17 June 2008

# SECOND PART OF CEBS'STECHNICAL ADVICE TO THE EUROPEAN COMMISSION ON LIQUIDITY RISK MANAGEMENT

## - Analysis of specific issues listed by the Commission and challenges not currently addressed in the EEA -

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# INTRODUCTION

1. On 5 March 2007, the European Commission issued a Call for Advice (no. 8)[1] asking CEBS to provide technical advice on liquidity risk management at credit institutions and investment firms (these two types of firms are referred to collectively hereafter as 'institutions'). The Call for Advice asked CEBS to perform two principal tasks:

   a) to update an earlier GdC survey of regulatory regimes across the EEA; and

   b) to conduct a detailed analysis of:

   - the factors that significantly affect liquidity risk management, in order to align supervisory approaches with market practice. These factors include collateral management, the use of different types of collateral, the impact of covenants on net liquidity positions, netting agreements, the distinction between banking and trading books, and the analysis of concentration of liquidity sources;

   - the interaction of funding liquidity risk and market liquidity risk;

   - the use of internal methodologies by sophisticated institutions and credit rating agencies; and

   - the impact of payment and settlement systems design, and of increased interdependencies between systems.

   **CEBS was also asked to identify other areas and problems that appear not to be adequately addressed by the current EU regulatory framework.**

2. The survey referred to in point (a) was published on CEBS's website in August 2007[2]. This report sets out CEBS' preliminary analysis on point b). It is published for public consultation and will also be delivered to the Commission as initial input to the second part of the Call for Advice" The final advice is expected to be delivered by September 2008.

3. The advice contained in this report builds primarily on the 2007 survey, and on detailed discussions in the light of the 2007-2008 liquidity crisis held with an ad-hoc industry expert group on liquidity[3]. More specific discussions on internal methodologies were held with the European Banking Federation, the Institute of International Finance (IIF)[4], and the rating agencies[5]. This work has been conducted

[1] The call for advice has been posted on the CEBS website at: http://www.c-ebs.org/Advice/documents/CfAonLiquidityRiskManagement20070315.pdf.

[2] The first part of the advice (survey) is available on CEBS website at: http://www.c-ebs.org/Advice/documents/CfA_8_LiquidityStockTakesurvey.pdf

[3] The Industry Expert Group on Liquidity was established in December 2007 as a joint initiative by CEBS and its Consultative Panel in order to promote consultation with the industry at an early stage. Its composition reflects the variety of credit institutions in the EEA, with savings and cooperative banks represented along with large cross border-groups. The Members' list is available at: http://www.c-ebs.org/ConsultativePanel_IndustryExpertGroups_liq.htm

[4] "The Principles of Liquidity Risk Management", published by the IIF in March 2007, containing recommendations relating to both financial services industry and regulators. The report is available at http://www.iif.com

[5] On 11 March 2008, representatives from Standard and Poor's, Moody's, and FitchRatings presented their respective agencies' internal methodologies for assessing the liquidity risk profiles of credit institutions and investment firms in the light of the crisis.

in close coordination with the Basel Committee on Banking Supervision (BCBS)[6] and the Banking Supervision Committee (BSC)[7].

4. This Advice is divided into four main parts, each of which highlights certain key lessons, recommendations, and points of interest:

   - Part I elaborates on the nature and definitions of liquidity and liquidity risk, as a precondition for common supervisory understanding and possible convergence;

   - Part II discusses recent changes in the liquidity risk environment;

   - Part III describes liquidity risk management practices at financial institutions[8]; and

   - Part IV discusses the principal challenges for the supervision of liquidity risk management.

   Parts III and IV touch upon areas and issues that were not mentioned explicitly by the Commission, such as internal governance and disclosure, without however calling into question the allocation of responsibilities between home and host supervisors in the current European legal framework.

5. CEBS welcomes market participants' views on the preliminary recommendations in Part III and IV of the report, and listed above. In particular, CEBS seeks more detailed feedback on recommendations 2, 8, 9-11, 14, 15, 16, 18, 25 to 27 and 28.

## Context

6. Annex V, point 10 of Directive 2006/48/EC introduced an explicit requirement for institutions to have policies and processes for the measurement and management of their net funding position, and contingency plans to deal with liquidity crises. Except for EEA branches, the Directive 2006/48/EC provides no further details.

7. Investment firms, as defined by Article 4 of Directive 2004/39/EC (the Markets in Financial Instruments Directive or 'MiFID'), require a specific focus if they are independent broker-dealers that do not benefit from intra-banking-group funding (or access to central bank refinancing), and hence face specific funding challenges. However, these challenges are much less for investment firms that conduct business only on behalf of their customers. They should not be assimilated to large international investment companies, which are usually licensed in EEA countries as credit institutions.

8. While there is currently no single regime for the supervision of liquidity within the EEA, there is a considerable degree of commonality in terms of qualitative expectations. Most if not all national authorities within the EEA appear to recognise the Basel Sound Practices for Liquidity Risk Management (2000) – which are currently under review - as an authoritative reference. In terms of quantitative requirements, roughly one third of all EEA countries rely entirely on the output of institutions'

[6] In the fall of 2007, the BCBS launched a review of its Sound Practices for Managing Liquidity in Banking Organizations (2000),

[7] Following publication in the fall of 2007 of the BSC report on Liquidity Management of Cross-Border Banking Groups in the EU, a new work stream was launched on liquidity stress testing and contingency funding plans.

[8] These include collateral management, the impact of covenants, netting agreements, the impact of payment and settlement systems, the distinction between the trading and banking books, concentration of liquidity sources, the increased used of market funding, the blurring of the distinction between liquidity funding risk, and liquidity market risk (these are the issues listed in the Call for Advice).

internal methodologies, while two thirds apply supervisory limits based on pre-determined methodologies (in some cases allowing for behavioural adjustments and in most cases supplemented with qualitative requirements). In this sense, the quantitative and qualitative approaches can be viewed as being part of a continuum.

9. With the expansion of the EU from 15 to 27 countries, the high proportion of core domestic institutions owned by foreign parent institutions has raised issues relating to the appropriate balance between the need for local liquidity to be held against predominantly local retail deposits, and the transferability of liquid assets and management at the group level for strategic liquidity. These issues are particularly pressing for banking systems that have not previously been integrated with international financial markets. At the same time, although day-to-day liquidity management is still conducted mostly in a decentralised fashion, there has been an increasing shift towards the centralisation of liquidity policies, procedures, limits, and contingency plans within groups operating on a cross-border basis.

10. Structural market developments over the past few of years pose challenges for liquidity risk management and supervision. These include the shortening of time horizons for payment obligations, the shift from traditional retail deposit-based funding to more volatile market-based funding sources, and, for some European institutions, the increased cross-border use of collateral and the increased use of complex financial instruments. The lasting liquidity squeeze generated by the fallout of the US subprime mortgage market shows that common assumptions on liquidity and liquidity risk no longer hold true, and calls for institutions and supervisors to revisit their approach to liquidity risk management, and liquidity supervision.

11. EEA supervisors agree that some changes to their domestic regimes should be considered, to reflect market developments and changes in industry practices as well as lessons learned from the 2007-2008 events. In order to promote convergence of practices, CEBS could build on this Advice to the European Commission by specifying under what circumstances supervisors could rely on internal methodologies developed by sophisticated credit institutions and investment firms, based on a more profound exploration of the necessary technical conditions.

# EXECUTIVE SUMMARY

12. This consultation paper sets out CEBS' preliminary views on the issues raised in the European Commission's call for advice on liquidity risk management (second part).

13. The events of 2007-2008 have challenged traditional assumptions concerning liquidity and liquidity risk, and call for a review of the common understanding of their **nature and definitions**. Liquidity risk is the current or prospective risk arising from an institution's inability to meet its liabilities/obligations as they come due without incurring unacceptable losses. The overall counterbalancing capacity to this risk is a general cash-generating capacity, including a capacity for unsecured funding. It consists not only of cash but also of a range of assets and liabilities, with a number of associated assumptions regarding the behaviour and cash generating value of those components.

14. In situations of stress, a 'liquidity buffer' consisting of unencumbered highly liquid assets allows an institution to meet payments over a chosen period of time (a survival period). The liquidity buffer should be actively managed and embedded in the institution's overall liquidity strategy. For the defined period of stress, a liquidity buffer is the readily available part of the overall counterbalancing capacity: i.e., the part not being used for ongoing business. The liquidity value of an institution's buffer depends strongly on the circumstances under which it tries to raise funds. Due to the self-fulfilling nature of reputation risk, an institution's perceived liquidity problems can undermine its ability to tap into its counterbalancing capacity at reasonable cost. While liquidity risk is often triggered by problems in the management of other risks, it will not be sufficiently mitigated by simply managing those other risks. Its management should therefore be embedded in the institution's overall risk management framework as a stand-alone risk.

15. A number of **market developments**, such as the increasing reliance of large institutions on market funding, the increasing use of complex financial instruments, and the globalisation of financial markets, have created significant new challenges in liquidity risk management. A key driver of these developments is the 'originate-to-distribute' model, which must be analysed carefully from a liquidity point of view, including its related off-balance sheet commitments and the potential for implicit support. Behavioural assumptions for relatively new investors in complex products, or even for retail depositors, also need to be monitored carefully, especially in times of stress. In addition, increased cross-border and cross-currency flows raise the prospect that liquidity disruptions could pass more easily across different markets and institutions, thus increasing the interdependence of different liquidity regulatory frameworks.

16. The interaction between funding and market illiquidity is key to how systemic financial crises play out. Due to the increased use of repo funding markets, the availability and regular use of high quality collateral has become a major component of institutions' funding structures, requiring adequate monitoring of unencumbered assets. Finally, European institutions, even those operating within the Euro zone, have to deal with different payment and settlement systems with different features (gross vs. net, deferred vs. real-time). This makes their intraday liquidity risk management particularly challenging, especially if they maintain an active position in FX markets.

17. These market developments, and the 2007-2008 market turmoil, highlight the need for credit institutions and investment firms to have adequate liquidity risk management systems for both normal and stressed times, and to maintain adequate

liquidity buffers. **Liquidity risk management** requires robust internal governance; adequate tools to identify, measure, monitor, and manage liquidity risk, including stress tests and contingency funding plans; and a carefully defined communication strategy tailored to the institution's various targeted audiences. The primary responsibility for these policies and procedures rests with the institution's Board of Directors. Senior management must define the institution's liquidity strategy and risk tolerance on an informed basis, matching them with the institution's funding profile and the robustness of its liquidity risk management, and reflecting them in the institution's organisational structure. In this connection, it is important that liquidity risk management be not considered as a profit centre. Senior management should have a clear view of all liquidity risks, including the vulnerabilities implicit in the institution's maturity transformation and its reliance on concentrated funding sources. It should ensure that a complete appraisal of all sources of liquidity risk, including contingent risk, is conducted through stress tests and reflected in liquidity policies, including setting adequate liquidity buffers and defining contingency funding plans.

18. Particular attention should be paid to collateral management, in view of the strategic role of secured funding in stressed times. Institutions should also have a good command of the implications of their participation in payment and settlement systems, especially intraday. More generally, there should be adequate coordination and overview at the group level, including awareness of potential constraints on cross-border and intra-group flows. CEBS recommends that internal methodologies be tested regularly following predefined policies, and that the results of these tests be communicated to senior management.

19. Supervisors should apply a proportionate approach to the **supervision of liquidity risk management**, assessing each institution's intrinsic liquidity risk and its systemic risk against the robustness of its liquidity risk management. In this respect, supervisors should not rely unduly on an institution's capital base or capital ratio. They should verify that all liquidity risks are covered in both normal and stressed times. They should assess the appropriateness of stress tests and verify that the results of those tests actually trigger action, especially in defining internal liquidity risk strategy and policies, such as setting liquidity buffers and defining contingency funding plans.

20. CEBS recommends that supervisors, in applying their current national liquidity regimes, assess the internal methodologies that institutions use to manage liquidity risk. Some supervisors may go further, relying directly on institutions' internal methodologies for supervisory purposes, either for all institutions or for those that are most sophisticated. This approach should encompass a thorough prior assessment of the completeness and efficiency of the internal methodologies used. Others may prefer to apply a standardised quantitative supervisory approach to all institutions, or to those institutions that are less complex. Finally, supervisors should have precise and timely quantitative and qualitative data at their disposal, and they should develop procedures for supervisory cooperation and information exchange regarding cross-border institutions in order to obtain a perspective on liquidity risk and its management at the group level. The information collected should allow supervisors to take adequate preventive measures when needed.

21. The public consultation will run until 1 August 2008. CEBS welcomes market participants' views on the preliminary recommendations in the report, a list of which is provided below. In particular, CEBS seeks detailed feedback on a number of specific issues addressed in recommendations 2 (internal cost/benefit transfer mechanism), 8 (contingent liquidity risk), 9 to 11 (collateral, particularly in relation to intra-day use of payment and settlement systems), 14 (stress tests), 15 (contingency funding plans), 16 (liquidity buffers), 18 (disclosure), 25-27 (bifurcated approach), and 28 (reporting).

# RECOMMENDATIONS

***Overarching principle –*** The application of the following recommendations should reflect the concept of proportionality, as set out in the Pillar 2 provisions of Directive 2006/48/EC and highlighted in the introductory statements of CEBS's Guidelines on the Supervisory Review Process[9]. Both institutions and supervisors should take into account the diversity of institutions' liquidity risk profiles.

***Recommendation 1 –*** The Board of Directors should define a liquidity risk strategy and set management policies that are suited to the institution's level of liquidity risk, its role in the financial system, its current and prospective activities, and its level of risk tolerance. The Board should have a clear view of the risks implied by its degree of reliance on maturity transformation, and should ensure that an adequate level of long-term funding is in place. Its strategy and policies should consider both normal and stressed times and should be reviewed regularly, including (at a minimum) when there are material changes. Senior management should define adequate processes to implement these strategies and policies.

***Recommendation 2 -*** Institutions should have in place an adequate internal liquidity cost/benefit allocation mechanism – supported where appropriate by a transfer pricing mechanism – which provides appropriate incentives regarding the contribution of liquidity risk of the different business activities. This mechanism should incorporate all costs of liquidity (from short to long term, including contingent risk).

***Recommendation 3 –*** The organisational structure should be tailored to the institution and should provide for the segregation of duties between operational and monitoring functions, in order to prevent conflict of interests. Special attention should be granted to the powers and responsibilities of the unit in charge of providing funds. All time horizons, from intraday to long-term, should be considered when tasks are allocated, as they entail different challenges for liquidity risk management. The institution should have sufficient well-trained staff, adequate resources, proper coordination and overview, and independent internal control and audit functions.

***Recommendation 4 -*** All institutions should be aware of the strategic liquidity risk and liquidity risk management at the highest level of the group, and have adequate knowledge of the liquidity positions of members of the group and the potential liquidity flows between different entities in normal and stressed times, taking into account all potential market, regulatory, and other constraints.

***Recommendation 5 -*** Institutions should have appropriate IT systems and processes that are commensurate with the complexity of their activities and the techniques they use to measure liquidity risks and related factors. The adequacy of the IT systems should be reviewed regularly.

***Recommendation 6 –*** The liquidity of an asset should be determined based not on its trading book/banking book classification or its accounting treatment, but on its liquidity-generating capacity. Supervisory distinctions between the trading and banking books should not have a major or undue impact on liquidity management.

***Recommendation 7 -*** When using netting agreements, institutions should consider and address all legal and operational factors relating to the agreements, in order to ensure that the risk mitigation effect is assessed correctly in all circumstances.

***Recommendation 8 -*** The liquidity risk due to documentation risk and possible implicit support should be taken into account in the overall liquidity risk management framework. In particular, covenants in contracts for complex financial products, such

[9] See pages 317 and following of CEBS Electronic Guidebook (http://www.c-ebs.org/EGB2008_02_29.pdf)

as those related to securitisation and/or 'originate to distribute' business, should be identified and addressed explicitly in liquidity policies. Institutions should consider whether SPV's/conduits should be consolidated for liquidity management purposes. The related liquidity risk should be determined by stress tests and addressed in an appropriate Contingency Funding Plan. Institutions' liquidity management should consider explicitly the extent to which contingent liquidity risk should be addressed by readily available liquidity reserves as opposed to other counterbalancing capacity. Covenants linked to supervisory actions or thresholds should be strongly discouraged.

***Recommendation 9 -*** In order to ensure sound collateral management institutions should:

- have policies in place to identify and estimate their collateral needs as well as all collateral resources, over different time horizons;
- understand and address the legal and operational constraints underpinning the use of collateral, including within control functions;
- have an overall policy, approved by senior management, that includes a conservative definition of collateral and specifies the level of unencumbered collateral that should be available at all times to face unexpected funding needs; and
- implement these policies and organise collateral management in a way that is suited to the operational organisation.

***Recommendation 10 -*** Institutions should have systems that adequately reflect the procedures and processes of different payment and settlement systems in order to ensure effective monitoring of collateral, at the legal entity level as well as at the regional or group level, depending on the liquidity risk management in place.

***Recommendation 11 -*** Regardless of whether institutions use net or gross payment and settlement systems, they should manage intraday liquidity on a gross basis, due to the time necessary to have cash available and collateral posted.

***Recommendation 12 -*** Institutions should adopt an operational organisation to manage short-term (overnight and intraday) liquidity within the context of strategic longer-term objectives of structural liquidity risk management. Institutions should also set up continuous monitoring and control of operations, assign clearly defined responsibilities, and establish adequate back-up procedures to ensure the continuity of operations. Special attention should be paid to monitoring sources of unexpected liquidity demands under stressed conditions.

***Recommendation 13 -*** Institutions should verify that their internal methodology captures all material foreseeable cash inflows and outflows, including those stemming from off-balance sheet commitments and liabilities. They should assess the adequacy of their methodology to their risk profiles and risk tolerance. Internal methodologies should be tested regularly according to predefined policies. If assumptions or expert opinions are used, they should also be assessed regularly. These reviews should be documented adequately and their results communicated to senior management.

***Recommendation 14 -*** Institutions should conduct liquidity stress tests that allow them to assess the potential impact of extreme but plausible stress scenarios on their liquidity positions and their current or contemplated mitigants. They should regularly project cash flows under alternative scenarios of various degrees of severity, taking into account both market liquidity (external factors) and funding liquidity (internal factors). To provide a complete view of various risk positions, stress testing of other risks may be usefully considered in constructing 'alternative liquidity scenarios'. When assessing the impact of these scenarios on their cash flows, institutions should rely on a set of reasonable assumptions that should be reviewed regularly. The results of stress tests should be reported to senior management and used to adjust internal policies, limits, and contingency funding plans when appropriate.

***Recommendation 15 -*** Institutions should have adequate contingency plans, both for preparing for, and for dealing with a liquidity crisis. These procedures should be tested regularly in order to minimise delays resulting from legal or operational constraints, and to have counterparties ready to be involved in any transaction.

***Recommendation 16 -*** Liquidity buffers are of utmost importance in time of stress, when an institution has an urgent need to raise liquidity within a short timeframe and normal funding sources are no longer available or do not provide enough liquidity. These buffers should be sufficient to enable an institution to weather liquidity stress during its defined 'survival period' without requiring adjustments to its business model.

***Recommendation 17 -*** Institutions should actively monitor their funding sources to identify potential concentrations, and they should have a well diversified funding base. Potential concentrations should be understood in a broad sense, encompassing concentrations in terms of providers of liquidity, types of funding (secured vs. unsecured), marketplaces, and products, as well as geographic, currency, or maturity concentrations.

***Recommendation 18 -*** Institutions should have policies and procedures that provide for the disclosure of adequate and timely information on their liquidity risk management and their liquidity positions, both in normal times and stressed times. The nature, depth, and frequency of the information disclosed should be appropriate for their different stakeholders (liquidity providers, counterparties, investors, rating agencies, and the market in general).

***Recommendation 19 -*** Supervisors should have methodologies for assessing institutions' liquidity risk and liquidity risk management. Appropriate resources should be allocated specifically to supervising liquidity risk and how it is managed by institutions.

***Recommendation 20 -*** When setting priorities for the supervision of liquidity risk, supervisors should take into account:
- the liquidity risk profiles of institutions, in order to apply a proportionate approach to their supervision; and
- the level of systemic risk that they present.

***Recommendation 21 -*** When assessing an institution's liquidity risk profile, supervisors should pay special attention to the institution's process for identifying all liquidity risks and – at a minimum – to its reliance on wholesale sources of funding, the concentration of funding sources, the level of maturity transformation, the position within a group, and, more generally, its business profile, risk tolerance, and stress resistance. The overall exposure to other risks and its possible negative impact on the level of liquidity risk should be analysed in conjunction with the institution's funding profile. Special attention should be paid to collateral management.

***Recommendation 22 -*** Supervisors should verify the adequacy and effective implementation of the strategies, policies, and procedures setting out institutions' liquidity risk tolerance and risk profiles, and ensure that they cover both normal and stressed times.

***Recommendation 23 -*** When assessing the quality of liquidity risk management, supervisors should pay particular attention to the adequacy of the institution's liquidity risk insurance, especially for stressed situations. Supervisors should pay particular attention to the marketability of assets and the time that the institution would actually need to sell or pledge assets (taking into account the potential role of central banks).

***Recommendation 24 -*** Supervisors should verify that institutions have dedicated policies and procedures in place for crisis management. Supervisors should pay

particular attention to the existence of appropriate stress-tests, the composition and robustness of liquidity buffers, and the effectiveness of contingency funding plans. In particular, supervisors should verify that robust and well-documented stress tests are in place and that their results trigger action. The Assumptions used should be appropriate and sufficiently conservative, and regularly reviewed. Supervisors should check that contingency funding plans build on the stress tests exercises and are regularly tested.

