

LM-2 “Sound Systems and Controls for Liquidity Risk Management”

A Guideline issued by Monetary Authority under Section 7(3) of the Banking Ordinance

Purpose

To provide guidance to AIs on the key elements of a sound liquidity risk management framework

Classification

A statutory guideline issued by the Monetary Authority (MA)¹ under the Banking Ordinance, §7(3)

Previous guidelines superseded

The first version of this module issued on 1 April 2011

Application

To all AIs

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¹ In this module, the term “MA” refers to the “Monetary Authority” (the person exercising the legal authority under the Banking Ordinance). The term “HKMA” refers to the “Hong Kong Monetary Authority”, which is the office of the Monetary Authority.

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1. Introduction

1.1 Background

1.1.1 For its safety and soundness, it is important for an authorized institution (AI) to have in place adequate and effective liquidity risk management systems. Such systems should enable an AI to –

- properly allocate liquidity costs and risks to its business activities and products, thereby avoiding mis-alignment in risk-taking incentives and assumption of excessive liquidity risks;
- adequately identify and account for contingent liquidity risks arising from off-balance sheet exposures or non-contractual obligations²;
- maintain a sufficient stock of liquid assets that can be readily monetized without incurring significant loss to allow the AI to withstand liquidity stress; and
- include and cater for severe and prolonged market-wide (as opposed to institution-specific) liquidity disruptions in its stress-testing framework and contingency funding plan.

1.1.2 This module provides guidance on liquidity risk management, incorporating as appropriate relevant international standards including, in particular, the *Principles for Sound Liquidity Risk Management and Supervision* issued by the Basel Committee on Banking Supervision (BCBS) in September 2008, with a view to ensuring that AIs have robust liquidity risk management systems to withstand severe liquidity shocks. Failure of an AI to adopt liquidity risk management systems which reflect the standards and guidance set out in this module may call into question whether the AI continues to satisfy the authorization criteria specified in the Seventh Schedule to the Banking Ordinance (BO).

² A typical example of contingent liquidity risk faced by some banks in stress situations would be the need for them to provide liquidity support, for reputation reasons, to their sponsored securitization vehicles which are experiencing financial problems.

1.2 Overview and scope

1.2.1 While the liquidity risk management systems of AIs may vary in their structure and their degree of sophistication, the common elements contributing to a sound liquidity risk management framework include the following:

Governance of liquidity risk management

- At the governing level, there is a need for the Board of Directors of an AI to determine and articulate the “liquidity risk tolerance” of the AI in terms of the types and magnitude of liquidity risk that the AI is willing to assume under normal and stressed conditions. In formulating business strategies and policies, the AI’s senior management is expected to put in place, among other things, a process for measuring and allocating liquidity costs, benefits and risks to relevant business activities so that line management incentives are consistent with the AI’s liquidity risk tolerance (see section 2).

Identification, measurement and control of liquidity risk

- An AI’s effectiveness in liquidity risk management depends first and foremost on its ability to accurately identify and measure liquidity risk exposure, which is primarily reflected by net funding gaps that may appear in different time horizons as identified in the AI’s cash-flow projections (or maturity profiling). The size of net funding gaps should be controlled by limits that reflect the AI’s stated risk tolerance. Liquidity positions of the AI should be monitored against these limits with the support of reliable management information systems that provide the Board and senior management with timely and relevant information (see section 3).
- Cash-flow projections should address both contractual and behavioural considerations and be based on well-documented and realistic assumptions. To ensure comprehensiveness, the projections should be firm-wide covering all major business units and activities, taking into account intragroup and, where applicable, cross-border liquidity movements, as well as all on- and off-balance sheet transactions and contingent exposures. Where appropriate, an AI should project

its cash-flows in relation to Hong Kong dollars (HKD) and individual “significant foreign currencies”³ respectively in order to gauge the extent of its reliance on foreign exchange swap markets for liquidity (see sections 4 and 6).

- An AI should have the ability to manage its cash flows and funding sources, and to generate in case of need sufficient liquidity from assets held, to cover net funding gaps that may emerge in various time horizons and under different scenarios. This calls for an effective liquidity risk management process to address funding diversification and market access (section 7), intragroup liquidity (section 9), intraday liquidity (section 10), and collateral management (section 11), and to maintain an adequate stock of unencumbered liquid assets as a liquidity cushion to meet funding needs in a range of stressed conditions (section 8).
- Stress-testing should be conducted based on severe but plausible stress scenarios covering, at a minimum, the respective impacts and combined impacts of institution-specific stress and market-wide stress. The results should shed light on an AI’s ability to withstand liquidity stress and therefore provide the Board and senior management with information to determine (and review periodically) the AI’s risk tolerance level, business strategies and contingency funding plan (section 5).
- An AI’s contingency funding plan should be robust and workable, with clearly defined triggers, responsibilities and escalation procedures that can be activated to meet liquidity needs under stress situations (section 12).

Liquidity risk disclosure

- Added to the above is the need for an AI to make pertinent disclosures in respect of its liquidity position and liquidity risk management framework. As required under the Banking (Disclosure) Rules (BDR), AIs, unless exempted, have to disclose information on their liquidity positions and liquidity risk management frameworks periodically.

³ Please refer to paragraph 6.1.2 for the meaning of a currency that is considered “significant” to an AI.

Guidelines on the application of the BDR are provided in Supervisory Policy Manual (SPM) module CA-D-1 “Guideline on the application of the Banking (Disclosure) Rules”. Please also refer to section 7 of SPM module LM-1 “Regulatory Framework for Supervision of Liquidity Risk” for details of specific liquidity disclosure standards.

- 1.2.2 Overall, an AI's liquidity risk management framework should be comprehensive and commensurate with the nature, scale and complexity of the AI's business activities.

1.3 Application

- 1.3.1 Locally incorporated AIs should apply the liquidity risk management standards set out in this module both on a legal entity basis⁴ and on a group basis. Those AIs which are foreign banks operating in Hong Kong through branches will be expected to apply the standards to their Hong Kong branches. See paragraphs 1.3.3 to 1.3.7 for more details on the application of this module to local banking groups and foreign bank branches and subsidiaries.
- 1.3.2 Consistent with its risk-based supervisory approach, the HKMA expects AIs to comply with the standards in this module on a proportionate basis, having regard to their business and liquidity risk profiles. AIs with relatively small and simple operations will not be expected to have liquidity risk management systems and processes that are as elaborate and sophisticated as those with more complex operations. Nevertheless, they should, at a minimum, be able to demonstrate that their systems and processes cover the key elements of an effective liquidity risk management framework outlined in subsection 1.2.

Local banking groups

- 1.3.3 The HKMA generally expects a local banking group⁵ to apply the standards in this module on a group basis.

⁴ This refers to the head office and branches (local and overseas) of an AI incorporated in Hong Kong.

⁵ This refers to a banking group in which the bank or the holding company at the top of the banking group is incorporated in Hong Kong.

The extent of application should be commensurate with the level of liquidity risk of the entities within the group. The management of an AI (or the management of its holding company where applicable) has the primary responsibility of assessing the liquidity risk of the group entities, and should ensure that all those entities posing a material liquidity risk to the group are adequately captured in the group's liquidity risk management framework. In general, such entities will normally include those engaged in any "relevant financial activity" as defined in rule 11(10) of the Banking (Liquidity) Rules (BLR), or in other activities that may subject the group to material liquidity risk exposures.

- 1.3.4 In satisfying the standards in this module, a local banking group may leverage, where appropriate, on the liquidity risk supervisory standards imposed by relevant host supervisors on its overseas operations (including branches and subsidiaries), provided that such supervisory standards are comparable to those adopted by the HKMA. In addition, an AI within a local banking group may not be required to establish its own liquidity risk management framework if: (i) its liquidity risk is already managed as part of the group liquidity risk management framework; and (ii) the HKMA is satisfied that the group liquidity risk management framework contains systems and controls that enable the liquidity risk of the AI within the group to be adequately identified, monitored and controlled.
- 1.3.5 AIs are encouraged, in case of doubt, to consult and agree with the HKMA their intended scope of application of the standards in this module to their group entities.

Foreign bank branches

- 1.3.6 Given that local liquidity risk management capabilities are important in ensuring the overall resilience and robustness of cross-border banking groups, the HKMA generally expects the Hong Kong branches of such groups to be able to comply with the liquidity risk management standards in this module in all major aspects, including the maintenance of adequate liquidity resources to cater for the liquidity risks they face. Nevertheless, recognising that foreign banks may manage their liquidity risk globally on an integrated basis, they may be allowed to adapt their group liquidity risk

management framework to enable their Hong Kong branches to comply with the standards.

Home-host supervisory communications

- 1.3.7 In considering the application of this module to individual AIs or banking groups, the HKMA may, where necessary, obtain information or seek confirmations from relevant home or host supervisors.

2. Governance of liquidity risk management

2.1 General

2.1.1 Effective oversight by the Board of Directors and senior management is a critical element of an AI's liquidity risk management process. The roles and responsibilities of the Board and senior management in risk governance and management are covered in SPM modules CG-1 "Corporate Governance of Locally Incorporated Authorized Institutions" and IC-1 "Risk Management Framework". Many of the requirements and practices set out in these two modules are generally applicable for liquidity risk management.

2.1.2 The Board and senior management of an AI have their own distinct responsibilities in the governance and management of liquidity risk, whereby –

- the Board should be responsible for determining the types and magnitude of liquidity risk that the AI can tolerate, and ensuring that there is an appropriate organisation structure for managing liquidity risk; and
- senior management should be responsible for setting and implementing the liquidity strategy, policies and practices, and ensuring that the liquidity risk tolerance set by the Board is adhered to. In order to align business incentives with the stated risk tolerance, senior management should also ensure that there is an internal framework for proper allocation or pricing of liquidity costs, benefits and risks. The liquidity risk management process should be subject to independent reviews and audits (see subsection 2.4) to ensure its continued

effectiveness in the face of new risks and challenges arising from the constantly changing operating environment.

- 2.1.3 To ensure effective governance and management of liquidity risk, the Board and senior management of an AI should have an adequate understanding of the close links between funding liquidity risk⁶ and market liquidity risk⁷, as well as how other risks (e.g. credit, market, operational and reputation risks) interact with liquidity risk and affect the AI's overall liquidity risk strategy. They should also ensure that the interaction of these risks is considered and taken into account by relevant Board-level committees and risk management functions within the AI.

2.2 Responsibilities of Board of Directors

Liquidity risk tolerance

- 2.2.1 The Board of an AI is ultimately responsible for the liquidity risk assumed by the AI and the manner in which the risk is managed. The Board should establish the AI's liquidity risk tolerance and ensure that it is clearly articulated and communicated to all levels of management.

- 2.2.2 The risk tolerance should be set in a way that –

- defines clearly the level of unmitigated funding liquidity risk the AI is willing to assume under normal and stressed conditions, given its business strategy, financial condition and funding capacity. The risk tolerance level should also be appropriate for the AI's role in the financial system. For example, an AI carrying out important market functions or the activity of which underpins a key segment of the financial system is generally expected to factor in an additional measure of conservatism in setting its risk tolerance level⁸;

⁶ Funding liquidity risk is the risk that an AI will not be able to meet efficiently both expected and unexpected current and future cash-flow and collateral needs without affecting either daily operations or its financial position.

⁷ Market liquidity risk is the risk that an AI cannot easily offset or eliminate a position at market price because of inadequate market depth or market disruption.

⁸ In the case of larger AIs, a broader range of risk factors will naturally be of relevance on account of their comparatively large size, the complexity of their operations, and their interconnectedness, and

- can be easily communicated, understood and monitored by relevant personnel of the AI involved in the liquidity risk management process;
- requires the AI to not only manage its liquidity prudently in normal times, but also withstand a prolonged period of stress, for instance, that lasts for 1 month or longer; and
- reflects the AI's assessment of the sources of liquidity risk it faces as well as the trade-off between risks and profits.

2.2.3 The risk tolerance level should be adequately documented and articulated, preferably with a combination of qualitative and quantitative factors. As an illustration, AIs may express it in the form of a high-level policy statement⁹, supported by various quantitative measures such as the specification of a minimum survival period under a range of severe but plausible stress scenarios and other limits on liquidity metrics¹⁰ used for controlling different aspects of liquidity risk.

2.2.4 The minimum survival period refers to the period of time an AI's net cumulative cash-flow position is to remain positive under specified stress scenarios, without the need for seeking emergency liquidity assistance from the HKMA or other relevant central banks (for a locally incorporated AI with overseas operations). Other quantitative measures may, for example, relate to controls over such areas as liquid asset holdings, maturity or currency mismatches, concentration of funding and contingent liquidity obligations, depending on where the AI's risks and vulnerabilities lie.

2.2.5 AIs should note however that the mere design of metrics and the setting of limits for managing different aspects of liquidity risk do not in themselves constitute sufficient

therefore should additionally be factored into their liquidity risk management framework. As an example, larger AIs may face, and hence need to more actively manage, intraday liquidity risks on account of a much larger volume of payment flows that may occur daily as compared to smaller AIs.

⁹ In the policy statement, an AI may describe the level of liquidity risk it is willing to assume under different time horizons (e.g. the AI may decide not to take any intraday liquidity risk or mitigate such risk as far as possible).

