



Supervisory Policy Manual

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Sound Systems and Controls for Liquidity Risk Management

V.1 – 01.04.11

This module should be read in conjunction with the [Introduction](#) and with the [Glossary](#), which contains an explanation of abbreviations and other terms used in this Manual. If reading on-line, click on blue underlined headings to activate hyperlinks to the relevant module.

Purpose

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

Classification

A statutory guideline issued by the MA under the Banking Ordinance, §16(10)

Previous guidelines superseded

Subsections 1.3 and 4.3, sections 5 to 8 (except subsection 6.5), and Annexes B to D of LM-1 “Liquidity Risk Management” (V.1) dated 20.08.04¹

Application

To all AIs

Structure

1. Introduction
 - 1.1 Background
 - 1.2 Overview and scope
 - 1.3 Application
 - 1.4 Implementation
2. Governance of liquidity risk management

¹ The superseded parts of LM-1 mainly relate to various aspects of an AI's liquidity risk management framework that are updated in this guideline. The remaining parts of LM-1 will be revised, replaced or expanded in due course.



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13.3 Liquidity risk management framework

13.4 Liquidity risk exposures

Annex A: Behavioural assumptions for cash-flow management

1. Introduction

1.1 Background

1.1.1 The global financial crisis, which began in 2007, exposed a range of deficiencies in the liquidity risk management systems of many of the banks most adversely affected by the crisis. This was manifested in their failure, among other things, to –

- properly allocate liquidity costs and risks to their business activities and products, thereby resulting in the mis-alignment of risk-taking incentives and excessive liquidity risks being assumed;
- adequately identify and account for contingent liquidity risks arising from off-balance sheet exposures or non-contractual obligations²;
- maintain a sufficient stock of high-quality liquid assets to withstand liquidity stress arising from the loss or impairment of their normal funding sources during crisis situations; and
- cater for severe and prolonged market-wide (as opposed to institution-specific) liquidity disruptions in their stress tests and contingency funding plans.

1.1.2 In response to the lessons learned from the crisis, the Basel Committee issued in September 2008 a set of

² A typical example of contingent liquidity risk faced by some banks during the crisis was the need for them to provide liquidity support, for reputation reasons, to certain of their sponsored securitization structures that experienced financial problems.



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Principles for Sound Liquidity Risk Management and Supervision (“*Liquidity Sound Principles*”) to strengthen international standards on liquidity risk. This module has been developed to implement these *Liquidity Sound Principles* with a view to ensuring that AIs have sufficiently robust liquidity risk management systems to withstand severe liquidity shocks.

- 1.1.3 This section: (i) provides an overview of what the HKMA considers to be the major elements of a sound liquidity risk management framework; (ii) describes the manner in which the HKMA will apply the risk management standards laid down in this module; and (iii) describes the phased approach and transitional arrangements to be adopted in implementing the standards.

1.2 Overview and scope

- 1.2.1 While the liquidity risk management systems of AIs may vary in terms of 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, senior management is expected to put in place, among other things, a process for measuring and attributing 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 monitoring and controlling



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liquidity risk depends first and foremost on its ability to accurately measure net funding requirements along different time horizons of its cash-flow projections (or maturity profiling). The size of net funding requirements 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).

- The 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-balance sheet transactions and off-balance sheet and contingent exposures. Where appropriate, an AI is required to make projections on individual major currencies to which it has significant exposure 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 meet net funding requirements within various time horizons along its maturity ladder and under different scenarios. This calls for an effective liquidity risk management process that addresses funding diversification and market access (section 7), intragroup liquidity (section 9), intraday liquidity (section 10), and the management of collateral positions for day-to-day operations (section 11) as well as the maintenance of an adequate stock of unencumbered, high-quality liquid assets (i.e. liquidity cushion) to meet funding needs in a range of stressed conditions (section 8).



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- Stress-testing should be conducted based on severe but plausible stress scenarios covering, at a minimum, institution-specific stress and general market-wide stress (individually and in combination). The results should shed light on risks that an AI can actually withstand and therefore provide the Board and senior management with information on whether the risk tolerance level remains realistic and whether any adjustments to the business strategies and contingency funding plan should be made as a result. The contingency funding plan established by the AI should be robust and workable, with clearly defined triggers, responsibilities and escalation procedures that can be activated to meet liquidity needs under crisis situations. See sections 5 and 12.

Liquidity risk disclosure

- Added to the above is the need for an AI to make pertinent disclosure about its liquidity risk management framework and liquidity risk position. Adequate public disclosure helps reduce market uncertainty concerning an AI's financial condition and enables relevant stakeholders to make an informed judgement of the AI's ability to meet its liquidity needs, both in times of stress and normal circumstances. Section 13 contains some recommendations for disclosure that the HKMA considers beneficial for relevant stakeholders' understanding of an AI's liquidity risks and controls. The HKMA will in due course consider setting minimum disclosure requirements (e.g. through amending the Banking (Disclosure) Rules) to reinforce the effectiveness of the standards.

1.2.2 In sum, an AI's liquidity risk management framework should enable the AI to identify, measure, monitor and control liquidity risk, and to maintain adequate liquidity resources to cover the nature and level of liquidity risk to which it is or may be exposed. The framework should also be comprehensive and commensurate with the



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nature, scale and complexity of the AI's business activities.

1.3 Application

General

1.3.1 Locally incorporated AIs should apply the liquidity risk management standards set out in this module both on a legal entity basis³ and on a group basis. Those AIs which are foreign banks operating in Hong Kong through branches will normally be expected to apply the standards to their Hong Kong operations. See paras. 1.3.3 to 1.3.9 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 will assess AIs' compliance 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, although the procedures and documentation involved can be simplified.

Local banking groups

1.3.3 The HKMA expects a local banking group⁴ to apply the standards in this module on a group basis. The extent of application should be commensurate with the level of liquidity risk of its group entities⁵. The group's management has the primary responsibility of assessing

³ This refers to the head office and branches (local and overseas) of an AI.

⁴ This refers to a banking group in which the bank holding company is a locally incorporated AI.

⁵ These entities include downstream subsidiaries operating locally or in overseas jurisdictions.



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the liquidity risk of its group entities, and ensuring that all those entities posing a material liquidity risk to the group are adequately captured in its liquidity risk management framework. In general, such entities will normally include those engaged in banking activities, or in other activities that may subject the group to material liquidity risk exposures⁶.

- 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 practiced by the HKMA. In addition, subsidiary AIs within a local banking group may not be required to establish their own liquidity risk management framework if: (i) their 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 subsidiary AIs 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 and subsidiaries

- 1.3.6 In the case of AIs which are branches or subsidiaries of foreign banks, their liquidity risk may be managed on an integrated global basis. 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 such AIs to be able to comply with the liquidity risk management

⁶ AIs may have regard to those activities defined for “financial entities” under the Basel II framework, which include financial leasing, issuing credit cards, portfolio management, investment advisory, custodial and safekeeping services and other similar activities that are ancillary to the business of banking, although this should not be regarded as an exhaustive list.



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standards in this module in all major aspects, including the maintenance of adequate liquidity resources to cater for the liquidity risks they face. They will however be allowed to adapt their group liquidity risk management framework to their Hong Kong operations to comply with the standards.

1.3.7 The HKMA may also consider providing some flexibility to individual AIs in complying with certain aspects of the standards, having regard to –

- the nature and systemic importance of their local operations to Hong Kong;
- the effectiveness of their group liquidity risk management policies and framework;
- the overall liquidity risk position of their banking group; and
- the approach adopted by the relevant home supervisor in supervising the liquidity risk of their banking group on a consolidated basis.

1.3.8 AIs seeking the flexibility under paras. 1.3.6 and 1.3.7 should however demonstrate that their liquidity risk management will not be prejudiced. For example, they will not be subject to risk management standards that are less stringent than those required under this module, having regard to the scale, complexity and risk profile of their business.

1.3.9 In considering the application of the standards in this module to individual AIs or banking groups, the HKMA will, where necessary, obtain information or seek confirmations from the relevant home or host supervisors.

1.4 Implementation

1.4.1 AIs are expected to upgrade their existing liquidity risk management systems and controls to meet the



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standards in this module as soon as practicable, to an extent that is commensurate with the nature, scale and complexity of their operations.

- 1.4.2 In order to allow time for AIs to complete system and process changes and to build up liquidity where necessary, the HKMA considers that the standards can be implemented through a phased process adopting the transitional arrangements mentioned below.
- 1.4.3 Within four months of the date of issue of this module, AIs should submit to, and agree with, the HKMA an implementation plan setting out concrete measures and target deadlines and deliverables⁷ for achieving a phased compliance with the liquidity risk management standards set out in this module. For branches or subsidiaries of foreign banks, this four-month period will include the time required for obtaining clearance from their head office or parent bank on the plan.⁸
- 1.4.4 The implementation plan should broadly cover the following areas:
- Governance framework and structure, funding strategies, and risk management and disclosure policies;
 - Risk limits, ratios, and other metrics and indicators;
 - Cash-flow projections and assumptions, stress scenarios, and contingency funding plan;
 - Systems and controls procedures (including management of liquid assets, collateral and intraday

⁷ These deliverables should include at least the policy statement for liquidity risk management (including liquidity risk tolerance), the liquidity risk management structure within the AI, the stress scenarios including assumptions to be adopted by the AI, the AI's contingency funding plans, and other relevant policies and procedures that have been developed or revised to comply with the standards.

⁸ AIs should strive to agree the implementation plan with the HKMA within the prescribed period. The HKMA will only consider a request for extension of the period in exceptional circumstances (e.g. if the need for extension is due to circumstances beyond the AI's control).



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risks);

- Management information systems and database; and
- Liquidity cushion.

