

# Financial Stability Report

April 2008 | Issue No. 23



BANK OF ENGLAND





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The Bank of England has two core purposes — monetary stability and financial stability. The two are connected because serious disruption in the financial system would affect the implementation and effectiveness of monetary policy, while macroeconomic stability helps reduce risks to financial stability.

The Bank's responsibilities for monetary stability are set out in the Bank of England Act 1998. Responsibility for financial stability in the United Kingdom is shared between the tripartite authorities — HM Treasury (HMT), the Financial Services Authority (FSA) and the Bank of England. Their roles are set out in a Memorandum of Understanding (MoU).<sup>(1)</sup>

The Bank's responsibility for contributing to the maintenance of the stability of the financial system as a whole derives from its responsibility for setting and implementing monetary policy, its role in respect of payment systems in the United Kingdom and its operational role as banker to the banking system. The Bank aims to bring its expertise in economic analysis and its experience as a participant in financial markets to the assessment and mitigation of risks to the UK financial system including, if necessary, helping to manage and resolve financial crises. In so doing, the Bank works closely with authorities domestically and overseas on issues relevant to the stability of the UK financial system, including the international financial architecture and regulatory frameworks.

The *Financial Stability Report* aims to identify the major downside risks to the UK financial system and thereby to help financial firms, authorities overseas and the wider public manage and prepare for these risks. The *Report* is produced half-yearly by Bank staff under the guidance of the Bank's Financial Stability Board, whose best collective judgement it represents.

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This document was delivered to the printers on 28 April 2008 and, unless otherwise stated, uses data available as at 14 April 2008.

The *Financial Stability Report* is available in PDF at [www.bankofengland.co.uk](http://www.bankofengland.co.uk).

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(1) The tripartite Memorandum of Understanding was revised in March 2006 and is available at [www.bankofengland.co.uk/financialstability/mou.pdf](http://www.bankofengland.co.uk/financialstability/mou.pdf).

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# Overview

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Rising US sub-prime mortgage defaults were the trigger for an inevitable and broad-based repricing of risk and deleveraging by banks and other financial market participants. This process is proving even more prolonged and difficult than anticipated. Banks have been unable to sell or secure funding on assets in which markets have closed. That has increased uncertainty about banks' financial positions, contributing to continued stress in money markets and tighter credit availability. In these conditions, adverse news and rumours can lead to a sudden loss of market confidence, as was shown by the collapse of Bear Stearns in mid-March.

An adjustment in both the price and quantity of risk-taking was clearly needed after an extended credit boom and was bound to have costs. But estimates implied by prices in some credit markets are likely to overstate significantly the losses that will ultimately be felt by the financial system and the economy as a whole, as they appear to include unusually large discounts for illiquidity and uncertainty. In effect, risk premia in some markets have swung from being unusually low to temporarily too high relative to credit fundamentals. That may be contributing to the delay in the return of confidence and risk-taking.

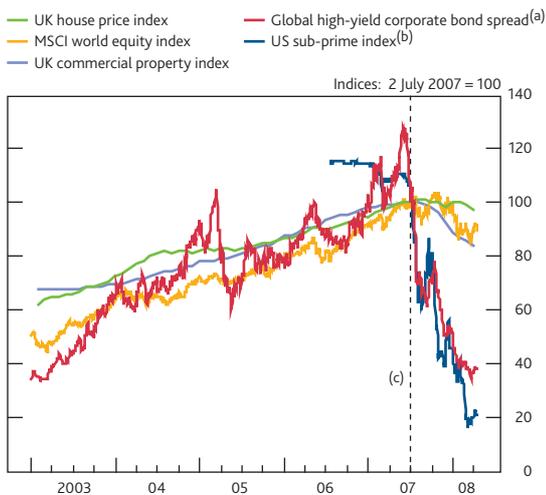
The most likely path ahead is that confidence and risk appetite turn gradually as market participants recognise that some assets look cheap on a fundamentals basis. But with sentiment still weak and deleveraging continuing, downside risks remain. Actions are needed to bolster confidence and ensure that risk appetite returns. Central bank measures to address liquidity problems, such as that announced recently by the Bank of England (Box A), are an important component. Banks can further boost confidence in their resilience through more informative disclosures and by raising capital as a signal of strength in turbulent market conditions, as some are already doing. Further ahead, it is important that banks and the official sector also tackle the underlying sources of the overextension of credit in recent years.

