

# 4 Mitigating risks to the UK financial system

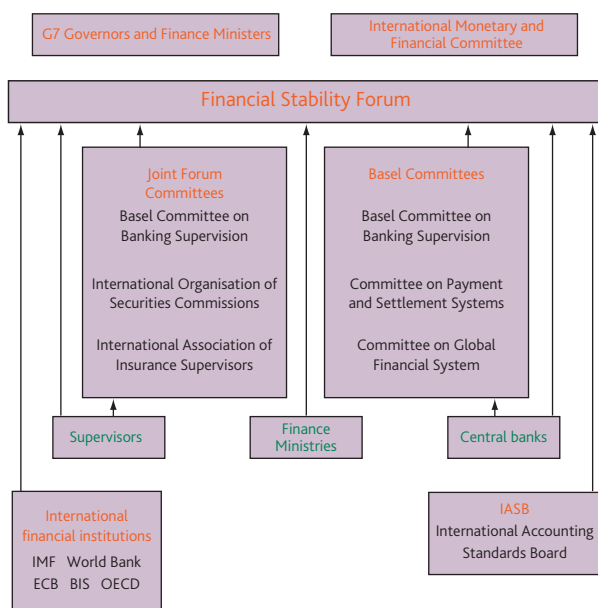
Previous sections have identified a number of conclusions which can already be drawn from recent events about the nature and source of some important vulnerabilities to the UK financial system. There is undoubtedly more to learn. This section sets out work that is currently under way by the private sector and the authorities to address these vulnerabilities, and new initiatives that may be required. Many of these require international action, others relate particularly to the United Kingdom.

The primary responsibility for managing risk lies with the individual institutions and investors taking on those risks. But the authorities may also have a role if private sector participants are unable — or have insufficient incentive — to price and manage the system-wide consequences of their behaviour.

Earlier sections have identified some key areas that have already emerged for further risk mitigation work. These include reducing risks arising from weaknesses in credit risk assessment; improving transparency about the composition of complex structured financial products and institutions' exposures to them; addressing weaknesses in commercial banks' liquidity risk management practices and limitations in regulation; the importance of stress testing and contingency planning within firms and infrastructure against extreme and correlated shocks; and the effectiveness of the tools available to the authorities for managing and resolving financial crises. These are discussed in turn.

**Chart 4.1** Financial Stability Forum

Key:  
 National authorities  
 International bodies  
 Arrows denote membership



Internationally, the Financial Stability Forum (FSF) seeks to promote financial stability, improve the functioning of markets and reduce systemic risk. It draws together representatives from the major financial sector standard setters (including the International Organisation of Securities Commissions (IOSCO), the Basel Committee on Banking Supervision (BCBS) and the International Association of Insurance Supervisors (IAIS)), policymakers from the major financial centres (central banks, supervisors and finance ministries) and representatives of international organisations such as the International Monetary Fund (IMF) and the World Bank. (See **Chart 4.1**.) In response to the recent turbulence, the FSF has been asked by the G7 to establish a shared assessment of the issues and to formulate a co-ordinated international response, drawing on the expertise of the FSF's membership.<sup>(1)</sup> It will report in Spring 2008, to ensure that important issues arising from

(1) FSF (2007), 'Financial Stability Forum meets in New York', Press Release 19/2007E, 26 September 2007.

recent events are not allowed to fall through gaps, and to draw out the main lessons.

## 4.1 Weaknesses in credit risk assessment

### *Some investors are over-reliant on ratings...*

Recent events have exposed weaknesses in credit risk assessment. Banks increasingly distribute the credit risk that they have originated. It is unclear whether the ultimate bearers of risk have sufficient information about the underlying credit risk in the products — in particular the more complex instruments — in which they invest. Investors may have become overdependent on rating agencies' assessments of risk. They may also have misinterpreted ratings, assuming that they provide information on a range of risks — such as liquidity and market risk — in addition to credit risk.

The central role of ratings in the market for structured finance products was on the agenda of a number of regulatory bodies before the recent turmoil. The Committee of European Securities Regulators (CESR), for example, is carrying out a study of the ratings of structured finance products. This is part of its annual assessment of whether rating agencies operating in Europe adhere to a Code of Conduct designed by IOSCO.<sup>(1)</sup> IOSCO is considering whether the Code needs to be amended to reflect problems that might arise in rating structured finance products, such as the potential for conflicts of interest if rating agencies are involved in advising on the construction of such products as well as their eventual rating. The Committee on the Global Financial System (CGFS) is also updating its 2005 study<sup>(2)</sup> on the use of ratings in structured finance, focusing on the information provided by rating agencies and on how investors use that information. The FSF has an important role to play in co-ordinating these closely related workstreams, as in other areas, to ensure there is no duplication of effort.

### *...whose information content could be improved...*

There are many unanswered questions about the ratings process, which these programmes of work should help to answer. One key issue — discussed in Box 6 — is how to improve the information content and the use of ratings by investors. Rating agencies play a crucial role in the financial system, providing information that it would not be efficient for investors to collect individually. But they could make a number of methodological changes to improve the usefulness of their ratings. These could include providing an assessment not just of credit risk, but also of other important characteristics of instruments such as their liquidity and market risk, rating stability over time and the certainty with which a rating is given. This would provide a better indication

(1) IOSCO (2005), 'Code of conduct fundamentals for credit rating agencies'.

(2) CGFS (2005), 'The role of rating agencies in structured finance: issues and implications'.

of the distribution of returns an investor might expect on an asset. Some rating agencies are already considering whether it is feasible for them to provide some of this additional information.

The potential for over-reliance on ratings is not confined to end-investors. There is a risk that banks, under the changes to international banking regulations being introduced in 2008 — Basel II — may also come to rely heavily on agency ratings, particularly for structured products. Banks on the 'internal ratings based' approach will be able to use their own models — subject to supervisory approval — to determine the capital charges for standard products. But they will have to use external ratings for structured products, where such ratings exist. It is possible that this regulatory requirement could result in some banks using external ratings as their only input when assessing structured products. This potential over-reliance needs to be addressed by banks and their regulators.

