Liquidity risk management at credit institutions

The growth of the interbank market and rapid expansion of the markets for innovative financial instruments have resulted in a sharp increase in the market-based funding of credit institutions. This trend has increased the banking industry's dependence on the functioning and liquidity of these markets. This places greater demands on banks' internal liquidity risk management systems, for instance in terms of further developing their risk management methods and processes using liquidity risk stress tests. The forthcoming publication of the Basel Committee on Banking Supervision's revised liquidity principles underscores the heightened significance of liquidity risk management, also from a regulatory perspective.

With the liberalisation clause of the Liquidity Regulation, German prudential legislation already sanctions internal liquidity measurement and management processes for prudential reporting purposes. Together with the qualitative provisions of the Minimum Requirements for Risk Management (*Mindestanforderungen an das Risikomanagement* or MaRisk), it promotes the further development of internal liquidity risk management, taking into account changes to refinancing conditions.

Concept and importance of liquidity and liquidity risks

Greater use of money and capital markets as source of finance

Over the last two decades, banks have increasingly used the financial markets as a means of financing long-term assets such as loans. Both the interbank market, in which banks provide each other with funds, and the markets for innovative financial instruments such as repurchase agreements, securitisation and credit derivatives – which expanded rapidly until the US subprime crisis – have increasingly complemented traditional sources of finance such as savings deposits at larger credit institutions. At the same time, the effective maturities of financing instruments have shortened in relation to the deposit business with its traditionally high share of core deposits.

Increased funding liquidity risk

The above trend has increased the funding liquidity risk. This term is used to describe the risk of being unable to raise short-term funds on an ongoing basis or only being able to do so at elevated market prices. It therefore comprises a cash flow and an earnings component.

Importance of market liquidity

Growing importance of market liquidity

At the same time, the importance of market liquidity as a further dimension of the liquidity concept has grown. Market liquidity refers to a feature of (financial) markets, which allows assets (eg loans, securities etc) to be sold at any time without affecting asset prices. It is usually determined by four key factors. The tightness of the market, which is measured using the bid-ask spread, determines the cost of unwinding a position at short notice. The depth of the market assesses which transaction volume can be realised immediately without affecting prices. Resiliency describes the speed at which market prices return to equilibrium after a major transaction. The notion of immediacy is defined as the time between the launch of a market transaction and its final completion.

Transaction costs as a key determinant of market liquidity

All four of the above factors provide information on the direct and indirect costs of market usage. These transaction costs are determined endogenously by the supply and demand behaviour of market participants. If demand meets supply, even for relatively large trading volumes, transaction costs are low and the market is considered liquid.

The existence of information asymmetries can have negative effects on market and funding liquidity

Information asymmetries and uncertainty are particularly important for transaction costs and thus market liquidity. In the presence of asymmetric information, less well-informed market participants tend to be more reserved and, in extreme cases, stay away from the market. Information asymmetries coupled with uncertainty can therefore increase transaction costs and have negative effects on market liquidity. Increasing market-based funding of banks creates a correlation between funding liquidity and market liquidity since a reduction in market liquidity can adversely impact funding liquidity. Particularly when transaction costs increase and market liquidity falls in stress situations, the funding of banks can become more expensive, requiring changes to the funding structure. The resulting changes in demand for funds can, in turn, affect market liquidity.

Refinancing sources for selected categories of banks

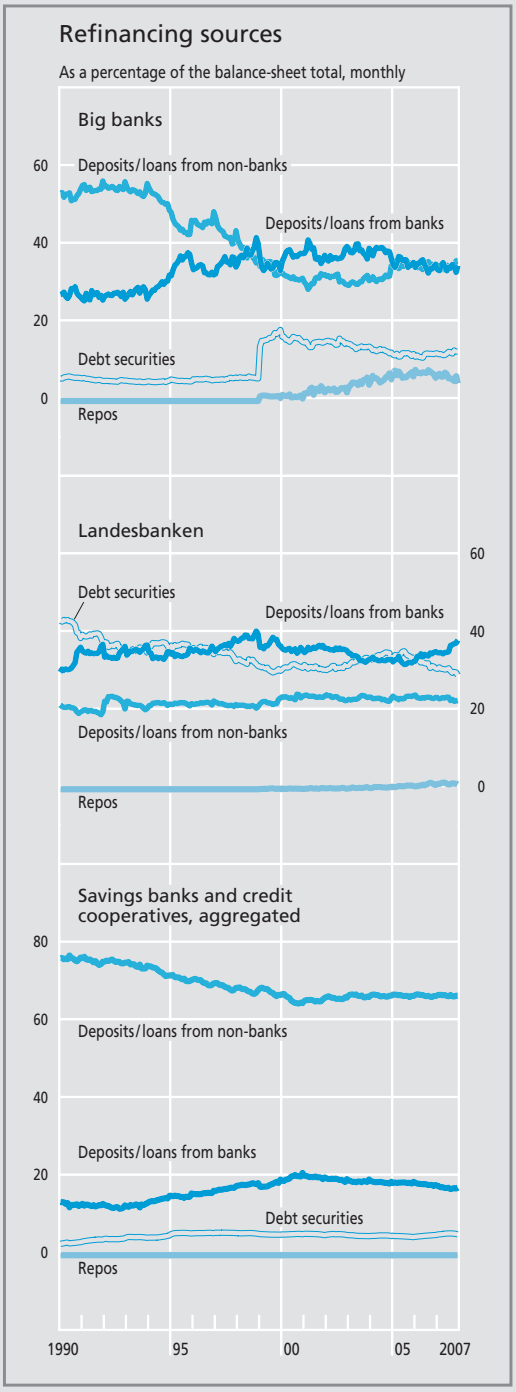
The absolute and relative importance of the various refinancing sources for the individual banking groups has changed, in some cases significantly, in recent years.