¹⁰ A liquidity metric refers to a measure that facilitates the quantification of one or more characteristics of an AI's liquidity risk exposures (see section 3).

articulation of an AI's overall liquidity risk tolerance. Such metrics and limits should reflect a coherent set of measures that help contain liquidity risk within the stated tolerance level. AIs should also keep the risk tolerance under constant review, having regard to any significant changes in market circumstances or the validity of assumptions used.

- 2.2.6 In the course of risk-based supervision, the HKMA may assess the appropriateness of an AI's liquidity risk tolerance (and any subsequent changes to such risk tolerance), and, where necessary, enter into discussions with the AI if the tolerance level is considered to be excessive.

Liquidity risk management structure

- 2.2.7 It is crucial for an AI to put in place a sound liquidity risk management structure, with proper delineation of powers and responsibilities. The Board may delegate authority to the AI's Asset and Liability Committee (ALCO) or other similar committees to carry out some of its responsibilities for liquidity risk management. However, such delegation of authority does not absolve the Board and its members from their risk management responsibilities and the need to oversee the work of any such committee(s) exercising delegated authority.
- 2.2.8 For the ALCO or any similar committee to perform a liquidity risk governance function on behalf of the Board effectively, its membership should be extended to comprise personnel from the treasury function, the risk management function and the principal business areas that affect the AI's liquidity risk profile. It should also be supported by competent risk managers with a dedicated responsibility for liquidity risk management.
- 2.2.9 The responsibilities for liquidity risk management within an AI should be clearly assigned. Depending on the overall risk management structure, the role of liquidity risk management may form part of an AI's treasury function, with a dedicated liquidity risk management unit embedded in that function, or it may come under the overall responsibility of the Chief Risk Officer.
- 2.2.10 In the case of a local banking group with overseas operations (whether in the form of a branch or subsidiary), the Board should determine the appropriate

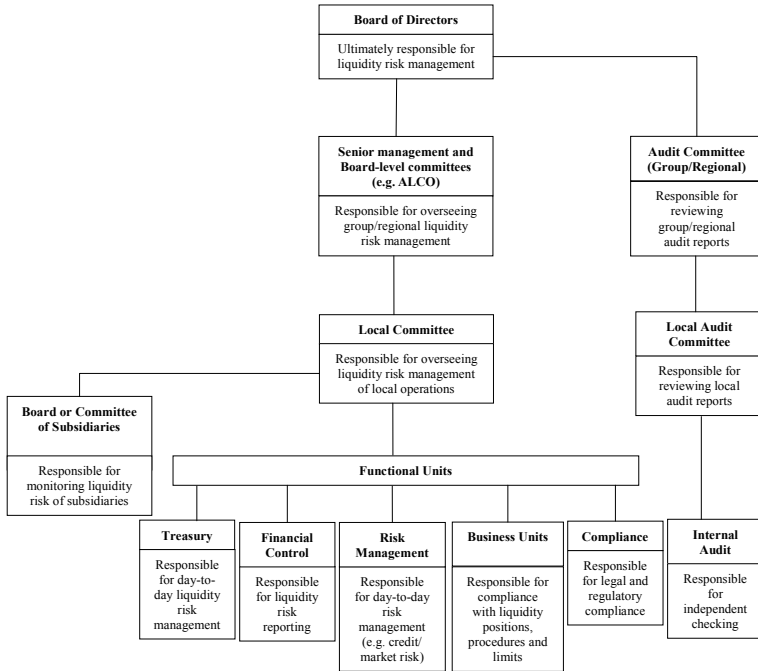
liquidity risk management structure for overseeing all such overseas operations (and this should include non-bank entities where appropriate¹¹), taking into account the differences in their liquidity risk characteristics and the transferability of funds between them in the light of any potential legal, regulatory or operational restrictions. The liquidity risk management structure of a banking group should clearly delineate authority, responsibilities and reporting lines for different levels of management, so that the liquidity management strategy, policies and procedures are executed effectively.

2.2.11 The liquidity risk management structure may assume varying degrees of centralisation or decentralisation within a banking group. In general, a set of group liquidity risk management policies and standards is produced and adapted to suit the specific circumstances of the group's operations at the regional or entity level. The actual measurement and control of liquidity risk based on these policies are usually executed by each entity within the group and overseen at the regional and group levels. The structure to be employed by a banking group should enable effective management of liquidity risk and ready access to liquidity across the group (particularly by the group's operation in Hong Kong) on an ongoing basis.

2.2.12 **Diagram 1** provides an example of the liquidity risk management structure of a banking group. This example is not intended to be prescriptive, but provides an illustration of how liquidity risk governance and management responsibilities can be coordinated within a banking group, whether at the consolidated, local or entity level.

¹¹ Non-bank entities should be subject to liquidity risk oversight if they contribute materially to the liquidity risk exposures of the banking group.

Diagram 1: Illustration of liquidity risk management structure of a banking group



2.2.13 The Board should review the appropriateness of the liquidity risk management structure periodically to address any business developments and changes in market circumstances.

Other responsibilities of the Board

2.2.14 In addition to the above, the Board of an AI is responsible for –

- ensuring the competence of senior management and appropriate personnel in measuring, monitoring and controlling liquidity risk in terms of expertise, systems and resources, and in taking appropriate and prompt remedial actions to address concerns when necessary;

- reviewing and approving at least annually the liquidity risk strategies and other significant liquidity risk management policies and systems (e.g. contingency funding planning and liquidity stress-testing framework), and ensuring that senior management translates the Board's decisions into clear guidance and operating standards (e.g. in the form of policies, controls and procedures) for effective implementation; and
- reviewing regular reports and stress-testing results on the AI's liquidity positions and maintaining continued awareness of its performance and overall liquidity risk profile.

2.2.15 In the case of foreign bank branches in Hong Kong, the head office of the bank may, where appropriate, delegate certain tasks for liquidity risk management to the local branch management, provided that adequate oversight is exercised by the bank's Board (or a delegated risk governance function at the head office or regional level) in approving the branch policies and monitoring the branch's compliance with such policies.

2.3 Responsibilities of senior management

Liquidity risk management strategy, policies and procedures

2.3.1 The senior management of an AI are responsible for developing and implementing the AI's liquidity risk management strategy, policies and procedures, properly documented in the form of a policy statement, in accordance with the risk tolerance established by the Board. The policy statement should be approved by the Board, and be subject to its regular review (at least annually) to ensure that it remains valid under changing circumstances.

2.3.2 An AI should develop its liquidity policy statement taking account of the nature of its business activities and liquidity needs under both normal and stressed conditions. An AI's liquidity policy statement should cover, at a minimum, the following key aspects:

- Liquidity risk tolerance as established by the Board;
- Liquidity risk management strategy, including

- the goals and objectives underlying the strategy;
- the composition and maturity of assets and liabilities;
- the level of diversity and stability of funding sources targeted by the AI;
- the approach to managing liquidity in different currencies, across borders, and across business lines and legal entities, where applicable, taking into consideration the home and host regulatory requirements in the jurisdictions in which the AI operates;
- the approach to intraday liquidity management;
- the assumptions on the liquidity and marketability of assets;
- Liquidity risk management responsibilities – with clearly defined lines of authority, responsibilities and reporting structure;
- Liquidity risk management systems – use of systems and tools for measuring, monitoring, controlling and reporting liquidity risk, including –
 - the setting of various liquidity limits and ratios (e.g. target Liquidity Coverage Ratio (LCR) or Liquidity Maintenance Ratio (LMR) where applicable to an AI, maturity mismatch limits, loan to deposit ratio, etc.);
 - the framework for conducting cash-flow projections and liquidity stress-testing, including the techniques, scenarios and assumptions used;
 - the management reporting system for liquidity risk; and
- Contingency funding plan – which should describe the approaches and strategies for dealing with various types of liquidity stress.

- 2.3.3 The policy statement of a locally incorporated AI should cover both its local and overseas operations as well as all related entities that may have a significant impact on its liquidity. If the AI manages liquidity on a group basis, the policy statement should address issues relevant to the AI and the group as a whole.
- 2.3.4 Regardless of whether liquidity risk management is centralised at the head office, a foreign bank branch should still formulate a policy statement for its Hong Kong operations. The policy statement should, in particular, include the line of responsibility for monitoring the liquidity risk of the Hong Kong branch and its operations and the reporting arrangements to head office.

Allocation of liquidity costs, benefits and risks

- 2.3.5 As liquidity risk management is not a profit-making function, it is important for an AI to avoid adverse incentives and potential conflicts of interest that may impede the soundness of its liquidity risk management framework. Senior management should appropriately incorporate liquidity costs, benefits and risks in the internal pricing, performance measurement and new product approval processes, thereby aligning the risk-taking incentives of individual business lines with the liquidity risk tolerance established by the Board.¹²
- 2.3.6 Normally, this liquidity pricing framework will involve the charging of a liquidity premium to activities that consume liquidity (e.g. granting new advances) and the assignment of a liquidity value to those that generate liquidity (e.g. obtaining new deposits), based on a predetermined mechanism for attributing liquidity costs, benefits and risks to these activities. Various considerations should be factored into the framework such that it –
- reflects the level of liquidity risk inherent in a business activity;
 - covers all significant business activities, including those involving the creation of contingent exposures

¹² Other than providing some general guidance, the HKMA does not intend to prescribe the manner in which an AI's internal analytical framework for the measurement and allocation of liquidity costs, benefits and risks should be formulated. No single or standard methodology can fit the circumstances of AIs of different size and complexity.

which may not immediately have a direct balance sheet impact;

- incorporates in the measurement and allocation process factors related to the anticipated holding periods of assets and liabilities, their market liquidity risk characteristics, and any other relevant factors, including the benefits from having access to relatively stable sources of funding, such as some types of retail deposits;
- takes account of both contractual maturity as well as behavioural patterns in estimating the length of tenor of any relevant asset or liability item for the determination of the liquidity value or premium to be allocated;
- provides an explicit and transparent process at the line management level for quantifying and attributing liquidity costs, benefits and risks; and
- includes consideration of how liquidity would be affected under stressed conditions.

2.3.7 The liquidity pricing framework of an AI should be reviewed periodically by senior management (and endorsed by the Board as appropriate) taking into account changes in business and financial market conditions.

Other responsibilities of senior management

2.3.8 Other responsibilities of senior management include –

- communicating the liquidity risk management strategy, key policies and procedures, liquidity pricing framework and liquidity risk management structure to all relevant business units and personnel throughout the organisation that conduct activities with an impact on liquidity;
- ensuring that there are close communication links between treasury, liquidity risk managers and other business and risk managers having access to critical information that affects liquidity. For example, information from credit risk managers or others monitoring market conditions can facilitate effective evaluation of liquidity risk and monitoring of

counterparty status;

- ensuring that liquidity risk managers have sufficient authority and independence from risk-taking units to discharge their function effectively;
- ensuring that adequate internal controls are executed by independent personnel with the necessary skills and competence to safeguard the integrity of the AI's liquidity risk management process (see subsection 2.4);
- monitoring closely the current trends and potential market developments that may require timely changes or updates to the liquidity risk management strategy, systems and internal controls to address any significant challenges;
- defining the specific process for handling exceptions to policies and limits, including the procedures for escalation, reporting and consideration of follow-up actions (e.g. whether exceptional approval could be granted at an appropriate level of authority, what remedial actions should be taken and, where necessary, who should be held accountable);
- ensuring the effectiveness of stress tests and contingency funding plans as well as the appropriateness of the liquidity cushion maintained; and
- through regular and ad hoc submission of risk management reports and risk analyses, informing the Board of any new and emerging liquidity concerns in a timely manner.

2.4 Independent reviews and audits

2.4.1 AIs should conduct periodic reviews of their liquidity risk management process to ensure its integrity, accuracy and reasonableness. The reviews should be conducted by independent parties, e.g. internal or external auditors, with the relevant skills and expertise.

2.4.2 Such reviews should, among other things, cover the following areas:

- the adequacy of internal systems and procedures for identifying, measuring, monitoring and mitigating liquidity risk;
- the appropriateness of various internal limits on liquidity metrics for controlling liquidity risk;
- the suitability of the underlying scenarios and assumptions for conducting cash-flow analyses;
- the integrity and usefulness of management information reports on liquidity risk; and
- the adherence to established liquidity policies and procedures.

2.4.3 AIs, particularly those with complex liquidity risk profiles and measurement systems, should have their internal models or other measurement methodologies validated by independent and qualified internal or external reviewers.

2.4.4 Any weaknesses or problems identified in the review process should be addressed by senior management in a timely and effective manner.

3. Liquidity risk identification, measurement, monitoring and control

3.1 Liquidity metrics and measurement tools

3.1.1 AIs should use a range of liquidity metrics for the measurement and analysis of liquidity risk. These metrics should enable the management of an AI to understand its day-to-day liquidity positions and structural liquidity mismatches, as well as its resilience under stressed conditions. In particular, these metrics should perform the functions of –

- ensuring compliance with statutory liquidity requirements;
- projecting the AI's future cash flows and identifying potential funding gaps and mismatches under both normal and stressed conditions over different time horizons;

- evaluating potential liquidity risks inherent in the AI's balance sheet structure and business activities, including the liquidity risks that may arise from any embedded options and other contingent exposures or events;
- assessing the AI's capability to generate funding, as well as its vulnerability to, or concentration on, any major source of funding; and
- identifying the AI's vulnerabilities to foreign currency movements.

