowers

Although major banks' foreign currency funding conditions in the certificates of deposit and commercial paper markets tightened somewhat during the March 2023 banking turmoil, the impact on their foreign currency funding was much more limited than during the March 2020 financial market turmoil. However, the turmoil highlighted that deposit funding conditions can change rapidly as banks subject to concerns about their soundness such as SVB saw outflows of deposits at a faster-than-expected rate. Moreover, some U.S. regional banks that were regarded by markets as having similar vulnerabilities to SVB or being in a weak financial position experienced a spillover of deposit outflows[5] and a shift of funds from deposits to money market funds.

Against this background, major banks are working to further enhance their early warning frameworks by, for example, considering the expansion of early warning indicators, to enable them to flexibly make decisions with regard to whether to change their level of alertness with respect to the tightness in funding. Major banks are expected to continue making ongoing efforts going forward.

Prompt and Accurate Liquidity Data Management

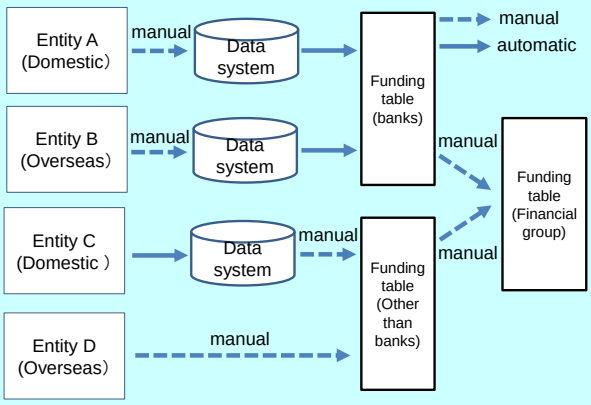
Since in the event of stress, circumstances can change rapidly for a variety of reasons, major banks have put in place liquidity management information systems (liquidity MISs) to ensure that liquidity-related data can be managed promptly and accurately.

As part of their efforts to enhance their stress testing on a global basis, major banks are constantly examining ways to reduce the time it takes to prepare data and improve the accuracy of data in order to utilize daily stress testing measurements in their day-to-day liquidity funding management. Moreover, they ensure that measurement methods are systematically documented to avoid measurement errors. Through these efforts, major banks have been improving their liquidity MISs, for example, by shortening the time to measure the required amount of liquidity.

However, looking at the data generation process, not all processes are necessarily automated, and data from multiple IT systems are used, so that the aggregation of data in many cases takes a fair amount of time, since data at each entity is processed overnight and the data of global overseas entities in different time zones needs to be linked (Chart 8). In contrast, some overseas G-SIBs are able to generate data in a timelier manner, submitting stress testing results to the relevant financial authorities on a daily or weekly basis.

Moreover, in some cases, the data is categorized not only at the group level but also on a major entity basis, with a high level of granularity for each item, such as the funding instrument, counterparty, and asset level. Since such advanced systems play an important role, especially in the event of sudden and severe stress, major banks need to continuously improve their systems to allow them to understand their funding conditions in a more detailed and timely manner during normal times and compute monitoring indicators and forecasts of funding outflows in the event of stress more swiftly.

[Chart 8] Data Generation Process (Example)



Note: A process is defined as "manual" if any part of the process is manual.

Management of Overseas Entities

Major banks use cross-border intra-group funding transactions for the purpose of effectively utilizing surplus domestic yen funds and allowing the head office to obtain foreign currency for the group as a whole. Under such circumstances, reflecting the expansion of overseas businesses, the importance of such global intra-group funding has grown. However, with regard to such intra-group transfers, the March 2023 banking turmoil has led to more emphasis in global discussions among financial authorities on properly understanding restrictions on intra-group funding transfers due to regulatory and supervisory requirements in jurisdictions where overseas entities are located.

This means that for major banks it is important to accurately understand not only the global flows of intra-group transfers but also whether liquidity risk management at the Tokyo headquarters and overseas entities is conducted in a consistent manner in light of discussions on local regulatory and supervisory requirements.

Major banks are working on -- and, going forward, need to continue working on -- further developing their liquidity MISs and improve the funding management and stress testing by overseas entities. To that end, the Tokyo headquarters need to better identify and manage the risks associated with their overseas entities' operations in a timely manner and pay even greater attention to the link between foreign currency liquidity stress testing for all entities on a global basis and for individual entities.[6]

Conclusion

This paper has presented major banks' efforts and progress toward the enhancement of their foreign currency liquidity risk management.

