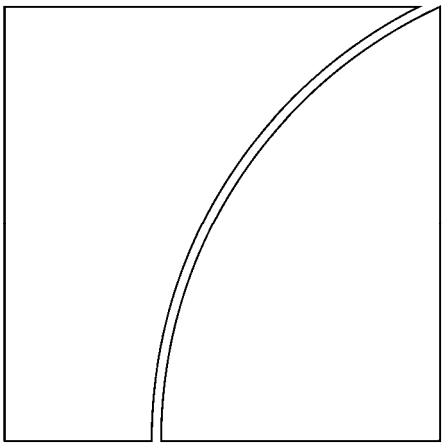
Basel Committee
on Banking Supervision



Liquidity Risk: Management and Supervisory Challenges

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Liquidity Risk: Management and Supervisory Challenges

I. Introduction

In December 2006, the Basel Committee on Banking Supervision (BCBS) established the Working Group on Liquidity (WGL) to review liquidity supervision practices in member countries.[1] The WGL's mandate was to take stock of liquidity supervision across member countries. This included an evaluation of the type of approaches and tools used by supervisors to evaluate liquidity risk and banks' management of liquidity risks arising from financial market developments.

The market turmoil that began in mid-2007 has highlighted the crucial importance of market liquidity to the banking sector. The contraction of liquidity in certain structured product and interbank markets, as well as an increased probability of off-balance sheet commitments coming onto banks' balance sheets, led to severe funding liquidity strains for some banks and central bank intervention in some cases. These events emphasised the links between funding and market liquidity risk, the interrelationship of funding liquidity risk and credit risk, and the fact that liquidity is a key determinant of the soundness of the banking sector. In response to the market events, the original mandate was expanded and the WGL made initial observations on the strengths and weaknesses of liquidity risk management in times of difficulty. These observations, together with those provided by the review of national liquidity regimes, formed the basis of the WGL's report, which was submitted to the BCBS in December 2007.

The WGL also reviewed the 2000 BCBS publication *Sound practices for managing liquidity risk in banking organisations*. While the guidance remains relevant, the WGL identified areas that warrant *updating and strengthening*. As such, the BCBS has requested the WGL to update Sound Practices for issuance by the BCBS later this year. In addition, the WGL will continue its work on evaluating the reasons for and implications of the diversity in national liquidity supervision regimes.

In view of the relevance and timeliness of the work of the WGL, the BCBS is publishing this summary of the key findings of the WGL's report. This document highlights financial market developments which affect liquidity risk management, discusses national supervisory regimes and their components, and then outlines initial observations from the current period of stress and future work of the WGL.

[1] The Basel Committee on Banking Supervision is a committee of banking supervisory authorities which was established by the central bank Governors of the G10 countries in 1975. It is made up of senior representatives of banking supervisory authorities and central banks from Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States. In addition to participants from these countries, the Working Group on Liquidity also includes members from Australia, China, Hong Kong and Singapore.

II. Liquidity risk management challenges

A. The challenge of liquidity risk management

Liquidity is the ability to fund increases in assets and meet obligations as they come due.[2] Within this definition is an assumption that obligations will be able to be met "at reasonable cost". Liquidity risk management seeks to ensure a bank's ability to continue to do this. This involves meeting uncertain cash flow obligations, which depend on external events and on other agents' behaviour. The fundamental role of banks in facilitating the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk, the risk that demands for repayment outstrip the capacity to raise new liabilities or liquefy assets.

Effective risk management estimates future cash flow requirements under both normal and stressed conditions. This presents a challenge even under relatively benign market conditions, as it requires the ability to draw information from various operations of the bank and assess the impact of external events on the availability of funding liquidity. This challenge increases, however, during stressed conditions, as the assumptions underlying liquidity risk may change – notably through changes in counterparty behaviour and market conditions that affect the liquidity of financial instruments and the availability of funding. These factors give rise to a different and significant set of challenges for firms in assessing their liquidity risk and for supervisors in the evaluation of risk management and controls.