## Deleveraging and repricing of risk

### *A prolonged period of overextension...*

For a number of years, low interest rates and benign global economic conditions encouraged higher risk-taking by investors and increased borrowing in parts of the household and corporate sectors. Strong demand for financial services and mark-to-market gains from rising asset prices boosted profitability at financial institutions and stimulated further expansion of activity, including innovation in markets such as structured credit. Financial markets provided a plentiful source of funding for growing balance sheets.

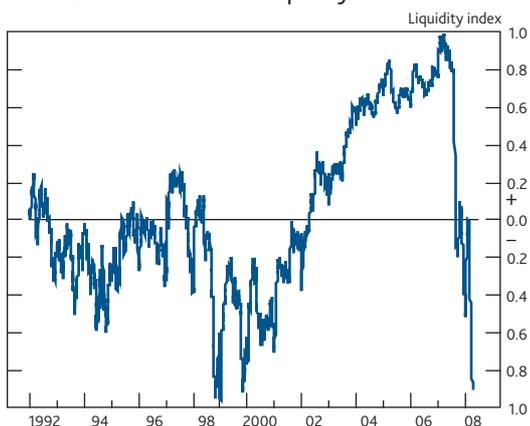
**Chart 1 Asset prices during the recent market turbulence**



Sources: Halifax, IPD, JPMorgan Chase & Co., Merrill Lynch, Thomson Datastream and Bank calculations.

- (a) Series inverted.
- (b) Sub-prime series is the A-rated 2006 H2 vintage ABX.HE index.
- (c) Dotted line shows start of July 2007.

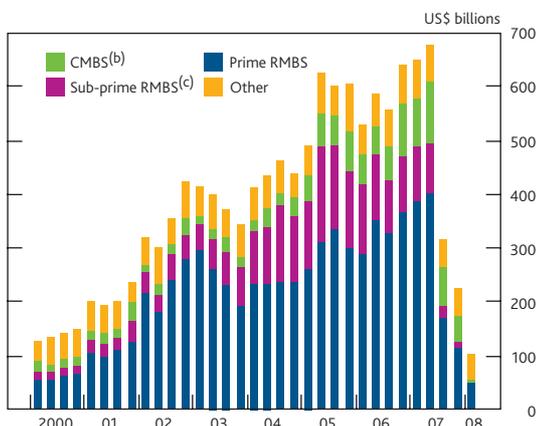
**Chart 2 Financial market liquidity<sup>(a)</sup>**



Sources: Bank of England, Bloomberg, Chicago Board Options Exchange, Debt Management Office, London Stock Exchange, Merrill Lynch, Thomson Datastream and Bank calculations.

- (a) The liquidity index shows the number of standard deviations from the mean. It is a simple unweighted average of nine liquidity measures, normalised on the period 1999–2004. The series shown is an exponentially weighted moving average. The indicator is more reliable after 1997 as it is based on a greater number of underlying measures.

**Chart 3 Global issuance of asset-backed securities<sup>(a)</sup>**



Source: Dealogic.

- (a) Quarterly issuance. 'Other' includes auto, credit card and student loan ABS.
- (b) Commercial mortgage-backed securities.
- (c) Residential mortgage-backed securities.

These conditions bred complacency about risks. Even highly sophisticated financial institutions that thought risk premia were too low believed that their risk management systems would enable them to weather any correction. Some firms believed that the business risks from reducing risk appetite — in terms of underperforming rivals in the short run and losing market share — outweighed the financial risks from continuing to expand risk-taking. Events of the past eight months have dispelled such presumptions.

*...is unwinding as risks are repriced and as market participants seek to deleverage...*

A sharp repricing of risks has occurred across a range of financial markets and some market participants are deleveraging.<sup>(1)</sup> The initial trigger was a deterioration in the US housing market, which led to rising arrears on sub-prime debt and the seizing up of some asset-backed securities (ABS) markets. As Section 1 discusses, this adjustment has broadened out to a wider range of markets (Chart 1). Leveraged loan markets were affected last summer (page 22). In recent months repricing has spread to other parts of the US household debt markets (page 20), commercial property (page 21), wider corporate debt markets (page 22) and emerging markets (page 16).