1.4.5 Als are expected to complete all necessary changes in respect of the first five areas listed in para. 1.4.4 within 12 months from the date on which the implementation plan is finalised and agreed with the HKMA (or any further period as may be agreed with the HKMA under exceptional circumstances).

1.4.6 Als will be given a longer period for implementing the requirements associated with the liquidity cushion under section 8 (i.e. the sixth area listed in para. 1.4.4), with the implementation date to be further advised by the HKMA. Nevertheless, Als should conduct an initial assessment of the extent to which their liquid asset holdings may have to be increased based on the requirements in section 8. The HKMA will discuss with individual Als the results of their initial assessments in conjunction with the review of their proposed stress scenarios for conducting liquidity stress tests (see para. 5.6.4). Where necessary, the HKMA may be prepared to allow Als to build up their liquidity cushions progressively (e.g. with annual step increases).

1.4.7 The HKMA will monitor Als' progress in complying with the standards, which will include a review of their deliverables, in the course of its ongoing risk-based supervision.

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 role and responsibilities of the Board and senior management in risk management



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are covered in [CG-1 “Corporate Governance of Locally Incorporated Authorized Institutions”](#) and [IC-1 “General Risk Management Controls”](#). Many of the requirements and practices cited in CG-1 and IC-1 have a general application.

2.1.2 Both the Board and senior management have their own distinct responsibilities in their governing roles in liquidity risk management. 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. 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 to ensure its continued effectiveness in the face of new risks and challenges arising from the constantly changing operating environment.

2.1.3 In addition, the Board and senior management should have an adequate understanding of the close links between funding liquidity risk⁹ and market liquidity risk¹⁰, 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 by the AI’s risk management committees and/or independent risk management functions.

2.2 Responsibilities of Board of Directors

⁹ 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.

¹⁰ 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.



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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, AIs which carry out important market functions or the activity of which covers a key segment of the financial system are generally expected to factor in an additional measure of conservatism in setting their risk tolerance level¹¹;
 - 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 strongly in normal times, but also withstand a prolonged period of stress, for instance, that lasts for one 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.

¹¹ 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 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.



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- 2.2.3 The risk tolerance level should be adequately documented and articulated, preferably with a combination of qualitative and quantitative expressions. As an illustration, AIs may express it in the form of a high-level policy statement¹², 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 metrics¹³ 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). The quantitative measures 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 setting of limits for managing different aspects of liquidity risk alone does not in itself constitute sufficient articulation of its 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 The HKMA will assess the appropriateness of an AI's liquidity risk tolerance (and any subsequent changes to

¹² 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).

¹³ 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 for further details).



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such risk tolerance), and will enter into discussions with the AI if the tolerance level is considered to be excessive.

Liquidity risk management structure

- 2.2.7 Liquidity risk management should form part of an AI's overall risk management as well as asset and liability management, the responsibility for which is usually delegated by the Board to a senior management committee (referred to as the Asset and Liability Committee ("ALCO")). For ALCO to function effectively, it should comprise personnel from senior management, treasury function, risk management and other business areas that affect liquidity risk. It should also be supported by competent risk managers with a dedicated responsibility for liquidity risk management. The main role and functions of ALCO are further described in [CG-1 "Corporate Governance of Locally Incorporated Authorized Institutions"](#).
- 2.2.8 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.
- 2.2.9 In the case of a local banking group with overseas operations, the Board should determine the appropriate liquidity risk management structure for overseeing all branches and subsidiaries (including non-bank entities where appropriate¹⁴) in jurisdictions in which the group is active, taking into account their different liquidity risk characteristics and transferability of funds among them in the light of any legal, regulatory or operational restrictions. The structure should identify the lines of authority and responsibilities for different levels of management and enable the liquidity management

¹⁴ Non-bank entities should be subject to liquidity risk oversight if they contribute materially to the liquidity risk exposures of the banking group.



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strategy, policies and procedures to be executed effectively.

- 2.2.10 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 should be such as to enable the monitoring of liquidity risks and the availability of liquidity across the group and at each entity on an ongoing basis.
- 2.2.11 Where an AI, as part of a banking group, has its liquidity risk managed on a group or sub-group basis, the AI remains responsible for ensuring compliance at the AI level with the liquidity standards and requirements set out by the HKMA. There should be arrangements in place such that any liquidity issues specific to the AI are identified and addressed by the AI itself or by those delegated with the responsibility for managing the AI's liquidity risk.
- 2.2.12 **Diagram 1** provides an example of the liquidity risk management structure of an international banking group. This example is not intended to be prescriptive, but provides an illustration of the composition of ALCO and how liquidity risk management responsibilities can be coordinated at the group/regional, local or subsidiary level.



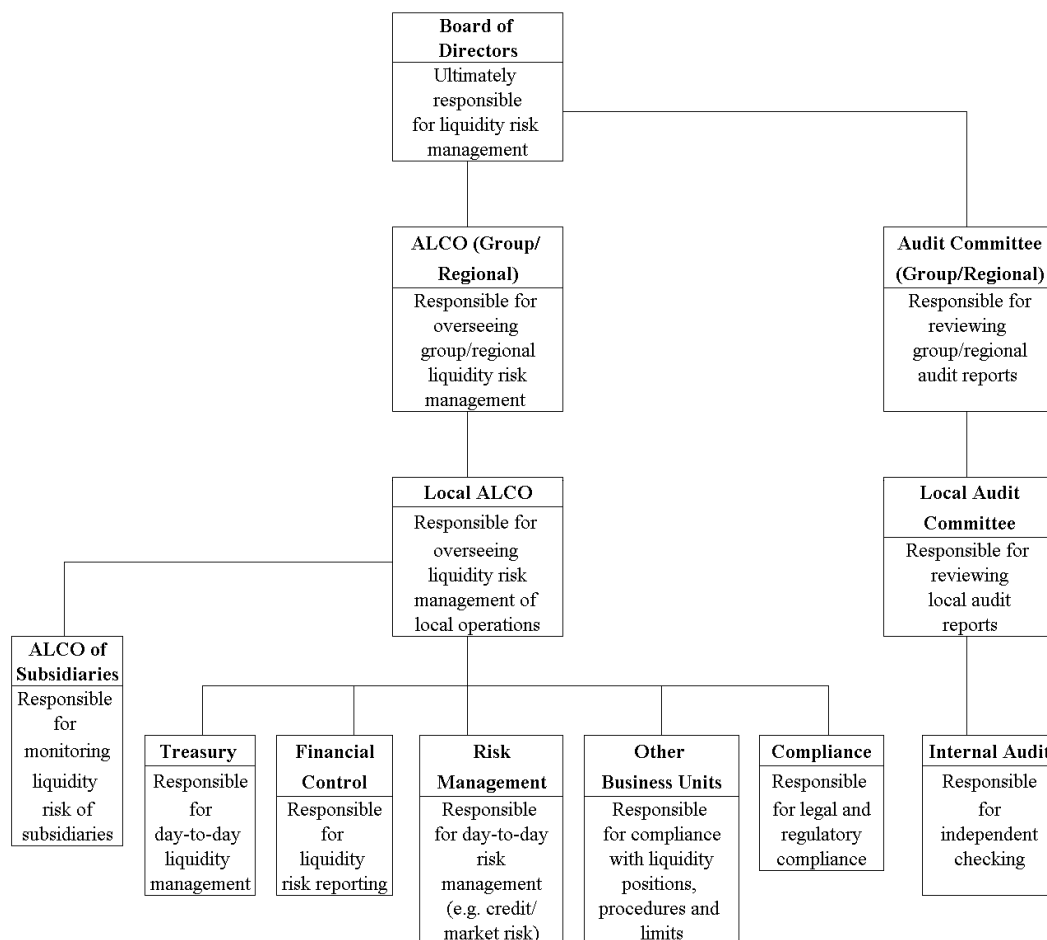
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Diagram 1: Illustration of liquidity risk management structure of an international banking group



2.2.13 The Board should review the appropriateness of the liquidity risk management structure in the light of business developments and changes.

Other responsibilities of the Board

2.2.14 In addition to the above, the Board of an AI should be responsible for -

- ensuring the competence of senior management and appropriate personnel in measuring, monitoring



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and controlling liquidity risk in terms of expertise, systems and resources, and in taking appropriate and prompt remedial actions to address concerns when necessary;

- approving and reviewing at least annually the liquidity risk strategies and other significant liquidity risk management policies and systems (including contingency funding planning), and ensuring that these are properly implemented by senior management with clear guidance and operating standards (e.g. in the form of policies, controls and procedures) set by the latter; and
- reviewing regular reports on the AI's liquidity positions and maintaining continued awareness of its performance and overall liquidity risk profile.

2.2.15 The Board may delegate authority to ALCO or other similar committees to carry out some of the above 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.

2.2.16 Similarly, in the case of foreign banks which operate 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 head office in approving the branch policies and monitoring the branch's compliance with the policies.

2.3 Responsibilities of senior management

Liquidity risk management strategy, policies and procedures

2.3.1 Senior management of an AI should be responsible for developing and implementing the liquidity risk management strategy, policies and procedures, properly documented in the form of a policy statement, in



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accordance with the risk tolerance established by the Board. The policy statement should be approved by the Board and agreed by the HKMA, and be subject to regular review (at least annually) by the Board to ensure that it remains valid under changing circumstances. The HKMA should be consulted prior to making any material changes to the agreed policy statement.