Financial innovation and global market developments have transformed the nature of liquidity risk in recent years. The funding of some banks has shifted towards a greater reliance on the capital markets, which are potentially a more volatile source of funding than traditional retail deposits. In addition, the growth and product range of the securitisation market has broadened as the originate-to-distribute business model has become more widespread. These factors have increased the potential for rapid shifts in demands on the funding capacity of the institutions, as well as the build up of loan inventory in banks' warehouses prior to securitisation. Also, the complexity of financial instruments has increased. This has led to a heightened demand for collateral and to additional uncertainty on prospective liquidity pressures from margin calls, as well as to a lack of transparency that may (and recently did) contribute to asset markets contracting in times of stress. Parallel to these market developments, the increasingly real-time nature of payment and settlement systems and the increasing interdependence among different systems has increased the importance of intraday liquidity management. Increased cross-border business, in combination with these structural changes, means that events in one market can quickly impact another. These factors are discussed below in greater detail.

B. Funding from capital markets

Over the past decade, many banks have turned to the capital markets for an increasing portion of their funding and have thus become more reliant on wholesale funding sources such as commercial paper, repurchase agreements, and other commercial money market instruments.

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[2] From *Sound Practices for Managing Liquidity in Banking Organisations*, BCBS, February 2000. http://www.bis.org/publ/bcbs69.htm

In general, money market instruments tend to be more volatile than traditional retail deposits[3] and may pose additional challenges to liquidity risk management. As recent events illustrate, during times of market stress investors exhibit heightened risk aversion by demanding higher compensation for risk, requiring banks to roll over liabilities at considerably shorter maturities, or refusing to extend financing at all. In these cases, the short-term nature of many money market instruments poses a problem as refinancing sources must be found quickly to replace the loss of funding.

C. Securitisation

Although securitisation began more than 30 years ago to pool and sell illiquid assets, it has grown rapidly in the past 10 years. Securitisation can be used by banks to expand sources of funding and free up additional balance sheet capacity. It can also be used to create revenue through buying and distributing third party assets which have not been originated by the bank. Securitisation presents liquidity risks that need to be managed carefully. For example, the process of pooling assets, selling to a special purpose vehicle, obtaining credit ratings and issuing securities is time consuming, and market difficulties during this timeframe could result in a bank having to warehouse assets for longer than planned.

Even as financial market innovation allows firms to obtain liquidity from previously illiquid assets, it also makes them more reliant on the functioning and stability of financial markets. As recent events illustrated, some firms had relied on securitisation as a source of business revenues and as a way to reduce assets on the balance sheet under normal market conditions, but during times of stress were forced to postpone some securitisations, leading to a build up of warehoused assets that had to be financed.

Some forms of securitisation (ie asset backed commercial paper) give rise to contingent liquidity risk, ie the likelihood that a firm will be called upon to provide liquidity unexpectedly, potentially at a time when it is already under stress. For example, some firms provide liquidity backstop arrangements in which they commit to provide funding if certain agreed-upon conditions occur, ensuring timely payment of principal and interest to holders of the commercial paper and thus contingent funding of the assets. Another example of contingent liquidity risk arises from early amortisation provisions incorporated into securitisations of revolving credits (eg credit card receivables). Lastly, additional liquidity needs can be created when institutions provide support to conduits and off-balance sheet vehicles they have sponsored even if not contractually obligated to do so, as they judge that the failure to provide such support would have a material adverse impact on their reputation.

D. Complex financial instruments

The use of complex instruments has grown substantially over the past decade.[4] For example, the notional growth of credit default swaps (CDS) more than doubled in both 2005 and 2006, with a significant portion of this growth associated with the creation of complex structured credit instruments, some with high embedded leverage.[5] As another example,

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[3] Moreover, retail deposits may not be as stable as in the past, due to the ease with which depositors can compare rate information and make transfers via the internet.

[4] See Analytical Discussion 2 of the Institute of International Finance's March 2007 publication, *Principles of Liquidity Risk Management*, for a more extensive discussion of this topic.

[5] *ISDA Margin Survey 2006,* International Swaps and Derivatives Association.

conduit financing (which is not new), became more complex with the growth of certain segments that engaged in more aggressive maturity transformation.

The increasing complexity of financial instruments creates new challenges for banks' management of liquidity risk. First, the inclusion of credit rating downgrade clauses and call features (or other forms of embedded optionality) complicates the assessment of an instrument's liquidity profile. Second, complex, highly bespoke instruments are not actively traded, which can make assessing the price and secondary market liquidity of such instruments highly challenging. Third, in view of the short track record of these products, predicting their cash flows and correlations with other financial assets in times of stress is difficult at best.