*...but this transition is proving even more prolonged and difficult than expected.*

A correction in risk premia in credit markets to more sustainable levels was needed and was bound to be costly for some financial institutions and borrowers. But the adjustment is taking longer and proving more difficult than anticipated. Markets are struggling to establish prices that can clear a legacy of financial assets created during the credit market boom. Liquidity has fallen sharply in a number of markets (Chart 2).<sup>(2)</sup> In particular, many ABS (Chart 3) and, at least until very recently, leveraged loan markets have been effectively closed.

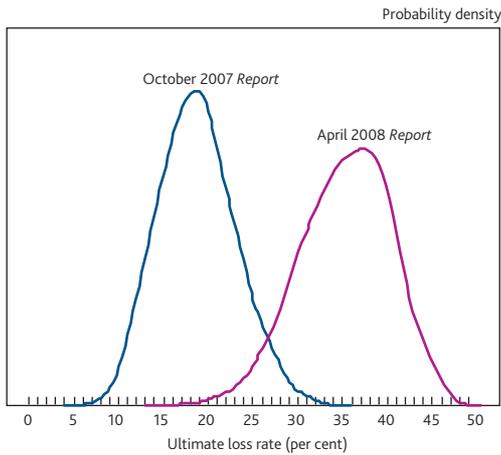
*Many credit markets are dislocated...*

A number of factors account for the prolonged dislocation of these markets:

- Potential buyers of ABS, and of more complex and opaque structured products, find it hard to assess their value and are no longer willing to rely on issuers' reputations and rating agency assessments. Gaps in information about the composition of instruments may have become more significant as asset prices have fallen and credit quality has weakened.
- With market liquidity impaired, there is an elevated risk of further price volatility as previous key buyers of ABS, such as

(1) Deleveraging refers to a reduction in borrowing to finance risk-taking or in exposures to financial instruments that embody financial gearing, such as derivatives.  
 (2) For details on the construction of this indicator see Box 2, page 18 of the April 2007 Report.

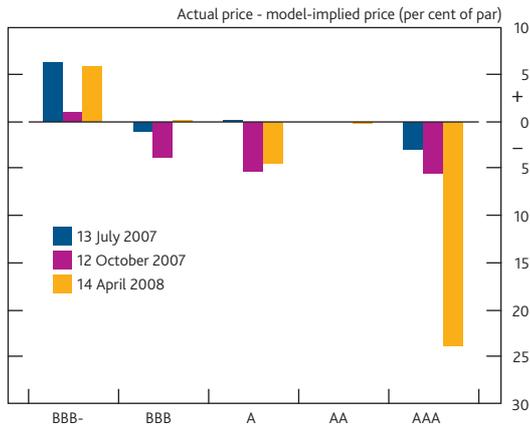
**Chart 4** Market-implied expectations of ultimate loss rates on US sub-prime mortgages<sup>(a)(b)</sup>



Source: Bank calculations using data from JPMorgan Chase & Co.

(a) Based on the collateralised debt obligation (CDO) model used in 'A simple CDO valuation model', Bank of England *Financial Stability Review*, Box 1, December 2005, pages 105–06, applied to 2007 H1 ABX tranches, assuming these prices reflect only credit risk.  
 (b) The model estimates a market-implied probability of default of the underlying mortgages. This is a 'risk-neutral' default probability. In the likely case that investors are averse to risk, the perceived probability of default will be lower than under the risk-neutral measure.

**Chart 5** Anomalies in the prices of the ABX sub-prime index (2007 H1 vintage)<sup>(a)(b)</sup>



Source: Bank calculations using data from JPMorgan Chase & Co.

(a) The pricing model is an adaptation of that used in 'A simple CDO valuation model', Bank of England *Financial Stability Review*, Box 1, December 2005, pages 105–06.  
 (b) The loss given default rate on the underlying collateral is uncertain, but is assumed for the purposes of this chart to be 50%.

structured investment vehicles that are unable to roll over market funding, seek to sell assets. That means large price discounts may be needed to persuade new, more risk-averse investors to take on ABS exposures. Contacts suggest that the heightened risk of further price falls in the near term is deterring even long-term institutional investors from investing, as their performance relative to peers is often assessed on a short-term, mark-to-market basis.