***Recommendation 25 -*** Supervisors should consider whether their quantitative supervisory requirements, if any, could be supplemented or replaced by reliance on the outputs of institutions' internal methodologies, providing that such methodologies have been adequately assessed and provide sufficient insurance to supervisors.

***Recommendation 26 -*** Under the proportionality principle, supervisors may consider their standardised regulatory approach (if they have one), as a key element in the internal liquidity risk management of less sophisticated institutions.

***Recommendation 27 -*** When using internal methodologies for supervisory purposes, supervisors should assess the adequacy of governance, the soundness of methodologies, conservatism, completeness, the timeliness of reviews, the robustness of stress testing, and resilience to liquidity crises, taking into account external constraints on the transferability of liquidity and the convertibility of currencies.

***Recommendation 28 -*** Supervisors should have at their disposal precise and timely quantitative and qualitative information which allows them to measure the liquidity risk of the institutions they supervise and to evaluate the robustness of their liquidity risk management.

***Recommendation 29*** – The supervisors of cross-border groups should coordinate their work closely, in particular within the colleges of supervisors, in order to better understand the groups' liquidity risk profiles.

***Recommendation 30 -*** Supervisors should use all the information at their disposal in order to require institutions to take effective and timely remedial action when necessary. They should explore the possibility of having tools that provide them with early warnings, facilitating preventive supervisory action.

# I. Nature and definitions of liquidity and liquidity risk

## 1. Nature of Liquidity, Liquidity Risk, and interactions with other risks

1 - ***Liquidity, in the broadest sense of the term, is the capacity to obtain funding when it is needed.*** The possession of cash or assets that can be readily converted into cash in the markets or via central banks are merely examples of the most common sources of liquidity. The capacity to generate cash at fair cost from current operations, as well as from possible adjustments made to those operations, or the capacity to attract fresh cash from the markets in various other ways within the necessary time frame, can also be considered as elements of financial institutions' liquidity in the broadest sense.

2 - ***Liquidity risk can be seen as the potential threat to this capacity to generate cash at fair cost as a counterbalancing capacity against liquidity demands.*** This concept includes the consequences of markets' perception of this cash-generating capacity. Liquidity risk should therefore be assessed as an unforeseen reduction in cash-generating/counterbalancing capacity at fair cost, or as an unforeseen increase in demand, over a certain time interval. This makes the time dimension of liquidity explicit: the counterbalancing capacity should be sufficient to counter the net cumulative outflow during a period of stress. Institutions should hold a certain liquidity reserve to enable them to offset unexpected liquidity demands. Since holding liquidity is expensive, institutions must make a trade-off between costs and risks. Supervisors must also take into account the social costs of systemic risk. This implies that they may require larger liquidity reserves than those modelled by the institutions themselves.

3 - From the perspective of structural liquidity management, **'counterbalancing capacity'** can be analysed as cash-generating capacity, including the capacity to obtain unsecured funding, It consists not only of cash and cash equivalents in the form of liquid assets, but also of a range of assets and liabilities, with a number of connected assumptions regarding the behaviour and cash-generating value of those components. The structural management of counterbalancing capacity involves holding a dedicated liquidity buffer for periods of stress.

4 - ***A liquidity buffer, consisting of unencumbered highly liquid assets, allows an institution to meet payments in stressed situations over a specified period of time (the survival period). The buffer should be actively managed, and should be an integral part of the institution's overall liquidity strategy.*** For the defined period of stress, the liquidity buffer is the readily available part of the overall counterbalancing capacity: i.e., the part not being used for ongoing business.

5 - ***'Liquidity management' is the constant process of balancing the cash inflows and outflows from on- and off-balance sheet items, along with structural and strategic planning, to ensure both that adequate sources of cost-effective funding – including some excess capacity – are available, and that those sources are used appropriately. All these activities must be carried out on a day-to-day basis***. The assumptions used are institution-specific, i.e., they depend on the institution's business model and profile, while taking account of exogenous factors. The structure for managing liquidity – i.e., the degree of centralisation or decentralisation of liquidity risk management – should take into consideration any regulatory restrictions on the transferability of funds.

6 - While liquidity risk often materialises in connection with the failure or severe difficulties of an institution, it can also be triggered by cash flows or reputational difficulties stemming from other risks. Thus, in order to understand liquidity risk and the liquidity risk management processes, it is necessary to analyse the relationship between the primary banking risks and their effects on liquidity.

7 - **Credit risk** interacts with liquidity risk in many ways, both directly and indirectly.

- As a lender and investor, a credit institution is exposed to the failure of one or more of its counterparties, which impairs its cash flows and hence its ability to meet its commitments as they fall due.
- As an institution's its creditworthiness as a counterparty to other market participants declines, it may face difficulty in generating funds at a reasonable cost or in a timely manner.
- As a provider of credit enhancement or liquidity facilities to securitisation transactions and conduits, an institution is exposed to liquidity risk due to recourse provisions, performance triggers, and covenants related to the credit quality of a pool.

8 - **Market risk**, for example in the form of interest rate uncertainty and volatility, influences liquidity risk management. The degree of liquidity of the market for a financial asset is a function of a variety of factors, including the size of the market; the size, frequency and modalities of transactions; the number and quality of market participants; transaction costs; the amount and quality of information on prices and traded volumes; the security of the asset ; and the credit-worthiness of counterparties. Adverse market conditions tend to create uncertainty regarding the value of assets in the context of liquidity management. Margin calls on derivatives transactions resulting from adverse market developments also have implications for liquidity risk. Finally, internationally active institutions rely on the smooth functioning of foreign exchange markets; interruptions in that functioning can be a source of liquidity risk.

9 - **Concentration risk** may be a source of liquidity risk, as concentrations of assets or liabilities can lead to liquidity problems. A 'liability concentration' (or 'funding concentration') exists when a single decision or a single factor could cause a significant and sudden withdrawal of funds or inadequate access to new funding.

10 - **Operational risk** can be a source of liquidity disruptions. In particular, significant problems can develop very quickly if the systems that process payment transactions fail or delay transactions.

11 - **Reputation risk** can affect the funding granted by counterparties and increase the cost of market funding. Conversely, liquidity problems tend rapidly to become visible to the market and can seriously damage the institution's reputation, rating, and profitability. As the events of 2007-2008 showed, stigma is sometimes associated with access to marginal lending facilities at central banks.

***Point of interest / lesson 1***

*Liquidity risk has been revealed to be a singular risk, with its own specificities, triggered by external factors not directly linked to the banking activities. However, it can be influenced by other risks in the banking business. These interactions with other risks are reinforced by developments observed in the funding structure of large EU institutions (See pp 11-19).*

*Liquidity risk should therefore be managed in tandem with other risks, and a sound liquidity risk management needs to be an integral part of overall risk management.*

12 - The nature and impact of liquidity and liquidity risk may be somewhat different for credit institutions as opposed to investment firms, as defined in Article 4 of Directive 2004/39/EC (the Markets in Financial Instruments Directive, or MiFID). In general, credit institutions engage in maturity transformation as an integral part of their business, while investment firms deal mainly in short-term assets and liabilities. Another fundamental difference is that investment firms generally do not have access to customer deposits or to central banks' refinancing facilities. As a result of their business model, investment firms tend to rely heavily on market sources of funding, and their franchise plays a key role in the cost of funding. For investment firms that are part of a banking group, intra-group funding plays a key role. These differences may explain why the EEA supervisory stock-taking found that only one-third of responding supervisors apply the same liquidity risk regime to both types of institution. (The other two thirds have either a reduced regime, different regulations and supervisors, or no liquidity regime for investment firms.)

## 2. Definitions

*Liquidity risk*

13 - Annex A presents the definitions of liquidity and liquidity risk issued by international forums (the BCBS, IOSCO, BSC, and CEBS), by the European Central Bank (ECB), and by financial institutions' associations. The differences between these definitions are not very significant, and are often connected either with the issuance date of the corresponding publication or with the perspective of the issuing institution. The response to the first part of the Call for Advice found that these definitions, upon which EU Member States have built their domestic liquidity regimes, present obvious commonalities and no contradictions.

14 - The definitions published in the early 2000s typically focus on covering both sides of the balance sheet and stress the importance of timing: liquidity is considered as the ability to make payments as they fall due and to sustain the growth of assets. More recent definitions tend to incorporate a dimension related to the negative impact on earnings and capital, and have a more prospective view. They may differentiate between several subsets of liquidity risks depending on the time horizon considered (e.g. strategic vs. tactical), distinguishing between normal and stressed periods (contingency liquidity risk) and types of risks (e.g., funding vs. market liquidity risk). Differences in definitions also reflect the authors' interests and sector-specific features more broadly: the ECB and CPSS target participants in payment and settlement systems, IOSCO focus on investment firms, while the BCBS could concentrate on large international banking groups.

***Definition***

*Liquidity risk is the current or prospective risk arising from an institution's inability to meet its liabilities/obligations as they come due without incurring unacceptable losses.*

15 - This definition is usually referred to as **funding liquidity risk**. There is also a market dimension to liquidity risk, which has become more relevant in recent years as institutions' reliance on market or wholesale funding has increased (see Part II)[10].

16 - **Market liquidity risk** is the risk that a position cannot easily be unwound or offset at short notice without significantly influencing the market price, because of inadequate market depth or market disruption.

17 - One way in which an institution can cover a funding shortfall is through asset sales. Thus, the ability to raise cash through the sale of assets mitigates funding liquidity risk. Market illiquidity or reduced market liquidity can disrupt an institution's ability to raise cash, and thus its ability to manage its funding liquidity risk.

18 - The discussions held with industry experts indicated that this definition of market liquidity risk might be considered too narrow, in that the absence of market liquidity to unwind or offset a position, which only affects changes in value, does not impact cash flows. The change in value could result in liquidity demand via margin calls or additional collateral requirements and could be of such a magnitude as to cause a material erosion in the capital strength of the institution and/or a rating downgrade.

*What is a liquid asset?*

19 - Beyond the general definition of liquidity, attention should be paid to the liquidity of each individual asset. The general liquidity squeeze prompted by the 2007-2008 US subprime mortgage crisis, during which presumably highly liquid assets became completely illiquid for more than six months, calls for fresh contemplation of the question: what is a liquid asset? The definition of sound liquidity risk management is also affected.

20 - In assessing the liquidity value of liquid assets, the time-to-cash period (the time necessary to convert assets into cash) should be considered. A distinction can be made between assets pledged/deposited at central banks, which can be drawn on immediately, and assets on the balance sheet that may have been pledged as eligible collateral, which may take some time to draw on. The time needed to convert a drawn currency to the currency needed should also be considered.

21 - Central banks are an important potential provider of funding through refinancing operations. But institutions do not know in advance how much funding they will receive: they receive only what they are allocated in the auction process. In addition, funds are distributed only once per week. Banks can also draw on central banks' overnight facilities in the course of normal business, but liquidity management should take into account the reputation risk (stigma) potentially associated with rumours of extraordinary drawings. Thus banks should not rely too heavily on obtaining funding from central banks.

22 - In times of stress, market liquidity may deteriorate. Depending on the type of stress, the deterioration may be specific to certain kinds of assets, or it may

[10] "The Management of Liquidity Risk in Financial Groups", Joint Forum, May 2006.

be more general. The central bank will continue to provide liquidity against eligible assets. When the broader asset market liquidity deteriorates, central bank eligibility may become more important, as observed during the 2007-2008 crisis. Banks may tend to pledge their relatively illiquid assets at central banks, when eligible, in order to use their most liquid/marketable assets to extend their liquidity buffer as much as possible.

***Point of interest / lesson 2***

*Liquid assets are usually defined as assets that can be quickly and easily converted into cash in the market at a reasonable cost. In this respect, due consideration should be made of the time-to-cash period.*

*In order to analyse the liquidity of an asset, institutions and supervisory authorities need to differentiate between normal and stressed times, taking into account the role of central banks' refinancing policies, particularly in times of stress.*

# II. Liquidity risk environment

23 - This part of the Advice focuses on factors that are important from a liquidity risk perspective and that do not otherwise fall within the scope of the European Commission's current review of EU supervisory arrangements. Thus certain important contextual issues, such as deposit guarantee schemes, crisis management, winding up and reorganisation, the transferability of assets, and lender of last resort policies, will not be considered here. The issues discussed below include market developments, the interaction of funding and market liquidity, and the infrastructures – most notably payment and settlement systems – that underpin the effective management of liquidity risk.

## 1. Market developments

24 - A number of market developments have created new challenges for institutions, as evidenced by the 2007-2008 market turmoil. These include the increasing reliance of institutions on market funding and the increasing use of complex financial instruments, combined with the globalisation of financial markets.

### *Increased reliance on market sources of funding*

25 - In recent years, most large banks have shifted from deposit-based funding to market funding sources. The 'originate-to-distribute' (OTD) model – originally designed to help banks address new challenges to traditional buy-and-hold strategies, such as the decline in the retail deposit base (especially long-term deposits) and more volatile retail customer behaviour[11]; and to reduce risk concentration – has increased reliance on market sources of funding. Under the OTD model, banks concentrate on originating and underwriting credit assets and distribute them to various types of investors through syndication, securitisation, and credit derivatives.

26 - Retail deposit funding is relatively stable, with less credit and interest rate sensitivity than other funding sources. Thus the increased use of market funding sources results in a higher exposure to the price and credit sensitivities of major fund providers. For example, more volatility is observed

[11] See the following subsection on behavioural changes of certain customers and investors.

in funding sources such as wholesale funds and brokered certificates of deposit.

27 - Since wholesale funding pricing also tends to be more expensive than retail deposit funding, the observed shift may reduce banks' profitability. Moreover, most wholesale funding needs to be rolled over regularly and is therefore exposed to variations in the liquidity of funding markets. The increasing share of inter-bank exposures and money market instruments in banks' funding can provide an additional channel for contagion.

*Illustration: the 2007-2008 market turmoil*

28 - In times of stress, reliance on the full functioning and liquidity of financial markets may not be realistic, as the 2007-2008 events have shown. In addition to its direct effects on institutions with exposures to the US subprime sector, the subprime crisis also had indirect effects on institutions that relied heavily on wholesale funding (including securitisation), or that had significant contingent liquidity commitments, especially towards ABCP conduits, SPVs, or money market funds. More specifically, liquidity was affected:

- in the interbank market, by a shortening of maturity, with borrowing limited for a time to overnight or a few days; by a marked shift towards secured lending such as repos (i.e. reduced unsecured lending); and by the cancellation of committed liquidity lines extended by other institutions;
- in the commercial paper (CP) market, by limited or no possibility for banks to tap the market or roll over funding;
- in the ABCP and ABS markets, by a drying-up of markets (regardless of the assumed quality of the paper as reflected in external ratings), which left banks unable to access liquidity by securitising portfolios and increased the risk of liquidity drains from SPVs or ABCP conduits that were unable to refinance their operations;
- in other asset markets, by the greater difficulty that banks experiences in issuing medium- and long-term securities, and by the illiquidity of markets which banks had considered as reliable sources of funding, even in times of stress; and
- in derivative markets, by a temporary decrease in liquidity on FX swap markets in some major currencies.

29 - These trends were accompanied by a general increase in the cost of funding. In one case, the heavy dependence on wholesale funding resulted in a severe liquidity problem which necessitated emergency liquidity assistance (Northern Rock).

30 - The related issues of financial innovation in general and the increased reliance on securitisations and repo markets more specifically are dealt with separately below.

***Point of interest / lesson 3***

*The 'originate-to-distribute' (OTD) model has increased banks' dependence on capital markets.*

*An interlinked financial system heightens the risk that contagion effects may spread more widely and amplify shocks.*

*Since the cost and availability of unsecured lending depends on the credit quality of an institution, an institution that suffers significant losses on its assets may find itself unable to obtain sufficient funding at reasonable cost on an unsecured basis.*

*Derivatives and complex financial products*

31 - The development and use of complex products such as equity swaps and leveraged derivatives expose institutions to new and complicated forms of liquidity risk. The complexity of these instruments and the rapid increase in their use raise questions as to whether the underlying liquidity of the market will stand up under stress. Therefore, the behaviour of the mark-to-market values of the positions may be unpredictable in severe crises. This market illiquidity may expose participants to unexpected liquidity requirements, through two channels:

- First, mark-to-market losses may place institutions under earnings or capital pressure, which in turn may limit continued access to unsecured credit markets. In the case of mild losses, access may be possible only at higher prices (and over time this will feed back to place further pressure on earnings and capital). In the case of severe losses, access to unsecured financing may be denied altogether.
- Second, changes in mark-to-market positions may prompt additional margin calls. These may result from a mark-to-market change in the value of the trading position, or from a decline in the value of the collateral.

32 - In general, complex products can be illiquid and are often opaque. Because their valuation[12] depends on data-intensive statistical models and on scenario analysis, they may involve substantial 'model risk' (the risk of errors in evaluating and pricing the exposures arising from financial transactions). For example, an asset can be difficult to value if it is based on dynamic parameters that can change with market conditions or for which no external reference exists[13]. Market illiquidity generates additional risk, such as 'warehouse risk' (the risk of being unable to find buyers and being stuck holding products that the institution might not want in the first place). This risk was in evidence in the 2007-2008 market turmoil. If an institution lacks sufficient assets, it will find it necessary to put up a greater amount of collateral in order to obtain additional funding sources. Furthermore, any pledging of assets to secure supplementary funds may reduce financial flexibility and send a negative signal to credit rating agencies, investors, and lenders. These entities may become more nervous and charge more for future credit extensions or rollovers.

33 - Collateralised Debt Obligations (CDOs) are complex products which are traded over the counter. Unlike traditional financial instruments such as bonds, no public information is available on their valuation. Thus conflicts of interest may be more prevalent in markets for these structured products than in bond markets, since it can be very difficult to determine whether the quality of the service provided and the reputation equilibrium that characterises the agencies' business model have been weakened.

34 - It is difficult to predict how the cash flows generated by complex products might behave in times of severe market stress. Complex products such as structured bonds usually are not actively traded, and thus their price transparency can be limited. Wider bid-ask spreads due to thin trading volumes, and the potential for sharp swings in demand, can increase the liquidity risk of these products. The off-balance sheet obligations and embedded options in some new instruments could increase price volatility and

[12] CEBS has addressed the valuation issues from an accounting perspective in its "Report on issues regarding the valuation of complex and illiquid financial instruments" (June 2008).

[13] For example, the prices of certain mortgage-backed securities require assumptions about future interest rates and prepayment behaviour. If the assumptions are wrong, the assets will be valued incorrectly.

liquidity risk in some circumstances, perhaps quite sharply, as evidenced recently.

***Points of interest / lessons 4***

*Derivatives and complex financial products pose significant challenges to institutions' liquidity management of and should therefore be treated with caution, taking the institution's business model and risk tolerance into account.*

*The use of these instruments may also reduce the transparency of institutions' liquidity positions.*

*The legal structure and financial mechanics of those instruments and their possible impact on liquidity – particularly the uncertainty in their valuation in times of stress – should be captured fully by liquidity management.*

*Increased use of securitisation*

35 - Securitisation is a central element of the OTD business model, with large internationally active banks as main actors in the credit intermediation process.

36 - While traditional securitisation allows institutions to obtain liquidity from previously illiquid assets (such as mortgage or loan portfolios), it also makes them more reliant on the smooth functioning and stability of financial markets.

37 - If liquidity in the securitisation market dries up:

- Originating institutions will be left with an unexpected funding need. In the 2007-2008 turmoil, some institutions were forced to defer some securitisations, leading to a build-up of warehoused assets that needed to be financed.

- As the usual practice is to fund the initial expansion of the lending book with short-term funding, and then to replace that shorter-term funding with a securitisation issue, if securitisation markets dry up, short-term funding will have to be rolled over until the securitisation markets reopen (increased roll-over risk).

- All types of securitisations also entail contingent liquidity risk: the likelihood that an institution will be called upon to provide liquidity unexpectedly, possibly at a time when it is already under stress. For example, some institutions provide liquidity backstop facilities in which they commit to provide funding to ensure timely payment of principal and interest if certain agreed-upon conditions occur (e.g., a downgrade). Moreover, some banks have faced additional liquidity calls to support off-balance sheet vehicles even when there was no legal commitment to do so, judging that not providing such support would damage their reputation[14].

- When the securitised assets are long-term assets (e.g. mortgages), and a roll-over risk materialises or the securitised assets are brought back onto the balance sheet as the result of a managerial decision in times of stress, this will result in a deterioration of the originating bank's maturity mismatch.

[14] "Report of the Working Group on Liquidity" BIS, 30 Nov. 2007.

– In addition, the short-term funding may need to be financed at higher prices, leading to earnings pressure and limited access to unsecured funding markets.

38 - There are other reasons why an inability to securitise may limit access to unsecured funding markets, through a deterioration in the bank's overall credit quality. First, the institution will be left with an unexpected increase in the size of its balance sheet, placing its capital under pressure. Second, if the market illiquidity is more severe (or the liquidity need is more urgent) the institution may be forced to unload assets below prevailing market prices. This will place earnings under pressure.

***Point of interest / lesson 5***

*Because of its high cost, securitisation is seldom a one-time operation. If securitisation is used as a regular source of funding, it can trigger liquidity problems in times of stress, when new issuances prove difficult. This illustrates the risks involved in relying heavily on market funding sources.*

*Securitisations can also be a potential source of unexpected cash outflows when an institution finds it necessary to provide liquidity to off-balance sheet vehicles in order to meet contractual commitments or to preserve its reputation (implicit support).*

*Increased use of repo funding markets*

39 - The need for high-quality collateral has increased substantially in recent years, in order to access central bank funding, to permit funding in wholesale markets, and to meet collateral requirements in derivative transactions. Institutions have increased their use of less liquid collateral (such as asset-backed securities, covered bonds, and corporate bonds) for the Eurosystem's open market operations. This enables banks to use more types of collateral in the private secured market.