3.1.2 The above should take into account all assets, liabilities, off-balance sheet positions and activities of the AI, across business lines, legal entities and overseas operations.

3.1.3 AIs should use metrics and tools that are appropriate for their business mix, complexity and risk profile. Some of the information contained in the Return on Liquidity Monitoring Tools (MA(BS)23) can be useful –

- information on the level of concentration of funding from major counterparties (including retail and wholesale fund providers), or major funding instruments (e.g. by issuing various types of securities);
- information on the size, composition and characteristics of unencumbered assets included in an AI's liquidity cushion for assessing the AI's potential capacity to obtain liquidity, through sale or secured borrowing, at short notice from private markets or central banks in times of stress;
- information on committed facilities granted or received by an AI, where the drawdown on such facilities may have implications for the AI's liquidity position;
- maturity mismatch analyses, based on contractual maturities as well as behavioural assumptions of cash inflows and outflows. Such metrics provide insight into the extent to which an AI engages in maturity transformation and identify potential funding needs that may need to be bridged; and

- in the case of a category 1 institution, LCR in individual currencies.
- 3.1.4 In addition to the above, AIs should adopt other metrics as considered prudent or necessary to supplement their liquidity risk management, such as –
- medium-term funding ratio¹³, stable or core deposit ratio or any similar ratio that reflects the stability of an AI's funding;
 - loan-to-deposit ratio or any similar ratio that reflects the extent to which a major category of asset is funded by a major category of funding;
 - metrics tracking intragroup lending and borrowing;
 - swapped fund ratio¹⁴ or any other type of metric that can portray how an AI uses specific types of financial instruments (such as currency swaps) to bridge funding needs in individual currencies.
- 3.1.5 AIs should analyse regularly information or trends revealed from liquidity metrics (e.g. a persistent decline in stable deposits) to identify any material liquidity concerns.

3.2 Risk control limits

- 3.2.1 AIs should, where appropriate, set limits for the liquidity metrics they employ in monitoring and controlling their liquidity risk exposures. The limits set should be relevant to an AI's business activities and consistent with its liquidity risk tolerance.
- 3.2.2 The limits should be used for managing day-to-day liquidity within and across business lines and entities. A typical example is the setting of maturity mismatch limits over different time horizons in order to ensure that an AI can continue to operate in a period of market stress.

¹³ A medium-term funding ratio is a ratio of liabilities to assets, both with a contractual maturity of, say, more than 1 year. This ratio focuses on the medium-term liquidity profile of an AI and is intended to highlight the extent to which medium-term assets are being financed by the roll-over of short-term liabilities.

¹⁴ A swapped fund ratio can be designed to measure the reliance of an AI on liquidity in a particular currency.

3.2.3 Als should ensure compliance with the established limits, and define the procedures for escalation and reporting of exceptions or breaches (see the 6th bullet under paragraph 2.3.8), which can be early indicators of excessive risk or inadequate liquidity risk management. The limits set, and the corresponding escalation and reporting procedures, should be regularly reviewed.

3.3 Early warning indicators

3.3.1 To complement liquidity metrics, Als should adopt a set of indicators that are more readily available, either internally or from the market, to help in identifying at an early stage emerging risks in their liquidity risk positions or potential funding needs, so that management review and, where necessary, mitigating measures can be undertaken promptly.

3.3.2 Such early warning indicators can be qualitative or quantitative in nature and may include, but are not limited to, the following:

- rapid asset growth, especially when funded with potentially volatile liabilities;
- growing concentrations on certain assets or liabilities or funding sources;
- increasing currency mismatches;
- increasing overall funding costs¹⁵;
- worsening cash-flow or structural liquidity positions as evidenced by widening negative maturity mismatches, especially in the short-term time bands (e.g. up to 1 month);
- a decrease in weighted average maturity of liabilities;
- repeated incidents of positions approaching or breaching internal or regulatory limits;
- negative trends or heightened risk, such as rising delinquencies or losses, associated with a particular business, product or activity;

¹⁵ For example, interbank funding market interest rates are increasing because of market-wide liquidity stress, or an Al's borrowing premium is rising due to adverse institution-specific reasons.

- significant deterioration in earnings, asset quality, and overall financial condition;
- negative publicity;
- a credit rating downgrade;
- stock price declines;
- widening spreads on credit default swaps or senior and subordinated debt;
- counterparties beginning to request additional collateral for credit exposures or to resist entering into new transactions to provide unsecured or longer dated funding;
- reduction in available credit lines from correspondent banks;
- increasing trends of retail deposit withdrawals;
- increasing redemptions of certificates of deposit before maturity; and
- difficulty in accessing longer-term funding or placing short-term liabilities (e.g., commercial paper).

3.3.3 In addition to the above, AIs should adopt indicators that signal whether embedded triggers¹⁶ in certain complex financial products (e.g. callable public debt, OTC derivative transactions, etc.) or other covenants are about to be breached or whether contingent risks are likely to crystallise (e.g. arising from contractual commitments or non-contractual obligations (out of reputation concerns) to provide credit or liquidity support to off-balance sheet vehicles or conduits). These triggers, which may result in the buying back of assets, additional liquidity support for products, increased collateral requirements or margin calls in cash, can have a substantial liquidity impact.

¹⁶ A triggering event referred to in this context is an event which enables commitments to be drawn upon and which thus may create a liquidity need. For example, such events could include changes in economic variables or conditions, credit rating downgrades, country risk issues, specific market disruptions (e.g. relating to commercial paper), and the alteration of contracts by governing legal, accounting or tax systems and other similar changes. Such triggers may be embedded in short-term financing transactions and derivative and other financial contracts.

3.4 Management information systems

- 3.4.1 An AI should have reliable management information systems (MIS) that provide the Board, senior management and other appropriate personnel with timely and forward-looking information on its liquidity positions. The MIS should be fit for the purpose of supporting the AI's day-to-day liquidity risk management and continuous monitoring of compliance with established policies, procedures and limits. The MIS reports should be capable of supporting the Board and senior management of an AI in identifying emerging concerns on liquidity, as well as in managing liquidity stress events.
- 3.4.2 An AI's MIS should encompass information in respect of the AI's liquidity cushion, major sources of funding and all significant sources of liquidity risk, including contingent risks and the related triggers and those arising from new activities. Moreover, an AI's MIS should have the ability to calculate risk measures to monitor liquidity positions –
- in all currencies, both individually and on an aggregate basis;
 - of the AI's Hong Kong office, and, in the case of a locally incorporated AI, any of its overseas branches and associated entities in its consolidated group;
 - under normal business conditions and during stress events, with the ability to deliver more granular and time-sensitive information for the latter;
 - for different time horizons (e.g. on an intraday basis, on a day-to-day basis for shorter time horizons (of, say, 5 to 7 days ahead), and over a series of more distant time periods thereafter); and
 - at appropriate intervals. In times of stress, the MIS reports should be capable of being produced at more frequent intervals (e.g. daily, or even intraday if necessary).
- 3.4.3 The MIS of AIs actively engaged in secured borrowing and lending transactions (e.g. repurchase (repo), reverse repo and securities swap transactions); structured financing transactions (e.g. securitization); or

other transactions in financial instruments or derivatives, should be able to capture fully liquidity risks that may arise from –

- maturity mismatches and asset liquidity;
- collateral outflows resulting from rating changes and asset price movements; and
- off-balance sheet funding vehicles and non-contractual obligations, providing greater transparency into contingent funding risks.

3.4.4 Owing to their systemic importance, AIs with a large retail deposit base should have MIS capable of supporting effective statistical and behavioural analyses to detect any signs that the average life of retail deposits is shortening or that the deposit base is becoming more volatile.¹⁷

3.4.5 To facilitate liquidity risk monitoring, there should be reporting criteria specifying the scope, manner and frequency of reporting liquidity information for various recipients (e.g. daily for those responsible for managing liquidity risk, and at each meeting convened by the Board or its relevant delegated committee(s) during normal times, with increased reporting frequency in times of stress) and the parties responsible for preparing the reports.

3.4.6 The contents of the MIS reports should be designed to adequately support the functioning of an AI's liquidity risk management tools for measuring liquidity needs and controlling different aspects of liquidity risk. In particular, the reporting should compare current liquidity exposures to established limits (both for internal liquidity risk management and statutory compliance purposes) to identify any limit breaches. Breaches in liquidity risk limits should be reported to the appropriate level of management. Thresholds and reporting guidelines should be specified for escalation of the reporting of breaches to higher levels of management and the Board.

¹⁷ Possible signs affecting the volatility of deposits may include, but are not limited to –

- changes in deposits taken upon expiry of preferential interest rate pricing;
- changes in the distribution of deposits taken from different types of depositors; and
- increase in the use of e-banking services by depositors to make money transfers.

3.4.7 In particular, an AI's MIS should enable the AI to report specific matters with respect to its liquidity positions to the HKMA pursuant to the BO and the BLR¹⁸, or as otherwise required specifically by the HKMA.

4. Cash-flow approach to managing liquidity risk

4.1 General

4.1.1 AIs are expected to adopt a cash-flow approach to managing liquidity risk, under which they should have in place a robust framework for projecting comprehensively future cash flows arising from assets, liabilities and off-balance sheet items over an appropriate set of time horizons. The framework should be used for –

- monitoring on a daily basis their net funding gaps under normal business conditions; and
- conducting regular cash-flow analyses based on a range of stress scenarios.

4.1.2 Unless otherwise specified, the cash-flow management standards in this section apply generally to AIs under both normal and stressed situations. See section 5 for further specific guidance on cash-flow projections for stress-testing purposes.

4.2 Scope, coverage and frequency of cash-flow projection

4.2.1 Cash-flow projections involve the estimation of an AI's cash inflows against its outflows and the liquidity value of its assets to identify the potential for future net funding shortfalls. The projections should be forward-looking and based on reasonable assumptions and techniques, covering liquidity risks stemming from –

- on-balance sheet assets and liabilities;
- off-balance sheet positions and derivative transactions (including sources of contingent liquidity demand and related triggering events associated with such positions); and

¹⁸ Please refer to §971 of the BO and rules 5, 8 and 14 of the BLR.

- core business lines and activities (for example, correspondent, custodian and settlement activities).
- 4.2.2 Cash-flow projections should address a variety of factors over different time horizons, including –
- vulnerabilities to changes in liquidity needs and funding capacity on an intraday basis;
 - day-to-day liquidity needs in the 5 to 7 days ahead, and funding capacity over short and medium-term horizons of up to 1 year;
 - longer-term liquidity needs over 1 year; and
 - vulnerabilities to events, activities and strategies that can put a significant strain on an AI's capacity for generating liquidity.
- 4.2.3 Cash-flow projections should cover positions in HKD and in all currencies in aggregate. Separate cash-flow projections should also be performed for individual foreign currencies in which an AI has significant positions. See section 6 for more details.
- 4.2.4 AIs should determine the frequency of cash-flow projections taking into account their business nature and risk profile. In general, an AI is expected to conduct daily projection of its cash-flow position covering each of the 5 to 7 days ahead. Cash-flow projections covering longer time horizons may be conducted at a frequency (say, weekly or monthly) that is both prudent and appropriate for the purpose of the AI's liquidity risk management.

4.3 Net funding gaps

- 4.3.1 In order to meet their obligations as they fall due and thereby stay in business, AIs need to ensure that either a positive cash-flow position is maintained or otherwise sufficient cash can be generated from their assets or funding sources to cover their funding gaps promptly.
- 4.3.2 Net funding gaps can be assessed through the construction of a maturity profile (supplemented where relevant with additional analysis of the funding capacity of specific on- or off-balance sheet items). All AIs are required to report their maturity profiles to the HKMA

periodically under Part 4 of Return MA(BS)23. In addition to this, AIs should develop as appropriate internal methodologies to project their maturity profiles taking into account any special characteristics of their operations (if not already captured by the Return). Some general guidance in this regard is provided below.

- 4.3.3 An AI's maturity profile together with any related supplemental analysis should cover all cash flows arising from assets, liabilities and off-balance sheet claims and obligations. Where appropriate, the maturity profile should also cover securities flows that may affect an AI's liquidity position. For example, such securities flows would include collateral posted by an AI that may require funding and collateral received by the AI that can be used for raising secured funding.
- 4.3.4 An AI's maturity profile should encompass adequate time bands so that the AI can monitor its liquidity needs for various time horizons. It is generally expected to have daily time bands in the very short term (say for a period of 5 to 7 days ahead), which may be followed by wider and less granular time bands for other periods¹⁹. The time frame can also vary depending on an AI's business. AIs that are less dependent on short-term money markets may, for example, need to actively manage their net funding gaps over a slightly longer period (such as 1 to 3 months ahead).
- 4.3.5 AIs should set internal limits to control the size of their cumulative net mismatch positions (i.e. where cumulative cash inflows are exceeded by cumulative cash outflows), at least for the shorter-term time bands (e.g. next day, 5 to 7 days ahead, and 1 month). Such limits should be in line with the established liquidity risk tolerance, and should take into account the potential impact of adverse market conditions on an AI's funding capacity. Maturity mismatch limits should also be imposed for individual foreign currencies in which an AI has significant positions (see section 6).
- 4.3.6 The maturity mismatch limits should be properly documented in the liquidity risk management policy statement. AIs should regularly review the suitability of such limits.

¹⁹ As a general guidance, the medium to longer time horizon covered by an AI's maturity profile may be calibrated into 1 week, 2 weeks, 1, 2, 3, 6 and 9 months, and 1, 2, 3, 5 years and beyond 5 years.