2.3.2 While specific details of the policy statement will differ across AIs according to the nature of their business activities, it should take account of an AI's liquidity needs under normal and stressed conditions and cover, at a minimum, the following key aspects:

- Liquidity risk tolerance as established by the Board;
- Liquidity risk management strategy – which should set out the general approach to liquidity (including goals and objectives) and the liquidity risk management policies on particular aspects, such as –
 - the composition and maturity of assets and liabilities;
 - the diversity and stability of funding sources;
 - 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 –



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- the setting of various liquidity limits and ratios (e.g. target liquidity ratio, maturity mismatch limits, loan to deposit ratio etc.);
 - the framework for conducting cash-flow analysis under normal and stress scenarios, including the techniques and behavioural assumptions used;
 - the management reporting system for liquidity risk; and
- Contingency funding plan – which should describe the approach and strategies for dealing with various types of liquidity crisis.

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, AIs which are branches of foreign banks should still formulate a policy statement for their Hong Kong operations. It should, in particular, include the line of responsibility for monitoring the liquidity in Hong Kong and the reporting arrangements to head office.

Allocation of liquidity costs, benefits and risks

2.3.5 Recognising that liquidity risk management is not a profit-making activity, it is important to avoid adverse incentives and potential conflicts of interest that would impede a sound risk management framework. Senior management should appropriately incorporate liquidity costs, benefits and risks in the internal pricing, performance measurement and new product approval process for all significant activities (both on- and off-balance sheet), thereby aligning the risk-taking incentives of individual business lines with the liquidity risk tolerance established by the Board.



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- 2.3.6 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.
- 2.3.7 Normally, this framework involves the charging of a liquidity premium to activities¹⁵ 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 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

¹⁵ These may, as appropriate, include positions, portfolios or individual transactions.



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line management level for quantifying and attributing liquidity costs, benefits and risks;

- includes consideration of how liquidity would be affected under stressed conditions; and
- is reviewed periodically by senior management and endorsed by the Board as appropriate to reflect changing business and financial market conditions and so maintain the appropriate alignment of incentives.

Other responsibilities of senior management

2.3.8 Other responsibilities of senior management should include -

- communicating the liquidity risk management strategy, key policies for implementing the strategy, and the 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;



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- monitoring closely the current trends and potential market developments that may require timely changes or updates to the liquidity risk management strategy to address any significant challenges;
- defining the specific process for handling exceptions to policies and limits;
- ensuring the effectiveness of stress tests and contingency funding plans as well as the appropriateness of the liquidity cushion maintained; and
- informing the Board of any new and emerging liquidity concerns in a timely manner.

2.4 Independent reviews and audits

2.4.1 Als 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 assumptions for conducting cash-flow scenario analyses;
- the integrity and usefulness of management information reports on liquidity risk; and
- the adherence to established liquidity policies and



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procedures.

2.4.3 Als 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 General

3.1.1 This section describes some features that an AI's liquidity risk management process should have in order to facilitate the identification, measurement, monitoring and control of liquidity risk. These include -

- the use of a range of customised tools or metrics, against which internal limits may be set, for measuring, monitoring and controlling liquidity risk exposures;
- the design and implementation of early warning indicators for identifying potential vulnerabilities in liquidity positions or risks; and
- the maintenance of effective management information systems for the reporting of forward-looking liquidity information and any liquidity issues or concerns to higher levels of management on a timely basis to enable them to make informed decisions where necessary.

3.2 Liquidity metrics and measurement tools

3.2.1 Als should use a range of liquidity metrics for the measurement and analysis of their liquidity risk. These metrics should enable the management of an AI to understand its day-to-day liquidity positions and



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structural liquidity mismatches, as well as its resilience under stressed conditions. In particular, these metrics should perform the functions of –

- projecting the AI's future cash flows and identifying potential funding mismatches under both normal and stressed conditions over different time horizons. The cash-flow projections should be based on reasonable and appropriate assumptions that are properly documented, and periodically reviewed and approved (see section 4 for more details);
- evaluating potential liquidity risks inherent in the AI's balance sheet structure and business activities (including emerging risks that are more distant in nature);
- 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.

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

3.2.3 AIs should use metrics and tools that are appropriate for their business mix, complexity and risk profile. Set out below are some examples of liquidity metrics that can be used:

- 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 gaps that may need to be bridged;
- information on the composition and quality of



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funding sources (e.g. medium-term funding ratio¹⁶, the ratio of stable or core deposits to total deposits, etc.) and the level of concentration of funding from major counterparties (including retail and wholesale fund providers) or other sources (see para. 7.2.7). Such metrics provide insight into an AI's stable funding sources to support asset growth and identify vulnerability to any particular funding source or fund provider;

- information on the size, composition and characteristics of an AI's liquidity cushion for assessing its potential capacity to obtain liquidity, through sale or secured borrowing, at short notice from private markets or central banks in times of stress; and
- various other ratios or measures (e.g. loan to deposit ratio, intragroup exposures and borrowings, swapped fund ratio¹⁷, contractual and non-contractual facilities and obligations, etc.) that are appropriate for an AI's business activities.

3.2.4 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.

3.3 Risk control limits

3.3.1 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.

¹⁶ A medium-term funding ratio is a ratio of liabilities to assets, both with a contractual maturity of, say, more than one 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.

¹⁷ A swapped fund ratio is designed to measure the reliance of an AI on foreign currencies to fund domestic currency liquidity needs.



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3.3.2 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. The limits should be set at such a level as to ensure that an AI can continue to operate in a period of market stress.

3.3.3 AIs should ensure compliance with the established limits, and define the procedures for reporting exceptions or breaches which can be early indicators of excessive risk or inadequate liquidity risk management (see para. 3.4.2). The limits set, and the corresponding reporting procedures, should be regularly reviewed.

3.4 Early warning indicators

3.4.1 Other than liquidity metrics (which require computations based on assumptions), AIs should design 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.

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

Internal indicators

- 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 costs (other than those purely caused by rising interest rates)¹⁸;

¹⁸ For example, an AI's "borrowing premium" in the interbank market has increased.



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- worsening cash-flow or structural liquidity positions as evidenced by widening negative maturity mismatches, especially in the short-term time bands;
- 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;
- significant deterioration in earnings, asset quality, and overall financial condition;

Market indicators

- 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).



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3.4.3 In addition to the above, Als should have indicators that signal whether embedded triggers¹⁹ 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.

3.5 Management information systems

3.5.1 Als should have reliable management information systems (“MIS”) that provide the Board, senior management and other appropriate personnel with timely and forward-looking information on their liquidity positions.

3.5.2 The MIS should encompass all significant sources of liquidity risk, including contingent risks and the related triggers and those arising from new activities, and have the ability to calculate risk measures to monitor liquidity positions -

- in all currencies, both individually and on an aggregate basis;
- in subsidiaries and branches in all jurisdictions in which an AI is active and on a group basis;
- required 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,

¹⁹ See footnote 20.



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on a day-to-day basis for shorter time horizons (of, say, one week), and over a series of more distant time periods thereafter); and

- at appropriate intervals. In times of crisis, the MIS reports should be capable of being produced at more frequent intervals (e.g. daily or intraday).

3.5.3 For Als actively engaged in securitization or other transactions in financial instruments or derivatives, their MIS should be able to capture fully risks in the following areas:

- secured borrowing and lending, including information on maturity mismatches and asset liquidity;
- derivative transactions, including 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.

3.5.4 Owing to their systemic importance, Als 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.

3.5.5 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 Board or ALCO meeting during normal times, with increased reporting frequency in times of stress) and the parties responsible for preparing the reports.



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- 3.5.6 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 any such breaches to higher levels of management and the Board and, where appropriate, to the HKMA.
- 3.5.7 The HKMA expects AIs to report to it on a timely basis breaches relating to the statutory liquidity ratio (which is a reporting obligation under §103 of the Banking Ordinance) and other key ratios or limits that have been agreed with the HKMA (e.g. target liquidity ratio, loan to deposit ratio, maturity mismatch limits, etc.). AIs are also expected to promptly inform the HKMA of any indicators of serious liquidity problems (e.g. those constituting events that trigger their contingency funding plans).
- 3.5.8 Other than compliance monitoring, 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 events during liquidity crises.

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 –



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- monitoring on a daily basis their net funding requirements 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 set out 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 and coverage

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 events²⁰ associated with such positions); and
- core business lines and activities (including 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;

²⁰ A triggering event referred to in this context is an event which enables commitments to be drawn upon and 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.



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- day-to-day liquidity needs and funding capacity over short and medium-term horizons of up to one year;
- longer-term liquidity needs over one 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 Hong Kong dollars and all currencies in aggregate. Separate cash-flow projections should also be performed for individual foreign currencies in which an AI has significant activity. See section 6 for more details.

4.3 Net funding requirements

4.3.1 In order to 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 satisfy their funding requirements on a daily basis.

Maturity profile

4.3.2 Net funding requirements can be assessed through the construction of a maturity profile. All cash flows from assets, liabilities and off-balance sheet transactions should be allocated into a series of time bands according to their expected maturity dates (or, where appropriate, behavioural patterns), and a net mismatch position can be obtained by subtracting outflows from inflows in each time band. A cumulative net mismatch position can then be derived by accumulating the net mismatch positions in successive time bands. This profile enables AIs to estimate the prospective net funding requirement in each time band.

4.3.3 The maturity profile should encompass adequate time bands so that AIs can monitor their short-term as well as medium-term and longer-term liquidity needs. The



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relevant time frame for active liquidity management is generally quite short. It is common to have daily time bands in the very short term (say for a period of five to seven days), followed by wider and less granular time bands for other periods. 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 requirements over a slightly longer period (such as one to three months ahead).

- 4.3.4 While the focus of the maturity profile is on short-term cash flows, AIs should also review the mismatch positions for the medium-term to longer-term time bands to identify any early sign of potential liquidity problems inherent in their structural balance sheet positions.

Maturity mismatch limits

- 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, seven days, and one 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.