40 - Collateral affects market dynamics primarily through collateral demands. These demands can occur both at the time of issuance and over the life of the position. Margin calls may force providers of collateral to liquidate positions. The sale of assets to meet margin requirements may cause disturbances in the underlying market for those assets. If the positions are large, forced liquidations may significantly reduce or dry up liquidity in the underlying market, which would otherwise be viewed as liquid. Price declines will affect the amount of liquidity that the institution is able to raise, and can result in earnings pressure.

41 - These collateral demands can directly affect other market participants that use collateral for netting and offsetting of counterparty risk.

***Point of interest / lesson 6***

*The availability and regular use of high-quality collateral has become a key element in an institution's liquidity and funding structure, as structural changes and market practices have increased the need for it.*

*Cross-border flows*

42 - As the volume and speed of cross-border flows has increased, financial markets have become increasingly integrated and intermediated. This has raised the risk of contagion between markets. During the 2007-2008 turmoil, some European banks experienced difficulties due to their direct or indirect

exposure to US asset-backed securities. In another example, the banking sector was affected by its reliance on off-shore funding, and was unable to access liquidity because of developments in Europe and North America that had nothing to do with local banks.

43 - In theory, liquidity disruptions could also spread through payment and settlement systems. However, this was not observed during the 2007-2008 events.

44 - Cross-currency liquidity management makes institutions heavily reliant on the smooth functioning of foreign exchange markets, and those markets did not always function smoothly during the 2007-2008 turmoil. The netting of liquidity positions held in different currencies therefore may not always be possible.

45 - Another point of interest is the increasing importance of cross-border intra-group funding. Centralised liquidity management may increase intra-group and cross-border contagion risks. Senior management at the group level should be aware of these risks, and should set objectives – and possibly policies – to ensure the provision of swift liquidity support to entities facing urgent liquidity needs, in order to prevent the materialisation of a liquidity shortfall.

***Point of interest / lesson 7***

*Increased cross-border flows raise the prospect that liquidity disruptions could pass quickly between different markets, although payment and settlement systems have been quite resilient to contagion so far.*

*Disruptions in the foreign exchange markets during the 2007-2008 turmoil call for specific liquidity risk management attention when handling net liquidity positions.*

*The choice between centralised or decentralised liquidity and liquidity risk management should be consistent with groups' global strategic plan to increase their resilience, taking any legal and regulatory requirements into account.*

*Behavioral changes of certain customers and investors*

46 - Several changes have been observed in retail customers' behaviour. First, there has been a long-term shift in household portfolios from bank deposits to investment funds, pension funds, and insurance company offerings. As a result, in many banks the growth in deposits has not kept up with loan growth, and banks have had to resort to alternative, more volatile funding sources[15]. Although a certain 'flight to quality and security' has been observed as a consequence of the recent crisis, leading to increased retail deposits at banks of good repute, this does not appear to have reversed the long-term trend mentioned above. Second, even among retail funding sources, there is evidence of increased volatility linked to higher price sensitivity and awareness, higher volatility of non-domestic deposits, and a decline in the importance of 'relationship banking', all of which are reinforced by structural changes such as electronic banking.

47 - Moreover, in past decades, many direct obstacles to possibly more volatile cross-border investments, such as restrictions on foreign purchases of domestic assets and limitations on the ability of domestic residents to invest

[15] "Liquidity Risk Management: Issues for Central Banks from a Financial Stability Perspective", ECB/WGBD, 11 Dec. 2006.

abroad, have been reduced. Indirect obstacles to cross-border flows, such as high costs of foreign transactions, inadequate information on foreign investments, or linguistic obstacles, have also been declined significantly, reducing the 'home bias' to invest domestic savings in the home country.

48 - Another new challenge to liquidity risk management is the uncertainty regarding the degree of commitment to the market of increasingly active unregulated providers of liquidity. The 2007-2008 subprime crisis confirmed the doubts expressed by some central banks and the IIF[16] as to the willingness of new investors in credit derivatives and structured products, such as hedge funds, to hold onto their investments in adverse conditions.

***Point of interest / lesson 8***

*The behavioural assumptions concerning retail depositors and investors, especially those relatively new to the markets, should be monitored closely in order to ensure that they correspond to actual behaviour, especially in times of stress.*

## 2. Interaction between funding liquidity risk and market liquidity risk

49 - The financial market developments described above have reinforced the interaction between funding liquidity risk and market liquidity risk. This has consequences for the management of liquidity risk.

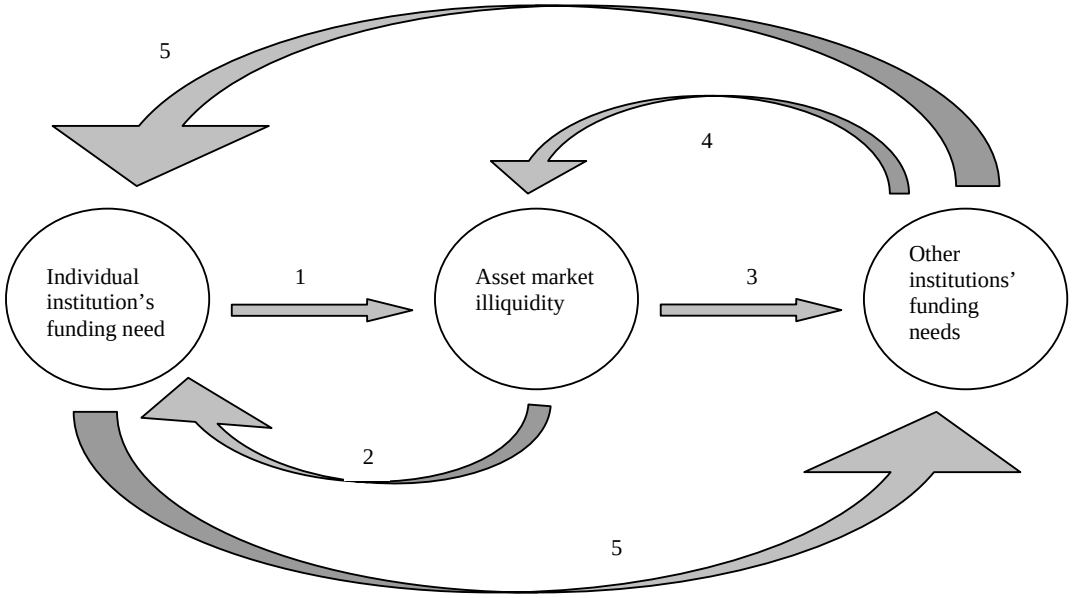
50 - The growing link between funding liquidity risk and market liquidity risk is closely related to the move towards the 'originate-to-distribute' (OTD) model of banking mentioned above. OTD is a sophisticated mechanism that relies on complex products, liquid markets, and a large number of operators to allocate risk efficiently. The shift to the OTD model gives greater importance to the interaction of funding and market liquidity, particularly in stressed market conditions. The difficulty with this model is that products may be opaque, market liquidity may dry up, and some operators may have opposing incentives. Thus the OTD model leads to a number of risks intrinsic to its mechanism or linked more generally to the greater interdependence of the financial system.

51 - All institutions hold some pool of assets that they can sell or pledge for cash in the event of a severe liquidity funding need. The liquidity of the underlying asset markets will vary from one asset class to another and over time. While some assets will always be easy to liquidate, others will prove to be less liquid in times of stress, for example due to doubts concerning their quality and future performance. Efforts to sell significant amounts of these less liquid assets may prompt (further) market illiquidity (channel 1 in the diagram below), leaving the institution unable to raise the amount that it originally planned[17]. Indeed, in the most severe circumstances, the sale of the assets may not be possible at all. A funding need can also arise from market illiquidity (channel 2), for example when an institution is unable to securitise or syndicate loans.

[16] "Principles of Liquidity Risk Management", Institute of International Finance, March 2007, p. 15.

[17] This is one reason why haircuts are placed on assets: to protect the individual bank's short-term liquidity position from changes in market prices.

Diagram: The interaction between funding liquidity and market liquidity




52 - In these cases, the institution becomes or remains short of liquidity (channel 2). In the case of fire sales, it may also incur losses, placing pressure on earnings and capital. If an institution is unable to securitise or syndicate loans, its balance sheet size will increase, resulting in capital pressure. The deterioration in credit quality may also constrain the institution's access to funding markets (reinforcing channel 2).

53 - The actions of the institution can also have external effects. Its attempts to sell assets can reduce general market liquidity, placing other institutions under liquidity pressure, even though they may have suffered no significant first-order losses. And the fall in market prices caused by fire sales can place other institutions under earnings and capital pressure. These institutions will then have liquidity needs of their own (channel 3), with their asset sales to meet their funding needs creating a potential feedback loop to market illiquidity (channel 4).

54 - Institutions that suffer large liquidity shortfalls may seek to close out lending positions, particularly in the inter-bank market. These actions create direct funding liquidity needs at other market participants (channel 5).

55 - Market liquidity and funding liquidity conditions can be mutually reinforcing, leading to liquidity spirals. A recent research paper by Brunnermeier and Pedersen linked an asset's market liquidity - i.e., the ease with which it is traded - with traders' funding liquidity - i.e., the ease with which they can obtain funding.[18]. Liquidity spirals can also be triggered by institutions' actions, such as stockpiling liquidity because of pessimistic assumptions concerning future market conditions. Market confidence plays an important role in this interaction. Behavioural assumptions and actions can exacerbate negative market sentiment, feeding the liquidity spiral and worsening the impact on market liquidity.

[18] "Market Liquidity and Funding Liquidity", Brunnermeier, M. and Pedersen, L., March 2006

56 - The interaction between funding liquidity and market liquidity becomes more important when markets are stressed. In normal market conditions, large fire sales by individual institutions should not materially affect market conditions, since as it can be assumed that the institution has already taken any potential market impact into account, or that it can obtain liquidity through repo operations. In contrast, fire sales in stressed conditions fuel market illiquidity and potentially tighten funding sources.

57 - The Industry Expert Group on Liquidity (IEGL) identified three main links between funding and market liquidity. First, a reduction in market liquidity affects an institution's ability to repo (or realise) its assets. Second, the reduction in market liquidity may lead to greater volatility in asset prices, resulting in increased haircuts or higher margin calls. Third, increased volatility in the value of derivatives positions can lead to higher levels of collateral required, and ultimately to a reduction in cover against funding risks. The precise impact of the interaction between funding and market liquidity depends on the structure and business model of the institution concerned.

58 - The IEGL also emphasized the importance of central bank support in times of market turbulence. The key issues identified by the industry were the list of eligible assets recognised, the maturity of refinancing operations, and the desire to have some degree of certainty regarding the level of support that will be provided. However, central banks need to retain discretion concerning the provision of liquidity support.

59 - The IEGL noted that a fuller recognition of off-balance sheet items in institutions' liquidity risk frameworks is important from a best practice perspective. This could include not only exposures to conduits and SPVs but also non-contractual exposures and implicit (reputational) support.

60 - The interaction between funding liquidity and market liquidity can have consequences that reach beyond the individual institution. The actions of a large institution attempting to meet a large funding shortfall, can have serious secondary effects on the rest of the financial system:

- Fire sales of assets can increase market illiquidity and exacerbate declines in asset values, placing other institutions under liquidity and capital pressure.

- Liquidity pressures can force widespread liquidity withdrawals in inter-bank and other wholesale funding markets.

- Illiquidity can cause bank failures, with associated losses to retail depositors and wholesale investors. Losses to inter-bank counterparties (particularly in association with other pressures) can trigger other bank defaults (systemic risk).

***Points of interest / lessons 9***

- *The interaction between market liquidity and funding liquidity is central to understanding how systemic financial crises play out. As market liquidity and funding liquidity become increasingly interlinked, the potential systemic consequences of liquidity problems become more important.*
- *The internationalisation of wholesale markets and institutions increases the potential for cross-border and cross-institutional contagion. Consequently, the interdependence on the liquidity regimes of regulators is also growing.*

## 3. Infrastructures

*Payment and settlement systems*

61 - Payment and settlement systems channel a very large part of institutions' liquidity flows (including those between entities in the same group), and therefore play a key role in their liquidity risk management. The importance of these systems has grown considerably in recent years, as European political and economic integration has contributed to a progressive integration of markets and payment systems. Any disruption in the sound functioning of payment and settlement systems could have serious consequences on other markets, other systems, and the participants themselves. The G10 Committee on Payments and Settlement Systems (CPSS) and the Payment Risk Committee have issued reports and core principles[19] to promote internationally accepted standards and practices for these systems.

62 - We can distinguish between national and cross-border systems, between gross and net systems, and between deferred and real-time systems. Their design, timing, and functioning have implications for both institutions and supervisors, as liquidity management must take into account the characteristics of the various payment and settlement systems. An overview of these characteristics and their implications for liquidity risk management can be found in Annex B.

63 - Large-value payment systems currently settle predominantly in 'Real Time Gross Settlement' (RTGS) mode, while retail payments systems often use net settlement. Recent technological developments have made net settlement systems faster and more efficient, reduced netting intervals and bringing them closer to a real-time system.

64 - Institutions generally participate in many payment and settlement systems, which presents challenges in the management of collateral and intraday liquidity. This is true whether they participate in net or gross systems. To mitigate systemic risk, net payment systems require participants to post collateral, which usually covers only a fraction of the payments processed through the system. In contrast, gross systems process each payment order separately, so settlement and systemic risk is reduced. Regardless of which type of system is involved, institutions must maintain sufficient liquidity throughout the day for the settlement of transactions - gross or net payment. Institutions can reduce their liquidity costs if they have access to collateralised intraday credit. In order to use intraday credit, the institutions need to establish continuous real-time monitoring of their treasury accounts and of the free collateral that can be used for liquidity purposes.

65 - In securities settlement systems, the clearing and settlement process includes a number of 'key' steps (even if some systems do not use all of them). These include matching the terms of the trade (both parties communicate the details of the operation to confirm that the data are the same); the clearance or calculation of the parties' obligations; and the settlement of the operation, which implies a transfer of funds by the buyer of securities, and of the securities by the seller. For the settlement of the operation, both counterparties must be able to fulfil their obligations and hold liquidity (and securities), which exposes them to liquidity risk.

[19] See in particular the CPSS's "Core Principles for Systemically Important Payment Systems and Recommendations for Central Counterparties".

*The European context*

66 - European institutions, although operating within the monetary union, have to deal with several payment and settlement systems. Consequently, their daily liquidity management is challenging, especially for those entities that maintain an active position in FX markets. Institutions usually participate, directly or indirectly, in TARGET2, (the Trans-European Automated Real-time Gross Settlement Express Transfer System), a clearing system for large-value payments in the Euro region and the EEA. They may also participate in other large-value systems. They generally also find it necessary to participate in one or more local retail payment systems. (The Single Euro Payments Area (SEPA), which is being implemented this year, is a framework that will harmonise the treatment of retail payment systems for local and cross-border operations, but is not an infrastructure in itself). The future TARGET2 Securities system that is currently being developed will allow the settlement of securities through a single treasury account, as is currently possible for the settlement of payments under TARGET2. TARGET2 Securities is expected to reduce liquidity management problems, since TARGET2 and the current securities settlement systems do not currently work in a harmonised fashion (different accounts treatment, different timing). A more detailed description of all these systems can be found in Annex C.

*Foreign exchange payments*

67 - Globalisation has increased the cross-border activity of most institutions, and thus they face the challenge of developing their activity in different markets, and also in different currencies. This increases the complexity of their liquidity risk management, as they need maintain count liquidity not only in their domestic currencies, but also in other currencies to meet their cross-border obligations. This creates additional risks in FX operations and payment systems, such as timing.[20]

68 - The G10's Committee on Payment and Settlement Systems (CPSS) published a report in May 2008 based on a survey of FX settlement that was conducted in the second quarter of 2006[21]. The survey found that most transactions are settled through the CLS Bank (a multi-currency bank based in New York) or through the corresponding traditional model. Liquidity risk is present in both systems, but since CLS Bank calculates a net final payment, liquidity risk is reduced in this system. Controls should be increased if settlement is done through a traditional correspondent bank. The most important FX settlement systems are described in Annex B.

***Point of interest / lesson 10***

*The design of payment and settlement systems is part of institutions' environment and influences their liquidity management.*

*When monitoring their intraday liquidity and liquidity risk, institutions should take into account the main features of these systems (gross vs. net, providing intraday facilities), the number of systems in which they participate, and the way in which they participate (directly or indirectly).*

[20] Central banks have supported liquidity risk management by enhancing their payment systems: lengthening their hours of operation and improving liquidity facilities in order to assist CLS operations (among other measures).

[21] See "Progress in Reducing Foreign Exchange Settlement Risk" consultative report, May 2008, CPSS, http://www.bis.org/publ/cpss83.pdf.

# III. Liquidity risk management at credit institutions and investment firms

69 - Liquidity risk management refers to the internal policies and procedures – usually combining quantitative and qualitative objectives, limits, and reporting – put in place by a credit institution or an investment firm, and possibly at the group level as well. Although targeting liquidity risk, these policies and procedures should to the extent possible also take into account the interaction of liquidity risk with credit risk, market risk, operational risk, and reputation risk, as mentioned above, as well as environmental factors such as regulatory requirements, central bank refinancing policies, constraints on asset transferability, etc. As a Pillar 2 risk under the CRD, institutions are required to address the management of liquidity risk in a manner appropriate to their size and their type of business.

70 - Liquidity risk management (LRM) consists of a number of components essential for preventing liquidity problems. These include governance; an adequate framework for measuring, managing, and monitoring liquidity; stress testing; and contingency planning. The design of an institution's Liquidity Risk Management depends first and foremost on the size, degree of internationalisation, and group membership of the institution and the strategy and complexity of its business model.

71 - In light of the 2007-2008 market turmoil, it is important that institutions' strategies and policies address both normal and stressed times. The difficulties that institutions experienced in obtaining medium-term to long-term funding during that period highlights the strategic role of long-term liquidity funding, independent of the shortening of time horizons due to the fact that payment obligations fall due much more quickly than in the past, as stated in the BSC report[22]. Since the degree of reliance on long-term funding reflects the trade-off made between cost and resilience to liquidity shocks, it should be stated clearly in an institution's strategy.

***Recommendation 1***

*The Board of Directors should define a liquidity risk strategy and set management policies that are suited to the institution's level of liquidity risk, its role in the financial system, its current and prospective activities, and its level of risk tolerance. The Board should have a clear view of the risks implied by its degree of reliance on maturity transformation, and should ensure that an adequate level of long-term funding is in place. Its strategy and policies should consider both normal and stressed times and should be reviewed regularly, including (at a minimum) when there are material changes. Senior management should define adequate processes to implement these strategies and policies.*

72 - This Part of the Advice covers the following aspects of LRM:

- Internal governance: incentives, funding strategy, the cost of liquidity, adequate organisation of LRM, IT systems, and internal control (Section 1);

[22] EU Banking Structures, ECB, October 2007.

- Influencing factors (the distinction between the trading book and the banking book, accounting rules, netting agreements, and covenants) and operational functions (collateral management and intraday liquidity management) (Section 2);

- Internal methodologies for measuring, monitoring, and mitigating liquidity risk: measuring liquidity risk in normal times, measuring liquidity risk in stressed times (stress testing), monitoring and controlling LRM, contingency funding plans, and mitigation of liquidity risk (Section 3).

- Specific issues of interest: rating agencies' approach to internal methodologies (Section 4), and transparency to the market (Section 5).

## 1. Internal governance

73 - Formulating an institution's funding strategy and defining its risk tolerance are fundamental roles of financial institutions' senior management bodies. The severity of the 2007-2008 turmoil highlighted how important it is for Boards of Directors' to set strategies and make informed decisions. As one illustration of this, the Board of Directors of Northern Rock was held responsible for that institution's continued expansionary mortgage lending policy, which was predicated on the continued success of its funding strategy at a time when there were indications of potential problems on the funding side[23].

74 - Principles 1 through 4 in the BCBS's 2000 Sound Practices for Managing Liquidity in Banking Organisations prescribe in detail the organisational structure for managing liquidity. The Principles recommend a board-approved strategy, an adequate management structure, and adequate information systems.

75 - Annex V of Directive 2006/48/EC sets forth general principles for risk management. These principles include the board's responsibility to establish and periodically review strategies and policies for taking up, managing, monitoring, and mitigating the risks the institution is or might be exposed to. The persons effectively directing the business must also define arrangements to ensure the segregation of tasks between risk-taking and risk-controlling units and the avoidance of conflicts of interest. These general principles should be applied to liquidity risk.

76 - The IIF has reached similar conclusions. It recommends that institutions should have board-approved strategies for managing liquidity risk under going-concern and stressed conditions. The execution of this strategy should be guaranteed by an adequate management structure and effective processes. The IIF also recommends the segregation of duties between the design, execution, oversight, and monitoring functions within the institution. Finally, the IIF stresses the importance of integrating liquidity risk management in the overall institution-wide risk-management framework.

77 - The 2007-2008 turmoil demonstrated the validity of these principles, which provide the foundation for the recommendations in this section.

[23] "The Run on the Rock", Report by the House of Commons Treasury Committee, Volume 1, p. 19

*Funding strategy, the cost of liquidity, and internal incentives*

78 - Maturity transformation is a central part of the banking business, and therefore it would not make sense to expect banks to match all liabilities and assets completely. However, the funding strategy of an institution is a component of the liquidity risk management as it will determine the level of liquidity risk to be managed due to maturity mismatches between funding profile and business needs.