4.4 Cash-flow projection assumptions and techniques

4.4.1 While certain cash flows can be projected based on contractual maturities, some may need to be estimated based on certain assumptions. In these circumstances, AIs should make realistic assumptions (with a reasonable degree of prudence) to reflect the characteristics of their businesses and products, as well as economic and market conditions. For example, AIs may take into account the following factors in setting the assumptions for cash-flow projection:

- expected future growth or contraction in the balance sheet;
- the proportion of maturing assets and liabilities that AIs reasonably expect to roll over or renew;
- the quality and proportion of liquid assets or other marketable securities that can be used as collateral to obtain secured funding;
- the behaviour of assets and liabilities with no clearly specified maturity dates, such as repayment of overdrafts and demand deposits;
- the potential cash flows arising from off-balance sheet activities, e.g., drawdown under loan commitments and contingent liabilities (including all potential draws from contractual or non-contractual commitments);
- the behaviour of cash flows under different service delivery channels (e.g. branches vs e-banking channels);
- the convertibility of foreign currencies;
- the lead time required for the monetization of marketable debt securities, taking into account the settlement time and the impact of time differences if the clearing or custodian agents are located outside Hong Kong; and
- access to wholesale markets, standby facilities and intragroup funding (see section 9 for more details).

- 4.4.2 Als engaged in correspondent banking, custodian and settlement services should understand, and have the capacity to manage, how the provision of these services can affect their cash flows. For instance, the gross value of customers' payment traffic (inflows and outflows) could be sufficiently large to affect an AI's liquidity position, both intraday and overnight. If an AI is a participant in a payment and settlement system, it should have a clear understanding of the procedure for handling incidents of settlement failure within the system, so that it is able to assess and manage the potential liquidity needs arising from such incidents.
- 4.4.3 Techniques employed by Als for designing cash-flow assumptions should be commensurate with the nature and complexity of their business activities. These may range from historical experience and static simulations based on current holdings to sophisticated modelling (for more complex Als), taking into account ongoing market developments.
- 4.4.4 In deriving behavioural cash-flow assumptions, Als may analyse historical observations on cash-flow patterns. While there is no standard methodology for making such assumptions, it is important that the assumptions used are consistent and reasonable and they should be supported by sufficient historical or empirical evidence. Further guidance in respect of behavioural assumptions for cash-flow analyses is set out in [Annex 1](#).
- 4.4.5 Als should document in their liquidity risk management policy statement the underlying assumptions used for estimating cash-flow projections and the rationale behind them. The assumptions and their justifications should be approved, and subject to regular review, by senior management to take account of available statistical evidence and changing business environment.

5. Stress-testing and scenario analysis

5.1 General

- 5.1.1 In addition to conducting cash-flow projections to monitor its liquidity positions under normal business conditions, an AI should perform stress tests regularly

based on severe but plausible scenarios to identify potential sources of liquidity strain under stressed conditions.

- 5.1.2 Some guidance for AIs conducting liquidity stress tests is provided in the following paragraphs. See also SPM module IC-5 “Stress-testing” which provides general guidance on the use of stress tests for risk management purposes.

5.2 Scope and process

- 5.2.1 Stress tests should enable an AI to assess its ability to generate sufficient liquidity from both sides of the balance sheet to meet funding needs under adverse conditions. Potential sources of demand for liquidity arising from off-balance sheet commitments and other contingent liabilities should also be addressed. The tests should consider the implications of the stress scenarios across different time horizons, including on an intraday basis.
- 5.2.2 An AI should conduct stress tests based on severe but plausible scenarios and assumptions that are commensurate with the AI’s business nature, size and complexity. The stress-testing scenarios and assumptions adopted by an AI should reflect the current market conditions and address the AI’s actual experiences in stressed situations. Such scenarios and assumptions should be reviewed regularly by an AI’s senior management, with any major changes endorsed by the AI’s Board or its relevant delegated committee(s). The active involvement of senior management is vital to the stress testing process. During their regular reviews, senior management should consistently require consideration of sufficiently severe stress scenarios. (Please refer to subsection 5.4 for further guidance on various types of liquidity stress-testing scenarios.)
- 5.2.3 Stress tests should enable an AI to analyse the impact of stress scenarios on its consolidated group-wide liquidity position as well as on the liquidity position of individual entities and business lines in order to understand where risks could arise.
- 5.2.4 Stress tests should be performed for all currencies in aggregate and separately for positions in HKD and

individual foreign currencies in which AIs have significant positions (see section 6).

- 5.2.5 The design and frequency of stress-testing should be commensurate with the size and complexity of an AI and its liquidity risk exposures, as well as with the relative importance of the AI within the financial system. AIs, particularly those designated by the HKMA as “domestic systemically important banks” should build in the capability to increase the frequency of stress tests in special circumstances, such as in volatile market conditions or at the request of the HKMA.
- 5.2.6 When conducting stress tests on their liquidity position, AIs should also consider the insights and results of stress tests performed for other risks, including possible interaction with these other risks.

5.3 Behavioural considerations for stress-testing

- 5.3.1 For stress-testing purposes, AIs are expected to analyse the behavioural characteristics of their assets and liabilities as well as off-balance sheet commitments and other contingent liabilities (including those that are non-contractual in nature) to facilitate understanding of how these items may contribute to, or place demands on, their liquidity under stress scenarios.

Assets

- 5.3.2 AIs may analyse assets in accordance with their relative level of market liquidity and classify them broadly as follows:
- cash (that provides a ready source of liquidity in all circumstances);
 - marketable assets included by an AI as “tier 1 assets” in its liquidity cushion – please refer to paragraph 8.3.1. Such assets should be readily monetizable with little or no loss or discount, either through sale or use as collateral for obtaining secured funding;
 - marketable assets included by an AI as “tier 2 assets” in its liquidity cushion – please refer to paragraph 8.3.2. Tier 2 assets may include assets

other than HQLA (for category 1 institutions) or “liquefiable assets” (for category 2 institutions) held by the AI. However, such assets should generally have the characteristics set out in footnote 28. The price risks attached to such assets under adverse conditions should also be addressed by the application of appropriate haircuts;

- Saleable loan (such as residential mortgage loans) or asset portfolios, which may provide an AI with a limited amount of liquidity, usually with a longer lead time and higher haircut on book values, particularly under adverse conditions; and
- Other assets which are illiquid or not marketable, such as loans that cannot be readily sold, bank premises, investments in subsidiaries or associated entities, as well as classified credits.

5.3.3 In each of the above categories, assets pledged to third parties or tied to other positions should be separately identified as being incapable of generating liquidity.

5.3.4 AIs should assess the potential of different categories of assets for the provision of liquidity under stress, whether through sale or secured funding. Assumptions used should be realistic (both in terms of timing and amount of liquidity generated) and should be supported by comprehensive analysis of relevant factors (e.g. size of AIs' holding vis-à-vis daily turnover of the assets concerned). Additional conservatism should be applied as appropriate to cater for possible changes in market liquidity characteristics in times of stress. In this regard, AIs should take account of the expected level of loss or discount in price and the time needed to execute and settle the relevant transactions under stressed conditions.

5.3.5 For contractual cash inflows generated from AIs' assets (e.g. receivables expected from retail or wholesale clients), AIs should assess the timing and amount of such receivables realistically and practically, taking into account, for example, possible needs to roll over outstanding loans to customers for relationship and franchise reasons. AIs should only include inflows from fully performing exposures for which they have no reason to expect a default within the stress period.

Liabilities

- 5.3.6 The liquidity risk inherent in an AI's liabilities is mainly determined by the reliability, stability or "stickiness" of its funding sources. AIs are expected to analyse funding sources (other than capital) identifying those that would tend to stay with the AI under most circumstances and those that would likely run-off quickly at the first sign of stress.
- 5.3.7 Wholesale funding, both secured and unsecured, from more sophisticated fund providers (such as financial institutions, hedge funds, etc.) tend in general to be more volatile than, for example, deposits taken from retail and small business customers. In general, wholesale fund providers may be inclined to react quickly to early signs of liquidity stress (whether institution-specific or market-wide) by withdrawing their funds. AIs should assess the likelihood of such possible reduction or unavailability of funding from specific counterparties and from wholesale funding markets generally in times of stress.
- 5.3.8 AIs should also consider, having regard to historical trends and account behaviour, factors that influence the stability (and hence the run-off rates) of different types of customer deposits during a stress scenario, such as –
- the size of deposit;
 - whether a deposit is fully insured;
 - the purpose of the deposit – for example, AIs may assess whether transactional deposits (e.g. payroll accounts) will exhibit greater signs of stability in times of stress;
 - the type of depositor – in particular, the relative stability of deposits from retail, small business, large corporate, private banking, and offshore customers can be assessed;
 - whether a depositor has any other business relationship with an AI;
 - the channel through which deposits are taken and can be withdrawn (e.g. direct or e-banking channels or brokered); and

- any behavioural patterns (e.g. renewal history) with respect to a certain type of deposits.

Off-balance sheet positions

5.3.9 AIs should assess the contingent liquidity risks arising from off-balance sheet commitments and other contingent liabilities, including the related triggering events associated with off-balance sheet positions, under adverse situations. There should be particular focus on the nature and size of an AI's non-contractual obligations, which may materialise under adverse market conditions.

Guarantees and commitments

5.3.10 Undrawn loan commitments, letters of credit and financial guarantees given by AIs to their customers may represent a potential drain of funds during stress. An economic downturn may trigger a substantial increase in the amount of drawdown of loan facilities, letters of credit or guarantees provided by AIs to their customers. AIs should ascertain the level of drawdown in the normal course of business, and then endeavour to estimate the likely scope of increase in these cash outflows during periods of stress. Where applicable, an AI should also consider the nature of its loan commitment and the credit worthiness of its counterparty in the context of its exposures to business and geographical sectors. For example, counterparties belonging to a particular business sector may all be affected by sector-specific stress at the same time, thereby posing a significant risk of liquidity stress to an AI if it has significant amounts of loan commitments or contingent liabilities to such counterparties.

5.3.11 Conversely, when an AI relies on committed lines of credit or guarantees provided by others, the extent to which such commitments can be relied upon during a stress situation should be assessed. Where an AI is holding assets which are guaranteed by a third party, or has raised funds against such assets, its funding liquidity could erode if and when the credit standing of that third party deteriorates. The resale value of those assets may diminish and the AI could be called upon to post additional margin in respect of borrowings against such assets.

Asset sale or securitization

- 5.3.12 Als engaged in asset sale or securitization transactions should, at inception and throughout the life of such transactions, monitor how the structure of such transactions will affect their liquidity positions. This should be undertaken in the context of their role in the transactions, including, for example, the potential liquidity risks that may arise from the contractual terms of the relevant transactions. For instance, there may be contractual terms that can trigger recourse in asset sales, extension of liquidity facilities to the programmes or early amortization. Als should assess the extent to which triggering events (e.g. downgrading of credit rating, fall in asset prices, etc.) are more likely to occur during adverse market conditions.
- 5.3.13 In addition to contractual obligations, reputation factors may oblige an AI to provide liquidity support to special purpose vehicles (SPVs) sponsored or arranged by it, or to buy back securitized assets from the market. Als therefore need to consider how their liquidity may be adversely affected by illiquidity at any such SPV. This could, for example, include the SPV's potential liquidity draws on the sponsoring AI, the liquidity required for buying back securitized assets, and any possible withdrawal of the SPV's liquidity surplus deposited with the AI.
- 5.3.14 Moreover, Als should be aware that they may not have continuing access to the securitization market as a funding source in the midst of an institution-specific or market-wide stress, which may in turn require the accessing of alternative sources of funding.

Financial derivative or other transactions

- 5.3.15 Where an AI has entered into short-term financing transactions, derivative or other contracts with embedded trigger clauses, the AI should assess the implications of such transactions or contracts for its liquidity position in times of stress. This would include the potential for counterparties to demand additional collateral in an event such as a decline in the AI's credit rating (e.g. downgrade by 3 notches or to a level below investment grade) or creditworthiness or a decline in the

mark-to-market valuation of derivative positions or the price of underlying assets.

Intragroup liquidity

- 5.3.16 Als which are part of a banking group should consider the appropriate treatment of their intragroup transactions, including short-term funding and committed liquidity lines provided to, or received from, other group entities in a stress scenario. This would largely depend on whether the stress scenario is localised or affects the group as a whole.
- 5.3.17 For a localised stress scenario, Als may only include cash inflows from intragroup funding lines where the funding arrangement is fully committed and irrevocable, and there is an acceptable level of certainty that the funding will be received in stress situations²⁰. Any assumption that intragroup deposits will not be withdrawn at maturity should also be supported by formal arrangements with the placing entity. If the stress affects the group as a whole, no intragroup or head office funding support should normally be assumed to be available. This is because such support can prove to be ineffective if the stress impinges on the group as a whole. See section 9 for more details.