In the period under review, 1990 to 2008, deposits/loans from non-banks lost their role as the most important source of funding for the big banks, while the importance of bank deposits increased. Since 2001, both refinancing sources have contributed roughly a third to the total refinancing volume. Over the same period, big banks also stepped up their use of the repo market, while there was no significant change in the use of debt securities.[1]

Looking at Landesbanken in the period under review, debt securities were replaced as the most important source of refinancing by deposits/loans from banks, which ranked second, initially well ahead of non-bank deposits, as measured by balance-sheet total. More recently, the percentage of deposits/loans from banks was almost on a par with that of the big banks. The percentage of deposits/loans from non-banks in refinancing is significantly lower for Landesbanken than for the big banks because of their business model. Refinancing using repo transactions is of only secondary importance for them.

Unlike the big banks and the Landesbanken, savings banks and credit cooperatives are still primarily funded by deposits/loans from non-banks. By contrast, debt securities and/or repo transactions have only a secondary role to play, if any.

Overall, market-based refinancing sources are of much greater significance to big banks and Landesbanken than to savings banks and credit cooperatives. The liquidity of the relevant markets and thus market liquidity risk is therefore likely to have a much greater impact on the refinancing activities of big banks and Landesbanken than on those of savings banks and credit cooperatives.



1 The sharp increase in the percentage of debt securities in the big banks' balance-sheet total in January 1999 can be attributed to an extension of the circle of big banks for which data are collated.

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Contagion effects through correlation between market and funding liquidity risks

Stress situations can lead to contagion effects between market participants due to the correlations described above. From a financial stability perspective, it should be noted that in a tense market environment, the individual and collective rationality of market participants' behaviour may diverge. For example, a bank's individual decision to exit the market in a stress situation would negatively affect market liquidity and, as a result, the remaining market participants' funding liquidity. From a collective perspective, however, market liquidity would increase if this bank remained in the market, thus alleviating the effects of the stress situation for all market participants.

Liquidity management rules

Ensuring adequate liquidity for payment purposes at all times is of the utmost importance to banks. Even in the early days of the banking industry, liquidity-oriented rules such as the "golden rule of banking" were developed. This rule stipulated that the size and maturity of the long-term loans issued should not exceed the size and maturity of the associated long-term refinancing assets or deposits. Nowadays, banks use not only the standardised approach of the Liquidity Regulation[1] prescribed by the banking supervisors, they also use own methods to measure and manage liquidity such as cash-flow-based gap analysis or, in some cases, stochastic model approaches based on the value-at-risk concept.

Gap analysis as a tool for measuring and monitoring liquidity risk

In gap analysis, cumulative contractual and expected cash inflows and cash outflows are compared to identify future liquidity surpluses or deficits. To this end, the cash flows relevant to a bank's liquidity position are first identified. Examples of relevant cash inflows include the receipt of due loan receivables, the receipt of deposits and the sale of assets. Examples of relevant cash outflows include the draw-down of standby credit extended to other market participants, payment obligations from derivative transactions and the withdrawal of deposits. When identifying relevant cash flows, a distinction is made between contractually agreed, certain and uncertain payments.

Based on a specific starting point, all of the cash inflows and cash outflows which are deemed relevant are assigned to maturity bands. The granularity of maturity band structures differs greatly among banks due to their different business structures. Assignment to a maturity band is based on contractual maturity, provided there is one and it appears economically reasonable, for example, when repaying time deposits received. If rollover assumptions are needed for the maturity calculation, as in the case of savings or sight deposits, the size and time of cash flows are usually based on statistical assessments or expert opinions. There is a liquidity gap if expected cash outflows exceed expected cash inflows in one or more of the maturity bands.