79 - The cost of liquidity thus has two main components: the cost of long-term funding (the explicit cost), which reduces maturity transformation and liquidity risk; and the cost of liquidity risk mitigation in the short term (the implicit cost).

80 - The cost of liquidity must be balanced against the risk tolerance of the institution. Recent market events have demonstrated the plausibility of extreme stress scenarios. Part of risk management involves defining what level of risk should be mitigated and what level of risk should be left uncovered because of other constraints. This can involve defining the extreme stress scenarios which the institution accepts that it will not be able to face (see the discussion of stress scenarios, below).

81 - The institution should be aware that liquidity risk management is and should remain a cost source. Trying to make a profit from liquidity management is a potential source of conflicts of interest, and would impede a sound risk management framework. To avoid this, institutions should draw a clear distinction between service centres and profit centres.

82 - Identifying and characterising the cost of liquidity and breaking it down across business lines are essential parts of institutions' strategy. Depending on their size and business model, they should have an internal system that allows them to allocate liquidity costs (both explicit and implicit) to business lines, in the same way that ICAAP models allow the institution to allocate capital (transfer pricing system). This allocation of costs should reflect not only the liquidity needs of the various business units but also the liquidity risk that they generate.

83 - Another issue is the potential adverse incentives for some of the units in charge of the liquidity management, typically the front office and treasury functions. This is particularly true for the treasury function and for the unit(s) in charge of collateral management. The senior management of the institution should pay close attention to these risks.

84 - It is therefore essential for institutions to set an adequate internal liquidity cost/benefit allocation mechanism which creates appropriate incentives. This mechanism should cover off-balance sheet and other contingent liquidity risks associated with complex financial instruments and OTD business. In the strategic part of liquidity risk management, institutions should seek:

- to measure all costs of liquidity, including long-term funding and short-term liquidity risk insurance;
- to 'price' the liquidity risk, including the contingent risk, of any exposure;
- to provide for a clear allocation of tasks, responsibilities, and objectives within the institution, avoiding adverse incentives by clearly identifying liquidity risk management as a non-profit centre .
- to allocate liquidity cost to profit business lines/entities, taking the long-term strategy into consideration.

***Recommendation 2***

*Institutions should have in place an adequate internal liquidity cost/benefit allocation mechanism – supported where appropriate by a transfer pricing mechanism – which provides appropriate incentives regarding the contribution of liquidity risk of the different business activities. This mechanism should incorporate all costs of liquidity (from short to long term, including contingent risk).*

### *Organisation of liquidity risk management*

85 - Industry practice with regard to the efficient organisation of the liquidity risk management framework varies. Accordingly, what constitutes an efficient organisation should be assessed on a case-by-case basis and reviewed regularly.

86 - Attention should be paid to the appropriate level for exercising some of these functions. While some functions (such as intraday management) should be exercised at the entity level within a group, others (such as strategy and policy development, or monitoring the group's overall liquidity position) may also be exercised at the group level. The trend in the industry is to develop a strategy at the group level, particularly for structural liquidity needs and the management of collateral. This has proven to be particularly helpful in times of stress, as the 2007-2008 events showed.

87 - Evidence gathered by the BSC indicates that the usual industry practice is to assign responsibility for liquidity risk management to the Asset Liability Committee, and to make the Asset Liability Management unit responsible for measuring and analysing funding liquidity and proposing mitigating actions. Thus the segregation of tasks mentioned above can only be assessed on a case-by-case basis.

88 - Time horizons are a key factor in the allocation of tasks, since different time horizons call for different types of liquidity management (day-to-day vs. strategic liquidity management). The shortening of time horizons that has been observed, reinforced in the intraday period by the development of Real Time Gross Settlement systems, should be reflected in the way institutions manage their liquidity[24].

89 - In any case, LRM requires a dedicated staff possessing the requisite knowledge. Adequate resources should be specifically allocated to the management of liquidity risk, including a sufficient number of competent and well-trained personnel.

90 - Finally, institutions should have well-defined internal controls and internal audit. These controls can assume a variety of forms, including internal limits on internal liquidity metrics. Internal controls should be well documented and responsibilities clearly acknowledged.

[24] The Banking Supervision Committee's Working Group on Developments in Banking (WGBD) explained that some large cross-border banks referred to intraday time horizons as short-term, overnight as medium-term, and one week as long-term.

***Recommendation 3***

*The organisational structure should be tailored to the institution and should provide for the segregation of duties between operational and monitoring functions, in order to prevent conflict of interests. Special attention should be granted to the powers and responsibilities of the unit in charge of providing funds. All time horizons, from intraday to long-term, should be considered when tasks are allocated, as they entail different challenges for liquidity risk management. The institution should have sufficient well-trained staff, adequate resources, proper coordination and overview, and independent internal control and audit functions.*

*Centralised LRM*

91 - The stock-taking presented in the first part of the Advice to the Commission indicated that liquidity risk policies, procedures, measurement methodologies, and monitoring of the group-wide liquidity position are commonly centralised, while day–to-day liquidity risk management is often decentralised.[25]

92 - The main rationale for this arrangement is the cost advantages of being able to transfer funds within a financial group, from an entity with surplus funds to an entity that needs funds. Transfers can be 'structural', where one entity (for example, a private banking subsidiary) is structurally long and funds other parts of the group. Or they can be 'operational', where fund transfers reflect temporary imbalances that can change from day to day. These temporary imbalances may reflect the chance pattern of payment flows across the group, or they may reflect a deliberate policy of funding opportunistically in the cheapest markets and transferring those funds to where they are needed. An important aspect of centralised liquidity management is making arrangements within the group – within the boundaries permitted by the requirements of local supervisors and an entity's willingness to transfer liquidity - for the timely transfer of funds when necessary. In stressed circumstances, such arrangements, under carefully designed mechanisms protecting the interests of all the entities involved, allow groups to move surplus liquidity to the part of the group which is under the greatest pressure and which otherwise could find it difficult to raise the funds it needs in the inter-bank market. The timely allocation of funds permitted by these methods can prevent an entity-level institution-specific liquidity crisis from materialising.

93 - However, in times of group-wide institution-specific liquidity stress, or systemic (market) stress, there may not be much 'surplus' liquidity in other parts of the group.[26] Furthermore, as noted above, the approach depends on the other parts of the group being both willing and able to transfer liquidity. The local subsidiary, while still presumably satisfying the liquidity requirements set in local regulations, would nevertheless be weaker because of the transfer. In light of these drawbacks, centralised liquidity management should aim at a better allocation of liquidity within the group, not at a reduction of the buffer of liquid assets at the group level. In any case, liquidity management should give due consideration to constraints on liquidity flows, and not take the free flows of assets for granted. These constraints may be operational (connectivity of settlement systems, existence of a cross-border

[25] See Issue Note of the LiqTF submitted to the Commission.

[26] In the case of market stress, a wide range of markets would be affected, and in the case of firm-specific stress, the entire group could suffer from reputational contagion.

repos market), or they may be due to internal limits or policies of the group or to legal or regulatory constraints (capital requirements, large exposures limits, ring-fencing rules, etc.).

*Central oversight of liquidity management*

94 - Regardless of whether institutions have chosen decentralised or centralised liquidity management, it is essential for institutions with multiple platforms and legal entities to have a central liquidity management oversight function. The group's strategy and policy documents should describe the structure for monitoring institution-wide liquidity risk and for overseeing operating subsidiaries and foreign branches. Central liquidity management oversight has the benefit of providing decision-makers with an overview of the entire business, including overall liquidity positions and maturity mismatches. In this respect, it should not be assimilated to accounting consolidation, since consolidation accounting rules do not necessarily generate data corresponding to the real amounts of liquidity flows.

95 - CEBS has published its technical advice to the Commission on the review of the large exposure rules[27] on 3 April 2008. Annex E presents the main ideas regarding inter-bank exposures from a liquidity risk management perspective.

***Recommendation 4***

*All institutions should be aware of the strategic liquidity risk and liquidity risk management at the highest level of the group, and have adequate knowledge of the liquidity positions of members of the group and the potential liquidity flows between different entities in normal and stressed times, taking into account all potential market, regulatory, and other constraints.*

## *IT systems*

96 - Internal governance should also provide robust IT systems that meet the needs and challenges of liquidity risk management. Those systems should:

- address the quality and limited availability of data from a liquidity risk perspective (which means that the institution should rely for some assets on nominal amounts and not on accounting figures), taking into account on-balance sheet and off-balance sheet assets/liabilities, pledged/available for pledge collateral etc.
- provide an adequate frequency of reports, taking into account, for instance, the shortening of time horizons for intraday liquidity management;
- provide technical support and flexible outputs for the management of liquidity risk at the group level, taking into account any differences across entities in terms of systems, legal obstacles, time zones, and currencies;
- support the various scenarios that may capture stress events;
- provide timely information (data should be available whenever necessary, with desired breakdowns);

[27] The advice is available at http://www.c-ebs.org/Advice/documents/2nd.LE_advice.pdf

***Recommendation 5***

*Institutions should have appropriate IT systems and processes that are commensurate with the complexity of their activities and the techniques they use to measure liquidity risks and related factors. The adequacy of the IT systems should be reviewed regularly.*

## 2. Influencing factors and operational components of liquidity management

97 - Some internal factors (the distinction between the trading and banking books, accounting rules, netting agreements, covenants) and operational functions (collateral management, intraday liquidity management), which are often linked to other objectives or rules, influence liquidity management and the liquidity risk management more or less directly. They are discussed in this part in response to the questions posed by the European Commission in its Call for Advice. Note that the capital regulation of investment firms entails implicit requirements for liquidity management.

*Impact of the distinction between the trading book and the banking book*

98 - This section analyses whether of the distinction between the trading and banking books influences liquidity risk management.

Classification of assets in the trading and banking books

99 - The distinction between the trading and banking books is a supervisory tool used in calculating capital requirements. For capital adequacy purposes, assets are classified in the trading and banking book according to the 'Basel compliant' rules set out in Directive 2006/49/EC. The classification is based primarily on trading intent. Other relevant criteria are marketability, hedgeability, and active management. The banking book includes all assets not included in the trading book.

100 - While trading intent incorporates the assets' marketability and liquidity, the role that it plays in the classification in the trading book does not preclude the inclusion of less liquid/marketable assets in the trading book under the Basel/CRD rules, if the material risks of those assets (such as interest rate and FX risk) can be fully hedged over the trading horizon. Conversely, liquid assets may be included in the banking book, depending on asset-liability management (ALM) decisions; for example, for income-generating purposes. It is common banking practice to classify most liquid and tradable assets in the trading book, but it is not uncommon to classify some illiquid assets (such as structured products with embedded options) in the trading book. Both liquid and illiquid assets may be classified in the banking book. Banking book assets, however, can be pledged or used as collateral in a repurchase agreement or as eligible collateral for standing central bank facilities and, in this way, provide a bank with a source of liquidity.

101 - IAS 39 classifies financial assets and financial liabilities as follows for accounting purposes:

- Financial assets held for trading (HFT): i.e. financial assets acquired principally for the purpose of generating a profit from short-term fluctuations in price, valued at fair value through profit or loss;

- Financial assets that the institution designates upon initial recognition as at fair value through profit or loss, under certain conditions in the context of hedging of embedded options (the 'fair value option');

- Investments held to maturity (HTM), that the entity has the definite intent and ability to hold to maturity, valued at amortised (historical) costs;

- Loans and receivables, valued at amortised costs;

- Available for sale (AFS): all financial assets that are not classified in another category, valued at fair value through equity.

102 - According to IAS 39, non-tradable financial assets such as loans and receivables may be classified in the held for trading portfolio if the institution intends to sell them immediately or in the near term. Thus, while classification in the trading book and classification in the 'held for trading' portfolio are both based on trading intent, the two will be identical only by coincidence. The following table provides a rough illustration of the classification described above, for assets.

| | **Capital Adequacy Classification** | |
|---|---|---|
| **Accounting Classification** | **Trading book** | **Banking book** |
| **Held for trading** | Liquid assets<br><br>Some illiquid assets/ hedgeable assets at fair value (FV) | |
| **Available for sale** | | Illiquid assets<br><br>Liquid assets at fair value through equity |
| **Held to maturity** | | Illiquid assets<br><br>Liquid assets at amortised costs |
| **Fair Value Option** | 'Hedge assets' at FV | 'Hedge assets' at FV |

103 - These classifications may affect how an institution uses its securities for liquidity purposes. To classify a security as HTM, the institution must have both the intent and the ability to hold the security to maturity. If the institution holds open the possibility of selling it prior to maturity for liquidity purposes, the security is not eligible for classification as HTM. HTM securities, however, can be pledged or used as collateral in a repurchase agreement, and in this way they provide the institution with a source of liquidity. Moreover, the liquidation of HTM portfolios is allowed under certain exceptional circumstances, when there is an urgent need for liquidity, the assets are near their maturity or call date, and market prices will not be affected materially. Institutions typically classify securities that will be used for liquidity as AFS because such securities have fewer accounting restrictions. Specifically, AFS securities are not subject to the 'intent and ability' restrictions for HTM securities. It could be argued that the accounting treatment described above might have some negative impact on the liquidity-generating capacity of assets held in the HTM portfolio, but it is not expected to be significant in practice.

104 - Different valuations of assets do not seem to have an impact on liquidity management, and, more generally, the intrinsic liquidity of assets remains unaffected by their classification in the trading or banking books. This follows from the fact that assets are not necessarily valued for asset-liability management purposes in the same way as for accounting purposes. However, some industry experts indicated that when these assets are monetised through asset sales, behavioural restrictions linked to the accounting treatment might arise if the sales reveal new losses. Indeed, selling assets from HTM loan and receivables portfolios in times of stress could give a signal to markets if embedded losses are realised. This could damage the institutions' liquidity position and reputation. (Selling assets from trading portfolios have no such effects, since the losses are already reflected in the institution's profit-and-loss account.) This potential indirect impact should not be given too much importance, since in times of stress, when institutions would prefer to avoid the adverse effect of publishing new losses, monetisation is more likely to occur through repurchase agreements.

Current EU supervisory treatment and recommendations

105 - For the reasons described above, a majority of supervisors apply the same treatment to the trading and banking books for liquidity measurement purposes. However, some supervisors apply a different treatment for the following reasons: the assumption of liquid assets in the trading book, potential distress, different maturities, different reporting requirements, and different risk weighting and eligibility. In light of the above, the criterion used by institutions in determining the liquidity of assets, and also by competent authorities from a supervisory point of view, should be the liquidity-generating capacity of the assets in the short term rather than their accounting or capital adequacy classification.

***Recommendation 6***

*The liquidity of an asset should be determined based not on its trading book/banking book classification or its accounting treatment, but on its liquidity-generating capacity. Supervisory distinctions between the trading and banking books should not have a major or undue impact on liquidity management.*

***Point of interest 11***

*In some cases, however, if the regulations prescribe different treatments for the trading and banking books, this distinction can have an impact on the supervisory measurement of liquidity. There may be some negative impact on the liquidity-generating capacity of assets held in the HTM/loans and receivables portfolios, but this impact is not expected to be significant in practice.*

*Netting*

106 - The technique of netting is not limited to payment and settlement systems. In payment and settlement systems, netting has been used mostly as a risk mitigant. The recent shift from net deferred models towards real-time models – which has the support of the authorities, since gross models present less systemic risk than net systems – has reduced the role of netting. But netting has proven to be a valid technique for risk mitigation, and participants in the system still use it.

107 - Netting arrangements reduce credit and liquidity risk, and thus reduce intraday liquidity needs. Since netting reduces all of the positions with different participants to a single net position, liquidity needs are reduced to

that final position. (Netting arrangements also reduce capital requirements, since capital needs only to cover the net position.)

| Contract | Description | Types and characteristics | | Liquidity risk implications |
|---|---|---|---|---|
| Bilateral | Two counterparties involved | No novation | No substitution of obligations, but a net position is calculated | Liquidity risk is reduced in both systems, but without novation, the counterparties retain the credit risk, since positions can be broken down into gross positions again. |
| | | Novation | Two obligations are cancelled and substituted by a new one. | |
| Multilateral | More than two counterparties involved | No novation | No substitution of obligations, but a net position is calculated | Generally results in larger liquidity risk mitigation, as more counterparties are involved. Risk mitigation depends on the type of arrangement:<br><br>- With no novation, the default of participant(s), leads the other participants to recalculate their net position facing significant liquidity risk.<br><br>– With novation, participants' liquidity risk is potentially substantially reduced as the central counterparty assumes the obligation(s)., but the mitigation effect will depend on the terms of the contract. |
| | | Novation | Two obligations are cancelled and substituted by a new one. A central counterparty is usually involved[28]. | |

108 - Close-out netting is an arrangement to settle all contracted but not yet due liabilities to and claims on the counterparties that are subject to the netting agreement with one single payment, made immediately upon the occurrence of one of a list of defined events (such as insolvency or the appointment of a liquidator to the counterparty). Close-out netting under EU legislation is currently based on bilateral close-out netting agreements, which cover off-balance sheet as well as on-balance sheet transactions. It is extremely important that close-out netting arrangements be effective under local laws, such as insolvency law. National legislation should not conflict with bilateral close-out netting.[29]

***Recommendation 7***

*When using netting agreements to mitigate risks related to payment and settlement systems, institutions should consider and address all legal and operational factors relating to the agreements, in order to ensure that the risk mitigation effect is assessed correctly in all circumstances.*

[28] The clearing house/central counterparty manages the liquidity risk associated with the settlements, and the obligations of participants must therefore be properly collateralised

[29] See Directives 2002/47/EC and 2006/48/EC.

*Covenants*

109 - Covenants are legal clauses relating to specific financial conditions or events that affect the terms of a contract. Financial covenants are commonly included in financial contracts to protect creditors. If the conditions are met, the creditors are allowed to waive the 'normal' terms of the contract on a discretionary basis. In such cases they may require, for example, ending the contract or some other contractually specified action or consequence such as the posting of (additional) collateral or a step-up in the interest rate. Covenants can be regarded as a kind of purchased trigger option for the creditors, as they give them a discretionary contingent right.

110 - Traditional financial covenants included in corporate loan contracts give institutions contingent rights without increasing their liquidity risk. It is only the covenants included in complex financial instruments used for innovative funding structures that raise liquidity risk management issue, especially during times of stress.

111 - For example, various kinds of Market Adverse Conditions clauses in securitisation contracts contain downgrade triggers and performance triggers (relating to recourse provisions leading to early amortisation) that can impose collateral requirements. Drawings on liquidity backup facilities provided to conduits are based on trigger covenants included in the contracts, and additional collateral requirements could be based on sponsor-linked rating triggers in the context of credit enhancement (such as those included in Credit Support Annexes). The liquidity risk posed by this kind of covenant is often of a 'low probability-high impact' nature. Various triggers can have a substantial liquidity impact, due to extended back-up facilities, early termination/buy-backs, or collateral requirements or margin calls in cash.

112 - Even when the conditions of covenants are not fully met, an institution may be forced to buy back assets because of reputation risk. Active management of this reputation risk may avoid additional liquidity risk.

113 - Documentation risk can be an element in the liquidity risk of covenants, if a dispute arises due to unclear covenant language, for example regarding received liquidity facilities.

114 - The IIF has concluded that, due to the lack of management information, business activities using complex financial instruments with low probability-high impact liquidity risk may not be visible to the treasury function and thus not included in liquidity plans and stress tests.

115 - In securitisation documents, covenants linked to supervisory actions or breaches of thresholds – for example, providing that such actions or breaches trigger early amortisation – could undermine the objectives of those supervisory actions and thresholds. Early amortisation can exacerbate liquidity and earnings problems. Such covenants could inhibit supervisors from taking action to address problems at a troubled institution. They could also force institutions to disclose confidential information. The use this kind of covenant should be strongly discouraged.

116 - Because of the contingent nature of the liquidity risk stemming from complex products and OTD business covenants, institutions should assess their liquidity impact using stress tests, based on various institution-specific and market-crisis scenarios. The results of these stress tests should be reflected through an appropriate Contingency Funding Plan.

117 - Institutions' liquidity management should explicitly consider the extent to which contingent liquidity risk is addressed by current liquidity reserves as opposed to other types of counterbalancing capacity to generate liquidity in a timely fashion.

***Recommendation 8***

*The liquidity risk due to documentation risk and possible implicit support should be taken into account in the overall liquidity risk management framework. In particular, covenants in contracts for complex financial products, such as those related to securitisation and/or 'originate to distribute' business, should be identified and addressed explicitly in liquidity policies. Institutions should consider whether SPV's/conduits should be consolidated for liquidity management purposes. The related liquidity risk should be determined by stress tests and addressed in an appropriate Contingency Funding Plan. Institutions' liquidity management should consider explicitly the extent to which contingent liquidity risk should be addressed by readily available liquidity reserves as opposed to other counterbalancing capacity. Covenants linked to supervisory actions or thresholds should be strongly discouraged.*

*Collateral*

118 - Regimes for regulating liquidity risk often consider the level of liquid assets (compared either to static indicators such as the size of balance sheet, in 'stock' approaches; or to the size of the maturity gaps, in maturity mismatch approaches). The availability of collateral is another, complementary measure of the capacity to raise cash in the short term (provided certain conditions are fulfilled).

119 - Collateral refers to the assets that secure a debt obligation: i.e., that secure the creditor against the risk of default by the debtor. The main source of liquidity risk mitigation for credit institutions is the possession of liquid assets. As a practical matter, an institution facing a liquidity stress has the possibility of selling these liquid assets or, more commonly, using them in order to obtain refinancing from counterparties. Pledging these assets is generally more advantageous for the institution than selling them. Thus collateral, in the form of more or less liquid assets, represents a potential source of funding, and can be considered as a form of liquidity risk mitigation. It is therefore very important that liquidity risk management allocate sufficient resources to the management of collateral.