5.4 Scenarios and assumptions

- 5.4.1 It is important for Als to construct severe but plausible stress scenarios and examine the resultant cash-flow needs. While Als should aim to cover different stress events and levels of adversity, they should, at a minimum, include the following types of scenarios in their stress-testing exercise:
- an institution-specific stress scenario;
 - a general market stress scenario; and
 - a combination of both.
- 5.4.2 An AI will need to assign the timing of cash flows for each type of asset and liability, as well as off-balance

²⁰ In the case of a foreign banking group, the HKMA may, where necessary, seek formal assurance from the group's head office and/or its home supervisor of the availability and unrestricted ability to transfer of the funding in case of need.

sheet and contingent items by assessing the probability of the behaviour of those cash flows under the scenario being examined. The timing of cash inflows and outflows on the maturity ladder can vary among scenarios and the assumptions may differ quite sharply. In estimating liquidity needs, both contractual and non-contractual cash flows should be considered.

5.4.3 In designing stress scenarios, an AI should take into account specific risks associated with its business activities, products or funding sources. These include, for example, heavy reliance on specific funding markets or significant exposures to complex financial instruments. Relevant market experience in prominent stress periods in the past, such as actual circumstances experienced during the 1997/1998 Asian financial crisis or the 2007/2008 global financial crisis, should also be considered.

5.4.4 An AI should take a reasonably conservative approach when setting stress assumptions. There are a number of possible areas that the assumptions should cover. For illustrative purposes, these areas include, but are not limited to, the following:

Assumptions associated with funding sources

- asset market illiquidity and erosion in the value of liquid assets;
- the run-off of retail funding;
- the loss or impairment of secured and unsecured wholesale funding sources;
- the correlation between funding markets and effectiveness of diversification across available sources of funding;
- the availability of contingent lines extended to the AI;
- access to standing facilities (e.g. discount window) provided by the HKMA or overseas central banks (where applicable)²¹;
- the availability of funding in different tenors;

²¹ AIs should not however base their scenarios on the availability of the HKMA's lender of last resort facilities, given that such facilities are not automatically available during a stress situation.

- the expected length of time needed to settle sale or repo transactions;

Assumptions associated with funding needs

- contingent claims, including potential draws on committed lines extended to third parties or the AI's connected parties (such as its overseas branches, associated entities in its consolidated group, controller or head office);
- liquidity drains associated with contractual obligations or non-contractual obligations involving off-balance sheet vehicles and activities, as well as complex products or transactions;
- additional margin calls and collateral requirements (e.g. in derivative or other contracts with embedded trigger clauses);
- estimates of future balance sheet growth;

Other assumptions

- currency convertibility and access to foreign exchange markets;
- the transferability of liquidity across entities, sectors and jurisdictions, taking into account legal, regulatory, operational and time zone restrictions and constraints; and
- access to payment and settlement systems on which an AI relies.

5.4.5 In addition, an AI should, as far as practicable, factor into its stress tests the impact of the likely behavioural responses of other market participants and their counterparties on the broader market and how that impact will feed back to its own position (i.e. "second-round" effects). Where the AI uses a correspondent or custodian to conduct settlement, the analysis should include the impact of those agents restricting their provision of intraday credit.

5.4.6 In applying stress scenarios on a consolidated basis, an AI should take into account that funding and liquidity

may not always be “fungible” across jurisdictions, especially under stressed conditions (i.e. not all available liquidity within a banking group is freely transferable). The AI should incorporate plausible assumptions into its scenarios reflecting any expected restrictions (e.g. given past historical experience) on the fungibility of cross-border liquidity.

- 5.4.7 All stress scenarios and their underlying assumptions should be properly defined and documented in an AI’s liquidity risk management policy statement.

Institution-specific stress scenarios

- 5.4.8 An institution-specific stress scenario should cover situations that could arise from an AI experiencing either real or perceived problems (e.g. asset quality problems, solvency concerns, credit rating downgrade, rumours on the AI’s credibility or management fraud, etc.) which affect public confidence in the AI and its firm-wide or group-wide operations. It should represent the AI’s view of the behaviour of its cash flows in a severe stress scenario. A key assumption is that many of the AI’s liabilities cannot be rolled over or replaced, resulting in the need to utilise its liquidity cushion.

- 5.4.9 For retail banks, this scenario will likely entail an acute deposit run. Such a scenario would typically include the following characteristics:

- significant daily run-off rates for deposits particularly at the initial stage of the stress scenario, with increasing requests from customers to redeem their time deposits before maturity;
- interbank deposits repaid at maturity;
- no new unsecured or secured funding obtainable from the market; and
- forced sale of marketable securities at discounted prices.

- 5.4.10 Foreign bank branches and subsidiaries of foreign banking groups should, in particular, assess the potential effects of a group-wide stress scenario on their liquidity positions. Such assessments should be based on severe but plausible assumptions to address different

possible scenarios. The baseline scenario should assume that an institution-specific stress event would affect the global operations of the banking group (i.e. with problems spilling over to the whole banking group), whilst no intragroup or head office funding support would be available²² (see also paragraphs 5.3.16 to 5.3.17).

5.4.11 There are other institution-specific scenarios that are less severe in the short term but may subject an AI to longer-term liquidity pressures. These scenarios may be triggered by possible changes in the market and public perceptions of an AI that affect its access to funds or cause a gradual drain on its liquidity. AIs are encouraged to take account of different scenarios applicable to their own circumstances as part of the ongoing liquidity risk management process.

General market stress scenarios

5.4.12 A general market stress scenario is one where liquidity at a large number of financial institutions in one or more markets is affected. Characteristics of this scenario may include –

- a market-wide liquidity squeeze, with severe contraction in the availability of secured and unsecured funding sources, and a simultaneous drying up of market liquidity in some previously highly liquid markets;
- counterparty defaults;
- substantial discounts needed to sell or repo assets and wide differences in funding access among AIs due to the occurrence of a severe tiering of their perceived credit quality (i.e. flight to quality);
- restrictions on currency convertibility; and
- severe operational or settlement disruptions

²² An AI wishing to assume that intragroup or head office funding support continues to be available under a group-wide stress scenario (i.e. a departure from the baseline position) is expected to carry out a documented and reasoned assessment to ensure, and to be able to demonstrate to the satisfaction of the HKMA upon request, that the relevant liquidity facilities provided by its head office or other group entities are subject to specific arrangements and safeguards that provide adequate assurance of the sufficiency, availability and transferability of funds for meeting liquidity needs in Hong Kong in a timely manner even under a group-wide stress scenario. Consideration should be given to potential obstacles such as directors' duties and regulatory restrictions in relation to overseas entities.

affecting one or more payment or settlement systems.

- 5.4.13 AIs should be aware that the cash-flow patterns of certain assets and liabilities may change in the case of a general market stress scenario as compared with an institution-specific stress scenario. For example, an AI may have less control over the level and timing of future cash flows from the sale of marketable debt securities under a general market stress scenario. This could be due to the fact that only very few market participants would be willing or would have sufficient liquidity to purchase securities. Hence, AIs should assign appropriate discount factors to such assets to reflect the price risk associated with different stress scenarios.

Combined stress scenarios

- 5.4.14 AIs are expected to incorporate a stress scenario into their stress test framework that has the key characteristics of both an institution-specific stress scenario and a general market stress scenario combined ("combined stress scenario"), with appropriate modulations of the underlying assumptions as necessary, to reflect a set of adverse circumstances that could plausibly happen.

- 5.4.15 The following are some relevant factors that could be considered by an AI in formulating its "combined stress scenario":

- as a greater number of financial institutions in the market will be affected under a combined stress scenario, this may change the way in which some institution-specific stress elements are to be structured. For example, instead of a quick but severe bank run, there may be a less acute, but more persistent and protracted run-off of customer deposits.
- even lower realisable values of assets may result as the AI concerned seeks to sell or repo large quantities of assets when the relevant asset markets become less liquid and market participants are generally in need of liquidity.

Minimum stress period

5.4.16 During a period of liquidity stress (particularly at the initial stage), the ability of an AI to honour its immediate commitments is crucial for its survival. As such, the HKMA would normally expect an AI to have sufficient funds (including those that can be generated from its liquidity cushion and other funding sources) to cover its liquidity needs and to enable it to continue its business for a certain minimum stress period under each of the stress scenarios, without resorting to emergency liquidity assistance from the HKMA (or any overseas authority). Generally speaking, an AI should assume the minimum stress period for an institution-specific stress scenario to last for no less than 5 working days, and that for a general market stress scenario and a combined stress scenario to last for no less than 1 calendar month. An AI should however adopt a longer minimum stress period for the purposes of liquidity stress-testing if its liquidity risk profile warrants this. To gauge an AI's survival period under stress, it is also generally expected that in addition to the minimum stress period, the AI's stress test should also include sufficiently granular time bands to assess the AI's ability to meet its obligations in the near to medium term (see paragraph 4.3.4 for guidance on setting of time bands).

5.5 Utilisation of stress-testing results

5.5.1 The stress-testing results should be linked to the overall liquidity risk management process of an AI. To this end, senior management should –

- ensure proper documentation of the stress scenarios and related assumptions, and review the scenarios and assumptions periodically;
- evaluate the stress-testing results and consider any possible need for remedial or mitigating actions. Remedial or mitigating actions may include actions to limit the AI's liquidity risk exposures, obtain more long-term funding, restructure the composition of assets, increase the size of the AI's liquidity cushion (see section 8) or the adoption of any other measures to adjust the AI's liquidity profile to fit its risk tolerance. Where such actions are not considered necessary to address stress test results

indicating potential liquidity strains or shortfalls, senior management should document the justifications for their view;

- report the stress-testing results and vulnerabilities identified to the Board (or its relevant delegated committee(s)), with recommendations for any resulting actions. Where appropriate, the HKMA (or any relevant overseas banking supervisors) should be informed of the results and anticipated actions if they are material to the AI (i.e. in addition to normal stress-testing reporting arrangements); and
- integrate the stress-testing results into the AI's strategic business planning, liquidity risk management processes (including the setting of the liquidity risk tolerance and the internal liquidity risk limits) and contingency funding plan.

5.5.2 In order to identify and analyse factors that could have a significant impact on its liquidity profile, an AI should consider conducting an analysis of the sensitivity of the stress-testing results to certain key assumptions.

5.6 Application of stress-testing standards

5.6.1 Locally incorporated AIs should apply the stress-testing standards on a legal entity basis and on a group basis. Foreign bank branches are expected to apply the standards to their Hong Kong operations only. See also subsection 1.3 for more details.

5.6.2 International banking groups may manage liquidity risk on an integrated global basis, with stress tests being conducted at the regional or group level. The HKMA may regard such an arrangement as acceptable, in relation to an AI which is part of such a group, for the purposes of complying with the stress-testing requirements, provided that the stress-testing approach adopted regionally or group-wide is consistent with the guidance set out in this section, and the stress scenarios adequately reflect the specific risk characteristics of the AI concerned.

5.6.3 In line with paragraph 1.3.2, certain AIs (e.g. those with simple and small operations, and which maintain positive funding positions based on cash flows which are

predominantly contractual and predictable) may apply a simpler approach to stress-testing if the nature and scale of their operations do not warrant the full use of the stress-testing techniques as discussed in this section. However, in such cases, the AIs concerned should maintain a more conservative level of liquidity cushion to cater for unexpected contingencies.

- 5.6.4 The HKMA may require an AI to provide information with respect to its stress-testing scenarios and underlying assumptions for review. The HKMA may also require an AI to report internal stress-testing results at a frequency mutually agreed on a case-by-case basis, taking into account the circumstances (e.g. business nature and complexity) of the AI concerned. Generally speaking, an AI should have the capacity to report internal stress-testing results to the HKMA at least on a quarterly basis, with the capacity to cater for a higher frequency of reporting as may be required by the HKMA in stress situations.

6. Foreign currency liquidity management

6.1 General

- 6.1.1 As mentioned in section 3, an AI should have adequate systems in place for measuring, monitoring and controlling its liquidity position in each currency which is significant to the AI for the purposes of liquidity risk management. These systems should be integrated into various aspects of the AI's overall liquidity risk management framework, such as managing net funding gaps, stress-testing and contingency funding planning as appropriate.
- 6.1.2 At a minimum, a currency should be regarded as "significant" to an AI if the AI's liabilities denominated in that currency account for 5% or more of its total liabilities (including shareholders' funds).²³

²³ In addition to significant currencies identified with reference to on-balance sheet liabilities, an AI may regard more currencies as "significant" where appropriate, taking into account, for instance, its off-balance sheet obligations.

6.2 Liquidity strategies and policies

- 6.2.1 Als should formulate, and review regularly, strategies and policies for the management of liquidity risks with respect to HKD and each significant foreign currency respectively, taking into account the potential market conditions and potential constraints in times of stress. If an AI has assets or liabilities denominated in a significant foreign currency and that currency is not freely convertible, more prudent management of liquidity risk should be adopted, such as more conservative limits on funding gaps in respect of that currency vis-à-vis other currencies, since liquidity may not easily be transferred into or out of that currency, particularly in times of stress.
- 6.2.2 As a general principle, Als should manage and control their funding gaps in significant foreign currencies to avoid over-reliance on foreign exchange or currency swap markets, as there is a risk that their ability to swap currencies may erode rapidly under stressed conditions. This is particularly so for currencies in relation to which foreign exchange markets are not yet fully developed.
- 6.2.3 An AI should also regularly assess the convertibility of foreign currencies and its capacity to access relevant foreign exchange markets.