Bank-specific definitions of the liquidity reserve

To cover liquidity gaps, the value of the liquidity reserve, ie the amount of additional liquidity available, which is defined individually by each bank, is calculated for the relevant ma-

1 For details of the standardised approach of the Liquidity Regulation (*Liquiditätsverordnung*), see the section "National regulation and international discussion of liquidity risks", pp 66.

Liquidity management lessons to be learned from the financial market turmoil of 2007-08

Banks that fund themselves largely through institutional investors and the capital markets were particularly hard hit by the financial market turbulence of 2007-08. Mainly for these banks, the following preliminary liquidity risk management lessons can be drawn from the market turmoil.

During the financial market turbulence, banks were faced with a simultaneous disruption of important funding markets (in particular the unsecured interbank market, securitisation markets as well as currency swap markets and the repo market), and, above all, they had difficulty accessing longer-term funding. Even in the run-up to the crisis, several banks regarded the extent, gravity and duration of the market disruption as too unrealistic to include the respective assumptions in their liquidity risk scenarios. These experiences should be reflected in the assumptions on which future liquidity risk stress tests are based. The market disruption demonstrates that risk measurement systems should, as a general rule, be adaptive rather than static in nature.

The endogeneity of liquidity risks proved a distinguishing feature of the turmoil. Banks mistrusted one another as they had virtually no information on their business partners' exposure to the subprime mortgage segment. At the same time, banks were uncertain as to what cash outflows they themselves would face in future. As a consequence, they hoarded liquidity and were particularly adverse to providing longer-term liquidity in the interbank market. The simultaneous increase in liquidity requirements in connection with securitisation transactions also resulted in second-round effects. These effects in turn led to an increase in the correlation between the interbank and the credit markets and thus further exacerbated the situation. These observations suggest that endogeneity should be better reflected in future stress tests, for example by modelling other market players' patterns of behaviour.

Because of information asymmetries in terms of banks' exposure to the subprime mortgage segment, the reputation of an institution was of critical importance in the financial market turmoil of 2007-08. In this context, (timely) communication, mainly with investors and rating agencies, proved crucial. At the same time, it became apparent that reputational risks, which emerged during the recent turmoil for instance when accessing credit lines or marginal lending facilities, should be included in liquidity risk management and in contingency plans. Furthermore, unexpected demand for market funding without being an established market player may also expose banks to reputational risks.

In addition, during the financial market turmoil, several banks had to meet, in some cases considerable, off-balance-sheet obligations resulting from transactions in structured products. These included, for example, liquidity facilities which banks had extended to conduits or other financing vehicles. To avoid jeopardising their reputation, banks were willing to provide liquidity even if they were not legally obliged to do so. Since such facilities had, in the past, been drawn on and/or voluntarily provided in exceptional cases at best, a lot of banks had not adequately reflected this in their liquidity risk stress tests. However, the turmoil demonstrated that off-balance-sheet obligations can prove material. It therefore appears appropriate to incorporate a liquidity risk charge in the pricing of structured products in the future and to take greater account of them in liquidity risk management.

In a crisis of international dimensions, difficulties may also emerge in cross-border liquidity transfers (eg lower volumes in the currency swap markets, delays, higher costs). Liquidity risk stress tests should therefore take into account such restrictions. At the same time, the observed spill-over effects underscored the importance of conducting liquidity risk stress tests at group level.

Besides these lessons, which relate mainly to the design of liquidity risk stress tests and contingency plans, there are also lessons to be learned for liquidity management in general. At several banks, the disruptions uncovered shortcomings for instance in internal and external communication on liquidity risk. In addition, a lack of coordination between operative units, treasury, risk controlling and top management hampered liquidity management under emergency conditions in some instances. Finally, the market turmoil underscored the importance of an adequate internal incentive system to promote the prudential use of the scarce resource that is liquidity.

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turity bands. The liquidity reserve usually comprises short-term, liquid assets, the use of standby credits received and collateralised refunding via the repo market. For securities on the asset side, haircuts are normally applied to the market price. In the case of collateralised refinancing, for instance, the haircuts are often based on the haircuts applied by the European Central Bank.

Liquidity management using limits

Banks usually define, within their gap analysis, limits for the balance or the ratio between the liquidity reserve and liquidity gap for liquidity management purposes. Countermeasures are initiated when the limit is approached or exceeded by a certain amount depending on what has been agreed.