Major banks have made progress in improving their foreign currency liquidity risk management not only by developing more conservative and appropriate scenarios for their foreign currency liquidity stress testing, but also by using stress testing to review their liquidity funding management, deposit outflow rates, and early warning frameworks. Through these efforts, major banks' resilience to foreign currency liquidity risk has steadily increased.

However, in the past few years alone, there have been a number of liquidity-related risk events around the world, such as the deterioration in market funding conditions due to the COVID-19 pandemic and the faster-than-expected deposit outflows seen in the bankruptcy of SVB. In developing risk management systems, it is important to continue making efforts to take such new events into account. Another issue that needs to be examined further and addressed going forward is the impact of the rise of online banking and social media on funding management. Moreover, there is room for further improvement in prompt and accurate liquidity data management.

Given their importance, G-SIBs need to have adequate systems in place. Based on discussions at international meetings, the FSA and the BOJ have held dialogues with overseas financial authorities on the supervision of major banks and have encouraged major banks to enhance the sophistication of their risk management, taking into account their supervisory expectations for G-SIBs expressed in those dialogues as well as the examples of leading overseas banks. Going forward, major banks need to continue to take steps to enhance their foreign currency liquidity risk management in line with changes in the risk profiles of their overseas businesses and the external environment.

Box: Outline of the FSA-BOJ Joint Survey on Foreign Currency Liquidity

Based on the "Initiatives for Further Strengthening Coordination between the FSA and the BOJ" (March 2021), the FSA and the BOJ have been conducting the "Joint Survey on Foreign Currency Liquidity Risk Management" for major banks classified as G-SIBs. The purpose of the survey is for the FSA and the BOJ, as the home authorities, to gain a thorough understanding of their current liquidity risk management frameworks and to ascertain whether their frameworks meet the requirements for G-SIBs. Since its launch in fiscal 2021 until fiscal 2023, the "Joint Survey on Foreign Currency Liquidity Risk Management" has been conducted three times.

Since the joint survey is conducted simultaneously for all G-SIBs each fiscal year, it is possible to horizontally review their foreign currency liquidity risk management frameworks. Such horizontal reviews of liquidity risk management are also conducted by some jurisdictions in other countries and have the advantage of making it possible to assess the level of risk management from a comprehensive and objective perspective and rising the overall level of liquidity risk management. However, since liquidity risk profiles differ depending on banks' business model, the joint survey does not call for uniform implementation of the same risk management methods and parameters, but rather encourages major banks to voluntarily consider such measures as part of their efforts to strengthen risk management in line with their business strategies with regard to maintaining and expanding their overseas businesses.

Issues concerning efforts to improve risk management identified in the surveys will be discussed with surveyed banks and their responses will be followed up in the joint survey in the following year. In this manner, the joint survey provides a framework that enables the FSA and the BOJ to confirm steady improvements through ongoing dialogue.

[1] For details on major banks' foreign currency funding during the pandemic, see Aoki, R., Antoku, K., Fukushima, S. Yagi, T., and Watanabe, S., "Foreign Currency Funding of Major Japanese Banks – Review of the March 2020 market turmoil," Bank of Japan Review 2021-E-4, 2021).

[2] See, for example, the Basel Committee on Banking Supervision's "Report on the 2023 Banking Turmoil" published in October 2023.

[3] Committed lines of credit are a form of credit in which a certain credit limit is set in advance to meet a customer's short-term funding needs, and the customer is allowed to freely withdraw funds within the limit.

[4] In both pairs, the latter type of deposits tends to be less sticky and its outflow rate therefore is assumed to be higher.

[5] As a result of the effects of SVB's failure, Signature Bank, a U.S. regional bank in New York, failed on March 12, 2023, and First Republic Bank, a U.S. regional bank in San Francisco, was placed under public control and acquired by JP Morgan Chase on May 1, 2023.

[6] As major banks have expanded their overseas businesses not only in Europe and the U.S. but also in Asia and other emerging countries, they are conducting stress testing in major currencies such as the dollar and the euro, as well as in local currencies, at each entity.

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