4.4 Cash-flow assumptions and techniques

- 4.4.1 While certain cash flows can be based simply on contractual maturities, there are those which can only be estimated based on assumptions. AIs should make realistic assumptions to enable prudent cash-flow



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projections that reflect the complexity of their underlying businesses, products and markets. These assumptions may include –

- future growth in the balance sheet;
- the proportion of maturing assets and liabilities that Als 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;
- 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);
- convertibility of foreign currencies;
- the lead time required for the liquidation 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 Other than their own business activities, Als engaged in correspondent, custodian and settlement banking 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 Als' overall liquidity position, both on an intraday and overnight basis. Als should also



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be familiar with the failure-to-settle procedures of payment and settlement systems in which they are direct participants and be able to assess and manage potential liquidity needs arising from any settlement failure of a counterparty.

- 4.4.3 In projecting cash flows, Als should also consider general economic and market trends (e.g. an interest rate hike) that could affect their ability to access funds readily and at reasonable terms.
- 4.4.4 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.
- 4.4.5 Techniques employed by Als for designing 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.
- 4.4.6 In deriving behavioural cash-flow assumptions, Als may analyse historical observations on cash-flow patterns. There is however no standard methodology for making such assumptions. It is important that the use of consistent and reasonable assumptions should be supported by sufficient historical or empirical evidence. The minimum criteria for using behavioural assumptions for cash-flow analyses are set out in Annex A.

5. Stress-testing and scenario analysis

5.1 General

- 5.1.1 Whether an AI can be regarded as having sufficient liquidity depends to a great extent on its ability to meet



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obligations under a funding crisis. Therefore, in addition to conducting cash-flow projections to monitor net funding requirements under normal business conditions, AIs should perform stress tests regularly by conducting projections based on “what if” scenarios on their liquidity positions to –

- identify sources of potential liquidity strain;
- ensure that current liquidity risk exposures remain in accordance with the established liquidity risk tolerance; and
- analyse any possible impact of future liquidity stresses on their cash flows, liquidity position, profitability and solvency.

5.1.2 The scenarios should cover, at a minimum, institution-specific and market-wide stress scenarios (individually and in combination). The scenarios should also cater for short-term and protracted liquidity stresses. AIs should consider the need for additional stress scenarios (or additional levels of severity for scenarios used) based on their individual risk profiles for the purposes set out in para. 5.1.1.

5.1.3 This section describes some major aspects of an AI's stress-testing for assessing liquidity risk, including guidance on the scope and process for conducting such stress tests, considerations for assessing behavioural characteristics of different stress items, design of stress scenarios and assumptions, and how the stress-testing results should be utilised. There is also a discussion of the HKMA's approach to applying the stress-testing standards.

5.1.4 See also [IC-5 “Stress-testing”](#) which provides general guidance on the use of stress tests for risk management purposes.

5.2 Scope and process



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- 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. These tests should consider the implications of the stress scenarios across different time horizons, including on an intraday basis.
- 5.2.2 Stress tests should be conducted based on plausible scenarios and assumptions that are subject to regular review by the Board and senior management to ensure their appropriateness. Senior management should be actively involved in the stress-testing process to ensure its effectiveness.
- 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 the Hong Kong dollar 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 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 supervisors.
- 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 items



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- 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 The liquidity of an AI's assets is essentially determined by their marketability. 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 such as government securities which are eligible as collateral either to obtain liquidity from the central bank or which may be sold or repurchased, or otherwise used as collateral for obtaining secured funding in the market under most circumstances;
- Other marketable assets (e.g. non-government debt securities, equities etc.) and interbank loans which may be saleable but subject to varying degrees of price risk under adverse conditions;
- Saleable loan or asset portfolios, which may provide an AI with a limited amount of liquidity, usually with a longer lead time, particularly under adverse conditions; and
- Other assets which are illiquid or not marketable, such as loans not capable of being readily sold, bank premises and investments in subsidiaries, as well as classified credits.



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- 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 Based on the above analysis, Als could assess the potential of different assets for providing liquidity, through sale or secured funding, under stress. In this regard, Als should take account of the expected level of loss or discount in prices and the time needed to settle the transactions under stressed conditions.
- 5.3.5 For contractual cash inflows generated from Als' asset portfolios (e.g. receivables expected from retail or wholesale clients), Als should assess the extent to which such payments will be received (taking into account any projected outflows needed to refinance outstanding loans). Als 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 of an AI's liabilities is determined by the reliability, stability or "stickiness" of its funding sources. Als are expected to analyse funding sources (other than capital) that would tend to stay with the AI under most circumstances and those that would likely run off quickly at the first sign of problems.
- 5.3.7 Wholesale funding, both secured and unsecured, from more sophisticated fund providers (such as financial institutions, hedge funds, etc.) tend to be more volatile as the fund providers may be inclined to react quickly to institution-specific and/or market-wide stress by withdrawing or switching their funds to other safe havens at the earliest possible maturity. Als should assess the likelihood of roll-over of such funding facilities and the possibility that wholesale funding markets may dry up in times of stress.
- 5.3.8 Als should also consider, having regard to historical trends and account behaviour, factors that influence the



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stability of customer deposits during a crisis scenario, such as –

- the size of deposit (e.g. small versus large deposits);
- the channel of soliciting deposits (e.g. direct, internet or brokered);
- whether a deposit is fully insured;
- whether a depositor has other established relationships (e.g. lending relationship) with an AI;
- 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;
- the purpose of deposit. For example, AIs may assess whether transactional deposits (e.g. payroll accounts) will exhibit more signs of stability in times of stress; and
- the behavioural patterns (e.g. renewal history) of deposits.

5.3.9 The above analysis can be used to estimate potential run-off rates for different types of deposits in a crisis.

Off-balance sheet positions

5.3.10 AIs should assess the potential 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 potential non-contractual obligations, which may become a source of liquidity risk under adverse market conditions (see para. 5.3.14). Set out below is a discussion of the contingent liquidity risks associated with certain off-balance sheet items that could materialise in times of stress.



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Guarantees and commitments

- 5.3.11 Undrawn loan commitments, letters of credit and financial guarantees given by Als to their customers may represent a potential drain of funds during stress. Als could ascertain the level of drawdown in the normal course of business, and then estimate the scope of increase in these cash outflows during periods of stress. For example, an economic downturn may trigger a substantial increase in the amount of drawdown of letters of credit provided by Als to their customers. Such behaviour may differ depending on the type of customers.
- 5.3.12 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 crisis 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 when the credit standing of that third party deteriorates. The resale value of those assets will diminish and the AI could be called upon to post additional margin in respect of borrowings against such assets.

Asset securitization

- 5.3.13 Als should understand how the structure of securitization transactions will affect their liquidity positions in respect of their role in the transactions, including contractual terms that can trigger recourse in asset sales, extension of liquidity facilities to the programmes and early amortization, etc., and the extent to which triggering events are more likely to occur during adverse market conditions.
- 5.3.14 Other than contractual obligations, reputation concerns may drive Als in times of stress to provide liquidity support to special purpose vehicles (“SPVs”) of securitization transactions they sponsored / arranged



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(irrespective of whether or not the SPV is consolidated for accounting purposes), or buy back securitized assets from the market. Als therefore need to consider how their liquidity may be adversely affected by illiquidity at the 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.

- 5.3.15 Moreover, Als should be aware that they may not have continuing access to the securitization market as a funding source in the midst of a market-wide stress or if they themselves face liquidity problems.

Financial derivative or other transactions

- 5.3.16 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. a 3-notch downgrade) or creditworthiness or a decline in the mark-to-market valuation of derivative positions or the price of underlying assets.

Intragroup liquidity

- 5.3.17 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 crisis scenario. This would depend on whether the crisis scenario is localised or affects the group as a whole.
- 5.3.18 For a localised crisis 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



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funding will be received in case of crisis²¹. Any assumption that intragroup deposits will not be withdrawn at maturity should also be supported by formal arrangements with the placing entity. If the crisis scenario 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 crisis impinges on the group as a whole. See section 9 for more details.

5.4 Scenarios and assumptions

General requirements

5.4.1 It is important for AIs to construct severe but plausible stress scenarios and examine the resultant cash-flow needs. While AIs 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 crisis scenario;
- a general market crisis scenario; and
- a combination of both.

5.4.2 AIs will need to assign the timing of cash flows for each type of asset and liability, as well as off-balance 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.

²¹ In the case of a foreign banking group, the HKMA will, where necessary, seek formal assurance from the group office and/or its home supervisor of the availability and unrestricted transfer of the funding in case of need.



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5.4.3 In designing stress scenarios, AIs should take into account specific risks associated with their 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 AIs should take a conservative approach when setting stress assumptions. There are a number of possible areas that the assumptions should cover. The appropriateness and severity of each of the assumptions will depend on the stress scenario used. 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 by other financial institutions to the AI;
- access to standing facilities (e.g. discount window) provided by the HKMA or other relevant central banks (for locally incorporated AIs operating in



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overseas jurisdictions)²²;

- 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 AIs' subsidiaries, branches 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 national borders, 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, AIs should, as far as practicable, factor into their stress tests the impact of the likely behavioural responses of other market participants and their counterparties on the broader market and how that

²² 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 crisis.



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impact will feed back to their own position (i.e. “second-round” effects). Where an 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, AIs should be aware that funding and liquidity may not be “fungible” across national borders, especially under stressed conditions (i.e. not all available liquidity within a banking group is freely transferable). As such, AIs should incorporate plausible assumptions into the scenarios reflecting the fungibility of cross-border liquidity, with adjustments made to the availability of liquid assets located in overseas jurisdictions which are likely to be affected by any known liquidity transfer restrictions (e.g. exchange controls).
- 5.4.7 The scenario design and underlying assumptions used by an AI should be subject to regular review and approval by the Board and senior management to ensure that the nature and severity of the tested scenarios remain appropriate and relevant to the AI. Reviews should take into account changes in market conditions; changes in the nature, size or complexity of the AI’s business model and activities; and its actual experiences in stressed situations.
- 5.4.8 All crisis scenarios and their underlying assumptions should be properly defined and documented in an AI’s liquidity risk management policy statement.