120 - The importance of collateral in liquidity risk management is reinforced by the role that collateral plays in the lending of last resort provided by central banks in time of crisis[30]. Indeed, the wide variety of needs and sources of collateral gives an idea of the complexity of collateral management in complex credit institutions. In order to master that complexity, institutions must have:

121 - Knowledge of their collateral needs. Credit institutions must be able to determine their collateral needs precisely at appropriate intervals. In making that determination, they should consider not only previously 'contracted positions' but also new business and new activities, as well as the impact that different stress scenarios can have on their liquidity position.

122 - Knowledge of their collateral resources. Institutions must know the exact amount of collateral available for different needs, and the range of collateral accepted by their counterparties. They should conduct a security funding capacity analysis to determine whether the liquidity obtained through short-term unsecured (wholesale) funding is being invested in unencumbered (freely marketable) assets. If this is not the case, the institution could be exposed to liquidity problems in the event that their access to capital markets is

[30] The role of collateral in mitigating credit risk is beyond the scope of this report. It is dealt with mainly in Annex VIII of the CRD. The range of collateral that is eligible for this purpose is very wide. It would not make sense to seek to harmonise the range of collateral eligible for credit risk purposes and for liquidity risk purposes; the objectives of risk management and the conditions for risk mitigation in these two areas are too different.

restricted. The 2007-2008 market turmoil demonstrated the importance of knowing the institution's access to central bank refinancing (in terms of both the collateral available within the bank and the conditions under which it is possible to call up the collateral).

123 - Understanding and mastery of legal and operational constraints. The widespread and growing use of collateral in the inter-bank market, as well as in improving the security of payment and settlement systems, raise documentation, legal, and operational issues that can have an important bearing on liquidity management. These issues should be mastered, including by the institution's control functions.

124 - In summary, collateral management should aim at optimising the allocation of collateral available for different needs, across products, business units, locations, and even 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. Pricing, operational, and documentation risks should be taken into account as well.

125 - The institution's overall policy regarding collateral management should be set by senior management. It should include at least the definition of amounts of collateral that should remain available (unencumbered) at all times in order to face unexpected funding needs. These limits can be defined in relation to other metrics. The range of collateral considered as a secure source of funding in times of stress should be defined and justified.

126 - The operational level for implementation should depend on the organisation of the institution. For example, activities that generate relatively constant needs for a pre-defined range of collateral (such as payment systems) could be managed independently from the rest of the needs.

***Recommendation 9***

*In order to ensure sound collateral management, institutions should:*

*- have policies in place to identify and estimate their collateral needs as well as all collateral resources, over different time horizons;*

*- understand and address the legal and operational constraints underpinning the use of collateral, including within control functions;*

*- have an overall policy, approved by senior management, that includes a conservative definition of collateral and specifies the level of unencumbered collateral that should be available at all times to face unexpected funding needs; and*

*- implement these policies and organise collateral management in a way that is suited to the operational organisation.*

*Collateral management linked to payment systems and intraday liquidity needs*

127 - Difference system designs and platforms call for different kinds of collateral management. Net systems tend to create contingent risks at the system level. In a net system, the failure of one participant to meet its payment and settlement obligations when due negatively impacts the whole system. To mitigate this systemic risk, net payment systems require participants to hold collateral, either to cover the largest net debit position in the system, or as an entry fee. In either case, the collateral required covers only a fraction of the payments processed through the system. Systemic risk is not eliminated, but its likelihood and impact are reduced.

128 - In contrast, gross systems process each payment order separately in real time. Settlement and systemic risk is reduced to a minimum. But the reduction of these risks imposes additional liquidity costs, as entities must hold sufficient liquidity throughout the entire day. These costs can be reduced, while still eliminating liquidity risk, if the institutions have access to collateralised intraday credit. As each operation is dealt with and settled individually, collateral requirements in gross systems are equal to the total amount of payments that are expected. For a given institution, that implies a constant monitoring of the treasury accounts, and of the free collateral that can be used for liquidity purposes.

***Recommendation 10***

*Institutions should have systems that adequately reflect the procedures and processes of different payment and settlement systems in order to ensure effective monitoring of collateral, at the legal entity level as well as at the regional or group level, depending on the liquidity risk management in place.*

*Intraday liquidity management*

129 - The growing globalisation of economies and changes in payment and settlement systems have increased intraday liquidity needs and the importance of intraday liquidity management. Liquidity managers must deal every day with foreign exchange operations, different time zones, real-time settlements, and peak hours on net systems.

130 - Intraday liquidity management of outflows must ensure that enough cash and/or collateral is available to meet immediate operational needs. Whether an institution uses gross or net payment and settlement systems does not make any difference in this respect: cash and collateral needs to be identified, measured, and made available in advance, which means on a gross basis. This seems to reflect the general practice among participants in payment and settlement systems.

131 - Intraday liquidity management of inflows demands cooperation between the front and back offices. It typically requires close monitoring of expected payments, and direct contacts with counterparties, when needed, to check quickly the reasons for delayed payments. Some institutions have shifted the responsibility for the monitoring expected intraday inflows from the back office to the front office, in order to increase the awareness of their traders.

***Recommendation 11***

*Regardless of whether institutions use net or gross payment and settlement systems, they should manage intraday liquidity on a gross basis, due to the time necessary to have cash available and post collateral.*

132 - Intraday liquidity management should be regarded as part of the overall liquidity management of the entity. Although operational implementation can be separated from medium-term structural implementation, the two need to be coordinated. Liquidity policies are usually focused on structural liquidity, with the main business lines, actions, controls, and activities managed according to long-term objectives. But in achieving these objectives, it is necessary to manage day-to-day and intraday liquidity accordingly. Intraday management should allow managers to make sound and timely decisions on an ongoing basis. It should include:

- continuous monitoring and control of operations;

- a clear assignment of responsibilities. In intraday management, decisions are time-critical. A clear allocation of tasks and responsibilities is essential to avoid losing time, and also to avoid internal control problems;

- back-up procedures that minimise the possibility of operational problems (e.g., with computer connections, unauthorised log-ins, operating system problems, etc.) which could jeopardise the institutions' normal activities.

***Recommendation 12***

*Institutions should adopt an operational organisation to manage short-term (overnight and intraday) liquidity within the context of the strategic longer term-objectives of structural liquidity risk management. Institutions should also set up continuous monitoring and control of operations, assign clearly defined responsibilities, and establish adequate back-up procedures to ensure the continuity of operations. Special attention should be paid to monitoring of sources of unexpected liquidity demands under stressed conditions.*

*Potential impact of the capital regime on investment firms' management of liquidity*

133 - An implicit liquidity requirement can be found in the possibility offered to national authorities to use an alternative determination of capital in application of Article 13(2) of Directive 2006/49/EC. In this alternative approach, competent authorities have the option of requiring investment firms to deduct illiquid assets from capital. This deduction would, in practice, provide strong incentives for investment firms to hold mainly liquid assets. This constitutes an implicit liquidity stock approach.

## 3. Internal methodologies to identify, measure, monitor, and mitigate liquidity risk

134 - The internal methodologies used in liquidity risk management can be defined broadly as the tools or methods used to identify, measure, mitigate, and monitor liquidity risk. 'Methodology' seems to be the most accurate term to define the range of tools actually used by institutions. In contrast with market risk and credit risk, there is not really any best-practice 'model', in the sense of an integrated measurement tool that is capable of covering all of the dimensions of liquidity risk, and that is used in similar form by a majority of institutions.

135 - Institutions' internal methodologies should serve three main functions:

- **identifying and measuring** liquidity risk, in normal and stressed times (stress testing);

- **monitoring** liquidity risk, to ensure that it is kept at or below the level defined (see internal governance), as well as a regular review of the standards set and their implementation; and

- **mitigation** of liquidity risk, in which institutions choose the appropriate tools to reduce their risk, such as diversification of funding sources or liquidity buffers.

*Identifying and measuring liquidity risk in normal conditions*

136 - As the GdC's stock-taking and the BSC report have shown, the vast majority of credit institutions use maturity mismatch approaches: i.e., models that compare cash inflows and outflows for different time horizons in order to calculate net funding requirements, which are then used to set liquidity limits. This method is recommended by the BCBS's Sound Practices for Liquidity Risk Management. Although this might appear to be highly convergent, the details of the approaches used differ across the industry, and thus there is no industry single best practice for liquidity risk measurement.

137 - The most simple approach is to consider only deterministic (both in time and magnitude)[31] or contractually fixed on-balance-sheet cash flows. As this approach does not capture other important aspects of an institution's business, institutions generally adopt more sophisticated methodologies, based on assumptions or statistical modelling of the factors that influence their net funding requirements under different scenarios. Institutions' internal methodologies typically set minimum/maximum thresholds on one or more liquidity ratios or gaps.

138 - Larger and more sophisticated institutions tend to rely on internal methodologies, calculating a set of ratios or gaps that reflect the institutions' liquidity position. In a number of (smaller) institutions, with less complex risk profiles, these ratios or gaps are based on or similar to the liquidity ratios set by the regulators.

139 - Thus liquidity risk measurement methodologies generally consist of two major elements: the calculation of ratios or gaps and the use of those ratios/gaps to set thresholds or limits.

140 - In calculating these ratios or gaps, a broad distinction can be drawn between stock-based approaches, maturity mismatch approaches, and mixed approaches which combine aspects of stock and mismatch approaches.

141 - Stock-based approaches should be forward-looking and therefore able to capture all material aspects of the liquidity risk faced by an institution.

142 - Maturity mismatch approaches, also known as 'gap analysis', are based on the estimation of the amount and timing of future cash flows, using both contractual and behavioural maturities. Institutions usually analyse two broad time horizons: shorter-term market liquidity, focusing on immediate funding needs and sources of available cash; and longer-term structural liquidity, where strategic choices of ALM come into play.

143 - Where relevant, internal methodologies can also distinguish between different currencies, so that all of the special features of the local liquidity market, including its depth, volatility, and fungibility with other currencies, are factored in.

144 - Not all surveyed institutions take into account the potential liquidity drain arising from off-balance sheet items such as derivative exposures, committed lines, guarantees, and margin calls. In particular, special attention is not always (if ever) drawn to covenants that trigger the drawing of liquidity lines, or to covenants that allow counterparties not to fulfil their obligation to provide liquidity. Implicit support is not always factored in, although the recent market turmoil revealed that non-contractual support is frequently provided when systemic risks occur.

[31] See: Survey on funding liquidity risk, Stahl and Zapp.

145 - Some publications mention the use of internal liquidity risk models to calculate liquidity ratios. These include sophisticated innovative stochastic approaches, often referred to as Liquidity-at-Risk (LaR) models[32].

146 - The GdC stock-taking indicated that stochastic models are still at an early stage of development, and have a number of methodological shortcomings to overcome. In particular, institutions find it difficult to define the appropriate confidence interval explicitly, the data gathered from normal business activities may not be a good proxy for stress situations, and historical data on stress situations, where available, may not be representative of future crisis situations.

147 - Internal methodologies should be validated/back-tested regularly using predefined methods. If assumptions or expert opinions are used, they should be assessed regularly as well.

148 - The necessary data must be collected and aggregated, and institutions should verify that the data are transferred correctly from primary to target systems. For this reason, reconciliation steps and plausibility checks are recommended. Both the completeness of the data used and the need to validate forecasted cash flows are mentioned in the IIF report.

149 - The validation/back-testing must be documented adequately and the results communicated to senior management.

150 - The quality of the reporting process is essential to ensuring that the management body and senior management have a sound understanding of the tools used to measure liquidity risk and the results of stress tests, and that they are able to take appropriate action if necessary.

151 - The BSC report referred explicitly to problems of supervisory validation of models, stating that "there is a significant challenge regarding how to validate models for stressed conditions, mainly due to a lack of data." This also applies to institutions' internal validation.

**Recommendation 13**

*Institutions should verify that their internal methodology captures all material foreseeable cash inflows and outflows, including those stemming from off balance sheet commitments and liabilities. They should assess the adequacy of their methodology to their risk profiles and risk tolerance. Internal methodologies should be tested regularly according to predefined policies. If assumptions or expert opinions are used, they should also be assessed regularly. These reviews should be documented adequately and their results communicated to senior management.*

*Identifying and measuring liquidity risk in times of stress*

152 - One of the core objectives of prudential supervision is to ensure the ability of institutions to withstand stressed situations. Thus the risk tolerance of each institution, and its implications for day-to-day management (i.e., the limits applied) are of great interest to supervisors.

[32]LaR models are comparable to the VaR models commonly used for market risk. LaR models are statistical models that estimate future liquidity needs on an empirical basis. More specifically, they estimate the probability that a certain liquidity reserve will (or will not) be sufficient over a given time horizon at a specified confidence interval, based on historical data. See "Liquidity Risk Management of Cross-Border Banking Groups in the EU", BSC, March 2007.

153 - The key tools used by institutions to measure and manage their capacity to absorb liquidity shocks are stress testing and contingency funding plans.

154 - Supervisors agree[33] that stress testing is extremely important for liquidity risk management. Stress testing tests the adequacy of liquidity buffers and ensures the ability to meet payment obligations in stressed situations.

155 - As the discussions with the industry have shown, the design of stress scenarios and the attention given to the outcomes can play an important role in the institutions preparedness to withstand a liquidity crisis, providing the results of the stress tests are being taken into consideration in defining the limits set for ongoing liquidity risk management.

156 - The GdC stocktaking indicated that all credit institutions use stress scenarios in one form or another. Some institutions incorporate stress scenarios in their models, either in place of or in addition to going-concern assumptions. Others conduct stress tests separately, and use the results to set limits on liquidity ratios. However, there appears to be considerable room for improvement in applying the results of stress tests to day-to-day liquidity risk management practices, policies, and procedures.

157 - Credit institutions consider different types of crisis (e.g., institution-specific or market-wide). Some use alternative liquidity scenarios to gather information from stress testing in other areas such as market risk, credit risk, reputation risk, or operational risk.

158 - The 2006 CEBS guidelines on stress testing[34] provided examples for elements concerning scenarios for projecting cash inflows and outflows considering both market-wide and institution-specific difficulties.

159 - The assumptions used to test market illiquidity or system-wide events will depend on market developments and the changing environment in which institutions operate. This requires knowledge and understanding of the factors that influence markets and how those factors could play out. When testing market illiquidity, institutions should consider not only a short-term but also a medium-term horizon without access to unsecured funding as a realistic assumption. The institution should also take into consideration the need to make adjustments to the business model following a period of stress, and an adequate level of long-term funding would be essential in that context. Scenarios can include:

- inter-bank market difficulties,
- the withdrawal of a major market player from a particular market,
- illiquidity in specific markets (e.g. the ABCP market, a crisis in emerging countries, etc.), and
- distress in specific currencies important for the institution's funding.

160 - To test institution-specific liquidity distress, scenarios can include:

- a downgrade in the institution's rating or the expectation of a downgrade, leading to an increase in funding costs and margin/collateral requirements,
- a sharp increase in the drawdown of commitments by borrowers,

[33] Annex V of the CRD, and (in greater detail) the sound principles on liquidity risk management issued earlier by the BCBS (Principle 6), state that alternative scenarios shall be considered and the assumptions underpinning decisions concerning the net funding position shall be reviewed regularly. Building upon this framework, CEBS published guidelines for liquidity stress testing in December 2006. In November 2007, the BSC formed a specific working group dealing with stress testing and contingency planning.

[34] "Technical Aspects of Stress Testing under the Supervisory Review Process – CP 12", 14 December 2006 (http://www.c-ebs.org/documents/GL03stresstesting.pdf)

- a sudden change in the composition of deposits and a sudden increase in cash deposit withdrawals, and
- a tightening of credit lines.

161 - The materialisation of risk events implies management actions (institutions do not manage their portfolios statically, and positions are changed in response to market developments). In addition, institutions should consider the potential reactions of their counterparties to these management actions and the likely behaviour of market participants in response to the risk events (e.g., the effect of market triggers). Introducing these aspects will greatly enrich stress tests and make them more realistic.

162 - In its March 2007 report, the IIF proposed stress tests using a variety of scenarios and/or sensitivity analysis – both institution-specific and market-related or a combination of the two – which could be conducted at a group, regional, or subsidiary level. Special consideration should be given to the choice of time horizon. Stress tests should cover all potentially material cash inflows and outflows, at least under normal business conditions, keeping in mind potential changes in the balance sheet in a crisis. The results of the stress tests should be communicated to senior management.

163 - A more systematic approach to stress tests, looking at a particular point on the loss distribution, would be to model the entire loss distribution using LaR models. However, as the GdC stock-taking indicated, there is relatively little interest in LaR models due to the difficulties in modelling liquidity behaviour. Since counterparty behaviour in liquidity crises differs fundamentally behaviours from behaviour in normal conditions, probabilistic measures of stressed cash flows, as used for VaR and IRB models, are often considered misleading and counterproductive.

164 - Stress testing should not focus only on expected and unexpected cash flows in a stress situation, but also on asset liquidity, since most institutions rely on generating liquidity from securities positions in order to generate liquidity in normal and crisis scenarios. The IIF recommends basing this assessment on the demonstrated ability to obtain liquidity from assets. Haircuts should be applied if warranted by the stress scenario. Indeed, according to the IIF report, most institutions apply volatility estimates to assets.

165 - Another relevant factor is the possibility that the institution will find it difficult or impossible to sell an asset or to pledge it in a secured lending transaction within the necessary time horizon, due to a decline in the capacity of the relevant markets. This was a feature of the 2007-2008 market turmoil, which most institutions have not adequately addressed in their stress tests.

166 - Institutions that are part of a group may evaluate scenarios on a global or regional basis if they can demonstrate the appropriateness of such an approach.

167 - The Guidelines on stress testing published by CEBS in December 2006 provided guidance to institutions and supervisors on how to perform stress tests, including tests focusing on liquidity risks. Eighteen months later, these guidelines (summarised below) are still considered valid.

***Recommendation 14***

*Institutions should conduct liquidity stress tests that allow them to assess the potential impact of extreme but plausible stress scenarios on their liquidity positions and their current or contemplated mitigants. They should regularly project cash flows under alternative scenarios of various degrees of severity, taking into account both market liquidity (external factors) and funding liquidity (internal factors). To provide a complete view of various risk positions, stress testing of other risks may be usefully considered in constructing 'alternative liquidity scenarios'. When assessing the impact of these scenarios on their cash flows, institutions should rely on a set of reasonable assumptions that should be reviewed regularly. The results of stress tests should be reported to senior management and used to adjust internal policies, limits, and contingency funding plans when appropriate.*

## Monitoring liquidity risk

168 - Institutions use various techniques to monitor liquidity risk.

169 - Along with ratios/gaps measuring the cash flow profile of the institution in a more or less sophisticated way, institutions often set limits on funding risk (roll-over risk, concentration/diversification risk) and/or on term transformation, since these are important drivers for the liquidity risk that the institution is exposed to.

170 - Most institutions have systems for controlling their liquidity positions in all material entities (branch or subsidiary), and in all major currencies.

### *Contingency funding plans (CFP)*

171 - An important issue mentioned in the GdC stocktaking is the relationship between stress testing and contingency funding planning. Triggering events for contingency plans should be aligned with stress testing results. Conversely, experience from stress tests could be incorporated in contingency guidelines.

172 - In its March 2007 report, the BSC defines a contingency funding plan (CFP) as the institution's set of internal "procedures for managing cash flow shortfalls in emergency situations. They incorporate assumptions about liquidity values of assets and buffers and the behaviour of liabilities, clients and regulators."

173 - Although CFPs are a relatively recent tool, the BSC notes that most top-tier banking groups have established one. However, there appears to be a wide range of practices, from relatively simple operational procedures setting out the responsibilities of and reporting lines to the crisis management committee, to full-fledged 'war plans'. The plans are designed to make it possible to make decisions rapidly and buy time in which to identify and think through the range of possible actions. Communication with markets and the public is essential, especially in name-specific events.

174 - A CFP involves striking a balance between the need to have pre-existing procedures in order to be prepared when a crisis occurs, and the need for flexibility as the crisis develops.

175 - As indicated in the BSC report, the CFP is usually formulated at the group level, and is supplemented with 'local' CFPs. It is usually tailored to circumstances that can affect the institution's liquidity position, such as idiosyncratic shocks or market disruptions.

176 - While CFPs actions can be tailored/contingent/scenario-specific, they usually share the following three objectives:

- reducing cash-consuming activities;
- maintaining franchise value; and
- signalling to the market that the institution is in reasonable health.

177 - The CEBS guidelines on stress testing provided the following examples of elements of a contingency plan:

- a definition of the events triggering the plan,
- a description of the potential sources of funding on both the asset and liabilities sides (e.g., slowing loan growth, sale or repo of liquid assets, securitisation, subsidiary sales, increasing deposit growth, lengthening the maturities of liabilities as they mature, draw-down of committed facilities, raising capital, and stopping dividends to parents);
- an escalation procedure detailing how additional funds could be raised;
- a procedure for the smooth management of the contingency, which should include a description of the delineation of responsibilities (including the responsibilities of the management body) and a process for ensuring timely information flows (for example, through contact lists); and
- a procedure governing contacts with external parties such as important counterparties, auditors, analysts, media, and supervisory authorities.

178 - The recent market turmoil highlighted the importance for institutions of regularly testing their contingency funding plans – and in particular the sources of funding listed in the plans – not only to prevent operational difficulties in times of crisis, when the need to activate those sources arise; but also to reduce reputation risk and avoid sending the wrong signals the market if those 'contingent sources' are to be activated only in times of stress.