E. Collateral usage

Over the past ten years, banks have increased their usage of high quality collateral. According to the 2006 ISDA margin survey, there were an estimated 110,000 collateral agreements in 2006, compared to only 12,000 in 2000. This is partly due to an increase in the use of collateral as a risk mitigant. It is also attributable to the changing nature of the transactions between financial firms, including the increased use of repo transactions and derivatives in the wholesale funding markets.

Several changes in risk management practices have also made collateral more sensitive to liquidity risk. For example, margin calls are now made on a daily or intraday basis, compared to weekly or monthly, which was the practice ten years ago. In addition, bilateral collateral agreements, which allow both parties to request collateral, have become more prominent and the re-use of collateral has grown, with almost all large dealers routinely rehypothecating collateral they have received.

While the use of collateral mitigates counterparty credit risk, it affects funding liquidity risk because counterparties have to provide additional collateral at short notice if conditions change. The more widely collateralisation is used, the more significant this risk becomes, especially as market price movements result in changes in the size of counterparty credit exposures.

F. Payments systems and intraday liquidity needs

Many banks are also facing increasing challenges with respect to intraday liquidity management in relation to both their own activities and to the activities of their customer firms or banks. These challenges arise in part from recent improvements to the design of payment and settlement systems, such as the adoption of large-value payment systems with intraday finality, (eg real-time gross settlement--RTGS systems) and of delivery-versus-payment securities settlement systems, the development of CLS to settle foreign exchange trades, and the increasing use of central counterparties.[6]

These improvements have reduced certain interbank credit risks, as well as operational risks. At the same time, however, these changes have increased collateral needs within some systems and increased the time-criticality of certain payments (eg those used to fund

[6] These changes have been described in a number of recent CPSS reports, including the 2006 CPSS report *Cross-border collateral arrangements*. For more information on CLS Bank see the 2007 CPSS report: *Progress on reducing foreign exchange settlement risk* http://www.bis.org/publ/cpss81.htm

expected or unexpected positions in CLS Bank, to fund settlement in other payment and securities settlement systems, or to meet the margin calls of central counterparties).

As a result, many banks are facing new forms of intraday liquidity risks. The failure of an institution to meet time critical payments could transmit a major liquidity shock to other firms domestically and internationally. It could also impair the functioning of short-term money markets in multiple jurisdictions.

To ensure the smooth functioning of systems, central banks generally offer intraday credit to the participants of RTGS-type systems. However, collateral is almost always required to obtain this credit. As such, institutions must have some form of liquidity available to meet their obligations on a timely basis throughout the business day.

G. Cross border flows

As the volume and speed of cross-border flows has increased, financial markets are increasingly integrated and intermediated. Many financial institutions have increased their international business and dependence on international markets. A few large global financial institutions are increasingly seeking to manage their intraday and overnight liquidity demands (including collateral) in a centralised manner across currencies and across borders.

Strong cross-border flows also raise the prospect that liquidity disruptions could pass quickly across different markets and settlement systems. Banks operating a "centralised" liquidity model may plan to meet a shortfall in one currency with funds in another currency, via the foreign exchange market or by transferring collateral across borders. Such banks consequently need to factor into their plans the condition of overseas markets, as well as the time it takes to complete the transfer of funds or collateral across jurisdictions. Liquidity may not be fully transferable across borders, particularly in times of market stress, as each national regulator requires sufficient liquidity to be held for local operations to protect national interests. Thus, an important element of conducting cross-border operations is the need to understand fully the supervisory and regulatory practices within each jurisdiction.

III. National liquidity regimes

A. Key features

Liquidity regimes have been developed along national lines to support the preservation of the safety and soundness of each country's financial system. Supervisors have national responsibilities to ensure that banks hold appropriate levels of liquidity 'insurance' (eg in the form of liquid assets or access to contingent funding). Supervisory regimes recognise that the interests of individual banks are closely aligned with the interests of their shareholders and thus may fail to take full account of the impact of their failure on the financial system more broadly. This could result in banks under-insuring against liquidity risk from a public policy perspective in the absence of supervision.

Liquidity regimes are nationally based according to the principle of "host" country responsibility (although in some cases, the task, though not responsibility, of supervision of branches is delegated to the home supervisor). The high level objectives for liquidity supervision are similar across jurisdictions, although there is much diversity in how these objectives translate into rules and guidelines. In addition, there is a diversity of approach to liquidity supervision within some countries. Surveyed countries indicate that the intensity of supervision tends to increase for the larger and more systemically important firms in

proportion to the assumed increase in risk. In some jurisdictions, different rules are implemented for large and small banks. For example, in some countries the regime embodies a more sophisticated approach for certain banks (where more flexibility is granted to the institution to use internal modelling methods), and a more prescriptive approach principally designed for smaller banks. In another style of regime, the larger banks are required to hold a large buffer of liquid assets compared to smaller banks, reflecting their systemic importance.