- Some hedge funds, which might be willing to take advantage of any distortions in ABS and loan markets, are constrained from investing because prime brokers have tightened credit availability. Contacts report that trading desks in major firms are also inhibited from arbitraging pricing anomalies because of a higher internal cost of funding.
- On the supply side, contacts report that some banks that had planned to distribute warehoused assets are reluctant to sell at what they see as unrealistically low prices because they would not only realise losses on sales but might also need to mark down retained exposures to reflect the disposal price.

*... which has led to large discounts for illiquidity and uncertainty in some markets...*

Other markets also appear to be dislocated. As Section 1 discusses (page 17), traded derivatives indices, such as the ABX index for sub-prime securities, point either to very severe outcomes for credit losses or, more plausibly, embody large discounts for illiquidity and uncertainty. For example, at face value, ABX prices imply that markets' modal expectation of ultimate loss rates on sub-prime mortgages securitised in 2006 H2 is 38% (Chart 4). To put that in context, it would be consistent with a probability of default of 76% and a loss given default rate of 50%, both of which would be unprecedented. As Chart 5 shows, prices of AAA tranches of the ABX index appear to be particularly out of line with credit fundamentals. As explained in Section 1, risk premia are unusually high across a number of other markets under stress.

*... potentially inflating loss estimates...*

While realised losses in sub-prime markets have been small to date, large complex financial institutions (LCFIs) have announced substantial write-downs (Table A and Chart 6). These estimates of expected future losses have been based on a range of indicators, including internal models and market prices such as the ABX. There has been considerable variation in reported valuations across products by different financial institutions (Chart 7). And disclosures have often provided only partial information on the assumptions underlying valuations and the uncertainties around reported point estimates of losses.

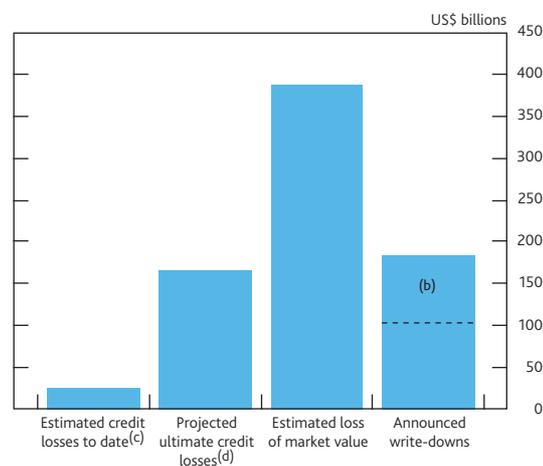
Falls in indices such as the ABX have led to increasing estimates of system-wide mark-to-market losses (Box 1 on

**Table A** Major UK banks' and LCFIs' structured credit and monoline-related write-downs and exposures<sup>(a)(b)</sup>

US\$ billions					
	Major UK banks	European LCFIs	US securities houses	US commercial banks	
<b>Total write-downs<sup>(c)</sup></b>					
	2007 H2	14	32	39	30
	2008 Q1	– <sup>(d)</sup>	5 <sup>(d)</sup>	13	17
Of which:					
US sub-prime	11	26	33	33	
Other US MBS and ABS <sup>(e)</sup>	1	2	4	2	
CMBS <sup>(f)</sup>	0	2	1	1	
Leveraged loans	1	4	7	8	
Monoline guarantees	1	3	7	3	
<b>Remaining exposures<sup>(g)</sup></b>	<b>192</b>	<b>232</b>	<b>295</b>	<b>195</b>	
Memo item					
<b>Total assets</b>	<b>11,215</b>	<b>11,748</b>	<b>4,086</b>	<b>5,579</b>	

Sources: Bank of England, Bloomberg, published accounts and Bank calculations.

- (a) Includes write-downs and exposures where information has been disclosed.  
 (b) Balance sheet data for US securities houses and US commercial banks at end-2008 Q1 and for other institutions at end-2007.  
 (c) Total write-downs on trading book assets and available-for-sale financial instruments announced on or before 24 April 2008.  
 (d) Excludes provisional write-downs made by Deutsche Bank (US\$4 billion), RBS (US\$12 billion) and UBS (US\$19 billion).  
 (e) Mortgage-backed securities and asset-backed securities. Principally includes US prime and Alt-A residential mortgage-backed securities.  
 (f) Commercial mortgage-backed securities.  
 (g) RBS data for end-2007 include ABN Amro.