6.3 Foreign currency mismatch controls

- 6.3.1 Als should assess their foreign currency liquidity funding gaps under both normal and stressed conditions, and control currency mismatches within acceptable levels.
- 6.3.2 If an AI relies on short-term foreign currency liabilities and short-term credit lines to fund a significant portion of its HKD assets, or vice versa, via foreign exchange or currency swap markets, it should have the capacity to assess and monitor the risk of adverse exchange rate movements that could sharply widen the AI's foreign exchange risk exposure and liquidity mismatches, and alter the effectiveness of foreign exchange hedges and hedging strategies.
- 6.3.3 As with the management of its overall maturity mismatch position (see section 4), an AI should set, and regularly review, internal limits to control the size of cumulative

net maturity mismatches arising from assets and liabilities denominated in significant foreign currencies. Such limits should cover the AI's maturity mismatch position in HKD and each significant foreign currency over various specific time bands (e.g. next day, 5 to 7 days ahead and 1 month). In general, such limits for a significant foreign currency should not exceed those for the AI's HKD maturity mismatch position, unless the AI's balance sheet is predominantly composed of assets and liabilities denominated in foreign currencies (e.g. the US dollar). The size of the limits should take into account, *inter alia*, the following factors:

- the amount of foreign currency liabilities that can be swapped through the foreign exchange market to fund local currency assets, or vice versa;
- the convertibility and price volatility of individual foreign currencies, the timing of access to funds in those currencies, as well as the potential for impairment or complete closure of foreign exchange swap markets for particular currency pairs in the case of market disruptions;
- the conditions of relevant foreign exchange markets, including the depth and liquidity of the markets and the level of interest rates;
- the AI's ability to raise funds in foreign currencies, and the transferability of such funds across jurisdictions and legal entities;
- possible differences in the behaviour of foreign currency depositors and lenders *vis-à-vis* those of local customers and counterparties, and the stickiness of deposits in foreign currencies under stressed conditions;
- the availability of foreign currency backup facilities²⁴ to cater for possible disruption of the AI's access to funding in individual currencies; and
- the ability of borrowers to repay their foreign currency liabilities to the AI under stressed conditions (e.g. interest rate hikes and exchange rate fluctuations).

²⁴ As discussed in section 7, an AI needs to carefully manage market access to ensure that liquidity sources – including credit lines – can be accessed when needed.

7. Managing funding diversification and market access

7.1 General

- 7.1.1 To ensure a reliable supply of funds, both in normal times and during stressed conditions, AIs should, to the extent practicable, maintain a range of diversified and stable funding sources (including liquid assets held) to meet liquidity needs for various time horizons, supported by their ready access to the relevant markets. AIs should also take appropriate measures to foster relationships with fund providers and strengthen their presence in funding markets.
- 7.1.2 AIs should regularly gauge their capacity to raise funds quickly from available sources. For this purpose, they should identify and monitor the main factors affecting their fund-raising capacity.

7.2 Funding diversification

- 7.2.1 AIs should establish an effective funding strategy to achieve sufficient diversification both of their funding sources and in the composition of their liquid assets. An AI's funding strategy should take into account correlations between sources of funds and market conditions.
- 7.2.2 AIs should put in place concentration limits on liquid assets and funding sources as appropriate, with reference to such characteristics as the type of asset, product, market or instrument; nature of issuer, counterparty or fund provider; maturity; currency; geographical location; and economic sector (see also paragraph 7.2.9). There should be systems for monitoring compliance with these limits.
- 7.2.3 Senior management of an AI should be aware of the composition, characteristics and level of diversification of the AI's liquid assets and funding sources, and should regularly review the funding strategy to cope with any significant changes in the market environment.
- 7.2.4 AIs should maintain an appropriate mix of liquid assets (including the type and quality of assets and level of such holdings) as a source of liquidity for day-to-day

operational needs (e.g. for settlement and clearing purposes)²⁵, as well as for meeting emergency funding needs. The amount and composition of such assets should be determined by individual AIs with reference to the nature of their business and liquidity risk profile.

- 7.2.5 AIs are expected to maintain a sufficient proportion of their liquid assets locally as it is generally easier and quicker to sell or pledge assets that are located in Hong Kong when needed in times of stress. This is particularly crucial for AIs with significant retail business in order to cater for any material increase of withdrawal demand from depositors. AIs, particularly retail banks, are also recommended to hold or maintain an appropriate amount of Exchange Fund Bills and Notes (which are eligible for rediscount at the HKMA's discount window) and/or funds in their HKD RTGS accounts.
- 7.2.6 AIs incorporated overseas are generally expected to maintain sufficient liquid assets within their branches in Hong Kong to cover the liquidity needs of the local operations.

Other funding sources

- 7.2.7 AIs should seek to build up and maintain a sufficient level of stable, longer term funding to support their business operations. They should analyse their funding structure and evaluate the stability of each funding source under both normal and adverse circumstances.
- 7.2.8 It is important for AIs to assess their exposure to significant funding providers (or depositors)²⁶ on an ongoing basis. For this purpose, AIs should have in place as part of their MIS regular reports on the funding received from significant funding providers to facilitate monitoring. Such reports should consolidate all funding that an AI obtains from each significant funding provider (including a group of related funding providers which when aggregated amount to a significant funding

²⁵ AIs participating directly in clearing and settlement systems should hold an appropriate amount of liquid assets that can be readily used as collateral for obtaining intraday credit to meet intraday liquidity needs.

²⁶ The thresholds adopted by the HKMA for the reporting of Table A of Part 1 of the Return on Liquidity Monitoring Tools (MA(BS)23) may serve as a baseline for AIs to define "significant funding providers (or depositors)" in their internal monitoring processes. This does not and should not preclude individual AIs from using more conservative approaches to embrace a wider scope of fund providers (or depositors) for internal monitoring purposes.

provider). The historical amount of funds provided by these funding providers, e.g. in terms of the maximum, minimum and average balances over the previous 12 months, should also be monitored. Trigger ratios may be established to identify any funding concentration for management review. In the case of a retail bank, a funding concentration may exist if a significant percentage of its total deposit base is from a limited number of the top-ranking depositors or a single depositor (or group of related depositors). Als should consider appropriate actions to diversify the deposit base.

7.2.9 Als should avoid any potential concentration in their reliance on particular funding markets and sources²⁷. Als should take into account the following major factors in assessing the degree of funding concentration:

- the maturity profile and credit-sensitivity of the liabilities;
- the mix of secured funding and unsecured funding;
- the extent of reliance on –
 - a single fund provider or a group of related fund providers;
 - particular markets, instruments or products (e.g. interbank borrowing, retail versus wholesale deposits, and repo agreements and swaps); and
 - intragroup funding (see also section 9);
- geographical location, industry or economic sector of fund providers; and
- the currency of funding sources.

7.2.10 Als should analyse the characteristics of their available funding sources and the potential impact these may have on their liquidity position. They should recognise that certain types of funding (e.g. interbank borrowing, wholesale funding, deposits solicited via e-banking channels, etc.) are more volatile than traditional retail funding (see also paragraph 5.3.7). Als heavily reliant on such perceived more volatile funding should seek to diversify their funding sources and maintain a larger liquidity cushion.

²⁷ A funding concentration exists when a single decision or factor has the potential of causing a significant or sudden withdrawal of funds.

- 7.2.11 Similarly, AIs should avoid excessive reliance on standby facilities provided by other financial institutions as a major source of funding, and recognise the likelihood that their right to draw on such facilities may be denied in a stress situation. Where an AI's standby facilities constitute a major source of backup liquidity, the AI concerned should be able to demonstrate the certainty of ability to drawdown under these arrangements if requested by the HKMA.
- 7.2.12 AIs with a large deposit base should, in particular, conduct more granular analyses on the stability of different types of deposits taking into account the relevant contractual and behavioural characteristics of such deposits (e.g. in terms of deposit insurance coverage, currency denomination, nature of depositors such as retail, wholesale or private banking customers, etc. – see also paragraph 5.3.8). They should monitor the trends and levels of their stable deposits regularly.
- 7.2.13 AIs should identify alternative sources of funding (e.g. intragroup funding, new debt issues, asset sales, access to central bank standing facilities, etc.) that may be used to generate liquidity in case of need, and review the effectiveness of using such sources in different situations. They should however be aware that not all fund-raising options are available in all circumstances and some may be available only with a substantial time delay.
- 7.2.14 While some AIs may regard deposits taken from connected parties as a stable funding source, the HKMA would generally expect AIs to broaden, as far as possible, their deposit base rather than relying too heavily on connected deposits.

7.3 Managing market access

- 7.3.1 Maintaining market access is critical for effective liquidity risk management. AIs should ensure that market access is actively managed, monitored and tested by appropriate staff.

Market presence

- 7.3.2 AIs should maintain an active presence in markets relevant to their funding strategy. This requires an

ongoing commitment and investment in adequate and appropriate infrastructures, processes and information systems. To ensure their access to funding markets in a timely manner, AIs should periodically utilise the established systems, documentation and arrangements for accessing those markets to confirm whether willing counterparties are readily available.

- 7.3.3 The ability to obtain funds in the interbank market is an important source of liquidity for AIs. AIs should be in a position to estimate their “normal” borrowing capacity based on past experience and aim to limit their wholesale funding needs for both local and foreign currencies on, say, a daily and weekly basis to an amount which is comfortably within that capacity.
- 7.3.4 AIs’ capacity to borrow from the interbank market depends on a number of factors, including the size and turnover of the local market, their share of that market as well as the credit limits imposed by counterparties. Given these factors, it may not be feasible for an AI to be absolutely certain about its borrowing capacity in the interbank market. Therefore, in setting internal targets for interbank borrowing, an AI should ensure that such targets have actually been attained and exceeded on a reasonable number of occasions. This will help give some assurance that the targets are achievable without causing any adverse market reaction. It may also be sensible to test their name in a more diversified base of markets and counterparties on a regular basis.
- 7.3.5 Developing the ability to monetize assets through other types of wholesale funding transactions (e.g. outright sale, repo or securitization) may provide some alternative sources of liquidity. However, an AI’s fund-raising capacity through such wholesale funding transactions should be evaluated realistically, prudently and practically having regard to any possible adverse developments in market circumstances. For example, AIs should be aware that the securitization market may become illiquid during a market stress.

Relationships with fund providers

- 7.3.6 AIs should identify and build strong relationships with funding providers. Nevertheless, AIs should take a prudent view of how such relationships may be strained in times of stress. For example, fund providers may

themselves become uncertain about their own liquidity needs or be concerned with an AI's repayment ability. In the formulation of stress scenarios and contingency funding plans, AIs should take into account possible situations where funding sources may dry up and markets may close, and where market perceptions of an AI's financial position may change (due to, for example, a deterioration of its capital adequacy).

8. Maintenance of liquidity cushion

8.1 General

8.1.1 A critical element of an AI's resilience to liquidity stress is the maintenance of an adequate cushion of unencumbered liquid assets that can be readily sold or used as collateral in private markets by an AI to obtain funds to meet the AI's liquidity needs at all times, even in periods of severe idiosyncratic and market stress.

8.2 Size of liquidity cushion

8.2.1 The size of the liquidity cushion should reflect an AI's established risk tolerance, and should be sufficient to meet the AI's liquidity needs in the initial phase of liquidity stress which is most critical to the AI's survival, taking into account the monetization or borrowing values of the assets included in the cushion under the relevant stressed conditions.

8.2.2 The liquidity cushion should be sized to enable an AI to continue to meet its daily payment and settlement obligations on a timely basis for the period of stress. In doing so, the AI should take into account other available tools and resources to manage intraday liquidity risks (see section 10).

8.2.3 In addition, the liquidity cushion should at least be sufficient to enable an AI to reach its internal LCR or LMR target.

8.3 Composition of liquidity cushion

- 8.3.1 An AI is expected to maintain a liquidity cushion that is largely made up of the most liquid and readily marketable assets (“tier 1 assets”), such as cash, EF debt securities and other high quality government debt securities or similar instruments, that can be easily or immediately monetized with little or no loss or discount at all times irrespective of the AI's own condition. .
- 8.3.2 To cater for any extension or deterioration of any stress situation, an AI may widen the composition of its liquidity cushion by holding other liquid and marketable assets (“tier 2 assets”) which can be used to cater for the longer end of the stress period (e.g. 1 month or beyond) without resulting in excessive losses or discounts (see paragraph 5.3.2 for general classification of assets in terms of marketability).²⁸
- 8.3.3 Whilst reflecting the standards in paragraphs 8.3.1 and 8.3.2, an AI's liquidity cushion should consist of an appropriate mix of eligible assets. To the extent practicable, there should be sufficient diversity in the types of liquid assets held by an AI, with concentration limits to control exposure to different assets (see section 7). AIs should apply appropriate haircuts to the liquid assets to account for price fluctuations due to credit and market risks.
- 8.3.4 An AI should document its policies and criteria for defining the liquid assets to be included in its liquidity cushion and distinguishing their relative levels of quality in terms of their ability to generate liquidity swiftly with little loss or discount. MIS reports should be in place to facilitate continuous management of an AI's liquidity cushion (see paragraph 3.4.2).

²⁸ For example, a category 1 institution may include assets such as gold bullion and marketable debt securities issued or guaranteed by financial institutions as “tier 2 assets” in its liquidity cushion, even though such assets do not fall within the scope of HQLA under the LCR standard. Likewise, a category 2 institution may include assets other than “liquefiable assets” as “tier 2 assets”. In any case, such “tier 2 assets” (as with tier 1 assets) should generally have the characteristics of:

- (a) low risk;
- (b) ease and certainty of valuation;
- (c) simple structure;
- (d) low correlation with risky assets;
- (e) active and sizable market with low volatility;
- (f) in case of a listed asset, listed on a developed and recognized exchange; and
- (g) denominated in convertible currency.