One important differentiating factor across regimes is the extent to which supervisors prescribe detailed limits on liquidity risk and insurance that banks should hold. This is in contrast to an approach that relies more on reviewing and strengthening banks' internal risk management systems, methods and reports. In recent years several regimes have placed greater emphasis on banks' internal risk management practices to better capture the risks that arise from financial market innovations. Moreover, countries are currently assessing their liquidity regimes to determine whether there are areas that could be strengthened.

Broadly speaking, high-level approaches to supervising liquidity risk are common across regimes: firms are expected to have specific policies to address liquidity risk; the use of stress tests is commonplace; all regimes recognise the importance of contingency funding plans; and all regimes require firms to report information regularly to supervisors. Regimes differ in the extent to which requirements are prescribed and standardised. These differences are highlighted below through a review of the individual components of national liquidity regimes.

Liquidity policies

Almost all regimes expect banks to document liquidity policies in order to set out the internal strategy for managing liquidity risk. Some regulatory regimes stop there, setting out no explicit requirements or guidance on topics to be covered. The majority, however, identify specific topics that should be documented.

Broadly speaking, firms' liquidity policies are expected to set out the internal processes in place to measure, monitor and control liquidity risk. The importance of contingency funding plans is emphasised by all jurisdictions. Outside that, the exact requirements of what must be outlined in the policies differ considerably across national regimes. For example, various regimes require some combination of the following elements to be included in their policies: the need for adequate information systems; required processes to assess future cash flows and net funding requirements; the importance of specific approaches for the management of foreign currency flows; stress tests; the setting of internal limits; the need for independent review of internal policies; and the need to communicate the policy through the institution.

Stress tests and scenario analyses

Stress tests and scenario analyses aim to identify potential weaknesses or vulnerabilities in a firm's liquidity position, enabling changes to be put in place to counter those weaknesses (eg a diversification of funding sources or an increase in contingent liquidity sources). All surveyed countries currently or will soon require banks to conduct liquidity stress testing/scenario analyses, although some excuse smaller, less complex firms. Generally speaking, supervisors require firms to undertake stress testing/scenario analyses at the same level of consolidation as their overall approach to liquidity supervision.

In some countries, the supervisor sets broad guidance as to the type of shocks that should be assessed,[7] while in others the choice is left to the individual firm.[8] In both cases, the behaviour of future cash flows is left to the individual firm to estimate. There are a variety of methods used by banks to estimate the behaviour of future cash flows. At one level, the estimation may simply involve the judgement of experienced practitioners. Other institutions may use historical data or statistical modelling techniques. Supervisors have different approaches to assess and/or approve these assumptions.[9] Some supervisors provide explicit guidance on how the results should be used. For example, some regimes expect the outputs of the test to feed into contingency plans or the setting of limits.

In addition to these individual institution requirements, some supervisors apply pre-defined scenarios to a selection of financial institutions (bank, insurers, pension funds). These are conducted with the aim of assessing potential second-round effects and market-wide responses.

Contingency funding plans

Contingency funding plans are used to set out firms' strategies for dealing with stress scenarios. They should set out management responsibilities and procedures to be followed once the contingency plan has been activated, and they should identify potential sources of liquidity to cover shortfalls that may arise in stressed conditions.

All surveyed countries expect firms to have pre-established contingency arrangements, although the formality of the requirement varies. Similar to overall liquidity policies, there do not appear to be fundamental differences in national expectations. Rather, diversity can be seen in the detail of the requirements. Explicit guidance may be given on the relationship between stress tests and contingency plans; the need for early warning indicators; the communication strategy (internal and external); and the need to ensure operational readiness to execute plans.

The setting of limits

Some regimes require banks to set internal limits or targets. These may include target holdings of liquid assets, limits on maturity mismatches or limits on the reliance on a particular funding source. These quantitative limits can help to constrain the amount of liquidity risk that a bank takes, can help to ensure that banks are adequately prepared for stressed conditions or can serve as early warning indicators of stress or vulnerability.

Several regimes prescribe explicit limits or target ratios as part of the regulatory requirements. Where targets are set for different purposes, their structures understandably

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[7] A common requirement is for the application of both an idiosyncratic shock and an aggregate market-wide shock.