*...and wider lessons may be drawn for credit assessment.*

The growth in the 'originate and distribute' business model also raises a wider question about whether the originators of risk have appropriate incentives to assess and monitor the performance of products in which they may have little or no retained interest. Investors need to know how the quality of securitised assets will be maintained throughout the life of the product. At a minimum, disclosures to investors should include information on the nature of any ongoing relationship between a borrower and the originator, including whether any interest retained at origination has subsequently been sold off or hedged (see Box 7). Any retained interests might usefully be a focus of greater regulatory attention in the future, given their importance and implications for risk incentives.

## 4.2 Inadequate transparency about complex financial instruments

*There have been difficulties in valuing exposures to complex instruments...*

The growth in the complexity of some financial instruments may have outstripped the reliability of the models used to value them. In the absence of reliable market prices, many exposures can be valued only by models ('marked-to-model'). But different models sometimes produce wide ranges of estimates for the values of such exposures, partly because of their sensitivity to underlying assumptions (see Box 2, Section 1) and partly because of the lack of a reasonable backrun of data. The resulting model risk should be reflected appropriately in firms' risk management decisions, such as in the setting of limits and allocation of reserves.

Institutions may also be able to adopt different approaches to the valuation of exposures to illiquid securities on their balance

## Box 6 Role of rating agencies

Recent events have raised a number of questions about the role of rating agencies in the financial system, in particular in evaluating structured credit products. This box puts forward some suggestions of how rating agencies could support improvements in investors' risk assessment processes.

### Role played by rating agencies

Rating agencies perform three functions for the international financial system, which it is important are not lost.

#### (i) They can help mitigate the fundamental information asymmetry in capital markets between investors and firms seeking external financing.

This inherent asymmetry may deter some investors from providing financing to firms because of the cost of acquiring the necessary information. A detailed analysis of credit risk would be impracticable for most investors to carry out; it might also be inefficient if the investor's stake is small relative to their overall portfolio. A rating from a neutral third party can enable small investors who could not afford to carry out their own risk assessments to enter the market. As a result, external ratings can help lower the cost of capital. When interpreting ratings, investors need to be conscious of any potential conflicts of interest — given that the issuer of an instrument pays for the rating.

#### (ii) Ratings can be a useful mechanism to solve some principal agent problems.

Principals (investors) can attempt to cap the amount of risk that the agent (pension funds, life insurers, money market mutual funds etc) takes on their behalf by stating a minimum rating for assets in which to invest or counterparty exposures to take. In addition, access to some financial markets or business models can be restricted to issuers with ratings above a minimum level. This applies to credit derivative product companies, who need an AAA rating to avoid posting collateral upon marked-to-market changes in their derivatives positions. Financial guarantee monoline insurers need AAA ratings to be able to provide an AAA wrap to bonds or securitisation tranches.

#### (iii) Ratings can be used to solve collective action problems between dispersed bond investors.

It may not be rational for individual investors to monitor and trigger a debt restructuring of a firm in difficulty. But if the firm continues trading without action being taken, this could reduce recovery values for investors. A credit rating downgrade can act as a clear signal for individual investors to

take action, triggering a debt restructuring. The winding up of several structured investment vehicles (SIVs) in recent weeks, following credit rating downgrades, are examples of this mechanism at work.

### Lessons from recent events

The recent financial market turmoil has revealed that some investors appear not to have fully appreciated that rating agency assessments are currently intended to cover only credit risk. In particular, investors may have inferred characteristics other than credit quality from a given rating. Liquidity and market risk (price stability) and credit rating stability characteristics may have implicitly been ascribed to assets with the same rating. The search for yield may have encouraged these perceptions, with investors looking for assets with the highest returns within a given rating category,<sup>(1)</sup> and thereby failing to recognise fully that these higher returns were providing compensation for some additional risks.

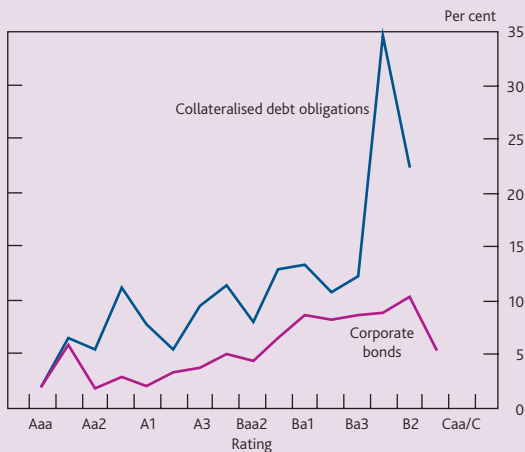
Inferring characteristics other than credit risk from ratings is particularly problematic for structured finance products. As described in Box 2 in Section 1, these instruments are complex and their prices are volatile. The secondary market liquidity of these products is low. And rating agencies' models are also often based on scarce historical data and are sensitive to assumptions about important parameters such as correlations between default rates. As a result, revisions to valuations can be large, making ratings for these products less stable than for sovereign or corporate bonds. **Chart A** shows that mezzanine tranches of 'sub-prime' structured products issued in 2006 have been subject to a particularly high number of rating downgrades — although only 8% of issuance by value has been downgraded. **Chart B** illustrates how the unconditional historical probability of sizable downgrades (of more than one notch) has also been much higher for structured products than for corporate bonds over the past few years.

**Chart A** Ratings downgrades of US sub-prime residential mortgage-backed securities by tranche of 2006 vintage



Source: JPMorgan Chase and Co.

**Chart B** Historical probability of a Moody's rating downgrade of more than one notch<sup>(a)</sup>



Source: Moody's Investors Service.

(a) Credit migration of CDO notes, 1996–2006, for United States and European transactions, 27 February 2007.