Institution-specific crisis scenarios

- 5.4.9 An institution-specific crisis scenario should cover situations that could arise from an AI experiencing either real or perceived problems (e.g. asset quality problems, solvency concerns, a 3-notch 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 crisis.



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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.

5.4.10 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, 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.

5.4.11 Foreign AIs (including branches and subsidiaries of foreign banking groups) should, in particular, assess the effects of a group-wide crisis scenario on their liquidity positions. This scenario assumes that an institution-specific stress event is affecting the global operations of the banking group (i.e. with problems spilling over the whole banking group). In a group-wide crisis, a default position would be that no intragroup or head office funding support can be assumed to be available²³ (see also paras. 5.3.17 to 5.3.18).

5.4.12 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

²³ An AI wishing to assume that intragroup or head office funding support continues to be available under a group-wide crisis scenario (i.e. a departure from the default position) must be able to demonstrate to the satisfaction of the HKMA that the relevant liquidity facilities provided by its head office or other group entities are subject to special arrangements and safeguards that can provide adequate assurance of the sufficiency, availability and transferability of funds for meeting liquidity needs in Hong Kong in a timely manner should a liquidity crisis occur at the group level.



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cause a gradual drain on its liquidity. Als are encouraged to take account of different scenarios applicable to their own circumstances as part of the ongoing liquidity risk management process.

General market crisis scenarios

5.4.13 A general market crisis 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 Als 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 affecting one or more payment or settlement systems.

5.4.14 Als should be aware that the cash-flow patterns of certain assets and liabilities may behave quite differently in the case of a general market crisis scenario as compared with the institution-specific crisis 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 crisis 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, Als should assign appropriate discount factors to such



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assets to reflect the price risk associated with different stress scenarios. Moreover, the impact of a general market crisis on individual AIs may differ. For example, an AI with a strong market reputation may benefit from a flight to quality as depositors seek a safe haven for their funds.

Combined scenarios

5.4.15 AIs are expected to incorporate a third type of scenario into their stress tests which bears the characteristics of both an institution-specific crisis and a general market crisis. Although this combined scenario may reflect a set of very adverse circumstances that could plausibly happen to an AI in terms of liquidity impact, it will generally be inappropriate for AIs to adopt an “additive approach” in designing the scenario, viz., simply by summing up the underlying assumptions and estimated impacts of an institution-specific scenario and a general market risk scenario. AIs should consider making appropriate adjustments under the combined scenario to modulate the severity of assumptions used commonly for the institution-specific and the general market crisis scenarios, having regard to how the various stress circumstances may interact in the scenario.

5.4.16 The following are some relevant factors that could be considered:

- As a greater number of financial institutions in the market will be affected by the crisis, 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.



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Minimum stress period

5.4.17 The ability of an AI to honour its immediate commitments at least for the initial period when the stress is likely to be most acute is crucial for its later survival. As such, the HKMA would normally expect an AI to have sufficient funds (including those that can be generated from its available liquid assets 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 crisis scenarios, without resorting to emergency liquidity assistance from the HKMA (or other relevant central bank in the case of a locally incorporated AI with overseas operations). Generally speaking, an AI should assume the minimum stress period for an institution-specific crisis scenario to last for no less than five business days, and that for a general market crisis scenario and a combined scenario, no less than one calendar month. AIs should adopt longer minimum stress periods if their liquidity risk profile warrants this.

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 –

- review stress scenarios and assumptions as well as thoroughly discuss the stress-testing results to consider the need for remedial or mitigating actions. These may include actions to limit the AI's exposures, obtain more long-term funding or restructure the composition of assets, increase the liquidity cushion (see section 8) or adjust its liquidity profile to fit its risk tolerance;
- document the choice of scenarios and related assumptions and review them together with the stress-testing results;



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- report the stress-testing results and vulnerabilities identified to the Board, with recommendations for any resulting actions. Where appropriate, the HKMA (or relevant banking supervisors in other jurisdictions) 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 process as well as its liquidity risk management strategies and practices, including the setting of internal liquidity risk limits and the assessment of, and planning for, related potential funding shortfalls in its 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 may conduct an analysis of the sensitivity of the stress-testing results to certain key assumptions. Such sensitivity analyses can provide valuable additional indications of an AI's degree of vulnerability to certain factors.

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. AIs which are branches of foreign banks are expected to apply the standards to their Hong Kong operations only. See also subsection 1.3 for more details.

5.6.2 In respect of an AI which is part of an international banking group, its liquidity risk may be managed on an integrated global basis, with stress tests being conducted at the regional or group level. The HKMA may regard this arrangement as acceptable 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



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can be demonstrated to the HKMA's satisfaction to adequately reflect the specific risk characteristics of the AI concerned. AIs subject to such an arrangement should discuss their approach with the HKMA.

- 5.6.3 The HKMA may exempt certain AIs from complying with this section if the nature and scale of their operations do not warrant the use of such risk management techniques. AIs that are likely to be exempted include, for example, those that maintain a simple and small operation with positive funding positions (based on cash flows which are mostly contractual and predictable). However, in such cases, the HKMA may require the AI to maintain a minimum level of liquid asset holdings to cater for unexpected contingencies. AIs should formally apply to the HKMA for this exemption.
- 5.6.4 AIs should provide their stress scenarios and underlying assumptions for review and agreement by the HKMA. They should also report the stress-testing results at a frequency agreed with the HKMA, which will be determined based on the business nature and complexity of the AI concerned. Generally speaking, AIs will be expected to report the 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 during crisis situations.

6. Foreign currency liquidity management

6.1 General

- 6.1.1 AIs should have adequate systems in place for measuring, monitoring and controlling their liquidity positions in each major currency in which they have significant activity or exposure²⁴. These systems should be integrated into various aspects of their overall liquidity

²⁴ The HKMA will normally regard a currency position as significant if the amount of an AI's on-balance sheet assets or liabilities, whichever is the larger, in that currency together with the sum of the AI's expected cash inflows and outflows from off-balance sheet and contingent activities in the same currency is more than 10% of its total customer deposits in all currencies.



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risk management framework, such as managing net funding requirements, stress-testing and contingency funding planning as appropriate.

- 6.1.2 An AI should seek the consent of the HKMA if the AI proposes to adopt its own internal approach for determining significant foreign currency positions. The AI will need to demonstrate to the satisfaction of the HKMA that its internal approach is more sophisticated and proficient than the quantitative threshold set out in footnote 25 in identifying significant foreign currency positions and will not result in a less stringent risk management measure that is out of line with the level of its foreign currency liquidity risk.

6.2 Liquidity strategies and policies

- 6.2.1 AIs should formulate liquidity strategies and policies for the major currencies in which they have significant activity or exposure, including those that are not freely convertible into Hong Kong dollars, taking into account potential constraints in times of stress. In the case of currencies which are not freely convertible, the need for full matching of the assets and liabilities should be considered. The effectiveness of such strategies and policies should be reviewed on an ongoing basis.
- 6.2.2 As a general principle, AIs should manage and control their funding needs to avoid over-reliance on foreign exchange or currency swap markets in respect of those currencies in which they have significant exposure, 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 fully developed foreign exchange markets do not exist.

6.3 Foreign currency mismatch controls

- 6.3.1 AIs should assess their aggregate foreign currency liquidity needs under both normal and stressed conditions, and control currency mismatches within acceptable levels.



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6.3.2 Maturity mismatch in a foreign currency may arise where, for example, an AI relies on foreign currency liabilities and short-term credit lines to fund a portion of their Hong Kong dollar assets, or vice versa via foreign exchange or currency swap markets. In these cases, AIs should have the capacity to assess and monitor the risk of sudden, adverse exchange rate movements that could sharply widen existing liquidity mismatches and alter the effectiveness of foreign exchange hedges and hedging strategies. AIs should also assess the likely convertibility of foreign currencies and access to foreign exchange markets for switching funding from one currency to another.

6.3.3 AIs should set and regularly review internal limits to control the size of cumulative net mismatches over particular time bands (e.g. “next day”, “7 days” and “1 month”) for each major foreign currency in which they operate. Such limits are generally expected to be lower than those for the Hong Kong dollar, unless an 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 different levels of fungibility between individual currencies and the Hong Kong dollar;
- the conditions of foreign exchange markets, including the depth and liquidity of the markets and



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the level of interest rates;

- the ability to raise funds in foreign exchange markets, and to transfer surplus liquidity from one currency to another, across jurisdictions and legal entities;
- 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 facilities²⁵ to cater for circumstances in which normal access to funding in individual currencies is disrupted; and
- the ability of borrowers to repay their foreign currency liabilities under stressed conditions (e.g. interest rate hikes and exchange rate fluctuations).

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, Als should, to the extent practicable, maintain a range of diversified and stable funding sources (including liquid assets held) for providing short-term, medium-term and long-term liquidity, supported by ready access to the relevant markets. They should take appropriate measures to foster relationships with fund providers and strengthen presence in chosen funding markets.
- 7.1.2 Als should also gauge regularly their capacity to raise funds quickly from each of the available sources, identify the main factors affecting their ability to raise funds, and monitor such factors closely to ensure that their estimates of fund-raising capacity remain valid.

²⁵ 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.