[8] During the recent turmoil, some supervisors asked banks to undertake additional stress tests. Some prescribed scenarios.

[9] Some require firms to provide detailed justification of their assumptions. Some compare assumptions across the industry to review performance of individual firms relative to their peers. After the evaluation process, corrections may be made, and if weaknesses are determined, the supervisor may take immediate action.

vary considerably.[10] However, ratios set for similar purposes also differ across jurisdictions in the detail of application, particularly in the choice of behavioural assumptions.[11]

Standardised limits are relatively inflexible and hence are not so easily adapted to changing financial markets, compared to other tools such as stress tests (eg some do not incorporate off-balance sheet risks). In recent years several regimes have lowered their emphasis on standardised limits. Several WGL members have reported plans to update such limits in the light of market developments.

Reporting requirements

All supervisors require banks to report information on their liquidity positions. Information is collected for a variety of reasons. Some data allow supervisors to identify the liquidity risks that banks are exposed to and to monitor the level of those risks. Other data items allow supervisors to monitor the potential sources of liquidity that banks have available to them. Together, these data allow supervisors to determine whether liquidity pressure is building at the institution and whether banks are complying with regulatory requirements.

The data collected by national authorities differ greatly. Some jurisdictions collect raw data (eg a balance sheet or cash flow breakdown) while others collect pre-defined metrics and ratios. Data collected for compliance purposes mirror the construction of the limit or target.

When pre-defined metrics are required, most regulators use standardised forms, with prescribed definitions and behavioural assumptions. This style of data collection aids cross-industry comparison by supervisors, but can involve the duplication of work at firms (where regulatory requirements are different from internal management requirements). A few regulators allow individual firms to report data in line with their internal management information systems (and hence internal definitions and behavioural assumptions). This reduces industry burden, but makes cross-industry comparison more challenging.

Public disclosure

In most countries, public disclosure of information on firms' liquidity positions is limited to disclosure required by accounting rules and rules applicable to publicly traded companies, rather than by regulatory requirements. Generally, accounting rules require firms to disclose a maturity analysis for financial liabilities and a description of how liquidity is managed. There are a few cases where public disclosure arises explicitly from regulatory data or where institutions are required to disclose key regulatory metrics in their annual accounts. Basel II, and in particular Pillar 3 (market discipline), should serve to increase public disclosure of liquidity positions. Recent events highlighted the importance of consolidation rules, as disclosure requirements generally are more exacting for on-balance sheet instruments than for exposures associated with off-balance sheet vehicles.

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[10] For example, for target holdings of liquid assets, the ratio may be (liquid assets / short-term liabilities > x %). A limit on a maturity mismatch may be (cash inflows / cash outflows *including* off-balance sheet items > y %). An example on a limit on the proportion of liabilities sourced from securitisation markets could be (ABS in issue / total liabilities < z %).

[11] For example: What assets should be considered "liquid"? What haircuts should be applied to those assets? How should committed facilities be treated? What size of retail deposit withdrawal should be covered? What currencies are fully convertible?

B. Diversity in liquidity regimes

The WGL sought to determine reasons for the diversity in national liquidity regimes, as well as the implications of this diversity. In part, such variances stem from differences in financial market conditions and differences in the vintages of national liquidity regimes. These may narrow over time as international financial market integration continues apace and as national regimes are revised and updated. Diversity also arises from linkages to other factors which govern the resilience of the banking system to severe liquidity stress but may fall outside the legal mandate of supervisors. These factors include nationally determined factors such as insolvency regimes, deposit insurance arrangements, and central bank credit and collateral policies, including intraday, standing facility, or emergency liquidity assistance arrangements, as well as the structure of the banking sector.

Liquidity regimes are affected by policy choices made by national authorities relating to the desired resilience of banks to liquidity stress. These choices, in turn, influence judgements on the appropriate degree of liquidity insurance that should be held by the banking system to support the achievement of the desired resilience, taking into account important influences such as national deposit insurance arrangements and central bank policies. National policy choices are under review in a number of jurisdictions, with the case for review strengthened in the light of the current episode of severe liquidity stress.

The application of liquidity regimes on a local management or legal entity basis requires that each legal entity be sufficiently robust to external shocks. This may require a pool of liquid assets to be held locally, or for each entity to have independent access to contingent liquidity lines. Additionally, each entity must demonstrate conformity with local supervisory guidelines through the preparation of liquidity policies and production of regular data reports. The WGL highlighted reasons for this approach.