### Suggestions for improvement

It is in the rating agencies' best interest that investors have a good understanding of what ratings mean, so that they retain their important role in the financial system. To that end, the following ideas to improve the information content of ratings merit consideration:

- Agencies could publish the expected loss distributions of structured products, to illustrate the tail risks around them.<sup>(2)</sup> Agencies have made significant efforts over the past few years to increase the transparency of their rating methodology for structured finance products, through publication of research reports describing their modelling methodology and their assumptions on correlations and recovery rates. But published distributions could provide a visual reminder of the fatter tails embedded in the loss distribution in structured products.
- Agencies could provide a summary of the information provided by originators of structured products. Information on the extent of originators' and arrangers' retained economic interest in a product's performance could also be included. Such a summary may satisfy investors that incentives are well aligned or encourage investors to perform more thorough risk assessments.

- Agencies could produce explicit probability ranges for their scores on probability of default. Probability ranges would provide a measure of the uncertainty surrounding their ratings. Although such figures are already available retrospectively as transition matrices, an explicit probability range would allow investors to monitor agencies' performance when rating different asset classes.
- Agencies could adopt the same scoring definitions. Currently, some use probability of default, some loss given default and others a combination. Converging on a single measure would reduce the risk of misinterpretation by investors.<sup>(3)</sup>
- Finally, rating agencies could score instruments on dimensions other than credit risk. Possible additional categories include market liquidity, rating stability over time or certainty with which a rating is made. Clear scores on these dimensions could encourage more sophisticated investment mandates and easier monitoring of non-credit risks in a portfolio. It would clearly take some time and money for agencies to develop the necessary expertise on these other risks, but some agencies have already proposed these additions.<sup>(4)</sup>

These suggestions aim to facilitate a more sophisticated use of credit ratings by investors. These measures would require further analysis and action by the rating agencies themselves. These actions might occur voluntarily in the light of recent market experience. Indeed, there is already some evidence of some of them occurring. Without this market evolution, there might be a case for public sector intervention to specify and encourage higher and common standards of assessment and disclosure. It is still critical, however, that investors carry out their own due diligence and do not become over-reliant on ratings as a summary statistic of risk.

(1) See Table 3.C, Section 3 of the April 2007 *Financial Stability Report*, page 46.

(2) The risk that extreme losses are more likely than what would be expected from a normal distribution.

(3) Moody's announced in 2006 that it would start disaggregating some of its long-term ratings into their two key components — loss given default and probability of default ([www.moody.com/cust/content/loadcontent.aspx?source=staticcontent/free%20pages/LGD/lgdadpage.htm](http://www.moody.com/cust/content/loadcontent.aspx?source=staticcontent/free%20pages/LGD/lgdadpage.htm), 22 June 2006).

(4) Moody's is considering issuing measures of liquidity risk and market risk alongside traditional ratings for complex financial instruments (Source: *Financial Times*, 17 September 2007).

sheets, depending on whether these exposures are held to maturity or for trading purposes. It is important that there is complete clarity over the valuation approach that has been used, as required under the recently adopted international standard for disclosure of financial instruments.<sup>(1)</sup>

Work under way in the BCBS on the reliability of valuations under stressed market conditions, and by the Joint Forum's

(1) International Financial Reporting Standard 7, 'Financial Instruments: Disclosures', which takes effect for accounting periods from the beginning of 2007.

credit risk transfer group, should allow progress to be made on these issues. Again, the FSF has a potentially important co-ordinating role to play. It is exploring whether auditors and market participants could work together to summarise sound valuation approaches consistent with accounting standards in time for 2007 year-end financial reporting.

*...and inadequate transparency from individual institutions...*

A key source of uncertainty and disruption in financial markets over recent months has been inadequate transparency about individual institutions' exposures, in particular to structured credit products. At present, this is being resolved by a drip-feed of disclosures. The absence of swift and clear disclosure has potentially delayed the recovery of confidence and activity in some markets, including asset-backed securities markets and term money markets.

*...which the introduction of Basel II will help to mitigate.*

Under Basel I, incentives existed to structure certain exposures in ways designed to exploit differences in capital charges. For example, the extension of a contingent (short-term) liquidity line to a structured investment vehicle (SIV) did not incur a capital charge in the United Kingdom.

The principles underlying the Basel II framework for securitisations aim to capture all of the risks that banks retain from their securitisation activities; to set high standards for what constitutes effective risk transfer; and to be neutral between holding risks on balance sheet and distributing them through the securitisation process. As a result, this type of regulatory arbitrage opportunity should be reduced somewhat with the adoption of the new Basel II framework in 2008. It is important that, as the new framework is implemented, due attention is paid to potential new and unintended distortions that might emerge.

Box 7 sets out how other regulatory changes as a result of the introduction of Basel II will increase the information available to the market and to supervisors on institutions' exposures. This will include details on exposures arising from securitisations, whether purchased or retained, as well as related liquidity facilities and credit enhancements. It will take time to determine if firms are adopting a common approach to their disclosures, and how useful, therefore, the new data will be in assessing the size and distribution of aggregate risks to the financial system.

But there are limits to the additional data that will become available under Basel II. For example, there are no additional disclosures on the measurement and management of liquidity or market risk. As noted in Box 7, careful thought is required to assess the costs and benefits of greater data provision. Recent events have clearly highlighted information gaps and their potentially adverse consequences for market stability. Regulatory, accounting and disclosure initiatives might usefully help to address these concerns.

### 4.3 Weaknesses in liquidity risk management

Work was already under way, well before recent market turbulence, to review liquidity regulation in the United Kingdom and internationally — notably through the BCBS. Recent events have provided added impetus to, and direction for, this work. They have provided a live 'stress test' for banks' liquidity risk management and for regulatory standards, which banks and supervisors are reviewing to identify areas for improvement.

#### *Shortcomings in liquidity management within firms...*

One key area for banks and supervisors to review is the assumptions that firms make when stress testing their resilience to liquidity pressures. In particular, it is now clear that firms need to give sufficient weight to the possibility that individual markets may be closed for a lengthy period, as distinct from disruption to their own access to a market. Recently, core markets for unsecured term interbank loans, foreign exchange swaps, asset-backed commercial paper (ABCP) and asset-backed securities (ABS) have all been disrupted for protracted periods. Firms also need to ensure that they have incorporated all potential demands for liquidity into their planning, including those from off balance sheet vehicles.