***Recommendation 15***

*Institutions should have adequate contingency plans, both for preparing for, and for dealing with a liquidity crisis. These procedures should be tested regularly in order to minimise delays resulting from legal or operational constraints, and to have counterparties ready to be involved in any transaction.*

## *Liquidity risk mitigants*

### *Liquidity buffers*

179 - In most of the internal methodologies used, institutions set implicit or explicit limits on liquidity risk, taking into account a liquidity buffer, which allows them to be able to meet payments in stressed situations for a chosen period of time (survival period).

180 - In addition to the question of the cost of liquid assets, there is the problem of assessing how liquid these assets remain over time. As market conditions change, the liquidity of the assets may deteriorate, putting additional pressure on the institution's liquidity position.

181 - Institutions should take into account:

- the depth of the markets in which an instrument is usually traded;

- the effect that the complexity of a product has on its liquidity. Structured assets, even if highly rated, have proven to be less liquid in time of stress, due to the uncertainty of the underlying assets;

- the institution's eligibility for central bank refinancing operations;

- the liquidity provided by private claims. These can be a source of refinancing, but only under certain circumstances, and time is required to transform then into liquidity; and

- the definition of liquid assets, which may vary depending on the time horizons considered.

182 - Haircuts can be applied to take into account the varying degree of liquidity of different types of assets.

183 - During the 2007-2008 turmoil, institutions took 'extraordinary' measures to secure adequate funding for their expected liquidity needs. These measures involved increasing liquidity buffers by (i) securing access to additional central bank funding and (ii) raising additional money from existing or new providers of funding (e.g., cash surpluses in other group entities such as insurance subsidiaries, retail customers, private placements, etc). It is not yet possible to determine precisely what role contingency arrangements played in this regard.

***Recommendation 16***

*Liquidity buffers are of utmost importance in time of stress, when an institution has an urgent need to raise liquidity within a short timeframe and normal funding sources are no longer available or do not provide enough liquidity. These buffers should be sufficient to enable an institution to weather liquidity stress during its defined 'survival period' without requiring adjustments to its business model.*

*Diversification of funding sources*

184 - A 'funding concentration' exists when a single decision or a single factor could cause a significant sudden withdrawal of funds. There are no fixed thresholds or limits that define a funding concentration; this depends on the institution and its balance sheet structure. The amount that represents a funding concentration is an amount that, if withdrawn by itself or at the same time as a few other large accounts, would require the institution to significantly change its day-to-day funding strategy. Concentrations are almost always credit-sensitive, although collateralisation may reduce the sensitivity, depending on the quality and reliability of the collateral[35]. Funding concentrations can include:

- **Concentrations in one particular market for funding purposes / Market funding**
  - the inter-bank market
  - funding through debt issuance (commercial paper, medium-term notes, hybrid bonds, subordinated bonds, etc.)
  - wholesale funding (deposits from institutional investors and large corporations)
- **Concentrations in secured funding sources**

[35] "Liquidity", Comptroller's Handbook, US Office of the Comptroller of the Currency, Feb. 2001

- securities financing arrangements such as repurchase/reverse repurchase agreements and stock borrowing/lending
- asset-backed commercial paper
- securitisation of loans, (credit cards, mortgages, autos, etc.)
- covered bonds

- **Concentrations in a few providers of liquidity.**
  - inter-bank and wholesale market providers
  - large individual depositors
- **Geographical and currency concentrations of funding sources**
- **Maturity concentrations of market-based funding.**

185 - Concentrations of funding sources can have a significant impact on liquidity risk as well as systemic implications for the entire banking system.

- Concentrations in market funding increase liquidity risk. Increased reliance on market funding sources leaves institutions more exposed to the price and credit sensitivities of major fund providers. As a general rule, institutional fund providers are more credit-sensitive and will be less willing than retail customers to provide funds to an institution facing real or perceived financial difficulties. An institution's ability to access capital markets may also be reduced by events not directly related to it. For example, the Asian crisis of 1997 and the collapse of the Russian ruble in 1998 increased volatility and reduced liquidity for various capital markets products. Wholesale fund providers will be likely refuse to roll over existing funds at institutions whose creditworthiness is (or appears to be) deteriorating. As a result, the institution may find it more difficult to roll over its maturing short-term liabilities, especially any unsecured and uninsured borrowings such as Commercial Paper. In addition, market funding has an effect on funding costs and profitability, since it is more expensive than traditional core deposit funding.

- Concentrations in inter-bank funding entail contagion risks. Inter-bank funding can be a volatile funding source, especially in times of crisis, when confidence among institutions is lost and they become reluctant to lend to each other.

- Concentrations in a few providers of liquidity pose the risk that one significant inter-bank[36] or wholesale provider will withdraw from the market, or that a large depositor will withdraw large amounts of deposits.

- Concentrations in secured financing sources pose the risk that funding will not be available at all times or when needed. Institutions that depend too much on securitisation may encounter funding difficulties when markets are unable to absorb new asset-backed security issues and institutions are forced to hold assets in their books. Possible returns of receivable balances to the balance sheet, as a result of scheduled or early amortisation, may result in large asset pools that require balance sheet funding at unexpected or inopportune times.

- In addition, adverse events in credit markets may result in liquidity and the sudden withdrawal of credit lines granted to asset-backed

[36] See Annex E for a focus on interbank exposures, analysed in the context of the review of the Large Exposures rules.

commercial paper-programs, depleting banks' cash reserves or liquid assets.

***Recommendation 17***

*Institutions should actively monitor their funding sources to identify potential concentrations, and they should have a well-diversified funding base. Potential concentrations should be understood in a broad sense, encompassing concentrations in terms of providers of liquidity, types of funding (secured vs. unsecured), marketplaces, and products, as well as geographic, currency, or maturity concentrations.*

## 4. Rating agencies' approaches to internal methodologies

186 - Rating agencies were invited to present their approaches and internal methodologies to liquidity risk to the ad hoc working groups of the BCBS (in June 2007) and CEBS (in March 2008). The conclusions from these meetings are summarised below, and a more detailed presentation is made in Annex F.

187 - Broadly speaking, liquidity risk is not a significant determinant of ratings, in comparison with other factors such as profitability and capital. This is especially the case for the largest (cross-border) banks, where the probability of liquidity problems arising is relatively low because of the quality of the banks' risk management systems and their low potential for solvency concerns, which can be a leading indicator of liquidity problems. If a bank's liquidity risk management practices were particularly poor or deficient, or if the bank were experiencing liquidity difficulties, then liquidity issues would weigh more heavily in its rating. However, the rating agencies noted that in the past, liquidity problems more often than not have been the ultimate reason for bank failure.

188 - The methods used by different rating agencies to assess liquidity risk are quite diverse. However, underlying these differences is a layer of commonality, with significant weight placed on enterprise risk management, the sophistication of institutions' liquidity management practices, and the competence of liquidity managers. Access to central bank refinancing is also taken into account, particularly for stressed times, thus establishing a distinction between credit institutions and independent investment firms. Liquidity ratios are used by some rating agencies, but limited weight is placed on them. Indeed, they are often used simply as an (indirect) window on risk management systems, or as a tool to prompt further questioning.

189 - The most common quantitative test applied by rating agencies is some form of assessment on how long a bank could survive without access to market funding. While the results were not seen as being particularly illuminating in the absolute sense, they were useful as a method for cross-industry comparison. And it is perhaps in these tests that the rating agencies have their greatest influence on market participants, by enabling the banks to rank themselves against their peers specifically on their liquidity risk management systems.

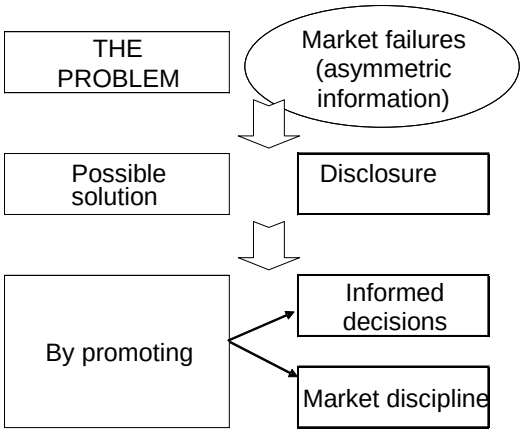
## 5. Transparency to the market

*"Adequate level of disclosure" on liquidity– for what purposes?*

190 - The adequacy of the level of disclosure on liquidity has been much debated in the light of the 2007-2008 liquidity crunch and confidence crisis prompted by the collapse of the US subprime market. Discussions with IEGL members revealed a consensus on the need to enhance transparency on exposures linked to the US subprime collapse. At the same time, they expressed strong reluctance to publish (more) information, especially of a quantitative nature, on liquidity risk and its management, for fear of misunderstandings or incorrect interpretations on the part of market participants or journalists, and due to the self-fulfilling nature of liquidity problems. The stigma associated with access to emergency funding from central banks was very much in their minds. Not surprisingly, CEBS's Report on Banks' transparency on activities and products affected by the recent market turmoil (June 2008) states that only a very few institutions have provided specific information on the effects of the crisis on their liquidity risk management. Where information has been published, it generally is of a qualitative nature, occasionally supplemented with charts or graphs illustrating the bank's funding structure.

191 - As reputation is critical to the access to and cost of funding, transparency to the market should be handled with caution. For example, industry representatives indicated that they had put in place enhanced bilateral channels of information to their major liquidity providers. Specific information was addressed to specific actors: rating agencies, depositors, or stockholders. In the recent turmoil, some institutions seem to have chosen direct and bilateral contacts in order to overcome rumours and to deliver information.

192 - Market discipline falls within the scope of Pillar 3. An appropriate level of disclosure is thought to promote market discipline, by enabling market participants to make informed decisions. Disclosure is intended to help investors in their investment decisions and depositors in their choice of where to deposit. But seen from the Pillar 3 viewpoint, it is also intended to motivate and enable these agents to discipline institutions' actions, such as enhancing the quality of their management. In this respect, the ultimate aim of disclosure is to prevent market failures caused by asymmetric information. The rest of this section discusses the pros and cons of increasing disclosure requirements.



*Transparency in compliance with IFRS 7*

193 - IFRS 7 applies to all risks arising from all financial instruments, including those instruments that are not recognised on the balance sheet, and to all types of listed entities that are required to prepare consolidated financial statements.

194 - IFRS 7 is less prescriptive than IAS 30, in that it eliminates the requirement to disclose the contractual maturities of financial assets. Financial liabilities, however, must be disclosed by contractual maturity, based on undiscounted cash flows, according to the internal information available to the management. One of the difficulties in preparing this maturity analysis is the treatment of derivatives, which normally involve a series of cash flows. The guidance in IFRS 7 states that net amounts should be included in the analysis for pay float/receive fixed interest rate swaps for each contractual maturity category when only a net cash flow will be exchanged. Hence, a currency swap would need to be included in the maturity analysis based on gross cash flows.

195 - IFRS 7 recommends time frames that may be used in preparing the contractual maturity analysis for liabilities. It also expands the disclosure of liquidity risk to include a description of how liquidity risks are managed.

196 - IFRS 7 disclosures must be based on the accounting policies used for the financial statements prepared in accordance with IFRS, including consolidation adjustments. It is possible that the internal information made available to management for risk management purposes is not prepared under accounting policies. To fulfil IFRS 7, this information is accepted, especially for the description of how liquidity risks are managed.

***Point of interest / lesson 12***

*IFRS 7 is of limited relevance to the banking business, particularly given that only liabilities are required to be declared by contractual maturity.*

197 - Even though institutions are increasing their disclosures on liquidity at the group level, authorities usually do not impose any disclosure requirements beyond those of the accounting rules. Hence, there seems to be a market demand for institutions to increase the level of the liquidity information they disclose. The issue here is whether there should be supervisory pressure or a supervisory requirement to increase the current level of disclosure.

198 - Although all banking business inherently generates liquidity risk, banks' liquidity risk management varies widely, depending on the business model, the main activities that are pursued, and many other features. Moreover, different institutions have different degrees of liquidity risk tolerance. All of these factors give rise to different liquidity needs and different liquidity approaches; hence a standardised approach to disclosure may fail to provide the right picture of each institution.

199 - The discussion on the pros and cons of requiring a higher level of liquidity disclosure will address each specific type of information (quantitative, qualitative, normal times, stressed times) in the sub-sections below.

*Type of information to disclose*

200 - Institutions' stakeholders are entitled to accurate and detailed information regarding the institutions' liquidity risk management, as well as on the liquidity risk exposures or even liquidity levels (e.g., buffers compared to an internal

benchmark), that allows them to make informed decisions. These stakeholders include not only the institution's stockholders, but also its depositors and ultimately the general public, which can be harmed if the institution fails (deposit guarantee schemes do not cover all stakeholders, and a failure may lead the governments to intervene).

201 - However, investors invest in institutions' securities, not in their 'liquidity'. The information that is most important to investors is information about the underlying risks. And so – turning to the root of the recent turmoil, which arose from the problems in the US subprime mortgage market – it appears that investors were highly uninformed about the securities they were investing in, leading them to shift to other type of instruments that were simpler to understand. An investor considering whether to invest in securities that an institution has packaged together in a securitisation program has a greater need for information about the risk of the assets underlying that operation, than for information on the institution's liquidity[37]. However, the need for this type of disclosure is being discussed in other working groups (IOSCO, industry initiatives sponsored by the European Commission, etc.), and therefore will not be addressed here.

Qualitative information

202 - **There is no question about the need for disclosure of qualitative information** about liquidity risk management: specifically, on internal governance and the policies and procedures for managing liquidity risk. Qualitative information should also include details on information systems, internal controls, and the numbers and expertise of personnel. This information helps market participants assess the capacity of each institution to manage liquidity properly. Moreover, knowing that they will be required to provide these details, institutions are disciplined by the market.

203 - These types of requirement are not applied to strategic information, which institutions are understandably reluctant to disclose because of confidentiality concerns.

204 - The problem, though, is that while institutions may support more disclosure of qualitative information, they will not want to reveal their weaknesses. Hence, it is difficult to provide the right incentives for institutions to disclose the most 'truthful' information. This leads to a discussion of disclosing quantitative information on liquidity.

Quantitative information

205 - One of the consequences of the recent market turmoil has been to put pressure on institutions to disclose more information on liquidity. The industry has expressed its reluctance to do so, especially for quantitative information. They claim that detailed quantitative information is too strategic to be made public, and sometimes also that the values of liquidity flows are so scenario- and context-specific as to be misleading if not properly understood. Finally, some critics claim that disclosure of specific liquidity figures might lead to erroneous comparisons between institutions and thus incorrect conclusions about their soundness and resilience.

206 - So what quantitative information should be disclosed? As discussed above, generic, standardised figures on liquidity could be misleading. Nevertheless, institutions should be encouraged to disclose qualitative information that can help market participants assess their situation in quantitative terms. And as

[37] This does not mean that investors are not interested in a security's liquidity.

the recent crisis has shown, information on off-balance sheet items is fundamental because contingent risk that has materialised came from these items.

207 - The market turmoil also showed that contingent risks can materialise even when they are not backed by any legal obligations. Thus, information on 'implicit support' should be made available, since in stress situations these become active constraints and further worsen liquidity positions.

**Advantages and shortcomings of quantitative disclosure**

| | Advantages | Disadvantages |
|---|---|---|
| **Contractual maturities** | - Provides information on BS maturity structure<br>- Easy to provide | - Necessary but not sufficient; |
| **Behavioural maturities** | - Provides information on BS maturity structure, and on the way the institution manages its liquidity position<br>- Easy to fit in buckets | - Highly subjective<br>- Reputation risk if problems in market participants' interpretation |
| **Liquidity buffers** | - Weighted net cash outflows can be related to the liquidity value of a stock of assets | - No common understanding of what a liquidity buffer is<br>- Possible misleading comparisons |
| **Survival periods for an institutions with no access to the markets** | - Easy to understand<br>- Comparable | - Highly dependent on the type of funding a bank relies on |
| **Internal methodologies** | - Close to the institution's actual LRM | - Reveals strategic information<br>- Difficult to understand and compare |

*Normal vs. stressed conditions*

208 - Stakeholders are interested in knowing how banks manage liquidity in normal conditions, but they are also concerned about periods of stress conditions and how are banks equipped to deal with them. Information on liquidity stress-testing and contingency funding plans is crucial for this purpose. The issue is where strategic or internal information ends and public information (for stakeholders) begins.

***Recommendation 18***

*Institutions should have policies and procedures that provide for the disclosure of adequate and timely qualitative and/or quantitative information on their liquidity risk management and/or their liquidity positions, in both normal and stressed times. The nature, depth, and frequency of the information disclosed should be appropriate for their different stakeholders (liquidity providers, counterparties, investors, rating agencies, and the market in general.*

# IV. Supervisory Approach to Liquidity Risk Management and Internal Methodologies

209 - The role of supervisors is to ensure the safety and soundness of individual institutions and, more broadly, of the financial system.

210 - Liquidity stresses are low-frequency but high impact events, and as such are likely not to be adequately considered by short-term oriented management and shareholders, particularly if there is no recent experience of liquidity problems. Institutions face a competitive disadvantage if they mitigate their liquidity risk, as they incur higher costs compared to other institutions that do not. Moreover, the availability of central bank emergency liquidity assistance, as well as deposit insurance schemes and implicit government guarantees, may (depending in part on their terms) reduce managers' and shareholders' incentives to build in as much resilience to liquidity stress as the wider costs of failure to the economy at large would justify.

211 - Solvency problems are often a source of liquidity pressure. Consequently, sound capital regulation and strong capital positions reduce the likelihood of liquidity pressure: the ability of an institution to bear liquidity risk is linked to the amount of capital it possesses and the losses it can absorb. But, as recent events have highlighted, although sound liquidity management is critical to protect capital, capital itself may not be an appropriate buffer in a difficult liquidity environment. Because of information asymmetries, creditors may be uncertain about an institution's solvency position, leaving them unwilling to lend even though the institution may be fundamentally solvent. This may be compounded by the self-fulfilling nature of bank runs: in trying to generate cash to repay creditors, an institution may suffer losses from the sale of less liquid assets at 'fire-sale' prices and become financially weakened.

212 - Thus there are two types of market failures that call for supervisory action: managers and shareholders may not have incentives to seek adequate access to liquidity from a public policy perspective, and even solvent institutions may face liquidity pressure. These market failures justify a regime for liquidity risk supervision. The objectives of EU supervisors are to ensure that credit institutions and investment firms maintain reasonable liquidity buffers and sufficient access to liquidity, taking into account the effect of individual failures on the broader financial system.

213 - As described above, supervisors have strong incentives to assess and monitor the liquidity risk of entities under their responsibilities, in order to rumours when needed, and avoid contagion. However, since the current market turmoil is to a large extent underpinned by a loss of confidence in supervised market participants, it also indirectly signals that markets do not fully trust the supervisors, highlighting the need for a specific supervisory focus and resources devoted to liquidity risk.

214 - From a supervisory perspective, any liquidity risk management framework should cover both normal times and stressed times.

215 - Taking into account national approaches and lessons from the crisis, there is a significant degree of agreement among supervisors on the following principles:

i) Liquidity buffers are needed as the first line of defence in the event of a liquidity drain.

ii) Qualitative requirements are also needed to assess the adequacy of institutions' internal liquidity risk methodologies.

216 - As recent cases in Europe and in the United States have shown, liquidity risk events should be handled swiftly, and can require close coordination between supervisors, central banks, and finance ministries. These authorities need to ensure that institutions have adequate policies and procedures in place for managing liquidity crises.

***Recommendation 19***

*Supervisors should have methodologies for assessing institutions' liquidity risk and liquidity risk management. Appropriate resources should be allocated specifically to supervising liquidity risk and how it is managed by institutions.*

## 1. Assessing the level of liquidity risk

*Level of risk implied by the business model*

217 - The first step for supervisors is to assess the gross level of risk incurred by institutions (i.e., the level of risk before assessing entities' internal risk management) and their level of risk tolerance. Each European supervisor has developed its own methodology, described in more or less detail in its supervisory handbook, for defining the profiles of credit institutions and investment firms that merit close attention and those allowing a lighter approach.

*Level of systemic risk*

218 - In order to fulfil their financial stability missions, supervisors need to look not only at an institution's intrinsic level of liquidity risk, but also at the potential for contagion from a liquidity risk event affecting the individual institution. This holds especially true for institutions that are deemed to pose systemic risk because of their market share, their role in payment and settlement systems, because they have a large retail customer deposit base in their balance sheet (which implies the need to avoid a run on deposits), or because they are key players in the inter-bank market.

219 - The State support and communication strategies adopted by different countries will not be discussed in this section, which focuses exclusively on supervisory approaches.

***Recommendation 20***

*When setting priorities for the supervision of liquidity risk, supervisors should take into account:*

*- the liquidity risk profiles of institutions, in order to apply a proportionate approach to their supervision; and*

*- the level of systemic risk that they present.*

*Static indicators and quantitative regimes:*

220 - Existing quantitative regimes and reporting requirements provide some tools for measuring the liquidity risk profile of an entity. Many of them assess

the level of liquidity risk insurance to the level of liquid assets. Additional tools may need to be developed for assessing the actual liquidity of assets that were presumed to be liquid, a problem that was at the centre of the recent market turmoil. Another possibility is to identify and monitor the level of maturity gaps.

221 - Independent of the nature of the regulatory regime, supervisors use indicators to define an institution's risk profile. As there is no single best practice indicator, supervisors use a variety of (static) indicators to assess liquidity risk in institutions with different business strategies. Some supervisors use a range of static indicators defining, for example, the level of financing provided by retail activities or by wholesale markets. As discussed above, assessing an institution's reliance on wholesale markets is essential in determining its vulnerability to market shocks.