Protection of local entities: As well as supporting resilience of the core of an international banking group, supervisors have a duty to help ensure the resilience of entities within their jurisdiction to protect local depositors. Because of national supervisory responsibilities and the risks of reputational contagion within a banking group, separate pools of liquidity are typically required so as to provide a degree of resilience to each individual entity and allow regulators to protect the interests of local depositors.[12] A robust liquidity position at an individual entity level may also be key to the domestic crisis resolution process. International crisis resolution processes can be complicated by cross-border exposures. For this reason, some regulatory authorities restrict the cross-border movement of liquidity through restrictions on intra-group exposures (thus limiting the scope for full centralised liquidity risk management).

Challenges in transferring liquidity: In certain circumstances, firms may also face challenges in transferring funds and securities across borders and currencies, especially on a same-day basis. For example, institutions operating centralised liquidity management may be dependent on foreign exchange (FX) swap markets. During the recent market turbulence, FX swap markets became relatively illiquid at times, even for currency pairs that are traditionally highly liquid (and hence were assumed to stay open in stress tests). Moreover, if funds are

[12] For example, if the liquidity reserve of an entity in country B is transferred within a cross-border group to country A where the local entity faces a liquidity shock but the transfer fails to resolve the problem within the group, the local entity in country B is also highly likely to come under severe pressure and will have no liquidity buffer to prevent failure. In that event, depositors in country B are in a potentially worse position than before the transfer. If, however, the transfer succeeds in stemming the problem, **and** there is no reputational contagion, then depositors in entity A would be better off and those in entity B no worse off.

required on short notice via same-day settled FX swaps, they must be settled outside of CLS, as currently that system is not set up to settle same-day FX transactions. Since most trades outside of CLS are not settled on a payment-versus-payment basis, banks engaged in same-day settled FX trades would be reliant upon finding a counterparty that is willing to assume intraday credit risk, which may be difficult in stress situations. Finally, other technical factors, such as market settlement conventions and timing differences across payment and settlement systems, may complicate the transfer of funds or securities, and lengthen the time needed to transfer liquidity across currencies or borders.

C. Implications of diverse regimes for supervisors and cross-border firms

The discussion above considers the reasons for locally-based supervisory requirements, abstracting from the specifics of each national regime. This part draws out some of the additional implications for supervisors and firms of operating with the diversity of regimes.

Level-playing field and competition issues: Diverse national objectives for the degree of desired resilience to liquidity stress may give rise to potential level-playing field issues. These may be most pronounced for cross-border firms. For example, two otherwise identical firms based in two different jurisdictions may face different liquidity requirements, thus raising questions of the evenness of competition in external markets and the scope for regulatory arbitrage. The WGL noted that there is a potential trade-off between the goal of promoting greater consistency in the supervisory approach to cross-border banks and the tailoring of the domestic regime to account for important factors that affect liquidity risk, such as deposit insurance arrangements and access to central bank lending and other forms of quasi-governmental funding.

Supervisory coordination: Given the diversity of supervisory approach, national regulators may be uncertain as to the level of resilience provided by other regimes, or the scope for liquidity to flow across borders to satisfy an increase in demand for liquidity in another part of a cross-border group. In addition, a host regulator may, for example, have a lower tolerance to liquidity stress than a home regulator (or vice versa). Under the belief that the entire banking group may come under pressure as a single entity, the host regulator may consequently require the host entity to increase its level of liquidity insurance. That may lead to an increase in the level of insurance against liquidity risk (eg in the form of liquid assets or access to committed lines) across the group.

Increased cooperation and understanding between national supervisors may reduce uncertainties as to the level of resilience provided by other regimes. WGL members noted that cooperation has improved in recent years, for example through the work of supervisory colleges.[13] The importance of a good understanding clearly increases in stressed conditions because of the need for judgements on the prospect for liquidity flows between group entities. Branches or subsidiaries could be reliant on liquidity flows from the parent to survive, which may not be forthcoming; or a foreign group entity may make a call on domestic liquidity, weakening the position of the domestic entity.