The recent market disruption also raises the issue of whether banks' internal models to assess liquidity risk can be relied upon by banks and supervisors. The value of internal models is much reduced when there are no or very limited data available on extreme events. The scale and duration of recent market disruption would have been difficult to predict from previous experience, but will provide data to help better calibrate these models in future.

Stress testing a bank's liquidity position should be seen as the basis for ensuring that appropriate contingency funding plans (CFP) are in place to protect the bank from unexpected liquidity shocks. To be fully operational, CFPs must be rehearsed so that banks are able to put them into operation at short notice and are alert to the circumstances in which they should do so. Supervisors need to ensure that banks are adopting good practice in this regard and are providing to the authorities appropriate and timely information on liquidity pressures before they become critical.

#### *...combined with limitations in UK liquidity regulation...*

The difficulties experienced at Northern Rock have exposed some of the limitations of the existing liquidity regime in the United Kingdom. One element is the nature and frequency of the information available on the liquidity position of firms. Another is the robustness of individual firm's stress testing and the contingency plans put in place as a result. The FSA has indicated that it aims to strengthen stress testing within

## Box 7 Transparency and disclosure of banks' exposures

### Role of transparency

Previous sections have argued that a lack of transparency contributed to the way the recent crisis was transmitted through global financial markets. Uncertainty about losses sustained at individual institutions appears to have contributed to a tightening of liquidity and increased spreads in wholesale funding markets. Indeed, of an estimated US\$100 billion of market losses on sub-prime RMBS,<sup>(1)</sup> only a relatively small fraction appears so far to have been disclosed by individual institutions, creating uncertainty about where losses may ultimately lie.

A lack of bank transparency can result in asymmetric information between a bank and its potential lenders on the risk of the loan — known as a 'lemons' problem<sup>(2)</sup> — that can lead wholesale and interbank funding markets to dry up. Transparency can also increase discipline on banks to invest prudently and maintain sufficient buffers against the risks they take.<sup>(3)</sup> On the other hand, transparency may not always be beneficial *ex post*, as market reactions can sometimes exacerbate an existing funding problem. Nier (2005) provides empirical evidence that banks that regularly disclose more information upfront are less at risk of a liquidity or solvency problem.<sup>(4)</sup> In other words, the reduction of asymmetric information and the increase in market discipline arising from regular disclosure appears to reduce the likelihood that transparency turns out to be detrimental *ex post*.

Before asking what new initiatives are needed to encourage bank transparency and disclosure, it is worth considering how policy initiatives already in the pipeline may help.

### Changes to disclosure requirements

The Capital Requirements Directive (CRD)<sup>(5)</sup> that will introduce Basel II in Europe (including the United Kingdom) from 2008 will require additional disclosures under Pillar 3 of the framework. There will be new requirements on banks to disclose information across a number of dimensions, in order to facilitate an assessment of the nature and extent of the risks that banks are exposed to, as well as the capital resources set aside to cover those risks. Under the CRD, all of these disclosures will be required at least at an annual frequency and will typically be made as part of the audited accounts. Moreover, while some banks might already disclose some of the information voluntarily, the new regime is likely to achieve a greater degree of consistency and uniformity across all banks incorporated within the European Union and eventually more broadly. This may enable more meaningful comparisons across banks and strengthen market discipline. If a high degree

of uniformity can be achieved, this also holds out the possibility that authorities might be able to use these disclosures for an improved assessment of the size and distribution of risk positions across the system.

### What are the specific additional disclosures under Basel II?

For banks on the internal ratings based (IRB) approaches for credit risk, mandated disclosures include both a geographic and an industry breakdown of credit risk exposures, as well as a breakdown of exposures into bands of different probability of default (PD), estimates of loss given defaults (LGD) by portfolio and average exposure at default (EAD) on any undrawn credit exposures.<sup>(6)</sup>

In addition, Pillar 3 will introduce requirements to disclose detail on exposures that arise from securitisations, in line with the new securitisation framework that is contained within the new Basel II rules. Disclosures on securitisation exposures include those exposures that arise from securities retained — typically, the so-called first-loss piece — or purchased, as well as those related to liquidity facilities, and credit enhancements provided to ABCP programmes and SIVs. These new disclosure requirements go beyond what currently flows from International Financial Reporting Standards (IFRS) and stock market listings requirements. The new rules will include a requirement on banks to report the aggregate amount of securitisation exposures, broken down by exposure type (for example credit cards, mortgages, auto, etc), as well as the capital requirements arising from these exposures. Liquidity facilities to SIVs and ABCP programmes will attract a regulatory capital charge under Basel II.

Basel II will also require some additional quantitative information on interest rate risk in the banking book, such as the bank's own assessment — arrived at through stress tests — of the impact on earnings of an interest rate shock. This might also help gauge a bank's vulnerability to an increase in the interest rate spread (above official rates) arising from a tightening of funding markets. By contrast, the disclosure requirements for market risk in general will provide little change from current reporting standards and practice, relying on disclosure of Value-at-Risk (VaR) calculations for marketable assets.

### Where might additional initiatives be useful?

The new Basel standards hold out the potential for increased uniformity and consistency of disclosure requirements across banks and jurisdictions. Uniform and consistent disclosures are important from the point of view of enhancing market discipline. They are crucial also in enabling central banks and supervisory authorities to gain a better understanding of both the size and distribution of aggregate risks to the financial system. However, the extent to which these benefits will be

realised in practice is still an open question. Supervisors across the EU should aim to work to preserve these benefits when implementing Basel II.