Stochastic model concepts

Besides gap analyses, the literature also suggests stochastic model concepts such as liquidity at risk (LAR) or liquidity value at risk (LVAR) for liquidity management.

LAR measures the risk of a shortfall in net cash flows

LAR is the term used to describe the shortfall in net cash flows which, with a given probability, will not be exceeded in the course of one business day. The respective confidence level is determined on the basis of the bank's risk tolerance and set individually by the credit institution (eg 95% in the case of normal business operations). LAR is used to determine the amount of liquidity credit institutions should maintain to cover their daily payment obligations. In terms of underlying concept, LAR is similar to value at risk for market risks; however, it relates to the distribution of autonomous net payment outflows[2] rather than loss distribution. Therefore, it bears no relation to either the profit and loss account or the management of equity. Crucially, risk values outside the sample can also be estimated via LAR using extreme value statistics. These extreme values are factored into calculations since credit institutions usually make conservative assumptions when calculating the liquidity reserve for daily business to minimise the liquidity risk.

LVAR measures the risk of higher refunding costs

LVAR describes the value at risk caused by unexpectedly high refinancing costs and which, with a given probability, will not be exceeded. Contrary to LAR, LVAR determines structural liquidity risk and therefore refers to asset level. As a result, the effect of liquidity risk on profit and loss, and potentially also on capital requirements, can be determined.

Gap analysis commonly used as a methodological basis for liquidity risk management

The vast majority of credit institutions that use their own methods to measure and manage liquidity do so on the basis of gap analyses or other comparatively simple procedures in terms of underlying concept.[3] Stochastic models are still used by only a few institutions; however, the percentage of – in particular, larger – credit institutions which use stochastic models has increased in the last two to three years. There are also indications that individual groups of banks are developing their own approaches to funding matrices

2 Autonomous payments are defined as payments which cannot be influenced by liquidity management.
3 The simpler procedures include the analysis of balance sheet stocks as of a specific cut-off date. However, this fails to take into account future payment flows and their uncertainty as well as off-balance-sheet obligations. The stock approach is also very common. This calls for a minimum stock of liquid assets (mostly defined as a percentage of short-term liabilities) to be held at all times.

and plan to use these for internal liquidity management.[4]

Liquidity risk stress tests

Estimating the consequences of critical developments using liquidity risk stress tests

Credit institutions measure and manage their liquidity not only in normal business operations, but also in case of potential liquidity crises. Stress tests are an important liquidity risk measurement and management tool for determining the effects of stress situations quickly and preparing suitable countermeasures. As such, carrying out stress tests and having the ensuing contingency funding plans in place as well as updating both stress tests and contingency funding plans to reflect the latest developments are a central task of risk management.

To date, advanced stress tests for liquidity risks are less widespread at credit institutions than stress tests for market and credit risks. Smaller institutions, in contrast, perform simpler scenario analyses which are often based on balance sheet ratios.

External versus internal scenarios

Depending on the type of trigger event, stress scenarios can be subdivided into external and internal scenarios. External scenarios include market-related liquidity shocks such as the drying-up of liquidity in individual markets; a typical internal scenario is the downgrading of an institution's own rating. Credit institutions calculate an average of two to three stress tests for liquidity risks, mostly in the form of rating downgrades and market crisis scenarios. The scenario design varies among banks according to their business focus.

Historical versus hypothetical scenarios

Furthermore, a distinction is made between historical and hypothetical scenarios depending on whether the database for the analyses draws on historical values, values derived from a model or heuristic values. Unlike market and credit risks, for which the time series tend to be longer, there is a limited amount of historical data available for measuring liquidity risks. For example, prior to the latest bout of turbulence, liquidity facilities were not simultaneously drawn upon to such a large degree. If no meaningful data are available, stress tests are performed primarily on the basis of hypothetical scenarios.

Sensitivity versus scenario analyses

Stress tests are carried out on the basis of sensitivity or scenario analyses. While sensitivity analyses test the dependence on a selected risk factor, scenario analyses simultaneously examine the effects of several risk factors on liquidity. The analyses take into account assumptions regarding the duration of the shock and the time required for suitable countermeasures. Once the scenario is developed, institutions check whether there is enough liquidity potential to cover any liquidity gaps. The parameters used in the individual assumptions, eg for the availability of unsecured refinancing funds in a stress situation, are primarily based on experience or on expert estimates.