*Investment firms:*

222 - Some institutions have business profiles that imply a low liquidity risk. For example, certain investment firms are only permitted to conduct activities on behalf of third parties. A majority of supervisors do not apply the complete set of liquidity risk requirements to investment firms, in recognition of their particular risk profile.

*Entities included in the liquidity risk management of a group:*

223 - In cases where entities are integrated into their parent institution's liquidity risk management strategy, the solo basis may not be the best level for assessing their liquidity risk, whether on a gross or net basis. However, some large banking groups prefer to use a decentralised approach – requiring each entity to operate on a stand-alone basis – due to potential constraints on intra-group transfers of funds in times of stress. In response to changes observed in cross-border groups, some EEA home supervisors have decided to assess liquidity risk at the group level, although host supervisors continue to supervise subsidiaries, and in most cases, branches. Some supervisors allow exemptions for branches included in a group when the group is subject to certain conditions, including broadly equivalent liquidity risk requirements.

*Interaction with other risks*

224 - As stated above (see Part I-2), EU institutions increasingly rely on funding sources that are more sensitive to interest rate, market, credit, and reputation risks. Therefore, when assessing the level of liquidity risk at institution level, supervisors should be able to assess the impact of other risks on liquidity risk.

225 - As these other risks can generate liquidity drains (through increased funding cost, for example), sound management of these risks helps, but does not provide sufficient liquidity risk mitigation. The existence of a reasonably robust capital base and a high capital ratio should not lead supervisors to minimise their assessment of liquidity risk. Supervisors should not rely solely on an institution's capital base or solvency ratio as a mitigant.

***Recommendation 21***

*When assessing an institution's liquidity risk profile, supervisors should pay special attention to the institution's process for identifying all liquidity risks and - at a minimum - to its reliance on wholesale sources of funding, the concentration of funding sources, the level of maturity transformation, the institution's position within the group and, more generally, its business profile, risk tolerance, and stress resistance. The institution's overall exposure to other risks and their possible influence on the level of liquidity risk should be analysed in conjunction with the institution's funding profile. Special attention should be paid to collateral management.*

## 2. Assessing liquidity risk management

226 - Once the liquidity risk profile has been assessed, supervisors usually assess the robustness of the institution's liquidity risk management and its adequacy to the institution's liquidity risk profile. The broad purpose is to assess the appropriateness of the risk management relative to institution's risk profile and the risk tolerance defined by its Board of Directors.

227 - In making these assessments, supervisors can build on the recommendations addressed to institutions in Part III of this Advice. Their assessments will also build on off-site monitoring (for example, through regular contacts at the senior level), on-site examinations, and institutions' internal control reports.

228 - Supervisors should be able to assess whether the liquidity risk tolerance or strategy set by the senior management stems from a well-informed assessment of the current level of liquidity risk and the legal and regulatory environment. They should also check whether the institution's structure ensures the segregation of duties between operational and monitoring functions, in order to prevent conflict of interests. In this respect, special attention should be paid to the powers and responsibilities of the unit in charge of providing funds.

229 - Finally, special attention should be paid to the adequacy of any liquidity cost/benefit internal transfer mechanism. Such a mechanism should address low probability-high impact contingency liquidity risks, and it should set appropriate incentives by ensuring that the quantitative funding costs and more qualitative benefits are adequately reflected in strategic planning and performance management.

***Recommendation 22***

*Supervisors should verify the adequacy and effective implementation of the strategies, policies, and procedures setting out institutions' liquidity risk tolerance and risk profile, and ensure that they cover both normal and stressed times.*

230 - In addition to assessing liquidity risk profiles and liquidity management, supervisors should pay particular attention to the level and quality of liquidity risk mitigation. One of the main lessons from the recent crisis is the fragility of unsecured funding, together with the low reliability of committed credit lines and the critical judgment needed in evaluating the liquidity of assets. Supervisors should consider liquid assets as a better form of liquidity risk insurance than liquidity lines, whether they are contractual or not. In any case, institutions should review their assessment of the liquidity of an asset regularly and consider the potential use of liquidity lines carefully. The liquidity

value of an illiquid asset should be based on projected cash flows from the assets, regardless of which portfolio they belong to.

***Recommendation 23***

*When assessing the quality of liquidity risk management, supervisors should pay particular attention to the adequacy of the institution's liquidity risk insurance, especially for stressed situations. Supervisors should pay particular attention to the marketability of assets and the time that the institution would actually need to sell or pledge assets (taking into account the potential role of central banks).*

231 - The various working groups on liquidity all attach great importance to stress-tests and contingency funding plans. Stress testing is valuable only when the outcomes are actually incorporated in the liquidity risk management framework. Similarly, the performance of contingency funding plans depends on testing their features before the need to activate them arises. 'Road testing' of contingency funding plans is not possible in times of crises.

232 - As indicated above (see Part III), stress testing covers a variety of techniques used by institutions to gauge their vulnerability to exceptional but plausible events.

233 - In its 2006 guidelines on stress testing, CEBS and its member supervisors noted the importance of institutions' embedding stress testing[38] into their overall risk management framework.

234 - Supervisors also acknowledged that there is no single 'correct' stress testing methodology or procedure. What is adequate for an individual institution depends very much on proportionality (meaning that the complexity of stress testing should to be related to the size of the institution and the sophistication and diversity of its activities) and the development of its practices over time. Thus, an important part of the supervisors' assessment of stress testing will be based on a continuing dialogue with institutions.

235 - Supervisors may design their own specific stress scenarios for internal purposes, based on information provided by institutions that are subject to some form of quantitative requirement relating to liquidity. Such scenarios may incorporate conservative assumptions, to test, for example, the ability of the institution to withstand a downgrade using its available liquidity resources. In such cases, supervisors may apply different discount factors to assets considered as liquid, and may use conservative behavioural assumptions for saving and sight deposits.

236 - Supervisors could also undertake further work to develop macro stress-test scenarios that capture the systemic risk posed by liquidity crises. Feedback to the industry should be provided, along with requests for corrective actions and modifications to assumptions where needed. A cross-sectoral stress test conducted in the Netherlands before the recent market crisis helped the industry to be better prepared to withstand the turmoil. Cross-sectoral stress tests capture the liquidity risks stemming from the credit risk transfer market, including possible second-round effects. Such stress-tests could include the different stakeholders in the credit risk transfer process: for example, insurers

[38] Further work on stress tests and contingency funding plans is being conducted by the Banking Supervisory Committee. CEBS is maintaining close coordination with the BSC, and will update this Advice on this issue as soon as possible.

and pension funds as well as banks and investment firms. Such an approach would help the industry refine its own tools.

237 - As highlighted by recent events, additional attention needs to be paid to the interaction between market liquidity and funding liquidity, and to the diversification of bank funding (by types of providers, products, maturities, etc.), taking into account correlations under stressed conditions. Further consideration should be given to developing integrated stress-tests.

238 - The assumptions used should cover all maturities involved in liquidity risk management, ranging from day-to-day operations to short-term and long term/strategic funding; and should, to the extent possible, capture the interaction between liquidity risk and other risks.

239 - Assumptions should be sufficiently conservative and should encompass all types of liquidity-related assets and liabilities, including off-balance sheet items as well as non-contractual support. Special attention should be paid to covenants and other legal triggers, to liquidity support to SPVs and conduits (which cannot be considered as remote as previously), and to bonds with extendable maturities. Back-up lines should be treated with caution, as they may not be available when needed (as recent events have shown) and their activation might send negative signals to the market.

240 - Supervisors should verify that robust and well-documented stress tests are conducted and that their results trigger action, in particular in defining liquidity risk internal policies, limits, and contingency funding plans.

241 - Supervisors should check that institutions have dedicated policies and procedures in place for crisis situations, especially in the form of contingency funding plans, and that their assumptions, building on the stress tests exercises, are tested regularly in order to avoid delays due to legal or operational constraints and in order to have counterparties ready to be involved in any transaction.

***Recommendation 24***

*Supervisors should verify that institutions have dedicated policies and procedures in place for crisis management. Supervisors should pay particular attention to the existence of appropriate stress-tests, the composition and robustness of liquidity buffers, and the effectiveness of contingency funding plans. In particular, supervisors should verify that robust and well-documented stress tests are in place and that their results trigger action. The assumptions used should be appropriate and sufficiently conservative, and regularly reviewed. Supervisors should check that contingency funding plans build on the stress tests exercises and are regularly tested.*

*Quantitative regimes*

242 - Supervisors that have a quantitative regime use a variety of approaches. Some supervisors regard quantitative requirements as a first step, and supplement it with the qualitative part of their regime. In this case, the quantitative requirements apply to all institutions that are subject to the liquidity risk regulation, allowing comparisons between all entities. Other supervisors consider that, beyond a certain level of complexity, the quantitative approach is less useful in assessing the level of liquidity risk and the quality of risk management than information defined on a case-by-case basis. These supervisors apply a bifurcated approach, allowing internal

methodologies to replace quantitative requirements at some institutions. Prior to granting any form of recognition to internal methodologies in their approaches, supervisors should assess the methodologies and gather supporting evidence which would give them the necessary assurances as to their adequacy.

***Recommendation 25***

*Supervisors should consider whether their quantitative supervisory requirements, if any, could be supplemented or replaced by reliance on the outputs of institutions' internal methodologies, providing that such methodologies have been adequately assessed and provide sufficient insurance to supervisors.*

## 3. Use of internal methodologies as supervisory tools

243 - Under the existing supervisory framework, the methodologies that institutions use to measure, monitor, and manage liquidity risk can be used in prudential supervision. There is currently a range of practice is supervisory reliance on these internal methodologies. Annex D summarises the supervisory use of internal models by the various national supervisory authorities.

244 - Most national supervisors, regardless of whether their supervisory approach is more or less prescriptive, expect large complex financial institutions to develop their own methodologies, which allows the supervisors to develop a more advanced approach to supervising liquidity (including under Pillar 2) than would be possible using a standardised supervisory framework.

245 - There is a considerable degree of commonality in supervisors' qualitative expectations concerning institutions' internal methodologies. This commonality is reflected in the BCBS Sound Practices paper. The main differences appear to be between those countries that are willing to rely more heavily on the outcome of liquidity ratios calculated on the basis of internal methodologies, and those countries that apply supervisory limits based on predetermined methodologies.

246 - A majority of smaller domestic institutions use a simple standardised approach that relies primarily on quantitative requirements, which are often prescribed by the supervisor. This simplified approach, applied proportionately, is often adequate, given the relatively fixed structure of the balance sheet at many institutions. Nevertheless, even smaller institutions may supplement simplified approaches with scenario analysis.

247 - Where international active banks are concerned, however, a simple quantitative approach is not always considered adequate for internal risk management. Both asset- and liability-side business is much more volatile at such institutions, and the risk profile of their transactions tends to be (increasingly) complex. This implies the need to supplement or replace quantitative regulatory requirements with requirements based on internal methodologies.

***Recommendation 26***

*Under the proportionality principle, supervisors may consider their standardised regulatory approach (if they have one), as a key element in the internal liquidity risk management of less sophisticated institutions.*

*Supervisory assessment of internal methodologies:*

248 - Regardless of whether internal methodologies are subject to formal approval, assessment should cover:

- Governance: the definition of liquidity risk, risk strategy, involvement of senior management, organisational embedding of liquidity risk management, the structure of limits, interaction with other risks, reporting.

- Sound methodology: useful ratios in assessing the short-term and structural liquidity position of institutions, the composition of the liquidity buffer and the assumptions used, the definition of material cash flows, diversification strategy, internal validation of outcomes, consideration of off-balance-sheet positions, New Product Process, and and the design and embedding of stress tests.

- Conservatism: the use of sufficiently conservative assumptions in calculating ratios.

- Completeness: internal methodologies sufficiently covering the institution's scope of consolidation, and ratios sufficiently covering all material anticipated and unanticipated future inflows and outflows of cash and liquid assets.

- Timeliness of the liquidity overview: data refreshing requirements, sufficiently high frequency of calculation of the ratios.

- Use Test: institutions should actually use ratios in their liquidity management.

- Liquidity crisis planning: the contents of the contingency plan, time horizon, strategy for selling assets.

- Cross-border aspects of liquidity management: centralisation vs. decentralisation, cross-currency liquidity risk management.

249 - Ratios should be useful in assessing both the individual and the aggregate liquidity position in the most important currencies for the institution.

***Recommendation 27***

*When using internal methodologies for supervisory purposes, supervisors should assess the adequacy of governance, the soundness of methodologies, conservatism, completeness, the timeliness of reviews, the robustness of stress testing, and resilience to liquidity crisis, taking into account consideration external constraints on the transferability of liquidity and the convertibility of currencies.*

## 4. Disclosure to supervisors

250 - Supervisors could explore the possibility of developing a minimum set of common reporting requirements, applicable to all credit institutions, and possibly to investment firms that are not restricted to activities on behalf of third parties. A set of metrics tailored to potential sources of liquidity vulnerabilities could be particularly useful. One such set of metrics was proposed in the March 2007 report of the Institute of International Finance[39];

[39]"Principles of Liquidity Risk Management", Institute of International Finance, March 2007.

it appears to be relatively comprehensive. The ability to do this, however, is heavily constrained by differences in environmental factors across the EEA, such as different central bank policies and depositor insurance schemes. These differences mean that similar metrics may behave differently.

251 - Reporting requirements could be met either through regular reports to local supervisors, or – in the case of institutions that use sophisticated internal methodologies which are subject to prior supervisory approval – by submissions in the institution's own format. When granting supervisory approval, supervisors should check that the quality and exhaustiveness of data are equivalent to those requested under the standardised reporting format.

252 - In times of liquidity stress, supervisors should consider whether it is appropriate to increase the frequency of regular reporting and/or to require additional information.

253 - Supervisors should enhance peer analysis of institutions with similar business models. A prospective dimension should be incorporated, taking into account quantitative data (such as maturity tables) and qualitative data (such as the medium-term strategy and risk tolerance set by the Board of Directors). Supervisors should consider which peer groups are the most appropriate for providing useful and accurate comparisons.

***Recommendation 28***

*Supervisors should have at their disposal precise and timely quantitative and qualitative information which allows them to measure the liquidity risk of the institutions they supervise and to evaluate the robustness of their liquidity risk management.*

## 5. Home-host cooperation: a need in the European zone

*The current framework*

254 - Under the CRD, Member States are responsible for supervising the liquidity risk of entities located within their jurisdictions. Article 41 of Directive 2006/48/EC specifically makes them responsible for the liquidity of branches, and they are responsible for the liquidity of subsidiaries as they are for all their other banking risks.

255 - This supervision is administered in the framework of the Pillar 2, as required by Annex V of Directive 2006/48/EC, but not just under Pillar 2. All Members States have specific, more or less prescriptive regulations regarding liquidity risk that they apply to all entities established in their jurisdiction (See the first part of the advice dealing with the stock-taking of current regulations within the EEA).

256 - Regarding subsidiaries, Article 131 of Directive 2006/48/EC provides for cooperation arrangements between home and host supervisors (with the possibility of delegating tasks to the home supervisor).

257 - Regarding branches, several EEA countries[40] already grant exemptions to EEA branches from their own liquidity regime, on a reciprocal, bilateral basis. These exemptions are often granted based on commitments from home

[40] Germany, Greece, Ireland, Italy, The Netherlands, and the United Kingdom. France is currently revising its regulatory framework to offer this possibility.

supervisor to ensure adequate control of the liquidity of the branch, to notify the host supervisor immediately in the event of a material adverse change in the liquidity of the branch, to provide whole-bank liquidity information in the event of a crisis, and to confirm that liquidity management within the institution is effectively centralised. These arrangements do not preclude the responsibility of the host supervisor granting the exemption. They may provide for the communication of information from the home supervisor to the host. Current practices of delegation relating to the supervision of liquidity risk are detailed in a CEBS report on delegation to be released soon.

258 - The increase in cross-border flows and their crucial importance in times of stress call for well-defined coordination and effective exchange of information between all the supervisors concerned.

*Potential improvements*

259 - There is significant room for improvement within the current legal framework. CEBS believes that consideration should be given to creating a **framework for cooperation dedicated to liquidity**, which could be used in the colleges of supervisors, and in the exemptions arrangements for branches. This framework could also provide for enhanced information exchange between home and host supervisors when dealing with branches that are systemically important to the group or the local market. Delegation of tasks could also help develop a comprehensive outlook of liquidity risk and liquidity risk management at the group level, and should therefore be promoted. As a follow-up to the Francq report, CEBS is currently analysing real-world cases of delegation of tasks, including in the area of liquidity supervision. The outcome of this analysis will be incorporated into this Advice, as appropriate. Supervisors are invited to explore the possibility of developing tools providing an outlook of liquidity risk and liquidity risk management at the group level, as a complement to those already in place at the institution level.

260 - Such a framework could include:

| **Type of information to be exchanged** | **Frequency of information (in normal times[41])** |
|---|---|
| General assessment of the liquidity position of the entity | Joint assessment between home and host (at the granting of an exemption for branches, for example), to be updated regularly by the home supervisor |
| Quantitative reporting requirements, when applicable | Annually, or more frequently as agreed |
| Qualitative reporting requirements, when applicable | Annually, or more frequently as agreed |
| Conclusions of on-site inspections | Whenever they occur |
| Conclusions of thematic surveys | Whenever they occur |

[41] Considering that crisis times are dealt with by other groups.

***Recommendation 29***

*The supervisors of cross-border groups should coordinate their work closely, in particular within the colleges of supervisors, in order to better understand the groups' liquidity risk profiles.*

## 6. Remedial action

261 - The analysis of qualitative and quantitative information disclosed to supervisors on a regular basis, as well as supervisory assessment and cooperation more generally, will help them to identify any deficiencies in the liquidity risk management framework of the institutions under their responsibilities at an early stage, and to direct the concerned institutions to take effective and timely appropriate remedial action when necessary, in accordance with the national supervisory framework.

262 - Convergence in preventive supervisory measures should be explored. The 2007-2008 events have shown how rapidly liquidity risk can materialise. This highlights the crucial importance of preventive supervisory action in this field. Supervisors are invited to develop common tools enhancing convergence of practices in setting early indicators and related preventive measures.

***Recommendation 30***

*Supervisors should use all the information at their disposal in order to require institutions to take effective and timely remedial action when necessary. They should explore the possibility of having tools that provide them with early warnings, facilitating preventive supervisory action.*

# ANNEX A: Mapping of existing definitions of liquidity risk

## Survey of existing definitions:

**(1) Basel Committee on Banking Supervision *Sound Practices for Managing Liquidity in Banking Organizations*,– BCBS, February 2000** [BCBS 2000]**.**

**Liquidity** is the ability to fund increases in assets and meet obligations as they come due.

**(2) International Organization of Securities Commissions *Sound Practices for the management of Liquidity Risk at Securities Firms* [IOSCO 2002]**

**Liquidity** is defined through its goals: "to have sufficient funds to meet obligations as they arise without selling assets, […] or to have excess liquidity in a normal environment and sufficient funding in a stress environment".

Firms define **Liquidity risk** as "the risk to their ability to meet commitments in a timely and cost effective manner while maintaining assets and, for some firms, the inability to pursue profitable business opportunities and continue as a viable business due to a lack of access to sufficient cost-effective resources."

**(4) Banking Supervision Committee *Liquidity risk management of cross border banking groups in the EU* BSC, March 2007**

**Liquidity risk** is the risk of not being able to fund increases in assets and meet obligations as they come due and at a reasonable cost.

Funding liquidity risk **is the risk of an individual institution can be defined as "… the risk that the firm will not be able to efficiently meet both expected and unexpected current and future cash flow and collateral needs without affecting either daily operations or the financial condition of the firm."**

**(3) Committee of European Banking Supervisors *Guidelines on the Application of the Supervisory Review Process under Pillar 2* (CP03 revised), CEBS, January 2006** [CEBS, CP03 2006]**.**

**Liquidity risk** is the current or prospective risk to earnings and capital arising from an institution's inability to meet its liabilities when they come due.

**(3) Institute of International Finance *Principles of liquidity risk management*, - IIF, March 2007** [IIF 2007]

Funding liquidity risk is the risk to funding the firm.

Market liquidity risk is the risk that a particular on- or off-balance sheet market or product is illiquid.

**(5) ECB, glossary**

**Liquidity risk** is the risk that a counterparty or a participant in a payment or settlement system will not settle an obligation at its full value when due. Liquidity risk does not imply that the counterparty is insolvent, since it may be able to settle the required debt obligations at some unspecified time thereafter.

# ANNEX B: Payment and securities settlement systems characteristics and implications for liquidity risk management:

## Payment systems

An overall view of the characteristics of current payment and settlement systems is necessary for analysing the liquidity implications of modifying them:

| | **Characteristics** | **Liquidity management implications** |
|---|---|---|
| **Gross settlement** | Operations are settled "one by one". | There is a continuous settlement process, so liquidity must be held at every moment. Liquidity management requires constant monitoring. |
| **Net settlement** | Each entity's operation over a period of time is batched into a single final settlement. Netting can be bilateral or multilateral. | Liquidity neees are punctual, so entities do not need to hold funds continuously; instead, they should assess the liquidity needs of the next settlement. |
| **Real-time settlement** | There is no delay between the moment the operation is accepted by the system and its settlement. | Once the operation is considered 'irrevocable', the entity must have enough liquidity for its settlement. |
| **Deferred settlement** | There is a lapse of time between the acceptance of an operation and its settlement | The need for liquidity is not immediate, and the manager will have some time for getting funds |
| **Cross-border payments** | A complex process used mainly for large-value payment settlement, and exposed to various kinds of risks[42], which are reduced if the settlement is done through a single platform. | Operating in various systems in different markets, with different settlement periods and system designs; challenges the management of a global liquidity account, as the entities have to deal with different system designs and timing. Overnight liquidity needs can increase. |
| **Local payments (1) (2)** | Generally for retail payments. | Depending on the number and the interconnections of the different local systems, liquidity risk management will become more complex. Due to different timetables, overnight liquidity needs may increase to some extent. |

(1) In the EU, the introduction of the euro has contributed to the establishment of a Single Market, that facilitates cross-border trades[43]

(2) SEPA began to operate at EU level in February 2008. Local and intra-European transfers will be treated by the same system.