Reporting and communication: Diversity in approaches to reporting may hamper effective communication between supervisory authorities as well as impose costs on firms. WGL members noted, however, the balance to be struck between improving the effectiveness of cross-border communication and reducing the quality of information to domestic supervisors,

[13] Supervisory colleges bring together supervisors with responsibility for the supervision of specific legal entities within large cross border banking organisations in order to address coordination issues.

if reporting frameworks were compressed into a common template that failed to take appropriate account of differences in the business models of banks in different jurisdictions. Indeed, going further, both industry and a number of WGL members noted the potential merits of placing greater reliance on firms' internal liquidity reporting and management information systems, as these were most closely attuned to the different business models practised by individual entities. That in turn highlights another potential trade off given the desirability of undertaking peer group comparisons as an important component of supervision, as such peer group comparisons would clearly be facilitated by greater consistency of reporting, (either within or between international groups).

IV. Initial lessons from the current episode of stress

Recent months have provided a severe stress test of liquidity regimes. Although events continue to unfold, the WGL has attempted to draw out the initial lessons from this episode as a key component of its overall assessment and stocktaking. In brief, the turmoil began against a background of a longstanding "search for yield" where credit and liquidity premia had been bid down to exceptionally low levels, and which had spurred rapid financial innovation and growth of complex financial instruments. Rising arrears on US sub-prime mortgages, nearly all of which were packaged in residential mortgage-backed securities (a large share of which were then purchased by managers of collateralised debt obligations of asset-backed securities), caused investors to lose faith in the ratings of these structured securities. This, in turn, led to heightened concerns about the valuation of such securities and over which institutions were most exposed to losses.

The loss of investor confidence in a wide range of structured securities markets led to risks flowing on to banks' balance sheets. The initial shock in credit markets was transmitted through a fall in asset market liquidity, which led to an increase in funding risk. Money markets tightened internationally as banks built up liquidity to meet contingent claims or in anticipation of having to meet such claims. Asset managers also stockpiled liquidity to guard against increased redemption risks. The combination of liquidity and balance sheet pressures and heightened credit concerns made banks reluctant to provide others with term funding.

The impact of the shock on banks has differed across jurisdictions. Some medium-sized banks that were very active in complex products or were particularly reliant on wholesale funding were vulnerable to liquidity pressures. To date, very large banks, while often significantly affected by weakening credit markets and exposure to complex instruments and to off-balance sheet vehicles, have retained access to a more diverse range of funding and have gained from some flight to quality. However, this is a situation that could change. Banks (often smaller ones) funded primarily by retail deposits have also faced less liquidity pressure than those more dependent on wholesale funds.

Authorities have increased the intensity of their supervision of liquidity in response to the rise in stress. Emerging lessons for liquidity risk management and supervision are highlighted below.

Stress testing: The nature, magnitude and duration of the shock across much of the global financial system was not fully anticipated by the financial sector. In most cases, stress testing had focussed on idiosyncratic or firm-specific shocks. Although that still had some value, and preparations for name-specific events (such as an inability to access wholesale markets for a period) aided resilience, recent events demonstrated that stress tests should also capture the implications of wider disruptions (eg market-wide events and events affecting multiple markets or currencies simultaneously) and the combination of idiosyncratic and market-wide

shocks which incorporate the behavioural responses of other affected banks. Some supervisors noted that they had faced considerable industry resistance in advance of the recent episode when they had tried to encourage more rigorous and comprehensive stress testing. The challenge of defining an appropriate level of stress remains a formidable one for both banks and supervisors.

Contingency funding plans and asset market liquidity: Recent events have highlighted the need to modify and strengthen contingency funding plans in some cases. Stress tests and contingency funding plans were often not sufficiently integrated. Moreover, the source of the recent funding shock involved instruments that some banks had assumed they would be able to use more extensively in their contingency plans. In particular, banks had made assumptions about the asset market liquidity of certain structured products, ABCP and loan books that proved to be overly optimistic. They had often assumed continuous high liquidity of these markets, and indeed some had treated mortgage securitisation and ABCP as very resilient support facilities and core backstops in the event of funding difficulties. It had not been anticipated that the liquidity of such markets would evaporate; nor had there been anticipation that this would be associated with widespread impairment of the term interbank market. The episode has raised the question of which assets could be relied upon for consistent liquidity. That may be linked in part to central bank collateral lists as the ability to rediscount assets at the central bank may provide some underpinning to market liquidity. Some supervisors also noted that banks were sometimes unprepared to execute their contingency plans (for example because legal documentation was not in place). Other contingency plans had, however, worked well, perhaps most particularly at some large institutions with diversified funding sources, illustrating the need for a diversity of elements within a contingency plan.