Focus on effects at cash flow level

In liquidity risk stress tests, institutions primarily focus on the cash flow level, while the effects on returns, eg higher refinancing costs, are largely not accounted for. Following the recent developments on the financial mar-

4 See N Moch, Liquiditätsrisikomanagement in Kreditinstituten, EUL Verlag, p 105.

Deutsche Bundesbank's quantitative survey of liquidity risk stress tests

In addition to stress test analyses based on the prudential reporting data provided under the Liquidity Regulation *(Liquiditätsverordnung)*, the Bundesbank also collects data from selected banks on the impact of various liquidity risk scenarios. The participating banks use their internal liquidity risk measurement and management processes to calculate the impact of negative events on their liquidity position. The results include the qualitative documentation of the scenarios used and assumptions made.

This year's survey reveals that the participating institutions employ very similar methods for their liquidity risk stress tests. Gap analyses are used to compare the outflows of funds in a stress event with the inflows of funds that can be generated in such an event or the liquidity buffer. Thematically, the stress tests also reflect similar events such as a rating downgrade or market crises. However, there are large differences in the concrete scenario description, the assumptions made, the ratios calculated and the internal reporting of the stress test results. In case of a rating downgrade, the stress tests differ, for one, in terms of the assumed severity of the downgrade (from one notch to three notches); for another, different assumptions are made in terms of the impact the stress event will have on funding.

Market crisis scenarios and rating downgrades were modelled as stress scenarios most frequently; there is a fine line between an institution-specific (idiosyncratic) and a market-related scenario, ie market crisis scenarios generally also include idiosyncratic elements. A number of institutions regard a decline in securities prices as a market crisis scenario (focus on the asset side), while others primarily look at restrictions in access to essential funding sources (focus on the liability side).

Combined scenarios, which simulate strong effects on both the asset and the liability side – for example a financial market crisis combined with a rating downgrade – have been studied less frequently to date; refinements are currently underway here.

As the financial market turmoil has been ongoing for nearly a year now, institutions are increasingly looking at a longer time horizon in their stress tests. Currently, most institutions observe a time horizon of six months to a year in stress testing.

The survey shows that there is a high degree of heterogeneity in terms of the design of different banks' liquidity risk stress tests. One reason is that the banks under observation act very differently depending on their business focus and therefore make different assumptions in terms of cash inflows and outflows in a stress event. Differences in scenarios and assumptions as a result of different business models are therefore justified. This diversity limits the comparability of the various banks' stress test results, but does have the advantage of reducing the danger of stability-jeopardising herding behaviour by banks.

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kets, however, some institutions intend to incorporate these aspects, too. Other institutions deliberately focus their stress tests on cash flows alone because they consider the primary goal of liquidity risk stress tests to be the safeguarding of short-term operating liquidity and not the analysis of medium-term or long-term effects.

Use of stress test results to set limits

Banks incorporate the results of the stress tests in their daily liquidity risk management, eg in the limits they set, in different ways. If a stress test exceeds the predetermined limits, stark automatism with regard to the countermeasures to be taken is usually avoided in favour of reacting flexibly and quickly depending on the situation. Potential responses in the event of an emergency and their organisational framework are provided for in contingency funding plans, among other things.

Contingency funding plans

Strategies for handling liquidity crises

In recent years, almost all banks have developed a contingency funding plan which, according to the recommendations of the Basel Committee on Banking Supervision, should present a "strategy for handling liquidity crises and include procedures for making up cash flow shortfalls in emergency situations".[5] Such contingency funding plans normally apply to an entire banking group, but individual institutions within a banking group can also have their own contingency funding plans.

There are significant differences between banks' contingency funding plans with regard to the level of detail and stringency of provisions. This is a result of the different preferences concerning the degree of flexibility decision-makers should have in an emergency situation. In some banks, contingency funding plans have a prescriptive character, while in others, they simply present a number of potential measures. In the event of an emergency, they normally define responsibilities and a decision-making committee which is then responsible for liquidity management. This committee generally consists of members of the treasury and trading departments, although the management of the bank is always involved either directly or indirectly. Contingency funding plans often define events which trigger the setting in motion of the contingency funding plan, such as changes in customer behaviour (eg withdrawal of sight deposits), in the money market (eg changes in short-term interest rates) or in the financial markets (eg changes in spreads for medium-term refinancing instruments). Other banks intentionally do not include an explicit definition of incendiary events and decide whether to activate the plan on a case-by-case basis.

Clear differences in the design of contingency funding plans

Emergencies divided into escalation levels

Often contingency funding plans divide an emergency into several escalation levels, eg in the form of a traffic light system: "green" is normal, "yellow" deteriorating business and refinancing conditions and "red" a threatening limitation of the liquidity situation. The number of levels varies from institution to institution, as do the criteria which determine

5 See Basel Committee on Banking Supervision, Sound Practices for Managing Liquidity in Banking Organisations, p 14.

the transition to the next level. Such criteria can include, for instance, poor stress test results or an increase in refunding costs. Normally, specific liquidity management measures, different responsibilities and different communication strategies are defined for the various escalation levels.