### Real time gross settlement (RTGS) vs. deferred net settlement systems:

It is very common for the design of systems to combine some characteristics. Here are the two most common designs:

[42] Operational, legal, Herstatt (for foreign currency operations), and liquidity risk are the most serious ones.

[43] In order to improve retail payments systems, the Eurosystem has been working, first, on drawing up objectives, and more recently, through the SEPA project, on establishing a single retail payment area in 2008.

| Implications for: | Real-time gross settlement system | Deferred net system |
|---|---|---|
| Monitoring and control | Institutions need to monitor their liquidity in real time. | The punctual liquidity needs do not demand a continuous monitoring of the liquidity position. |
| Intraday liquidity | A continuous settlement process demands holding enough liquidity during the cycle and continuous access to sufficient cash. Managers should have comprehensive real-time information and foresee the liquidity needs for settling each transaction. Intraday management becomes fundamental. | Liquidity necessities are punctual, as the orders are 'promises to pay' until the final period, when the net position is communicated and send for settlement, The final net obligations can be much smaller than the underlying gross obligations. |
| Systemic, contagion risk | The risk of individual failures is increased but the problem can be easily detected, and the possibility of contagious risk is mitigated. | Greater risks of systemic consequences: a failure in the settlement, can lead to re-calculation and/or reversion to gross obligations, as the operations can not be netted. |

Other characteristics:

DVP (for securities settlement systems) and PVP (in foreign exchange transactions) mechanisms ensure, respectively, that the final transfer of assets or currency occurs if and only if a final transfer of another asset or currency takes place.

We can also distinguish between revocable transactions - where one or both of the parties retain the possibility of modifying or rescinding the transfers, and irrevocable and final transactions - where neither the parties, nor any participant on the system, can rescind it.

The Settlement Finality Directive is aimed at reducing the systemic risk associated with participation in payment and securities settlement systems, and in particular the risk linked to the insolvency of a participant in such a system. Finality in a transaction means that once the transaction has been accepted by the system, it can not be modified, revoked, or stopped. This has systemic implications, as the other counterparty will be sure of the settlement of the transaction even in case of insolvency.

| | Characteristics | Liquidity management implications |
|---|---|---|
| **Delivery versus Payment (1)** | The final transfer of assets or currency occurs if and only if a final transfer of another asset or currency takes place | Both counterparties must have the assets, so liquidity management must include the liquidity necessities derived of the securities system. Intraday and overnight controls must increase |
| **Final system-Irrevocability of the operations** | None of the parties can modify and/or rescind the transfer. If a participant can rescind it, the order is irrevocable but provisional; if it can not be rescinded, the order is irrevocable and final. | Finality provides the system of a safety network, as the operation can not be revoked, even in case of insolvency, so systemic risk is reduced. |

Description of the most important FX settlement systems

a) CLS Bank

CLS Bank (created in 2002 as a real-time PVP settlement system for foreign exchange trades) acts as a counterparty, but do not serve as a Central Counterparty, as the liabilities remain on the participants and are not taken by CLS. CLS works, in effect, by

acting as a trusted third party between the two counterparties to an FX trade. Each participant holds a multi-currency account at CLS, so each transaction is settled in two members' account (a debit and a credit account). If a member does not fulfil its obligation (failure at payment), the principal risk is avoided, as CLS covers the obligation. However, liquidity risk is not completely eliminated, primarily because although CLS settles individual trades on a gross basis, the amounts to be paid in are calculated on a multilateral net basis assuming all trades will settle. A pay-in failure by a CLS member may cause some trades to fail to settle, and thus cause the net amounts others have to pay in to be recalculated at short notice. To reduce liquidity risk in these circumstances, CLS has standing liquidity facilities with large banks.

b) Traditional correspondent banks

Traditional correspondent bank settlement is the next most important method of settlement after CLS. This method usually exposes both counterparties to principal and liquidity risk for the full value of the transactions. The length of the exposure depends on various factors, such as the currencies that are involved, the institutions involved, the type of trades (there can be single-day or multiple-days trade, which increase the length of the exposure), and time zone differences.

# ANNEX C : Evolution of European Payment Systems

### Target 2:

TARGET (Trans-European Automated Real-time Gross Settlement Express Transfer System) is a RTGS that eliminates the credit risk inherent in net settlement systems. It settles credit transfers with immediate finality and therefore reducing systemic risk, although it is relatively liquidity intensive. It is a decentralised system, set up by interlinking the existing RTGS national systems of the EU members, and has also been connected to some non-euro-area NCBs. TARGET2 is intended to address the shortcomings perceived in TARGET, and to accommodate new developments, such as the enlargement of the EU. Services will be offered through a common technical platform (Single Shared Platform or SSP) - its most important innovation - developed and managed on behalf of all ESCB central banks by the German, French and Italian central Banks.

TARGET2 does not represent a major change from the original TARGET system, but the new system does provide entities with five tools for day-to-day liquidity management:

| Tool | Characteristics | Liquidity management implications |
|---|---|---|
| Prioritisation of payments | Settlements are usually done on a FIFO basis, but entities can assign a priority to the payments (0, 1, and 2), to alter the queue settlement order. | Entities can alter the regular order of settlement. This can help their liquidity control, and allow them to set since the beginning if a payment must be settled in the first place.<br>On the negative side, queuing can distort the regular functioning of the system, if the entity decides to retain a payment until the end. Decisions taken by one entity can affect liquidity management of others. |
| Liquidity reservation | Entities can reserve liquidity for urgent or very urgent payments (which are not taken into account for calculating the liquidity balance of the account). | As it is a flexible system – it can be set for several days, or can be modified intraday – entities can set aside the funds necessary for the settlement of specific operations without distorting the regular settlement process. |
| Definition and implementation of limits | Participants can set sending limits (bilateral or multilateral) with others – maximum sending of funds. | The system allows that in order to avoid possible retentions of payment from the participants until they receive other payments. |
| Assignation of liquidity to linked ancillary systems---sub-accounts | Specific reservation for the settlement of the connected systems – only the excess after the settlement is included in the treasury account balance. | Ensures the settlement of final orders from other systems, and this reduces the possibility of disrupting the functioning of these ancillary systems, reducing systemic risks. |
| **Liquidity pooling** | Developed upon the request of TARGET. There are two possibilities: a Virtual Account – intraday grouping of the liquidity available in the single components (sum of individual balances plus possible credit lines) (VA) or/and consolidated account information (CAI) | Both help the entities to have a group liquidity overview, but only the Virtual Account [44] offers a practical centralisation of the accounts, as the CAI only offers consolidated information.<br><br>VA allows consolidated liquidity management, as payments of any component will be settled if the global liquidity balance of the group is sufficient.<br>Each account holder within the group will be able to make its payments through his own account up to the total level of intraday liquidity available to the group. |

## EBA Clearing (Euro Bank Association)

EBA was founded in 1985 by 18 commercial banks and the European Investment Bank, and currently has over 190 members. EBA CLEARING was established in June 1998 by 52 major European and international banks The initiation and development of cost-effective and efficient euro clearing systems for domestic and cross-border payments are core activities of the association, and have led to the creation of Europe's leading private large-value clearing system, EURO1; the low-value payment system, STEP1; and the first PE-ACH (pan-European automated clearing house), STEP2. The end-of-day settlement takes place in TARGET.

[44] It appears that the VA has been set for subsidiaries, as TARGET 2 assigns a single BIC name for the 'entity' - parent and branches - if it is requested. Entities must pay for each BIC, so it has become normal to demand a single BIC.

## SEPA (Single Euro Payments Area)

Despite the introduction of TARGET in 1999 for large-value payments, retail payments had remained local and fragmented. Cross-border entities were forced to maintain bank accounts in many of the countries in which they developed activities, and even national transactions were subject to different settlement systems or different rules. The SEPA project will allow customers to make non-cash euro payments to any beneficiary located anywhere in the euro area through a single bank account and a single set of payment instruments. There will no longer be any differentiation between national and cross-border payments within the euro area.

SEPA works with two instruments: SEPA Credit Transfer (for sending payments) and SEPA Direct Debit (for collecting payments). Based on standards, this new instruments allow the users of the system to introduce the orders in a harmonised way, and to collect information that will allow them to have a wider knowledge of the transactions. From a liquidity management perspective, consumers and companies are the direct beneficiaries, as SEPA reduces costs and offers the opportunity of centralising liquidity management, as all payments can now be done through a single account. For financial entities, the effects will be indirect, as they will be the receptors of the orders. But the system is expected to reduce costs, allow an expansion of their activities, and provide them with a similar framework for retail and large payments.

## Other projects

Work beyond TARGET2 on newer Euro system initiatives revolving around market integration is currently in progress in the euro-zone Central Banks. TARGET2-Securities will provide a platform for the cross-border and domestic settlement of securities against central bank money. In addition, the current euro-system collateral management handling procedures, in particular the Correspondent Central Banking Model (CCBM), will be reviewed. A single platform will be developed that will allow the euro system to manage collateral for both domestic and cross-border operations.

TARGET2 Securities is expected to reduce current problems regarding liquidity management, as TARGET2 will allows entities to work through a single treasury account, while the securities settlement system will be decentralised. The two systems also have different timetables. That means that, since it is necessary to maintain enough collateral for demanding overnight credit, and since securities are held in local accounts, entities must allow enough time for ordering the transfer of assets.

# Annex D : CURRENT SUPERVISORY USE OF INTERNAL MODEL OUTPUTS.

### Reliance on internal models to replace standard quantitative requirements:

In DE, a liberation clause allows institutions to use their own internal liquidity risk measurement and management procedures. If an institution is authorised by the supervisor to use its own internal procedure for regulatory purposes, it is no longer required to calculate the liquidity and observation ratios of the standard approach.

### Reliance on internal models to replace standard reporting requirements:

In BE, banks' internal ratios can be accepted as prudential reporting in place of the standardised reporting scheme.

### Reliance on internal models to deliver behavioural estimates for maturity mismatches used in certain standardised quantitative requirements and corresponding reporting requirements:

Under current liquidity regulations, most supervisory authorities partly or completely accept quantitative methodologies for supervisory purposes. This applies to the behavioural assumptions for certain cash flows in some countries, including flows that are difficult to quantify precisely, and the cash-flow projections used in limit systems, gap analysis, or stress testing (AT, BE, DE, DK, ES, HU, IE, LT, LV, PL, SE, SI, NO, UK (banks on mismatch regime),). In other countries, banks' internal liquidity models can be used only for particular cash flows (e.g., core deposits, derivatives).

### Reliance on internal models as a complement to standard quantitative or reporting requirements, especially for more sophisticated institutions:

Most large credit institutions use quantitative models in the management of liquidity risk, even if the models are not accepted for supervisory purposes (FR). In their the implementation of Pillar 2 of the Basel Accord, some countries (DE, DK, FI, IE, IT) allow for a more principles-based approach to managing liquidity risk, and accept quantitative items in banks' own LRM systems. Many countries encourage and expect banks to use their own methodologies/models to manage liquidity risk, in order to comply with the requirements of adequate risk management systems.

# Annex E : Interbank exposures and large exposure limit

CEBS recently delivered its Advice on large exposures to the European Commission[45]. CEBS concluded that large interbank exposures are associated with systemic risk and give rise to market failures, and proposed that limit interbank exposures above a certain absolute size should be limited.

Interbank exposures limits, depending on how they are calibrated, could affect banks' day-to-day liquidity management and their preparations for periods of liquidity stress.

In normal circumstances, banks that are structurally or temporarily long of liquidity may have to diversify and/or secure their interbank exposures to a greater extent than they would otherwise. Provided that banks have access to a sufficiently diverse range of high-quality counterparties, this should not reduce the aggregate amount of liquidity available to banks in need of it. Smaller domestic banks may not have such access, and it is partly for this reason that CEBS proposed to exempt interbank exposures below a certain absolute size from the limits regime.

Interbank exposure limits may be more likely to affect liquidity in stressed circumstances, but only to the extent that banks are prepared to extend their exposures to trusted counterparties in such a scenario. Interbank exposure limits could therefore prompt banks, all else being equal, to hold larger stocks of liquid assets to counteract the risk that some trusted counterparties may be constrained by the regulatory limit in a period of liquidity stress. They are also likely to prompt banks to improve the robustness of their contingency funding plans by making arrangements to be able to draw on liquidity from a wider range of counterparties.

CEBS concluded that exposures between banks within a banking group can give rise to market failures unless there are robust arrangements for ensuring the prompt transfer of capital within the group, and therefore that supervisors should retain national discretion to impose limits on them. Such limits could, depending on their calibration, affect the efficiency of groups' centralised liquidity management operations, and again could prompt individual banks within the groups to hold more liquid assets locally or improve their contingency funding plans in order to protect against liquidity shocks.

Together with the Commission, CEBS will conduct further work to determine the costs and benefits, including with respect to liquidity risk management, of specific proposals for interbank large exposures limits.

[45] The Second Part of CEBS's technical advice to the European Commission on the review of the large exposure rules (27 March 2008) can be accessed at the following link: http://www.c-ebs.org/Advice/documents/2nd.LE_advice.pdf

# Annex F : Rating agencies' approaches to internal methodologies

Rating agencies regard liquidity risk assessment as a complex and challenging task for which there is no magic formula. The quality and consistency of data is a particular problem.

Rating agencies note a wide degree of divergence in banks' liquidity risk management practices, particularly in determining which assets can be considered liquid in stressed situations, choosing the haircuts to be applied to the sale of assets (although S&P noted that the haircuts assigned by Canadian banks were surprisingly consistent), and making assumptions about the behaviour of counterparties. Retail deposits are viewed as the 'stickiest' liabilities, with a wide variety of assumed run-off rates – even more than could be explained by differences in customer bases or banks' business models. Banks argued that they could securitise assets more quickly than ratings agencies believed. Agencies take notably into account banks' standing and experience in securitisation markets, which influence the speed and ease with which loan portfolios can be monetised.

Rating agencies also consider the general operating environment. In a sense, the starting point for rating a bank is rating the banking system as a whole, which includes assessing the role of central banks and the regulatory environment.

**Standard & Poor's**:

S&P generally does not have special resources to devote to assessing liquidity, compared with the resources of regulators or central banks. Hence its assessment of banks' liquidity management is as simple as possible, serving primarily as a basis for comparing between institutions (which is ultimately how ratings should be viewed in general). However, their ability to make meaningful comparisons is hindered by the wide divergence in the internal management information and models used by banks.

In Canada, S&P has a unique approach to ensuring comparability: it has developed a standardised model for liquidity risk analysis which has been applied to twelve major Canadian banks. This model performs a survivability analysis using data provided by the banks: assessing how long banks can survive without access to market funding. Parameters such as assumptions about run-off rates and haircuts on assets sales are varied to reflect different instrument characteristics or scenarios. Haircuts are initially based on those in repo markets, as this is assumed to be the discount that banks would have to accept if they were forced to sell an asset within a day.

The results of the model indicate that, on average, Canadian banks could survive for six months. Larger banks had longer survival periods. S&P noted that the real value of the model is to provide a basis for making comparisons between banks, and to identify strengths and weaknesses in banks' liquidity risk management by engaging banks in discussion. The speed of availability and the quality of the data obtained from the banks are regarded as good indicators of the soundness of banks' procedures.

The results have been shared with the banks that participated. Most banks were not surprised by where they appeared on the survival horizon relative to their peers. Risk managers at some banks found the information (particularly information on where they were inferior to their peers) useful in convincing senior management of the need for improvements in their liquidity risk management. S&P believes it has observed changes in the way that banks' managed their liquidity risk since the beginning of the project, citing an increase in term funding and diversification by currency and country.

Estimated run-off rates on retail deposits was an area of great divergence between banks. S&P suspects that there is no real justification for this variation, even when different customer bases are taken into account, but agreed with the general perception that retail deposits are the 'stickiest' liabilities. The extent to which banks believed they could liquidate their loan portfolios also differed from bank to bank. In assessing banks' ability to monetise these assets, S&P pays particular attention to a bank's standing and experience in the securitisation market. S&P also notes that many banks seemed to have particular difficulties with providing information on off-balance sheet liquidity exposures, for example in relation to potential margin calls. S&P does not assess payment or intraday liquidity risk.

S&P ran its model separately for each currency, as well as on the consolidated basis across a bank's entire book, in recognition of the relative ease of swapping liquidity between USD and CAD. Since Canadian banks do not have holding companies, their organisational structure was not such an issue, but S&P noted that this would be more important in other jurisdictions such as the United States.

While much discussion focussed on the specifics of the Canadian model, S&P noted that its attitude to banks in all countries was to place greatest weight on qualitative factors such as the general operating environment and the banking system (including the behaviour of central banks and regulators), enterprise risk management and corporate governance, and banks' contingency funding plans.

**Moody's**

Moody's includes a liquidity ratio in its Bank Financial Strength Ratings (BFSR) scorecard. The ratio is: [(market funds – liquid assets) / total assets]. However, Moody's noted that this was a crude metric which represents only one-eighth of the overall weighting for liquidity in the BFSR; the remaining seven-eighths is based on a qualitative assessment.

Moody's uses banks' internal liquidity risk management policies and methodologies to assess the quality of a bank's enterprise risk management. Moody's does not directly compare assumptions and funding results between banks, as this would be too difficult, but rather forms a judgment as to the competence, maturity, and dedication of a bank's liquidity management team. For example, in assessing off-balance sheet liquidity exposures, Moody's would assess the sophistication of the reports sent to the Board, rather than relying on banks' quantitative estimates.

Moody's noted a wide variety of internal methodologies, particularly between regions. Practices in Brazil, Turkey, and Russia are comparatively advanced, since recent episodes of market turbulence have forced banks in these countries to develop ways of managing liquidity.

Moody's agreed with other rating agencies that retail deposits were the most 'sticky', but noted that it is generally in the U.K. that deposits move fastest from bank to bank, because of the relatively large amount of internet deposits. On the asset side, what constitutes 'liquid assets' varies widely from bank to bank and from market to market.

Moody's noted that although centralised treasury functions were increasingly being used by cross-border banking groups, Moody's role was to rate legal entities. As far as possible, Moody's seeks to assess liquidity by country, by legal entity, by time-zone, and by individual funding program, as well as assessing the group as a whole. In this context, Moody's considers parental support in the context of the parent's history and its stated attitude towards supporting failing subsidiaries. The prospect of government or central bank support and ring-fencing is also taken into account: the BFSR includes an assessment of the operating environment.

A strong focus is placed upon CFPs, particularly the diversity of funding sources and the extent to which they are actively tested through dry runs. Moody's noted that the 2007-

2008 market turmoil would certainly provide incentives for institutions to act on the outcomes of their stress-tests, and to adapt their CFPs accordingly.

Moody's does emphasize the assessment of intraday liquidity risk. For banks that Moody's considers systemic, this factor would be covered by the joint default analysis.

**FitchRatings**

Like the other rating agencies, Fitch said that there is no magic formula for assessing banks' liquidity risk; Fitch relies on an individualised qualitative analysis of each bank's policies and procedures. Ratios may be used, but only to highlight areas that require further investigation, such as heavy reliance on wholesale funding. Attention is paid to the regulatory framework, since this determines the context within which firms must act. Fitch places confidence in stock requirements, such as the U.K.'s SLR, which ensure that a certain amount of liquidity will always be available. Firms are relying increasingly on RMBS and other AAA securities such as high-grade corporate paper, and Fitch questioned whether these would be as liquid as government bonds in a crisis.

Liquidity is not a dominant factor in determining ratings unless there are particular issues (such as the lack of a retail deposit base for Russian banks). Broadly speaking, liquidity is more important for weaker banks. Sub-standard liquidity risk management is more likely to be a constraint to a ratings upgrade than a specific motivation for a downgrade, since it reflects an ongoing structural weakness that would need to be rectified before an upgrade can occur.

Fitch noted convergence in banks' approaches to ALM, with most firms employing a combination of gap analysis and a liquid assets approach. However, there are large inconsistencies in firms' behavioural assumptions, haircuts, and definitions of liquid assets. Banks are looking more closely at the volatility of customer flows, since 'hot money' is perceived to be increasing, particularly for specialist banks (Fitch linked 'hot money' to those banks that advertises special high interest rate current accounts). Nonetheless, retail deposits remain relatively sticky.

Fitch is increasingly asking for information on firms' CFPs and stress-testing procedures. They consider factors such as whether committed lines are reliable, for example in context of Material Adverse Change (MAC) clauses; the ability to securitise assets; over-reliance on particular sources of funding; and how ABCP conduits are financed. Fitch expects firms to test ratings downgrade and loss of market funding scenarios as a minimum. In addition, firm-specific scenarios should be tailored to the institution's structural weaknesses.

With regard to cross-currency liquidity management, Fitch thinks it is more likely that a problem would arise in a less liquid currency which would need to be funded in more liquid currencies like dollars and euros. Fitch assumes fungibility of liquidity within the group, and considers how easy it is to transfer liquidity within a group, but admitted this was an area to which it could devote more attention.