Off-balance sheet activity and contingent commitments: Stress tests had also under-estimated the risks of extending liquidity support to conduits and off-balance sheet vehicles. Moreover, tests had failed to take account of contingencies that materialised when banks felt compelled to offer capital and liquidity support to affiliated investment vehicles on reputational grounds (even when such support was not formally contracted). This highlighted the need for banks to take sufficient consideration of reputational risk and its implications for liquidity buffers.

Balance sheet management and internal transfer pricing: Recent events highlighted the importance of close coordination between treasury functions and business lines to ensure a full appreciation of potential contingent liquidity risks. At some banks, treasury functions had been unaware of the contingent liquidity risk of new products or how evolving business practices could change the contingent liquidity risk of existing business lines. Moreover, the extent to which firms' internal transfer pricing systems assessed business lines for building contingent liquidity exposure varied from extensively to little or none. Banks that, before the turmoil began, were less rigorous in pricing contingent liquidity internally or externally had greater challenges in meeting their funding liquidity needs.

Capital: Capital allows banks to absorb unexpected losses and provides financial flexibility to support unanticipated asset growth or to sell assets at a discount if needed to meet obligations. But while higher levels of capital may provide some reassurance to market participants, recent events demonstrate that even well capitalised banks can face severe liquidity problems. That demonstrates the need for strong liquidity risk management by banks and the importance of well-designed liquidity regimes.

Supervisory and market information: Members highlighted the importance of a nimble approach by supervisors that allowed for the rapid collection and analysis of additional information once stresses had been identified. Many members found that regular reporting frameworks for monitoring liquidity risk were inadequate in content (eg often missing off-

balance sheet items and funding pressure points), comparability and timeliness. Other members were satisfied with their ability to gather more comprehensive data quickly during times of stress to supplement information gathered routinely. Many supervisors have upgraded reporting templates and increased the intensity of monitoring, including calling for additional stress tests, and some supervisors plan to review reporting guidelines. Market disclosure did not always meet the needs of market participants, and in some cases, financial markets sought additional information on the liquidity positions of banks.

Central bank facilities: In some cases, when use of central bank marginal lending facilities became visible to the market, it was interpreted by market participants as a signal of funding difficulties. The perceived 'stigma' of borrowing from the central bank led to other banks withdrawing lines and cutting exposures, thus risking an exacerbation rather than an easing of funding pressure.

Cross-border issues and exchange of information: The location of liquidity within legal entities and across jurisdictions was important in some cases. Some banks did not anticipate the degree of impairment in FX swap markets at the onset of the period of severe stress. Nonetheless, the existence of 'trapped pools' of liquidity was not judged to be a major concern – in part because banks' contingency plans were based on limited cross-border transferability of liquidity, at least in the very short term. Members highlighted that information sharing and co-ordination among supervisors has been good in recent months, although some host supervisors (particularly of branches) noted difficulties in establishing the liquidity position at group level.

V. Future work to strengthen liquidity risk management and supervision

As a result of the findings of the WGL, the BCBS will take action aimed at strengthening banks' liquidity risk management in relation to the risks they hold. The WGL has begun work to improve supervisory practice and strengthen bank's liquidity risk management through the updating and strengthening of core principles and best practice guidelines for banks and supervisors. To that end, the WGL will update the BCBS's February 2000 *Sound Practices for Managing Liquidity in Banking Organisations* by further developing the sound practice principles to reflect recent experience. As part of this effort, the WGL will draw on recent and ongoing work on liquidity risk by the private and public sectors.

Potential areas of focus in updating the BCBS's sound practice guidance include:

- The identification and measurement of the full range of liquidity risks, including contingent liquidity risks associated with off-balance sheet vehicles;

- Stress testing, including greater emphasis on market-wide stresses and the linkage of stress tests to contingency funding plans.

- The role of supervisors, including communication and cooperation between supervisors, in strengthening liquidity risk management practices.

- The management of intra-day liquidity risks arising from payment and settlement obligations both domestically and across borders (working with the Committee on Payment and Settlement Systems).

- Cross-border flows and the management of foreign currency liquidity risk.

- The role of disclosure and the market discipline in promoting improved liquidity risk management practices.

The BCBS plans to issue the revised sound practices for public comment later this year. In addition, the WGL will continue its work on evaluating the reasons for and implications of the diversity in national liquidity supervision regimes.

List of members of the Working Group on Liquidity

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Canada:	Mr Richard Gresser
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