Earnings and reputation influence choice of measures in the event of an emergency

Liquidity management measures at the various escalation levels can serve to generate liquidity, eg from the sale of liquid and less liquid assets, additional open market transactions with central banks, the issue of debt securities, securitisations or the utilisation of standby credits received from other credit institutions. Also, liquidity-saving measures such as no longer purchasing illiquid assets or placing restrictions on the issue of new loans are possible. Earnings and reputation are often the decisive factors when it comes to deciding the order in which the various refunding options are realised. The contingency funding plan often ensures that, in the event of an emergency, the legal and operational prerequisites necessary for initiating the respective measures are met. Some contingency funding plans address internal and external communication, eg with banks' management, supervisory bodies, supervisory authorities, investors and rating agencies. In addition to allocating responsibility for communications, they also contain information on the timing and contents of communications and what form they should take.

Regular tests ensure that contingency funding plans work

Regular tests can be conducted to ensure that a contingency funding plan functions as smoothly as possible in the event of an emergency. These tests often relate to operational aspects such as the ad-hoc convening of an emergency committee, checking the telephone numbers of the individuals deemed responsible or checking whether the necessary legal and operational preparations have been made.

If banks initiated their contingency funding plans during the financial market turbulence of 2007/2008, they did so mostly at a relatively low escalation level. In such cases, the contingency funding plans proved useful since valuable time was saved as a result of potential measures and responsibilities having been defined in advance.

National regulation and international discussion of liquidity risks

Provisions of the Liquidity Regulation *(Liquiditätsverordnung)*

Liquidity Regulation as national reporting regulations

The Liquidity Regulation, which entered into force on 1 January 2007, sets forth the national prudential reporting regulations for banks. The standardised approach of the Liquidity Regulation is, in essence, a continuation of the regulations of the previously applicable Principle II, while the liberalisation clause allows for the use of internal procedures.

The standardised approach of the Liquidity Regulation

Using the standardised approach, institutions report their expected payment inflows and outflows from specific balance-sheet and off-balance-sheet asset and liability positions according to their residual maturity or call probability, as determined by the supervisors, in

four maturity bands. They also recognise listed securities and covered debt securities as well as assets eligible as central bank collateral as highly liquid assets in the shortest maturity band and thus as funds (irrespective of the residual maturities). Highly liquid assets therefore act as a buffer for settling payment obligations at any time. The result is liquidity surpluses or deficits for all four maturity bands.

Calculating the regulatory liquidity ratio

An institution's liquidity is deemed sufficient when the funds available for the coming month (first maturity band) – calculated from the relevant reporting date – at least cover the payment obligations for that period. The regulatory liquidity ratio is the ratio of funds to payment obligations and must amount to at least one.

Information value of the standardised approach depends on an institution's size and complexity

The prudential reporting regulations of the Liquidity Regulation give supervisors regular insight into banks' liquidity situation. Using the standardised approach, however, institution-specific factors are not taken into account. It is therefore a pragmatic compromise in which certain conceptual deficits are accepted in return for methodical simplicity and comparability. With the increasing size of business, higher complexity of transactions and increasing volatility of payment flows, the standardised approach becomes less meaningful for calculating an institution's actual liquidity risk.

With the "liberalisation clause" (section 10 of the Liquidity Regulation), banks can, for the purpose of prudential reporting, use liquidity risk figures which have already been calcu-

Requirements of liquidity models (section 10 (3) of the Liquidity Regulation)

Overarching requirements, which must be reviewed regularly
- The institution's internal procedures must be based on its specific situation, the type and complexity of its business and its size
- There must be adequate ongoing calculation and monitoring of the institution's liquidity risk
- There must be a more in-depth and appropriate description of the liquidity situation than when the standard approach is applied
- The internal procedure must convey information about expected short-term net outflows of funds, the possibility of unsecured borrowing and the effect of stress scenarios

Further requirements for approval
- Appropriate quantitative ceilings (limits) for liquidity risks, in consideration of stress scenarios, must be set
- The institution must identify ratios in its internal procedure to depict the risk of insufficient liquidity
- There must be documentation of what levels these ratios must reach for the institution to deem itself exposed to a noteworthy, medium or high risk of insufficient liquidity
- There must be documentation of the measures the institution will take when the ratios hit one of the specified risk levels
- The internal procedure and the limit system must be used for internal liquidity risk management and in the institution's corporate governance procedures

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Liberalisation clause allows for bank-internal liquidity models instead of the standardised approach

lated in their internal liquidity risk management procedures. The liberalisation clause allows banks, under certain circumstances, to use their own liquidity models[6] instead of the standardised approach. If the eligibility criteria of section 10 of the Liquidity Regulation are met, the institution receives written confirmation of the suitability of its internal liquidity model within the meaning of the Liquidity Regulation from the BaFin on the basis of an examination carried out by the Deutsche Bundesbank in accordance with section 44 (1) sentence 2 of the German Banking Act (*Kreditwesengesetz*).