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- 7.1.3 This section sets out some major considerations and strategies for ensuring the stability and diversification of Als' asset and funding sources, the aim of which is to strengthen an AI's fund-raising capacity to withstand a variety of severe liquidity shocks.
- 7.1.4 Relevant factors for determination of the extent to which an asset or funding source is capable of generating liquidity (particularly under stress scenarios) are included in section 5. Section 8 provides further guidance on certain criteria that Als should take into account in assessing the liquidity of an asset for the purposes of the liquidity cushion.

7.2 Funding diversification

Funding strategy, plans and limits

- 7.2.1 Als should establish a funding strategy that provides effective diversification of their asset and funding sources and maturities, taking into account correlations between market conditions and the ability to access funds from different sources.
- 7.2.2 Als should limit concentration in any particular asset or funding source and tenor (i.e. short-term, medium-term or long-term). Concentration limits should be set 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 para. 7.2.7 for more details on funding concentration). 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 asset and funding sources, and should regularly review the funding strategy, in the light of any changes in the market environment in which it operates.



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Liquid assets²⁶

- 7.2.4 Als 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)²⁷, as well as for meeting emergency funding needs. Liquidity can be raised either through selling these assets or using them as collateral to obtain secured funding from counterparties in the market (see section 11 for more details on collateral management). The amount and composition of such assets should be determined by individual Als with reference to the nature of their business and liquidity risk profile.
- 7.2.5 Als 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 physically located in Hong Kong in crisis situations. In particular, Als with significant retail business need to have sufficient funds in the event of a deposit run to purchase quickly bank notes from note-issuing banks to meet the immediate demand from depositors. In this regard, Als are recommended to hold an appropriate amount of Exchange Fund Bills and Notes for liquidity risk management. If there is a funding crisis, they can be sold or pledged almost immediately. Moreover, they are eligible for rediscount at the HKMA's discount window if an AI has a shortfall in its clearing balance.
- 7.2.6 Where Als are part of a foreign banking group, the HKMA would in principle expect such Als to maintain sufficient liquidity within their local operations to cover the liquidity needs of those operations. Nevertheless, the HKMA may allow some flexibility in applying this requirement subject to consideration of relevant factors such as the nature and systemic importance of such Als'

²⁶ The liquid assets referred to here are broader in scope than the stock of high-quality liquid assets that an AI should maintain as a liquidity cushion to safeguard against severe liquidity stresses.

²⁷ Als 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.



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local operations to Hong Kong, the overall liquidity position of their banking group, the level of supervisory oversight exercised by the home supervisor and other alternative funding arrangements for supporting the local operations.

Other funding sources

7.2.7 Als should avoid any potential concentration in their reliance on particular funding markets and sources²⁸. What would constitute a funding concentration cannot be expressed in definite sizes or amounts, as this depends on the nature and complexity of an Al's business activities. Als should take into account the following 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 repurchase 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.

7.2.8 Als should analyse the characteristics of their available funding sources and the potential impact these may have on their liquidity position. They should recognise

²⁸ A funding concentration exists when a single decision or factor has the potential of causing a significant or sudden withdrawal of funds.



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that certain funding sources (e.g. interbank borrowing, wholesale funding, internet deposits, etc.) are more volatile than traditional retail funding (see also para. 5.3.7). Als heavily reliant on such funding sources should seek more diversification of these sources and maintain a higher proportion of high-quality liquid assets to withstand the potential impact of liquidity or market disruptions.

- 7.2.9 Similarly, in the case of standby credit facilities, Als should recognise the likelihood that their right to draw on these facilities may be denied in a crisis (i.e. the fund providers may simply not honour their contractual obligations by refusing to advance any funds). Als should therefore avoid excessive reliance on standby facilities. Where an Al's standby facilities constitute a major source of backup liquidity, the HKMA will seek to be satisfied as to the certainty of these arrangements.
- 7.2.10 For Als active in multiple currencies, access to diverse funding sources in each major currency in which they have significant activity or exposure is required, as it may not always be easy to swap liquidity from one currency to another at times of market stress.
- 7.2.11 Als should seek to build up a sufficient level of stable, longer term funding to support their assets and activities. They should analyse their funding structure and identify which funding sources are likely to stay with them, and which may leave, under adverse circumstances. Als with a large deposit base should, in particular, conduct a granular analysis to evaluate the behavioural characteristics of different types of deposits (e.g. insured versus uninsured, domestic versus foreign, retail versus wholesale / private banking, etc.) with a view to determining the attributes of deposits that are more stable in nature (see also para. 5.3.8). They should monitor the trends and levels of their stable deposits.
- 7.2.12 It is important for Als to assess their exposure to large fund providers (or depositors) on an ongoing basis. At a minimum, Als should review regularly reports on large



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fund providers (say, the largest ten or twenty) which consolidate all funding that an AI obtains from each fund provider or group of related fund providers. The historical performance of these fund 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). AIs should consider appropriate actions to diversify the deposit base.

- 7.2.13 While some AIs may regard connected deposits 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.
- 7.2.14 AIs should identify alternative sources of funding (e.g. intragroup fund transfers, 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.

7.3 Managing market access

- 7.3.1 Maintaining market access is critical for effective liquidity risk management as it affects both the ability to liquidate assets and raise new funds. Senior management should ensure that market access is being 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



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

- 7.3.3 The ability to obtain funds in the interbank market is an important source of liquidity for Als. Als 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. It may also be sensible to test their name in the market on a regular basis even if there is no immediate need for funds.
- 7.3.4 Als’ 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, Als 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.
- 7.3.5 Developing the ability to sell assets (e.g. through inclusion of sale clauses in loan documentation or use of securitization structures) or exploring arrangements under which an AI can obtain liquidity against its assets (e.g. through repurchase agreements or through sale of residential mortgages to the Hong Kong Mortgage Corporation) may provide some alternative sources of liquidity under adverse circumstances. In the case of asset securitization, however, Als should be aware that the securitization market is likely to become illiquid



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during a market stress and the time taken to organise a securitization transaction may imply that it cannot be relied upon to provide liquidity at short notice.

Relationships with fund providers

- 7.3.6 Als should identify and build strong relationships with current and potential funding providers. The frequency of contact and the frequency of use of a funding source are two possible indicators of the strength of a funding relationship. A strong relationship can give Als insights into the providers' behaviour in times of institution-specific or market-wide shocks, and provide a line of defence should liquidity problems arise.
- 7.3.7 Nevertheless, Als should take a prudent view of how such relationships may be strained in times of stress. For example, fund providers may themselves be 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, Als should consider second-round effects and take into account that funding sources may dry up and markets may close as well as the potential effects that losses and the resulting reduction in capital can have on an AI's ability to maintain funding relationships.

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, high-quality liquid assets that can be reliably sold or "repoed" in private markets to obtain funds to meet the AI's liquidity needs at all times, even in periods of severe idiosyncratic and market stress. The HKMA expects Als to maintain such a liquidity cushion as a source of strategic liquidity reserve to be held as insurance against a range of liquidity stress scenarios (see subsection 5.4).



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- 8.1.2 This section sets out various considerations that Als should take into account in determining the size and composition of, and the types of liquid assets to be included in, the liquidity cushion as well as the operational issues that Als should deal with in order to ensure the continued availability of the assets during stress periods.

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 cover any funding gap generated from the liquidity stress scenarios adopted by the AI under subsection 5.4 for the duration of the relevant stress periods (see para. 5.4.17), taking into account the liquidation or borrowing values of the assets included in the cushion under the relevant stressed conditions.
- 8.2.2 In addition to maintaining sufficient resilience to liquidity stress, 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 also section 10).

8.3 Composition of liquidity cushion

- 8.3.1 Als are expected to maintain a liquidity cushion that is largely made up of the most liquid and readily marketable assets (i.e. tier 1 liquid assets) that can be easily or immediately liquidated with little or no loss or discount at all times (irrespective of the AI's own condition). Such tier 1 assets should be sufficient to meet the liquidity needs in the initial phase of the liquidity stress which is most critical to an AI's survival (e.g. the first one to two weeks in the case of a one-month scenario). Such tier 1 assets generally include cash, high-quality marketable securities issued or guaranteed by sovereigns or central banks and other similar instruments (e.g. marketable securities issued or



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guaranteed by public sector entities or multilateral development banks of comparable quality)²⁹.

- 8.3.2 Als may widen the composition of the cushion by holding other highly liquid and marketable assets of a second tier (including high-quality corporate bonds and other marketable securities issued or guaranteed by sovereigns, central banks, public sector entities or multilateral development banks of comparable quality)³⁰ which can be used to cater for the longer end of the stress period (e.g. up to one month or beyond) without resulting in excessive losses or discounts (see para. 5.3.2 for general classification of assets in terms of marketability).
- 8.3.3 The 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 for more details). Als should apply appropriate haircuts to the liquid assets to account for price fluctuations due to credit and market risks.
- 8.3.4 The HKMA will assess the appropriateness of the composition of Als' liquidity cushions having regard to their individual liquidity risk profiles and positions.

8.4 Characteristics of liquid assets

- 8.4.1 Als should document their policies and criteria for defining liquid assets to be included in the liquidity cushion and distinguishing their relative levels of quality and liquidity. The following describes some of the basic

²⁹ Tier 1 liquid assets held by an AI should generally qualify for a 0% risk-weight under the Basel II standardized approach for credit risk in the jurisdiction in which the assets are used to cover the AI's liquidity needs in that jurisdiction. A locally incorporated AI may also include in the liquidity cushion as Tier 1 liquid assets the non-0% risk-weighted debt issued or guaranteed by the government or central bank in an overseas country in which the AI operates so long as such debt holdings are maintained to meet the liquidity needs in that country.

³⁰ Tier 2 liquid assets held by an AI should generally qualify for a 20% risk-weight under the Basel II standardized approach for credit risk in the jurisdiction in which the assets are used to cover the AI's liquidity needs in that jurisdiction.