There should be no legal, regulatory or operational impediment to the use of such assets by an AI to obtain funding.

- 8.3.5 In the course of risk-based supervision, the HKMA may assess the appropriateness of the size and composition of an AI's liquidity cushion having regard to its liquidity risk profile and position.

9. Intragroup liquidity risk management

9.1 General

- 9.1.1 Where an AI is part of a banking group (local or foreign), the AI should be able to monitor and control liquidity risks arising from intragroup transactions (including cross-border transactions where applicable) with other legal entities in the group, taking into account any legal, regulatory, operational or other constraints on the transferability of liquidity and collateral to and from those entities.
- 9.1.2 In managing intragroup liquidity risks, AIs should understand how their liquidity positions may be affected by liquidity problems faced by other group entities. For example, an AI may be required to extend support to group entities that experience liquidity problems, while the funding provided by other group entities to the AI may be withdrawn in an emergency situation. Also, a localised liquidity problem originating in a group entity may lead to a liquidity strain across the whole group due to reputation contagion (i.e. when market counterparties assume that a problem at one entity implies a problem for the group as a whole).

9.2 Treatment of intragroup transactions

- 9.2.1 AIs should specify in their liquidity risk management strategy the treatment of intragroup liquidity and assumptions on intragroup dependencies for the purposes of making cash-flow projections.
- 9.2.2 AIs may treat normal intragroup transactions (i.e. intragroup placements and borrowings transacted at arm's length) in the same way as other third party transactions for the purpose of cash-flow projections under normal business conditions, provided that there is no doubt about the financial position of the banking group as a whole.

- 9.2.3 In assessing funding needs (especially under stressed situations), Als should account for any funding or liquidity commitment provided to group entities (e.g. in the form of explicit guarantees or funding lines to be drawn in times of need) and prepare for any withdrawal of funding provided by group entities. Als should also analyse how the liquidity positions of group entities may affect their own liquidity, either through direct financial impact or through contagion when those entities encounter liquidity strain. Where there is reliance on funding support from group entities, Als should take steps to identify the existence of and take into account any legal, regulatory or other limitations that may restrict their access to liquidity from those entities in case of need (see subsection 9.4).
- 9.2.4 For the avoidance of doubt, an AI that has entered into “back-to-back” transactions²⁹ with its group entities should exclude such transactions from cash-flow or liquidity calculations, as such transactions usually involve no actual movement of funds and hence cannot effectively improve the AI’s liquidity.

9.3 Intragroup liquidity limits

- 9.3.1 Als should establish internal limits on intragroup liquidity risk to mitigate the risk of contagion from other group entities when those entities are under liquidity stress. Als may also establish specific limits to avoid over reliance on funding provided by their branches and group members operating outside Hong Kong. Moreover, Als should consider setting stricter internal limits on intragroup funding denominated in foreign currencies where the convertibility and transferability of such funding is not certain, particularly in stressed situations. See section 6 for more details on foreign currency liquidity management.
- 9.3.2 In the course of risk-based supervision, the HKMA may monitor the level and trend of Als’ intragroup transactions, and may consider setting supervisory limits to control intragroup exposures if the HKMA has

²⁹ These transactions refer to interoffice or intragroup transactions which typically involve two legs, one borrowing long (say, with maturity of more than 1 month) and the other lending short (say, with maturity of 1 month or less). Both legs are for the same or similar amount and at the same or similar rate of interest and are, in most cases, rolled forward continuously.

significant concerns about the prudence of the exposure levels, especially when the financial and liquidity position of the group is in doubt.

9.4 Constraints on intragroup liquidity transfers

- 9.4.1 Als should understand potential constraints that may affect intragroup liquidity movements, and specify their assumptions regarding the transferability of funds and collateral in liquidity risk management policies. These assumptions should fully consider regulatory, legal, accounting, credit, tax and internal constraints on the effective movement of liquidity and collateral. The HKMA may review the reasonableness of such assumptions in the course of risk-based supervision.
- 9.4.2 Als should also consider the operational arrangements needed to transfer funds and collateral across entities and the time required to complete such transfers under those arrangements.

9.5 Reputation contagion

- 9.5.1 To mitigate the potential for reputation contagion, it is of vital importance that Als engage in effective communication with credit rating agencies, major counterparties and other stakeholders when liquidity problems in their group entities arise. Group-wide contingency funding plans, liquidity cushions and diversified funding sources are mechanisms that Als may use to mitigate reputation contagion. Detailed supervisory guidance on these aspects is contained in SPM module [RR-1 "Reputation Risk Management"](#).

9.6 Group-wide liquidity risk management (for local banking groups)

- 9.6.1 In addition to the above provisions, an AI heading a local banking group should actively monitor and control liquidity risks on a group basis (including all of its branches and associated entities in its consolidated group), by incorporating processes that aggregate data across multiple systems in a jurisdiction (and across jurisdictions) to develop a group-wide view of liquidity risk exposures.

- 9.6.2 Als should clearly document their policies and limits established for group entities and any internal liquidity support arrangements provided to such entities. The policies should also address how the liquidity positions of the entities are monitored and controlled by senior management at the head office in Hong Kong.
- 9.6.3 For each jurisdiction in which they are active, Als should ensure that they have the necessary expertise concerning the jurisdiction-specific features of the legal and regulatory regime that influence liquidity risk management, including arrangements for dealing with failed banks, deposit insurance and central bank operational frameworks and collateral policies. This knowledge should be reflected in Als' liquidity risk management processes.
- 9.6.4 Where there is a localised systemic stress event, Als should have processes in place to allow for the allocation of liquidity and collateral resources to affected entities, to the extent that transferability is permitted.

10. Intraday liquidity risk management

10.1 General

- 10.1.1 Intraday liquidity risk management is an important component of Als' broader liquidity risk management strategy. Als should actively manage their intraday liquidity positions and risks to meet payment and settlement obligations on a timely basis under both normal and stressed conditions, and thus contribute to the smooth functioning of payment and settlement systems.
- 10.1.2 Apart from direct participation in payment and settlement systems, Als may incur intraday liquidity risk through their provision of correspondent and custodian banking services. Where an AI relies on other correspondent or custodian banks to conduct payment and settlement activities, operational or financial disruptions at those banks will also affect the AI's own liquidity position.

10.2 Objective and challenges

- 10.2.1 A primary objective in intraday liquidity risk management is for AIs to identify, prioritise and meet time-specific and other critical obligations when they become due, and to settle other less critical obligations as soon as possible. In satisfying this objective, AIs should be aware of, and be able to address, various challenges associated with intraday liquidity risk management.
- 10.2.2 A key challenge in intraday liquidity risk management lies in the uncertainty in both the amount and timing of an AI's gross cash inflows and outflows during the day, in part because such cash flows may reflect the activities of its customers or counterparties which are beyond the AI's control, especially where the AI provides correspondent or custodian services. Moreover, the timing of the cash flows may be dictated by the rules governing payment and settlement systems (e.g. payment obligations may be due by specific times during the day). Because an AI's daily gross cash outflows can often far exceed the AI's gross cash inflows at different points of time during a day or its net overnight balances even under normal circumstances, differences in the timing of its inflows and outflows could result in significant intraday liquidity shortfalls. These shortfalls may necessitate the AI borrowing funds on an intraday basis, prioritising its outflows to meet critical payments, or borrowing additional overnight funds (if certain expected cash inflows are not received before the end of the working day).

10.3 Risk management controls

- 10.3.1 AIs should have effective policies, procedures, systems and controls for managing their intraday liquidity risks in all of the financial markets and currencies in which they have significant payment and settlement activities. Such systems and controls should, among other things, ensure an AI's capacity to –
- measure expected daily gross cash inflows and outflows, anticipate the intraday timing of these cash flows where possible, and hence forecast the range of potential net funding shortfalls at different time points during the day. This requires an AI to –

- understand the rules of all payment and settlement systems in which the AI participates, and the level and timing of liquidity needs that may arise as a result of the failure-to-settle procedures of these systems;
 - identify key counterparties, correspondents or custodians that are sources of incoming or outgoing gross liquidity flows;
 - identify key times, days and circumstances where liquidity flows and possible intraday credit needs may be particularly high;
 - understand the business needs (and related behavioural patterns) underlying the timing of liquidity flows and intraday credit needs of internal business lines and key customers;
 - request key customers, including customer banks, to forecast their own payment traffic to facilitate the process;
- monitor intraday liquidity positions against expected activities and available resources (including liquidity balances, remaining intraday credit capacity, and available collateral) and prioritise payments if necessary. Such monitoring should be frequent enough to enable an AI to assess the need for obtaining additional intraday liquidity or restricting liquidity outflows in order to meet critical payments; to allocate intraday liquidity efficiently among its own needs and those of its customers, and to react quickly to unexpected payment flows and adjust overnight funding positions;
 - manage intraday liquidity positions so that there is always sufficient intraday funding to meet the AI's intraday liquidity needs. This requires an AI to –
 - maintain sufficient assets that can be mobilised as collateral to obtain intraday or overnight funding from various sources, including the HKMA (or overseas central banks where applicable) and correspondent or custodian banks which may provide intraday credit to customer banks, and other counterparties in the markets (e.g. through overnight money

market transactions), and ensure the efficiency of operational arrangements in place for pledging or delivering the collateral concerned. In determining the size of such asset holdings, the AI should take into account the volume and volatility of transactions that it may be required to process. The AI should also understand the timeframes required to mobilise different forms of collateral, including collateral held on a cross-border basis;

- have the ability to manage the timing of the AI's liquidity outflows, particularly the payment outflows attributed to its key customers. Where customers are provided with intraday credit, the credit procedures should be capable of supporting timely decisions. Also, internal coordination across business lines is important to achieving effective controls over liquidity outflows; and
- have the capacity to deal with unexpected disruptions to the AI's intraday liquidity flows, supported by robust stress-testing and contingency funding planning that reflect intraday considerations. The AI's overall operational risk management and business continuity arrangements should also take into account the possibilities of such disruptions.

10.3.2 Intraday liquidity risk management demands cooperation between the front and back offices, as it typically requires close monitoring of expected payments and direct contacts with customers, where necessary, to verify quickly the reasons for delayed payments. A clear assignment of tasks and responsibilities to personnel involved is therefore important, particularly as time-critical decisions need to be made, for instance, to meet the settlement cut-off times.

10.3.3 The tools³⁰ and resources applied by an AI in managing intraday liquidity risks should be tailored to the AI's business model and role in the financial system. This relates, for example, to whether the AI participates in a

³⁰ On the selection of intraday liquidity monitoring tools, AIs may, where appropriate, make reference to the metrics set out in the HKMA's Return on Intraday Liquidity Position of an Authorized Institution (MA(BS)22). This does not preclude the possibility for an AI to select other tools to monitor intraday liquidity risk in accordance with its business nature and risk profile.

payment or settlement system directly or through correspondent or custodian banks, and whether it provides correspondent or custodian services and intraday credit facilities to other banks, firms or systems. If an AI relies heavily on secured funding markets, the AI should have adequate systems and procedures in place to monitor positions in securities settlement systems.

- 10.3.4 If an AI relies on correspondent or custodian banks to conduct payment and settlement activities, the AI should assure itself that this arrangement allows it to meet payment obligations on a timely basis and to manage its intraday liquidity risks under a variety of circumstances. In particular, the AI should recognise the potential for operational or financial disruptions at its correspondent or custodian bank to disrupt its own liquidity risk management, and should have alternative arrangements in place to ensure it can continue to meet its obligations in such situations.

11. Collateral management

11.1 General

- 11.1.1 The ready availability of assets that AIs can use as collateral to obtain funding by means of secured borrowing (e.g. repo) mitigates liquidity risk. Therefore AIs should allocate sufficient resources to the efficient management of collateral in their liquidity risk management process.
- 11.1.2 Collateral management should aim at optimising the allocation of collateral available for different operational needs, across products, business units, locations, and currencies. It should be based on a prioritisation of needs and an awareness of the opportunity cost of its use, in both normal and stressed times.

11.2 Management of collateral positions

- 11.2.1 AIs should have the ability to calculate all of their collateral positions, including assets currently deployed for use as collateral relative to amount of collateral required and unencumbered assets available to be used as collateral.

- 11.2.2 Als' level of available collateral should be monitored by legal entity, jurisdiction and currency exposure. Als should be able to track precisely the legal entity and the physical location (i.e. the custodian or securities settlement system) with which each of the assets is held, and monitor how such assets may be mobilised in a timely manner in case of need.
- 11.2.3 Als should have sufficient collateral to meet expected, and accommodate unexpected, borrowing needs as well as potential increases in margin requirements for pledged assets over different timeframes, including intraday, short-term and longer-term structural liquidity requirements, and have adequate systems for monitoring the shifts between intraday, overnight and term collateral usage.³¹ In determining the required collateral to be allocated for intraday liquidity needs, Als should consider the potential for significant uncertainty around the timing of payment flows during the day, as well as the potential for operational and liquidity disruptions that could necessitate the pledging or delivery of additional intraday collateral.
- 11.2.4 Als should assess the eligibility of each major asset class for pledging as collateral with relevant central banks (for intraday, overnight and term credit or secured borrowing under standing facilities, as the case may be) as well as the acceptability of assets to major counterparties and fund providers in secured funding markets. They should also ensure that there is proper legal documentation for each asset class to be effectively pledged for liquidity.
- 11.2.5 Als should diversify their sources of collateral to avoid excessive concentration on any particular funding provider or market, taking into consideration capacity constraints, sensitivity of prices, haircuts and collateral requirements under conditions of institution-specific and market-wide stress, and the availability of funds from private sector counterparties in various market stress scenarios.