Liberalisation clause has benefits for both banks ...

The model alternative of section 10 of the Liquidity Regulation is an option which does not contain any method-related provisions. The requirements of the Liquidity Regulation are formulated in an open way to allow for flexibility with regard to banks' internal model design. Institutions are therefore given the opportunity to create consistency between internal bank risk management and prudential reporting requirements and, in doing so, avoid double calculations and reduce overall administrative outlay. Another advantage for institutions is the possibility of having a liquidity risk measurement and management process approved at institutional or financial holding group level. The liberalisation clause allows supervisors, in turn, to analyse internal liquidity risk management processes and the liquidity situation of an institution in greater detail.

... and banking supervisors

To meet the challenges for both institutions and banking supervisors resulting from the high degree of flexibility, an exhaustive exchange of ideas and information was held when the Liquidity Regulation came into effect, both among banking supervisors as well as with institutions and associations. An examination concept and examination guidelines were developed internally by a working group of supervisors (Bundesbank and BaFin). Furthermore, various documents were published to foster the process of approving internal liquidity risk models.[7]

Liquidity risk in the MaRisk

In addition to the Liquidity Regulation, the MaRisk also apply

Irrespective of whether an institution opts for the intentionally simple standardised approach or for the liberalisation clause, which takes individual conditions into account to a greater extent, it must fulfil the quality-oriented Minimum Requirements for Risk Management (MaRisk). These provide concrete detail on section 25a of the German Banking Act and should, as principle-based requirements, also be applied according to the principle of proportionality.

General liquidity management requirements of MaRisk

The MaRisk classify liquidity risk as one of the types of risk which is usually significant for an institution. Liquidity risks are basically subject to the general requirements for organisation-

6 A liquidity model in this context does not necessarily imply a stochastic model. In addition to risk measurement, the emphasis lies on risk management and integrating the model into company-wide risk management. The Liquidity Regulation uses the term "internal liquidity risk measurement and management procedures".
7 For a notice on the application and approval procedure describing approval procedures and listing documentation requirements, see http://www.bundesbank.de/bankenaufsicht/bankenaufsicht_liquiditaet_merkblatt.en.php). The study conducted jointly by the Bundesbank and BaFin illustrates the liquidity risk management practices of selected German credit institutions (see http://www.bundesbank.de/bankenaufsicht/bankenaufsicht_liquiditaet_risiko.en.php.

al and operational structure and must be incorporated in an appropriate manner in the bank's internal risk management and controlling processes. Liquidity risks must also be included in management's risk strategy, but need not necessarily be taken into account in the risk-bearing capacity analysis. Institutions must justify their non-incorporation and are not exempt from complying with the other MaRisk requirements.

Special liquidity risk management requirements of the MaRisk

As well as these general risk management provisions, the MaRisk also contain special liquidity risk management requirements: the requirement that liquidity for payment purposes must be ensured at all times incorporates the legal provision of section 11 of the German Banking Act, according to which institutions must invest their funds in such a way as to ensure that "sufficient liquidity for payment purposes is guaranteed at all times". The asset and capital structure must be diversified to avoid unilateral dependencies, for example, on certain refinancing channels. To be able to cover liquidity needs, institutions must pay particular attention to asset liquidity. This requires that institutions deal with the characteristics of the products and markets relevant to them.

Presenting the current and future liquidity situation, including scenario analyses

As part of their liquidity risk management processes, institutions must prepare a liquidity overview which shows both the current liquidity situation and expectations for the future. The regular scenario analyses are particularly important for liquidity risk management. To be able to assess the liquidity situation, even when conditions deteriorate, institutions must take it upon themselves to develop appropriate scenarios. Potential liquidity squeezes can be identified in this way and taken into consideration in the risk management process.

Catalogue of measures in preparation for emergency situations ...

An institution-specific and scenario-specific catalogue of measures which contains liquidity sources in the event of a liquidity squeeze and takes into account any shortfall in payment inflows must also be compiled. The organisational units or persons responsible for initiating and carrying out liquidity-generating measures as well as the design of communication channels and authority to issue instructions must be defined. Finally, the MaRisk require that management receive regular reports on the liquidity situation.