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characteristics Als should take into account in determining the eligibility of assets for inclusion in the liquidity cushion.

Asset characteristics

- Unencumbered – This means that there should be no legal, regulatory or operational impediment at all times to using the assets to meet an AI's liquidity needs as and when they arise. Assets that are pledged, either explicitly or implicitly, to secure, collateralise or provide credit enhancement to any transaction, or are part of a "tied position" (e.g. the assets are held as a hedge for some other positions) should be excluded.³¹ Assets that are designated to cover operational costs (such as rents and salaries) should likewise be excluded. For the avoidance of doubt, client pool securities, or cash received from a repo backed by client pool securities, should not be treated as liquid assets.
- Low credit risk – An asset which is less risky, whose issuer has a high credit standing, and with a low degree of subordination will enhance its liquidity. Als may have reference to the credit ratings assessed by international rating agencies³², but this should not obviate the need for them to conduct their own assessment of the asset's suitability on an ongoing basis.
- Low market risk – The possession of such characteristics as low duration³³, low volatility, low inflation risk and being denominated in a convertible currency with low exchange rate risk will all enhance

³¹ An AI may consider including assets received in reverse repo and securities financing transactions provided that they are held at the AI, have not been rehypothecated, and are legally and contractually available for the AI's use.

³² In general, the credit ratings of tier 1 liquid assets should be higher than A+ or equivalent while the credit ratings of tier 2 liquid assets should be A- to A+ or equivalent (for sovereigns, central banks, public sector entities and multilateral development banks) and at least AA- or equivalent (for corporate bonds).

³³ Duration measures the price sensitivity of a fixed income security to changes in interest rate.



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an asset's liquidity.

- Low correlation risk – Als should avoid relying on liquid assets that are subject to wrong-way risk. Assets (such as marketable securities) issued by financial institutions³⁴, for instance, are more likely to be illiquid in times of a liquidity stress affecting the financial system generally and hence should be excluded.
- Ease and certainty of valuation – An asset's liquidity will tend to increase if market participants are more likely to agree on the asset's valuation, with its pricing formula being easy to calculate and not dependent on strong assumptions or private knowledge (i.e. inputs into the formula are publicly available). The structure and risk characteristics of the asset should also be transparent to the market, investors and counterparties. In practice, this should rule out the inclusion of any complex, structured product.
- Proven record of liquidity – Als should favour those types of assets that have a proven record as a reliable source of liquidity in the markets (sale or repo) even during stressed market conditions. For example, the maximum decline of price or increase in haircut for individual types of assets during a relevant period of significant liquidity stress should not exceed 5% (for tier 1 liquid assets) and 10% (for tier 2 liquid assets) within a 30-day period. Some types of assets (e.g. high-quality government bonds) may also benefit from flight to quality in a systemic crisis.

Market-related characteristics

- Active, sizable and liquid market – The assets should be traded or listed in developed, deep and

³⁴ These include banks (whether authorized in Hong Kong or not), investment firms and insurance companies.



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active markets (sale or repo), typically indicated by a narrow bid-offer spread, a sufficient number of market participants (including active market makers), a low level of market concentration³⁵, and large transaction volume. Als should however not assume that a liquid market will exist for a given asset in all stress scenarios simply because such a market exists in normal times.

- 8.4.2 In addition, some high-quality liquid assets may enable an AI to access central bank lending facilities (e.g. intraday credit, overnight liquidity or other standing facilities). While central bank eligibility may confer additional confidence on an asset's liquidity, Als are not expected to use this as the main criterion for considering eligibility of the asset for inclusion in the liquidity cushion. Als should also be realistic about how much funding they will be able to obtain from the relevant central bank against eligible assets.

8.5 Operational considerations

- 8.5.1 Als could improve their ability to convert liquid assets reliably and predictably into cash through the following measures:
- maintaining a regular presence in the markets of liquid assets held by them. This ensures that their ability to generate funding at times of stress is based on realistic operational information. An added advantage is that it minimises the possibility of market stigma which might arise from trading high-quality liquid assets under stress;
 - have a diversified portfolio of liquid assets with limits by type, tenor and currency; and
 - avoid holding a liquid asset of an amount that represents a significant proportion of the market

³⁵ This is reflected by the presence of a diverse group of buyers and sellers in the market which increases an asset's reliability as a liquidity source.



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turnover.

- 8.5.2 Als should ensure that the liquidity cushion is ready for use in the event of severe stress. The stock of high-quality liquid assets should be unencumbered (see para. 8.4.1), managed by Als with the clear and sole intent for use as a source of contingency funding, and segregated from those assets held within, or used to hedge, trading positions.³⁶ Als are allowed to hedge the risks associated with the ownership of the stock of high-quality liquid assets, but they should take into account in the haircut applied to each asset the cash outflow that would arise if the hedge were to be closed out early (e.g. in the event of the asset being sold).
- 8.5.3 The stock of high-quality liquid assets should be under the control of the specific function(s) charged with liquidity management responsibilities. Als should be able to use the liquid assets to generate funds in the desired currency and in the jurisdiction in which the liquidity will be required (e.g. with the assets physically located in that jurisdiction).
- 8.5.4 Als should avoid running large currency mismatches in their assets and liabilities. The currency denomination of assets in the liquidity cushion should take into account potential problems in an AI's access to foreign exchange markets under stressed conditions, and should cater for the operational needs of the AI in individual currencies. Locally incorporated Als with significant overseas operations or foreign currency positions should carefully consider the appropriate mix of currency denomination in the liquidity cushion.
- 8.5.5 Where an AI utilises a centralised pool of liquid assets maintained by a banking group of which it is a part, the HKMA will need to be satisfied that the liquid assets in

³⁶ An AI wishing to include trading book assets in the liquidity cushion must be able to demonstrate to the satisfaction of the HKMA that the AI's existing liquidity risk management framework is organised or structured in a way that can provide adequate assurance that the relevant assets can be monitored, managed and mobilised in the same way as other eligible liquid assets to meet its liquidity needs during normal and crisis situations.



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the pool are available to, or under the control of, the AI and are transferable without restriction to meet its liquidity needs.

- 8.5.6 Als should periodically monetise a proportion of the liquid assets in the cushion through repo or outright sale to the market in order to test the usability of the assets.

9. Intragroup liquidity risk management

9.1 General

- 9.1.1 Als should have adequate policies and systems to monitor and control liquidity risk exposures and related funding needs within and across business lines and currencies. Where an AI is part of a banking group (local or foreign), the AI should also 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, Als 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).
- 9.1.3 This section outlines some specific considerations for dealing with intragroup liquidity issues, including the treatment of intragroup transactions for liquidity purposes, setting of intragroup limits, constraints on intragroup liquidity transfers, mitigation of reputation



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contagion, and monitoring of liquidity risk exposures on a group-wide basis.

9.2 Treatment of intragroup transactions

- 9.2.1 Als 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 Als 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 are faced with liquidity strain. Where there is reliance on funding support from group entities, Als should take into account any legal, regulatory or other limitations that may restrict their access to liquidity from those entities in case of need.
- 9.2.4 For the avoidance of doubt, Als that have entered into back-to-back transactions³⁷ with their group entities should exclude such transactions from cash-flow or liquidity calculations, as such transactions usually

³⁷ These transactions refer to interoffice or intragroup transactions which typically involve two legs, one borrowing long (with maturity of more than one month) and the other lending short (with maturity of one 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.



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involve no actual movement of funds and hence cannot effectively improve their liquidity. A few AIs which still maintain back-to-back transactions previously approved by the HKMA for liquidity purposes should promptly assess the impact of removing such transactions from their liquidity positions and agree with the HKMA a plan to phase out the transactions.

9.3 Intragroup liquidity limits

- 9.3.1 AIs 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. AIs may also establish limits to restrict the reliance of their branches and subsidiaries on funding from elsewhere in the group. Moreover, AIs should consider setting stricter internal limits on foreign currencies where ready conversion between the currencies is uncertain, particularly in stressed situations. See section 6 for more details on foreign currency liquidity management.
- 9.3.2 The HKMA will monitor the level and trend of AIs' intragroup transactions, and may consider restricting such transactions by setting supervisory limits to control their intragroup exposures, especially when the financial and liquidity position of the group is in doubt.

9.4 Constraints on intragroup liquidity transfers

- 9.4.1 AIs 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, which will be subject to review by the HKMA, should fully consider regulatory, legal, accounting, credit, tax and internal constraints on the effective movement of liquidity and collateral.
- 9.4.2 AIs 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.



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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. In addition, 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 [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, Als which head local banking groups should actively monitor and control liquidity risks on a group basis (including all of their branches and subsidiaries), by incorporating processes that aggregate data across multiple systems 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 the entities. The policies should also address how liquidity of the entities is monitored and controlled by senior management at the head office in Hong Kong.
- 9.6.3 For each country in which they are active, Als should ensure that they have the necessary expertise concerning the country-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 framework and collateral policies. This knowledge should be reflected in their liquidity risk management processes.



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- 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 an AI's broader liquidity risk management strategy, and is critical to implementing other longer term aspects of that strategy. Failure of an AI to manage intraday liquidity effectively can impair the AI's ability to meet its payment and settlement obligations during the day, which can in turn affect the liquidity positions of other counterparties, thereby potentially causing liquidity dislocations across institutions and financial systems (especially if large and critical payments are delayed or missed).
- 10.1.2 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.
- 10.1.3 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 Als 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, Als should be aware of, and



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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 net overnight balances even under normal circumstances, differences in the timing of its gross 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 business 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



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- 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 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 during the day should be frequent enough as to enable an AI to assess the need for additional intraday liquidity or restricting liquidity outflows to meet critical payments, 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 central banks in other jurisdictions in which a locally incorporated AI has operations), 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),



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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 tools 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



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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's capacity for monitoring positions in securities settlement systems should be as strong as that for monitoring positions in real time gross 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 in 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 availability of assets that AIs can use as collateral to obtain funding in the market by means of repurchase agreement or secured borrowing gives them the capacity to raise cash quickly to meet short-term liquidity needs. This can be considered as a form of liquidity risk mitigation. It is therefore important that AIs allocate sufficient resources to the 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.