**Chart 6** Losses on sub-prime asset-backed securities<sup>(a)</sup>

Sources: Banks' financial statements, Bank of America, BlackRock, Dealogic, JPMorgan Chase & Co., Moody's Investors Service, Standard and Poor's and Bank calculations.

- (a) See Box 1 on page 18 for details.  
 (b) Area below dotted line shows net write-downs by major UK banks and LCFIs since the start of 2007 to 22 April 2008, while total height of bar shows an S&P estimate (published on 13 March 2008) of write-downs by all investors.  
 (c) In the absence of data on realised losses, this estimate is derived from data on actual delinquency rates on outstanding mortgages by vintage, and an assumption about the transition from delinquency to default, as described in Box 1.  
 (d) This estimate is derived in the same way as for estimated credit losses, but assuming that serious delinquency rates on different vintages continue to rise at their average rate to date until the mortgages are four years old, when they are assumed to be plateau. See Box 1 for details.

page 18) (Chart 6). The gap between these estimates and reported write-downs to date by firms have fuelled expectations that further losses are in store but have yet to be revealed. This has added to the mood of uncertainty and pessimism in financial markets, which is retarding the recovery of confidence and risk-taking.

But credit losses from the turmoil are unlikely to ever rise to levels implied by current market prices unless there is a significant deterioration in fundamentals, well beyond the slowdown currently anticipated. That is because prices are likely to reflect substantial discounts for illiquidity and uncertainty that have emerged as markets have adjusted but which should ease over time. While market-based estimates and the write-downs announced by firms may be unduly pessimistic, if such concerns persist there is a risk they could become self-fulfilling.

### ...while weaknesses in risk management have been revealed...

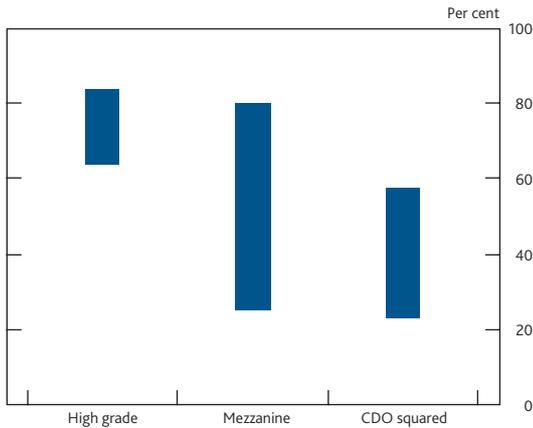
Losses announced by firms have also highlighted weaknesses in their risk management systems. As Section 3 notes (page 46), financial institutions were unprepared for such prolonged disruption to core funding markets. This has posed particular challenges for firms that have built their business around the origination and distribution of risk.

More generally, events have highlighted the limits to which financial institutions can insulate themselves from risk in a highly interdependent system. Risks that were thought to be dispersed around the financial system have flowed back to core firms — for example, from off balance sheet vehicles as liquidity lines have been called or as support has been provided to preserve reputation. Investment in senior and 'super-senior' tranches of structured products has provided less protection from losses than anticipated, particularly where the underlying collateral has been tranches of already securitised assets, which can introduce greater price sensitivity to changes in fundamentals. And, as discussed in Box 3 on page 36, heightened concern about monolines has reduced the value of the insurance they provide on financial instruments.

### ...undermining confidence in banks' resilience...

An adverse interaction between asset prices and financial institutions' balance sheets has raised concerns about counterparty risk. Banks' capital ratios have fallen, particularly for those institutions that experienced outright losses in the second half of 2007 (Chart 8). The cost of buying protection against the default of an LCFI rose to unprecedented levels in March 2008 around the time of the collapse of Bear Stearns, though concerns have eased significantly in recent weeks (Chart 9). A similar, though less pronounced, pattern is evident among other financial institutions. Despite relatively limited write-downs by UK banks, the cost of insurance against UK bank defaults is significantly higher than at the time of the

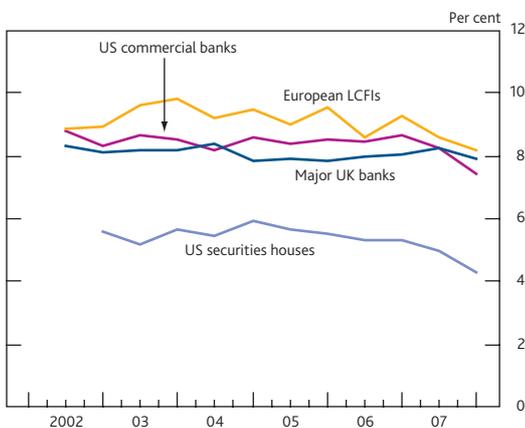
**Chart 7** Illustrative implied marks on CDO super-senior tranches<sup>(a)(b)(c)</sup>



Sources: SEC filings, company reports and Bank calculations.