Although the new requirements will go some way towards clarifying for investors the risk profile arising from a bank's securitisation activities, the Basel II framework will stop short of requiring detail on exposures to specific off balance sheet vehicles. Likewise, Basel II does not contain a requirement on banks to disclose whether or not the so-called first-loss piece on any specific securitisation has been retained, sold or hedged. The principle here is that individual exposures need not be disclosed, since such disclosures might impair the business interests of the bank. However, it may be worth exploring how and in what form more information could be provided to the market on the retained interest in a securitisation.

Under Basel II there will be no additional disclosure requirements as regards the measurement and management of liquidity risk. While some banks already provide on a voluntary basis an analysis of funding gaps as part of their annual accounts, more consistent information here may be useful to help investors understand the degree of liquidity risk any one bank is subject to. Detailed requirements on liquidity risk might invite strategic behaviour in interbank markets, if banks with ample cash use their market power to exploit banks whose liquidity position is known to be weak. So any new disclosure requirements in this area would need to be designed and applied with care.

A shortcoming in current practice is the lack of comparability in the measurement of market risk across banks. This arises as banks are free to choose the key parameters of the VaR model used, including the distributional assumptions made and the horizon at which the model is applied. A greater degree of

standardisation in the assumptions used for VaR calculations would improve the degree of comparability of market risk disclosures.

A final crucial limitation of the framework is the relatively low frequency of disclosure. While the Basel framework proposes a minimum of a semi-annual frequency, the CRD — mindful of the costs of regular reporting especially for smaller firms — has pushed this out to an annual requirement. More frequent reporting is largely at the discretion of the bank. But in modern financial markets, even six months without disclosure can give rise to considerable uncertainties about positions which could destabilise financial markets in times of stress. Gropp and Kadareja (2006)<sup>(7)</sup> have shown that information provided in the annual accounts of financial institutions is 'stale' and no longer valued by investors when it becomes older than four to five months. Listing rules already require banks to disclose material changes to their earnings prospects. More frequent and regular reporting of information on banks' risk profile could help investors put any new information into context and thus encourage timely and comprehensive disclosure of losses incurred on existing positions. If undertaken on a co-ordinated basis, this could help improve market functioning and reduce system-wide risk.

(1) According to Bank calculations based on publicly available data.

(2) In 'The market for 'lemons': quality uncertainty and the market mechanism', *Quarterly Journal of Economics*, Vol. 84, pages 488–500. Akerlof (1970) first described how asymmetric information could lead to the breakdown of markets.

(3) Nier, E and Baumann, U (2006), 'Market discipline, disclosure and moral hazard in banking', *Journal of Financial Intermediation*, Vol. 15, pages 332–61.

(4) Nier, E (2005), 'Bank stability and transparency', *Journal of Financial Stability*, Vol. 1, pages 342–54.

(5) The Capital Requirements Directive, comprising Directive 2006/48/EC and 2006/49/EC, was published in the Official Journal in June 2006. The text is also available at [http://ec.europa.eu/internal\\_market/bank/regcapital/index\\_en.htm](http://ec.europa.eu/internal_market/bank/regcapital/index_en.htm).

(6) See BCBS (2004), 'International convergence of capital measurement and capital standards', June, available at [www.bis.org/publ/bcbs128.htm](http://www.bis.org/publ/bcbs128.htm).

(7) Gropp, R and Kadareja, A (2006), 'Stale information, shocks and volatility', *European Central Bank Working Paper no. 686*.

individual firms, as part of its comprehensive review of lessons from the Northern Rock events.<sup>(1)</sup>

As well as requiring that banks have in place appropriate stress-testing arrangements and CFPs, and that they pursue sound practices in managing their liquidity risk, the FSA requires that the major UK banks adhere to a 'stock liquidity regime' (SLR). This requires banks to hold a pool of highly liquid assets to cover their short-term liquidity needs in a situation of stress. As noted in the April 2007 *Report* (page 52), there are well-known shortcomings with the SLR, and it was already under review. For example, it does not cover non-sterling outflows or contingent liquidity lines that have been extended to off balance sheet vehicles. It also

(1) 'Recent turbulence in global financial markets and Northern Rock's liquidity crisis', Memorandum from the FSA to the Treasury Committee, 5 October 2007.

assumes that only a relatively small proportion of customer deposits, 5%, would flow out of the institution.

The SLR was designed to provide insurance against liquidity outflows for one week — a much shorter period than the duration of the recent market disruption. It is important that consideration is given to the rationale behind and calibration of the SLR alongside other policies that affect banks' resilience to liquidity stress. As part of its review, the FSA will also be considering whether changes should be made to its liquidity regime.

*...provide lessons to be taken forward internationally.*

The work in train on UK liquidity regulation was taking place in the context of international discussions of liquidity, notably through the BCBS which established a working group in January this year to carry out a stock take of liquidity regulation and supervisory practices.<sup>(1)</sup> The Committee of European Banking Supervisors is also reviewing and extending its earlier (2000) survey of the supervision of liquidity risk management within the European Union, in response to a call for advice from the Commission in March 2007. It is important that the authorities liaise closely, given the international integration of capital markets and the development of global banking groups operating more centralised liquidity management strategies.

The BCBS will discuss the working group's findings in December and decide how to take forward future international work in this field. The Committee will also discuss the group's suggestions on practical lessons for national authorities emerging from the recent market turbulence. The work of the group will form the basis for a closer dialogue on practical policy issues in this area, improving the level of common understanding between the authorities on the role that liquidity regulation plays in different countries.

#### 4.4 Testing the resilience of the system

*Stress testing of firms' balance sheets is crucial...*

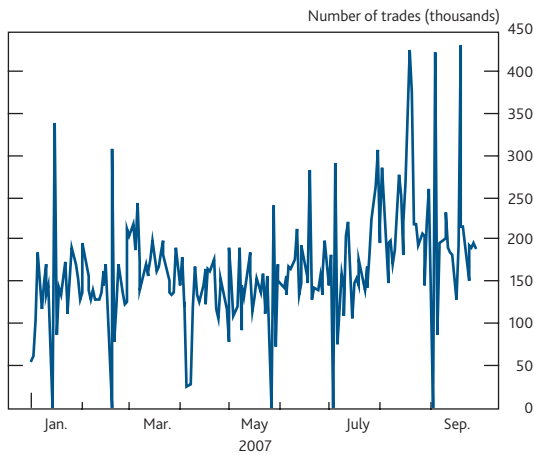
Previous Reports have noted that the relative stability of the financial system in recent years has meant that firms might not be taking sufficient account of the possibility of large shocks to the real economy or to financial markets when analysing the robustness of their balance sheets.<sup>(2)</sup> In the light of recent events, firms need to check that the scenarios used in their stress tests are sufficiently extreme and exacting to provide a genuine test of their robustness.