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11.2 Management of collateral positions

- 11.2.1 Als should have the ability to calculate all of their collateral positions, including assets currently pledged relative to the amount of collateral required and unencumbered assets available to be pledged.
- 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 bank 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.³⁸ 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

³⁸ 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.



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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.

11.2.6 Als should prudently measure the value of collateral, together with estimates on its liquidated 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 system (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



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- 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, in particular, liquidity shortfalls estimated from stress tests performed by the AI under institution-specific, market-wide and combined stress scenarios (see section 5). The CFP should contain a set of policies, procedures and action plans that prepare an AI to deal with the relevant liquidity stress events 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, and with the results of the scenarios and assumptions used in stress tests. The CFP should address liquidity issues over a range of different time horizons, including intraday.
- 12.1.3 The CFP should be consistent with an AI's business continuity plans and should be operational under



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situations where business continuity arrangements have been invoked. As such, the AI should ensure effective coordination between teams managing issues surrounding liquidity crises and business continuity.

12.1.4 The following subsections describe the essential elements of a CFP and other relevant considerations for designing the CFP and testing its effectiveness.

12.2 Strategy, plans and procedures

Contingency funding measures / 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 situations³⁹. 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 AIs 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

³⁹ For example, some contingency funding measures may include slowing 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.



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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 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 The CFP should reflect central bank lending programmes and their relevance as secondary sources of liquidity, including the types of available central bank lending facilities (e.g. discount window) and collateral requirements, the operational procedures for accessing those facilities and potential reputation issues involved in accessing them.



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12.2.6 Locally incorporated Als may consider the extent to which their assets are eligible to secure funding under the HKMA's lender of last resort framework. However, they should not assume that such support is automatically available to them during a crisis. Als' eligibility under this framework is subject to their meeting the prescribed criteria set out in the HKMA's policy statement. They should also recognise that such support can only be sought in exceptional circumstances and as a last resort.

Early warning signals / 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. Als may have regard to various internal and market indicators set out in subsection 3.4 for defining and monitoring triggering events.

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

- the authority to invoke the CFP and the establishment of a formal "crisis team" to facilitate internal coordination and communication across different business lines and locations and decision-making by senior management during a liquidity crisis;
- 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;



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- 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 / business relationships

12.2.10 The CFP should include procedures for determining the priority of customer relationships during a crisis, 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). AIs should also maintain strong ongoing links with trading counterparties and liability holders in order to be better positioned to secure funding sources under crisis situations.

Retail / foreign banking operations

12.2.11 The CFP of retail banks in Hong Kong should cater adequately for the occurrence of a retail bank run. In particular, the procedures for obtaining and distributing



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bank notes 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 bank notes to these branches within a short period of time in the case of emergency. In addition, there should be procedures to ensure the continued functioning of branch and non-branch (e.g. ATMs, internet, phone banking) banking services as well as an effective strategy for communicating with the media and the public (see below) in the midst of a crisis.

- 12.2.12 The CFP of foreign bank branches and subsidiaries in Hong Kong should describe how the local entity 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 group office to provide liquidity support in the event of a crisis.

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 authorities⁴⁰, 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.

- 12.2.14 An appropriate strategy should also be formulated for managing media relationships, making public announcements, and dealing with enquiries during a

⁴⁰ These include central banks, financial regulators, and payment system operators, where applicable.



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crisis situation to help reduce uncertainty or speculation about the AI in the market. Designated staff with expertise in handling public relation matters should carry out such responsibilities.

12.2.15 AIs which are subject to disclosure obligations under the rules and standards of the relevant Stock Exchange(s) in Hong Kong or other jurisdictions 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. The aim is not only to prevent operational difficulties in times of crisis when the need to activate those funding sources arises, but also to reduce reputation risk and avoid over-reaction or speculation of the market that an AI is facing liquidity problems when those sources are activated.

12.3.2 The testing of the CFP should cover the following major aspects:

- 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 synchronized 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



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short notice.

- 12.3.3 An AI should involve external parties as counterparties for the testing of its capacity to access funding sources in the markets on a regular basis (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 to ensure that these procedures can operate smoothly as intended.
- 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 regularly, at least annually or more often as business or market circumstances change, to ensure that it remains robust over time. Any changes to the CFP should be properly documented and approved by the Board.
- 12.3.6 Liquidity crisis teams, including 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.

13. Public disclosure

13.1 General

- 13.1.1 Public disclosure is an important element of liquidity risk management in that it improves transparency, strengthens market discipline and helps manage perceptions and reduce uncertainty in the markets, particularly during times of stress. Where applicable, AIs are encouraged to disclose regularly, and whenever appropriate, sufficient information regarding their liquidity risk management framework and liquidity risk exposures to enable relevant stakeholders (e.g. investors,



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depositors, rating agencies, etc.) to make an informed judgement about their ability to meet liquidity needs.

13.1.2 This section describes what the HKMA expects Als to include as part of their regular financial disclosures in relation to liquidity risk. At this stage, the examples provided are meant to be recommendations for liquidity risk disclosure that are consistent with the guidance set out in the *Liquidity Sound Principles*. The HKMA will consider revising the Banking (Disclosure) Rules to reflect minimum liquidity disclosure requirements that should be adopted by Als consistently.

13.2 Disclosure policy

13.2.1 Als should have a formal disclosure policy approved by the Board setting out their approach for determining what disclosures they will make and the internal controls over the disclosure process. There should also be a process for assessing the appropriateness of their disclosures (e.g. in terms of quality, scope, frequency and transparency) and for validating the accuracy of their disclosures.

13.3 Liquidity risk management framework

13.3.1 Als should include in their financial disclosures a qualitative description of their organisation structure and framework for the management of liquidity risk. For illustrative purposes, information to be disclosed may include –

- a statement of the principal objectives of an Al's liquidity risk management framework;
- the degree to which liquidity risk management is centralised or decentralised, with a broad description of the roles and responsibilities of, and interaction among, the relevant committees (e.g. ALCO) and different functional and business units within the group structure with respect to liquidity risk;



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- the funding strategies (including strategies for the diversification of funding sources) and intragroup lending policies, if applicable, together with a description of the regulatory restrictions on the transfer of liquidity among group entities;
- the systems and techniques employed (together with the key assumptions used) for measuring and managing liquidity risks. These could usefully include a description of:
 - major sources of liquidity risk to which the AI is exposed and the techniques used to mitigate liquidity risk;
 - the manner of addressing market liquidity risk in the liquidity risk management framework;
 - the approach and assumptions used for measuring and managing liquidity risk arising from off-balance sheet exposures and contingent funding obligations (including the provision of financial guarantees, credit protection, liquidity support for ABCP conduits, etc.);
 - the management information systems for reporting liquidity positions and risks, including the approach for measuring such positions and risks (and metrics used) as well as the frequency and type of internal liquidity reports;
 - the stress-testing scenarios adopted and how stress-testing is conducted and the results used;
 - an outline of the contingency funding plan and an indication of how the plan relates to the AI's stress-testing and overall business continuity plan; and
 - the policies on maintaining the AI's liquidity cushion.

13.4 Liquidity risk exposures

- 13.4.1 AIs are expected to disclose relevant quantitative liquidity information to enable market participants to form



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a view of their liquidity risk. Examples of such disclosures include –

- the values of regulatory ratios and key internal metrics for measuring and managing liquidity risk, together with relevant explanations to facilitate the understanding of each metric, such as in relation to its objective, the time span covered, key underlying assumptions (including whether it is computed under normal or stressed conditions), and the level within the group (e.g. group, bank or non-bank subsidiary) to which the metric applies;
- on-balance sheet and off-balance sheet items broken down into a number of short-term maturity bands and the resultant cumulative liquidity gaps;
- the size and composition of the AI's liquidity cushion; and
- the extent to which the AI is subject to additional collateral requirements in relevant contracts as a result of a credit rating downgrade.



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Annex A - Behavioural assumptions for cash-flow management

A1 Introduction

A1.1 This Annex sets out the minimum criteria for the behavioural assumptions adopted by AIs in the projection of expected cash flows of their assets, liabilities and off-balance sheet activities. The HKMA may review the techniques used by individual AIs and request them to provide evidence or justification to support the assumptions.

A2 Minimum criteria for using behavioural assumptions

A2.1 The minimum criteria for using behavioural assumptions are as follows:

- The assumptions should be consistent and reasonable for each scenario. For example, the proportion of marketable debt securities which could be liquidated in case of need and their liquidation value should properly reflect the quality and market liquidity of the securities under different scenarios.
- The assumptions should be verified and supported by sufficient evidence, experience and 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 / 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



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- general economic and market trends as well as other relevant information that could affect AIs' ability to access funds readily and at reasonable terms.
- The length of the underlying historical observation period used for the analyses and models should be at least one year, unless otherwise agreed with the HKMA.
- 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 details of that documentation should be consistent with the significance of the risk and complexity of the analysis.
- Senior management should ensure that key assumptions are evaluated at least annually for reasonableness. Changes in market conditions, competitive environment and strategies would be likely to cause assumptions to lose their validity. Therefore, AIs are expected to evaluate the key assumptions should significant changes occur.
- The Board of Directors, or its delegated committee, 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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