³¹ This is because a given asset can provide collateral support for only one type of credit facility at a time, thus creating the need for effective collateral management in order to address potential competing demands to serve different borrowing purposes.

11.2.6 Als should prudently measure the value of collateral, together with estimates on its monetizable value in adverse market conditions.

11.3 Operational issues

11.3.1 Als should be able to address various operational issues relating to the use of collateral for obtaining liquidity. These include –

- being aware of the operational and timing requirements associated with accessing the collateral given its physical location;
- understanding the liquidity risks associated with different types of payment and settlement systems (e.g. “net” systems versus “gross” systems) and their implications for collateral management; and
- taking into account the implications of obligations embedded in the contractual terms of certain transactions which, when triggered, may reduce the availability of collateral for liquidity risk management. These refer to, for example, margin requirements and triggering events that require an AI –
 - in the case of derivative transactions, to provide additional collateral as a result of changes in the market valuation of the transactions or in the AI’s credit rating or financial position; or
 - in the case of securitization transactions, to hypothecate or deliver additional assets to the pool of underlying assets when the embedded triggering events occur.

Als’ information systems should be able to monitor such transactions with embedded triggers and obligations, and report whether there are sufficient unencumbered assets of the right type and quality to meet such contingent needs.

12. Contingency funding plan

12.1 General

- 12.1.1 Every AI should have a formal contingency funding plan (CFP) that sets out clearly its strategies for addressing emergency situations. These include liquidity shortfalls to the extent beyond the level estimated from the stress tests performed by the AI under institution-specific, market-wide and combined stress scenarios (see section 5) and beyond the level covered by the AI's liquidity cushion (see paragraph 8.2.1). The CFP should contain a set of policies, procedures and action plans that prepare an AI to deal with relevant liquidity stress events including but not limited to those assumed in the stress tests, with clearly established lines of responsibility and invocation and escalation procedures. The CFP should also be regularly tested and updated to ensure that it is operationally robust.
- 12.1.2 The CFP should be commensurate with an AI's complexity, risk profile, scope of operations and role in the financial system. The design of a CFP, including its action plans and procedures, should be closely integrated with the AI's ongoing analysis of liquidity risk. The CFP should address liquidity issues over a range of different time horizons, including intraday.
- 12.1.3 It is generally expected that the CFP will constitute an integral part of any recovery plan prepared by an AI. The CFP should also be consistent with an AI's business continuity plans. As such, the AI should ensure effective coordination between teams managing issues surrounding liquidity stress and business continuity.

12.2 Strategy, plans and procedures

Contingency funding measures and sources

- 12.2.1 The CFP should provide an AI's management with a diversified set of viable, readily deployable potential contingency funding measures for preserving liquidity and making up liquidity shortfalls in emergency

situations³². All available potential sources of funding should be spelled out, along with the estimated amount of funds that can be derived from these sources, their expected degree of reliability, under what conditions these sources should be used, and the lead time needed to tap additional funds from each of the sources.

12.2.2 Als should analyse the viability and likely impact on market perception of adopting different contingency funding measures. Some of the factors that should be considered include –

- the impact of stressed market conditions on an AI's ability to raise funding through different sources. As an example, it will likely be difficult for an AI to rely on asset securitization for providing liquidity at short notice during a market disruption;
- the interaction between asset markets and funding liquidity, especially in situations where there is an extensive or complete loss of typically available market funding options;
- any second-round effects, as well as reputation, legal, regulatory and operational constraints, related to the execution of such measures; and
- any peculiarities (including special terms and conditions) associated with particular funding sources. For example, Als should generally refrain from excessive reliance on backup credit lines (even if committed) and need to understand various conditions, such as notice periods, that could affect an AI's ability to access such lines quickly.

12.2.3 The above considerations should reflect an AI's previous experiences and expert judgement, market practice and insights that the AI has gained through stress-testing.

12.2.4 In developing contingency funding measures, Als should also be aware of the operational procedures needed to transfer liquidity and collateral across group entities, borders and business lines, taking into account legal, regulatory, operational and time zone restrictions and controls governing such transfers. The CFP should

³² For example, some contingency funding measures may include slowing down the rate of loan growth, sale or repo of liquid assets, securitization or loan sales, increasing deposit growth, drawdown of unused committed facilities, raising capital, and stopping dividend payments.

incorporate relevant operational procedures and realistic timelines for such transfers. Assets intended to be pledged as collateral in the event that backup funding sources are utilised should be held by a legal entity and in a location consistent with management's funding plans.

Central bank lending facilities

12.2.5 Generally, an AI should not construct its CFP entirely on the assumption that liquidity support from the HKMA (or an overseas central bank) is automatically available to them in a stress situation. The AI's eligibility would be subject to meeting the prescribed criteria set by the HKMA (or by the relevant central bank). An AI should also recognise that some support facilities are fully discretionary and intended for use only in exceptional circumstances and as a last resort.

12.2.6 Taking into account the caveat in paragraph 12.2.5, an AI's CFP may reflect, as potential secondary sources of liquidity, lending programmes and facilities provided by the HKMA (or any overseas central banks) that may be capable of being accessed by the AI. The amount of funding available should be assessed regularly in a pragmatic manner, taking into account the relevant criteria (such as collateral requirements), operational procedures and potential reputation issues that may arise from the usage of such programmes and facilities.

Early warning signals and triggering events

12.2.7 The CFP should define clearly a set of triggering events that will activate the plan as well as the mechanisms for identification, monitoring and reporting of such events at an early stage. AIs may have regard to the various early warning indicators set out in subsection 3.3 for defining and monitoring triggering events.³³

Roles and responsibilities

12.2.8 The CFP should contain clear policies and procedures enabling an AI's management to make timely and well-informed decisions, communicate the decisions effectively, and execute contingency measures swiftly

³³ For the avoidance of doubt, triggering events (including those referencing early warning indicators) should be handled according to a pre-defined mechanism that is appropriate to an AI's circumstances. Such a mechanism should help determine whether a triggering event is to be escalated to the Board or senior management, or whether it should activate an AI's CFP directly.

and proficiently. To achieve this, the roles and responsibilities and internal procedures for liquidity stress management should be clearly delineated. These should cover –

- the authority to invoke the CFP and the establishment of a formal “crisis management team” to facilitate internal coordination and communication across different business lines and locations and decision-making by senior management in a stress situation;
- clear escalation and prioritisation procedures detailing what actions to take, who can take them, and when and how each of the actions can and should be activated;
- names and contact details of members of the team responsible for implementing the CFP and the locations of team members; and
- the designation of alternates for key roles.

Intraday liquidity considerations

12.2.9 The CFP should include potential steps to meet intraday critical payments. In situations where intraday liquidity resources become scarce, an AI should have the ability to identify critical payments and to sequence or schedule payments based on priority. As with stress tests, the CFP should acknowledge that time-critical settlement needs may arise not only from the AI’s own transactions, but also from those of its customers, and from its provision of services to payment and settlement systems (e.g. by acting as a contingency liquidity provider). The CFP should be sufficiently robust to handle simultaneous disruptions in multiple payment and settlement systems.

Managing customer and business relationships

12.2.10 The CFP should include procedures for determining the priority of customer relationships during a stress situation, e.g. the order in which credit lines would be withdrawn from specific customers. In deciding which assets are to be disposed of, AIs would typically select those which are least detrimental to business relationships and public perception about their financial soundness (e.g. Exchange Fund Bills and Notes). An AI

should also maintain strong ongoing links with trading counterparties and liability holders in order to be better positioned to secure funding sources under stress situations.

Retail and foreign banking operations

12.2.11 The CFP of retail banks in Hong Kong should cater adequately for the risk of occurrence of a retail bank run. A retail bank should have procedures in place to ensure the continued functioning of its business locations (e.g. branches) and other service delivery channels including e-banking channels (e.g. ATMs, Internet banking, phone banking). In particular, the procedures for obtaining and distributing banknotes are a vital part of contingency planning. Banks with distant branches in the New Territories and the outlying islands should have a plan to ensure the delivery of banknotes to these branches within a short period of time in the case of emergency.

12.2.12 The CFP of a foreign bank's branch or subsidiary bank in Hong Kong should describe how the local operation works with the group in liquidity crisis management, including the extent to which the liquidity of the Hong Kong operation is supported by liquid assets held or managed locally, and the degree of commitment from the head office to provide liquidity support under stress situations.

Communication and public disclosure

12.2.13 As part of the CFP, an AI should develop a communication plan to deliver on a timely basis clear and consistent communication to internal and external parties, in a time of stress, to support general confidence in the AI. Internal communication should cover employees and encompass different business lines and locations of the AI. External parties should include the HKMA, other relevant local or overseas public authorities³⁴, clients, and creditors. The plan should in particular address communication with shareholders and other external stakeholders such as market participants, correspondents, custodians and major counterparties and customers to whom assurance about the AI is extremely important as their actions could significantly affect the AI's reputation and liquidity position.

³⁴ These include central banks, financial regulators, and payment system operators, where applicable.

12.2.14 An appropriate strategy should also be formulated for managing media relationships, making public announcements, and dealing with enquiries during a stress situation to help reduce uncertainty or speculation about the AI in the market. Designated staff with expertise in handling public relations matters should carry out such responsibilities.

12.2.15 AIs which are subject to disclosure obligations under the rules and standards of relevant stock exchange(s) in Hong Kong or overseas markets should have regard to such obligations in deciding the manner and extent to which public disclosure should be made.

12.3 Testing, update and maintenance

12.3.1 The CFP should be subject to regular testing to ensure its effectiveness and operational feasibility, particularly in respect of the availability of the contingency sources of funding listed in it.

12.3.2 The testing of the CFP should cover:

- verifying key assumptions, such as the ability to sell or repo certain assets or periodically draw down credit lines;
- ensuring that roles and responsibilities are appropriate and understood;
- confirming that contact information is up-to-date, with reporting lines clearly stated and synchronised with the latest organisation chart;
- proving the transferability of cash and collateral (especially across borders and entities); and
- reviewing that the necessary legal and operational documentation is in place to execute the plan at short notice.

12.3.3 An AI should, to the extent practicable, consider involving external counterparties for the testing of its funding capacity from time to time (see also subsection 7.3). Where it is not practical for the AI to involve external parties in the rehearsal of the CFP's workflows and communication and escalation procedures, it is

acceptable for this part of the testing to be confined to internal parties.

- 12.3.4 Senior management should review all aspects of the CFP following each testing exercise and ensure that follow-up actions are delivered.
- 12.3.5 Senior management should review and update the CFP at least annually, or more often as warranted by changes in business or market circumstances, to ensure that the CFP remains robust over time. Any changes to the CFP should be properly documented and approved by the Board (or its relevant delegated committee).
- 12.3.6 An AI's crisis management team, including its members and alternates, should have ready access to the CFP, both on-site and off-site. The CFP should be maintained in a corporate central repository and in locations that would facilitate quick implementation by responsible parties under emergency situations.

Annex 1 – Behavioural assumptions for cash-flow management

- 1 This Annex sets out guidance on adopting and developing behavioural assumptions for cash-flow projection. The HKMA may review the techniques used by individual AIs and request them to provide evidence or justification to support their assumptions.
- 2 The assumptions should be consistent and reasonable for each scenario. For example, the proportion of marketable debt securities which could be monetized in case of need and their monetizable value should properly reflect the quality and market liquidity of the securities under different scenarios.
- 3 The assumptions should be verified and supported by sufficient evidence, including past experience and past performance rather than arbitrarily selected. Typical information sources that could be used to help formulate the assumptions include –
 - historical observations or statistical analyses of cash-flow patterns and behavioural maturity under different scenarios. For instance, the past behaviour of different types of customer deposits, coupled with an analysis of their characteristics and factors affecting their stability, may provide relevant information for estimating the amount of deposits that will likely be withdrawn under normal or stressed situations;
 - models developed or used by banks for conducting cash-flow analysis;
 - input from managerial and business units about business and pricing strategies, as planned changes to business or repricing strategies could affect the behaviour of future cash flows of positions with uncertain maturities; and
 - general economic and market trends as well as other relevant information that could affect AIs' ability to access funds readily and at reasonable terms.
- 4 The length of the underlying historical observation period used for the analyses and models should generally be at least 1 year.
- 5 AIs should document the behavioural assumptions in their liquidity management policy statement. The type of analysis performed under each assumption should also be documented to facilitate periodic review. The level of detail of that

documentation should be consistent with the significance of the risk and complexity of the analysis.

- 6 Senior management should ensure that key assumptions are evaluated at least annually to assess their reasonableness. Changes in market conditions, competitive environment and strategies all have the capacity to cause assumptions to lose their validity. Therefore, AIs are expected to re-evaluate the key assumptions should significant changes occur.
 - 7 The Board, or its relevant delegated committee(s), should review key assumptions and their impact at least annually. The review of key assumptions should include an assessment of the impact of the assumptions on the AI's cash flows.
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