Banks also need to consider the potential actions of others in situations of stress, as these may potentially invalidate the assumptions that feed into their models. The analysis in

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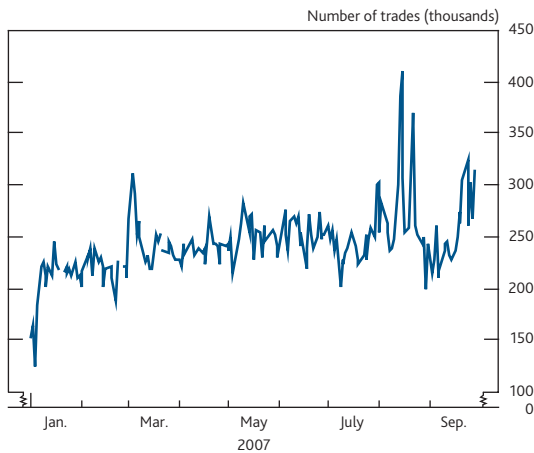
(1) The Bank of England chairs this working group.

(2) See, for example, Section 4 of the April 2007 Report, page 50.

**Chart 4.2** Daily volumes in CLS<sup>(a)(b)</sup>

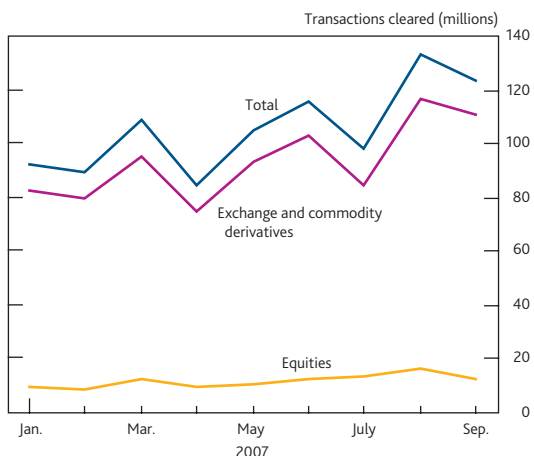
Source: CLS Bank International.

- (a) Volume figures report the number of trades submitted to Continuous Linked Settlement (CLS).  
 (b) CLS does not settle currencies on local public holidays. On US\$ holidays, volumes typically fall to a few hundred transactions.

**Chart 4.3** Daily volumes in CREST<sup>(a)</sup>

Source: Euroclear.

- (a) Excluding self-collateralising repos.

**Chart 4.4** Monthly volumes in London Clearing House<sup>(a)</sup>

Source: LCH.Clearnet Ltd.

- (a) Total includes swaps and fixed income which are not shown as volumes are very small.

Sections 1 and 2 demonstrates how shocks can be amplified by the behavioural responses of other firms. For example, the hoarding of liquidity by individual banks has contributed to the drying up of liquidity in term money markets. Assessing these potential behavioural and market-wide effects presents a significant challenge for individual firms.

Banks should consider a range of shocks and employ a variety of techniques in their stress testing including: standard macroeconomic stress testing; traditional market and credit risk modelling; and stress tests carried out collectively among banks that can incorporate the type of second-round behavioural effects discussed above. The last of these is not standard practice at present and recent events have highlighted the importance of that gap. The Bank and FSA now hold regular discussions with a group of major banks operating in the United Kingdom on stress-testing techniques. These discussions provide an opportunity both to review the lessons from recent events and to consider how they can be incorporated into firms' stress-testing practices.

*... as is assessing the resilience of market infrastructures.*

A robust market infrastructure — the framework allowing institutions to make payments and settle transactions — is crucial to the smooth functioning of financial systems. This is particularly true at times of market stress, when any disruption to the underlying infrastructure is most likely to exacerbate market pressures.

As discussed in Section 2, the market infrastructure has generally performed well over recent months, despite record volumes of transactions being processed over a number of consecutive days (**Charts 4.2–4.4**). For example, between end-July and end-August, CLS — the dominant global foreign exchange settlement system — exceeded its previous record for daily trading volumes on 'normal' trading days<sup>(1)</sup> on nine occasions. There were, however, incidents in some systems during August and September, as a result both of those high volumes and of the behaviour of some individual members. These were dealt with effectively and had limited impact, but serve as a useful reminder of the importance of a smooth functioning infrastructure in situations of stress.

These incidents suggest two key areas for risk mitigation. First, it is vital that members undertake adequate capacity tests of their own systems and processes. These capacity tests must assume extreme scenarios over a sustained period. Second, changes in the timetable or in the methods of processing transactions in times of stress may require members to change their behaviour — for example, being ready to provide the resources for extensions to settlement timetables. These back-up plans must be well articulated in advance and tested.

(1) That is, excluding the peak volumes occurring the day after a US bank holiday or on the quarterly foreign exchange futures expiry dates.