... and regular reports to management

International regulation

Heterogeneous international supervisory environment

At international level, there are major differences between supervisory systems for monitoring liquidity risk; purely qualitative and principles-oriented prudential requirements exist alongside predominantly quantitative supervisory regimes based, for example, on liquidity ratios.[8] Given the increasing complexity of institutions' business structures, innovative products and a modernised payment infrastructure, liquidity risk has attracted more attention from international bodies in recent years. Supervisory and industry[9] initiatives

8 For related analyses, see Liquidity Risk: Management and Supervisory Challenges, February 2008; CEBS: First Part of CEBS' Technical Advice on Liquidity Risk Management, August 2007.
9 The Institute of International Finance's (IIF) "Principles of Liquidity Risk Management" of March 2007 represent a much-publicised contribution by the banking industry to the discussion regarding the appropriate treatment of liquidity risks at cross-border banks.

have addressed, amongst others, the question of how the relative lack of international harmonisation impacts the efficiency of both regulation and banks' internal liquidity risk management processes, particularly at cross-border institutions.

Work of the Basel Committee

Against this backdrop and owing to the recent financial market turbulence, the Basel Committee on Banking Supervision has resolved to develop new international principles for the management and prudential treatment of liquidity risks in the banking sector. This intention is supported explicitly in the recommendations of the Financial Stability Forum (FSF).[10]

Modernising and expanding the liquidity principles

In June 2008, the Basel Committee published and released for consultation a corresponding draft entitled "Principles for Sound Liquidity Risk Management and Supervision". The new framework aims to modernise and expand the "Sound Practices for Managing Liquidity in Banking Organisations" from 2000 and takes into account the Basel Committee's recommendation of a more principles-oriented approach to banking supervision regulations. The final version should be available by the end of September this year.

Amendments to the new liquidity principles

The following amendments to the status quo are particularly relevant for the banking industry and supervisory bodies.

- Systematic listing of all potential sources of liquidity risk (including off-balance-sheet transactions) and risk limitation techniques (eg limit systems, early warning indicators)
- Definition of risk tolerance by management, taking into consideration business policy and the relevance of the institution in the financial system
- Demand for an appropriate liquidity cushion, for example in the form of high-quality liquid assets
- Greater gearing of liquidity management and regulation to stress and emergency situations, eg through stress tests with suitably conservative stress scenarios
- Consideration of liquidity costs and risks in the overall bank management process
- Addressing the intraday liquidity risk when participating directly and indirectly in payment and settlement systems (intraday liquidity management)
- Emphasis on adequate collateral management to determine the amount of collateral effectively available
- Organisational requirements for liquidity management in banking groups to ensure the group-wide availability of liquid funds or refinancing sources
- Recommendations on regular disclosure with a view to informing market participants of banks' liquidity management more effectively

10 "Report of the Financial Stability Forum on Enhancing Market and Institutional Resilience" of 7 April 2008.

– Clear expansion of the role of banking supervisors, with greater emphasis now placed on prudential information extraction, intervention in the event of non-compliance with principles and cross-border as well as inter-institutional co-operation

Proposed amendment to the Banking Directive

Since the Basel Committee and the FSF expect the new liquidity principles to be implemented carefully and monitored regularly, the European Commission has already proposed a corresponding amendment to the provisions of Annex V of the Banking Directive.

The CEBS's liquidity management and supervision recommendations

To coincide with the new liquidity principles of the Basel Committee, in compliance with a consultation assignment from the European Commission, the Committee of European Banking Supervisors (CEBS) published a consultation paper at European level containing recommendations for liquidity risk management and supervision at financial institutions.[11] The content of the CEBS recommendations is based largely on the principles of the Basel framework. The CEBS places more emphasis than the Basel Committee on the fact that these recommendations also apply to smaller banks and investment companies in accordance with the guiding principle of proportional applicability. The CEBS recommendations differ fundamentally from the Basel principles in that they explicitly take into account the possibility of prudential recognition of an institution's internal liquidity risk measurement and management processes and thus go beyond the proposals of the Basel Committee. Ultimately, this approach means that important elements of the German liquidity provisions have been incorporated in the CEBS recommendations for institutions.

National implementation of new liquidity principles and next steps at international level

All in all, banking supervision in Germany, with its updated liquidity regulations which apply to both small and medium-sized banks and cross-border institutions, is well positioned in the European and international discussion. In addition to existing individual bilateral agreements, international and European supervisory bodies are also aiming to intensify cross-border cooperation in the area of liquidity supervision. The work of the Basel Committee and the CEBS is therefore expected to continue, with a view to making more progress on the convergence of liquidity regimes.

11 "Second Part of CEBS's Technical Advice to the European Commission on Liquidity Risk Management", 17 June 2008.