**Table 4.A** Market Wide Exercise 2006: progress on follow-up issues

Issues for follow-up	Progress
<b>Cash</b> What arrangements can be made to make cash distribution more resilient to a pandemic?	The Market Wide Exercise highlighted the importance of a co-ordinated approach to planning cash distribution. The cash industry is currently working on plans to address these issues.
<b>Retail</b> Can improvements be made to co-ordination between high street banks to enhance the availability of branch networks and ATMs to consumers during a pandemic?	The Retail Bank Business Continuity Group (RBBCG) <sup>(a)</sup> has drafted a statement of principles on this issue. Once available, the statement will be scrutinised to ensure it does not breach competition laws.
<b>Wholesale</b> Do the various concerns raised by firms about reliance on home working undermine its potential role in a pandemic?	A Remote Working Group <sup>(b)</sup> has been established, with representation from the tripartite authorities and across the financial sector. This group will identify specific issues relating to remote working. It is also liaising with the telecoms industry to establish levels of resilience.
<b>Infrastructure</b> What are the impacts of disruption or closure of exchanges or infrastructure providers?	Possible workarounds and simplifications are being investigated by infrastructure providers (eg LSE, LCH.Clearnet, EuroclearCrest, and Euronext.Liffe) with the support of the Cross-Market Business Continuity Group (CMBCG). <sup>(c)</sup>
<b>Regulatory forbearance</b> In what areas, and when, would firms be seeking regulatory forbearance during a pandemic?	The tripartite authorities are working with the financial sector and with overseas regulators to produce a statement of principles.
<b>Dependencies</b> How accessible will third-party recovery space be?	The four key UK recovery site providers have agreed to prepare a statement covering invocation of services during a pandemic. Once available, the statement will be scrutinised to ensure it does not breach competition laws.

(a) The RBBCG consists of representatives of the five major retail banks, plus the British Bankers' Association and APACS. The group considers business continuity issues for the retail banking sector.

(b) The Remote Working Group was established to explore solutions to the issues raised during the exercise, identify where workable solutions are not available and establish key potential implications for the financial sector where there is no obvious solution.

(c) The CMBCG provides a forum for the authorities, infrastructure providers and key firms to pool information in the event of a major operational disruption.

There is scope for further testing of the infrastructure, in conjunction with firms, to supplement the existing programme of work in this area. A tripartite-led market-wide exercise in 2006, which covered disruption to market infrastructure following a flu pandemic, produced a programme of follow-up work, including more testing of the infrastructure 'workarounds' that might be required under stressed conditions. As outlined in Table 4.A, progress is being made on these fronts.

## 4.5 Financial crisis management

The evaporation of liquidity in structured credit and term money markets, and the consequent problems at Northern Rock, were an important test of the United Kingdom's tripartite crisis management arrangements. As reported in the July 2006 *Report*, the UK tripartite authorities have established domestic arrangements for exchanging information and making decisions in response to financial crises.<sup>(1)</sup> These arrangements delineate the responsibilities of the Bank, the FSA and HM Treasury, and seek to ensure orderly communication with market participants and overseas authorities. While the tripartite authorities have worked closely with one another throughout the recent market turbulence, they will be reviewing how to improve these arrangements, as the Chancellor has already indicated.<sup>(2)</sup>

### *The Bank's role in a financial crisis.*

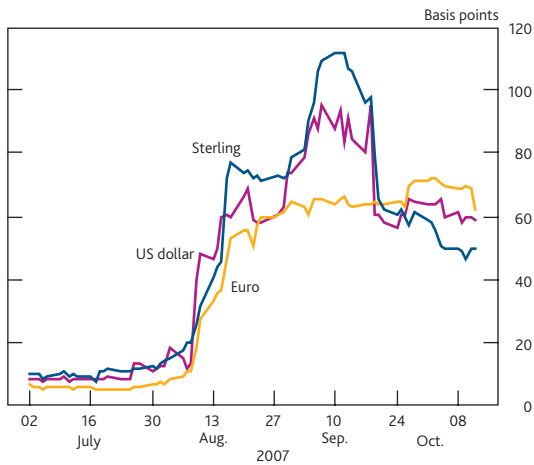
There are essentially four instruments potentially available to the Bank in addressing the causes and consequences of the recent market turmoil: interest rates; liquidity contingency measures set out within the Bank's published framework for money market operations; broader liquidity support operations; and lender of last resort facilities.

The Bank's approach to the setting of interest rates is set out in detail in its quarterly *Inflation Report*, which is next published in November. The Bank's operations in short-term money markets are aimed at delivering overnight interest rates in line with Bank Rate and the Bank's recent operations are set out in the 2007 Q3 *Quarterly Bulletin*. The Bank has also offered longer-term liquidity to the banking system against a wider range of collateral through a sequence of term auctions, the first of which took place on 26 September. These auctions were restricted in overall size and set at a minimum rate of 100 basis points above Bank Rate, to relieve liquidity problems at a price which would encourage firms to adopt more prudent approaches to liquidity management in the future. The announcement of the term auctions may itself have helped sentiment in the sterling money markets, as reflected in a

(1) See Box 8 of the July 2006 *Report*, page 58, and the Memorandum of Understanding on financial stability between HM Treasury, the FSA and the Bank, available at [www.bankofengland.co.uk/financialstability/mou.pdf](http://www.bankofengland.co.uk/financialstability/mou.pdf).

(2) See Chancellor of Exchequer's statement to the House of Commons on financial market instability, 11 October 2007.

**Chart 4.5** Spreads of international three-month interbank rates to three-month expected policy rates<sup>(a)</sup>



Source: Bloomberg.

(a) Three-month Libor spreads over comparable overnight index swap rates.

narrowing of the spread between Libor and anticipated policy rates (Chart 4.5). The Bank has provided lender of last resort facilities to Northern Rock, as set out in Box A.

This is the first time the Bank has operated its new money market regime in conditions of acute stress in financial markets. It is also the first time it has offered exceptional liquidity to the market outside of this framework and the first time for many years that it has undertaken a lender of last resort operation for a major bank. These events have illustrated the risk that, at times of stress, stigma can attach to banks that call on central bank facilities, potentially undermining their usefulness. The Bank will consider carefully the design of its lending facilities in times of stress to maximise the chances of these being effective.

#### *Lessons need to be learnt for banking reform.*

The Northern Rock episode has also provided a number of lessons about the interaction of different elements of the legislative framework during a financial crisis, and the crisis management tools that are available to the authorities. The recently announced consultation on banking reform will cover the most important of these tools.<sup>(1)</sup>

One important tool that is currently unavailable in the United Kingdom is an insolvency process specifically adapted to banks. As described in the April 2007 Report, UK banks are subject to normal corporate insolvency procedures, which have a narrow focus on the failing firm and the interests of its creditors, whereas a number of G10 countries have special insolvency procedures for banks.<sup>(2)</sup> The sudden closure of a bank could cause difficulties for its depositors, even if they are eventually repaid in full: they might be unable to make and receive payments for an extended period, and be unsure about the long-term security of their funds. A sudden closure could also potentially impose costs and disruption elsewhere in the financial system, particularly if the bank concerned provides key functions (such as correspondent banking services) for other banks. These problems would be compounded if the bank operates in more than one jurisdiction.

There are a number of options for reform of the United Kingdom's current approach. These include alternative methods of ensuring 'continuity of function' for a bank, such as the transfer of the assets and liabilities of the existing legal entity to a new legal entity, or the transfer of ownership of the existing entity to new owners. The 'new' bank would then continue to provide the critical functions while either a recapitalisation or a permanent transfer of business to new owners is organised. The Bank will contribute fully to tripartite consideration of the case for making special provision for

(1) HMT, FSA and Bank of England (2007), 'Banking reform — protecting depositors', discussion paper, October 2007.

(2) See Box 7 of the April 2007 Report, page 58.

**Table 4.B** Deposit insurance in the Group of Ten

	Coverage limits per depositor <sup>(a)</sup>
Belgium	€20,000
Canada	C\$100,000
France	€70,000
Germany	90% of insured deposits up to €20,000 <sup>(b)</sup>
Italy	€103,000 <sup>(c)</sup>
Japan	100% coverage of non interest bearing 'settlement deposits' and up to ¥10 million for time and demand deposits
Netherlands	€40,000 <sup>(d)</sup>
Sweden	SKr 250,000
Switzerland	SFr 30,000
United Kingdom	£35,000
United States	\$100,000 <sup>(e)</sup>

Sources: Individual country schemes.

- (a) Depositor limits refer to insured deposits held at an individual institution. A number of countries have additional limits which apply to other types of financial investments.  
 (b) This limit applies to the statutory schemes for public and private banks. Additional protection is provided by various voluntary schemes. For further information see: [www.bafin.de/bankenaufsicht/sicherungen\\_en.htm](http://www.bafin.de/bankenaufsicht/sicherungen_en.htm).  
 (c) To the nearest €1,000.  
 (d) 100% of the first €20,000 of qualifying deposits and 90% of the next €20,000. Please note that this qualification is not made in the hard copy of this publication.  
 (e) Certain retirement accounts are insured up to \$250,000.

preserving critical banking functions for a period, and the possible options for doing so.

The consultation also covers the nature of the United Kingdom's deposit insurance regime. The reaction of Northern Rock depositors to the announcements about its position exposed the limitations of the UK deposit insurance regime in averting a run on a bank.<sup>(1)</sup> The scale of deposit insurance varies widely even within the G10 (**Table 4.B**), demonstrating that there is a balance to be struck between providing insurance to individual investors and creating moral hazard. The degree to which depositors are asked to 'co-insure', by limiting the level of coverage, must be considered, alongside other elements, such as the method of funding the insurance, the speed of payment and the intended role of insurance within the wider framework of measures designed to protect investors and improve the resilience of the financial system. These aspects will all be considered as part of the current consultation.

#### *Further progress is also needed internationally.*

These domestic issues become even more complex in an international context. There are a number of ongoing crisis management initiatives at the international level, focusing on the operational issues that can arise during a crisis and implementing practical improvements. For example, the European Union is extending its existing Memorandum of Understanding on co-operation and information exchange between banking supervisors, central banks and finance ministries to cover a number of crisis management issues, including a common analytical framework for assessing the potential systemic implications of a crisis.<sup>(2)</sup> Efforts are also continuing, co-ordinated by the G10 Committee of Payment and Settlement Systems, to improve the arrangements to facilitate cross-border use of collateral, particularly in stressed circumstances.

Progress is also being made on practical and operational issues in smaller groups of authorities whose financial systems are closely linked (so-called 'interest groups') on how to manage the disruption caused by a crisis. Recent turbulence has demonstrated both the likelihood that disruptions to the financial system are likely to cross international borders, and that further improvements to the existing architecture for handling cross-border financial crises are required.

The FSF is well placed to oversee and co-ordinate the work that is already being undertaken, in different forums, to improve the framework of international financial crisis

(1) Details of the scheme, the Financial Services Compensation Scheme, can be found at [www.fscs.org.uk/consumer/](http://www.fscs.org.uk/consumer/).

(2) The extended Memorandum of Understanding will cover principles for co-operation to preserve financial stability, an analytical framework for assessing the potential systemic implications of a crisis, and practical guidelines to be followed during a cross-border crisis. (See Press Release 2822nd Council Meeting Economic and Financial Affairs, Luxembourg, 9 October 2007, 13571/07.)

management. It should also seek to ensure that the additional work being carried out in response to recent events complements and extends work already in progress, but does not duplicate it.

## 4.6 Key lessons from recent events

In summary, there are at least four key areas where early lessons from recent events can be learnt by market participants and the authorities.

### (i) Liquidity management, including:

- underinsurance against closures of key funding markets;
- inadequate recognition of contingent liquidity obligations to off balance sheet entities; and
- scenarios used in the stress testing of funding insufficiently severe.

### (ii) Valuation of complex structured products, including:

- high dependency on models in valuations;
- extent of investors' reliance on a narrow ratings metric; and
- insufficient clarity in the composition and construction of instruments.

### (iii) Opacity of structured credit exposures, including:

- inadequate transparency of exposures and losses; and
- lack of transparency of off balance sheet exposures.

### (iv) Crisis management arrangements, including:

- insolvency arrangements for banks;
- nature of deposit insurance regime;
- improvements in tripartite arrangements; and
- underdeveloped practical arrangements for managing stress at an international institution.