- (a) Data are for six LCFIs. Not all firms have reported data in each of the categories. Super-senior tranches are those that are above senior tranches in the capital structure.
- (b) For two banks, reported average marks on positions are used. Otherwise, an implied mark is calculated as reported net exposures at end-2007, relative to these net exposures plus net losses in that year. Estimating marks on the basis of net, rather than gross, figures is problematic as it does not take into account any changes in hedges. The calculation also does not allow for purchases and sales of assets. In one case an adjustment is made for disclosed changes in hedges and purchases/sales.
- (c) Figures include liquidity commitments on CDOs where disclosed.

**Chart 8** Tier 1 capital ratios<sup>(a)(b)(c)</sup>



Sources: Bloomberg, published accounts and Bank calculations.

- (a) Weighted by total assets.
- (b) Capital ratios measured under Basel I except for US securities houses. Capital ratios for US securities houses measured as ratio of tangible common equity to total assets adjusted for secured assets, segregated assets, derivative liabilities, identifiable intangible assets and goodwill.
- (c) RBS data for end-2007 include ABN Amro.

previous *Report*, though that cost has also fallen significantly in the past few weeks (**Chart 9**).

Higher counterparty risk has contributed to continued strains in money markets. Banks and other money market participants remain reluctant to provide term funding. Reflecting that, UK and international Libor spreads are still elevated and are expected to remain so for longer than markets previously anticipated (**Chart 10**). As Section 2 describes (page 32), tight funding markets have increased the vulnerability of banks' liability structures. In particular, some banks in the United Kingdom and internationally have found it hard, or costly, to obtain wholesale funding beyond short-term maturities. Greater short-term funding exposes them to heightened rollover risk.

*...culminating in the collapse of Bear Stearns...*

Problems in financial markets intensified in mid-March when concerns about Bear Stearns, a US securities house, resulted in a wholesale funding run. Bear Stearns was not only unable to obtain funding in unsecured markets, but also could not secure funds against high-quality collateral. That led to a rapid fall in its sizable reserves of liquid assets (**Chart 11**) and the firm was forced to seek support from JPMorgan Chase & Co. and the Federal Reserve Bank of New York (FRBNY).

*...despite concerted central bank interventions.*

Central banks have responded to the economic effects of the turmoil by lowering policy interest rates. They have also provided additional longer-term funding for banks against a wider-than-usual range of collateral, including through concerted international action in December 2007 and March 2008. In response to the rise in funding pressures that culminated in the crisis at Bear Stearns, the FRBNY widened its liquidity provision to US non-bank primary dealers.

On 21 April, the Bank of England announced a new scheme to enable banks and building societies to swap assets that are currently illiquid for UK Treasury bills. The scheme is designed to improve the liquidity position of the banking system and raise confidence in financial markets while ensuring that the risk of losses on the loans they have made remains with the banks. Box A explains the scheme and its aims; Box 6 on page 58 discusses other actions taken by central banks to address the turmoil.

**Prospects for financial stability**

Prospects for financial stability depend on the duration of impaired market functioning and tight funding conditions for banks and how that, in turn, affects lending and the economy. As Section 2 discusses, funding and other balance sheet pressures have led some banks — both in the United Kingdom and internationally — to seek to limit balance sheet growth by raising the cost and/or tightening the availability of credit to

## Box A

### The Special Liquidity Scheme

The crisis since the late summer has left banks internationally with an inventory of assets which they have been unable to securitise or sell given the continuing illiquidity of some asset-backed securities markets. This overhang has stretched banks' balance sheets and created uncertainty about their financial position. Banks have, as a result, tightened credit conditions, including to each other.

Since August, the Bank has increased the amount of central bank money made available to reserves scheme participants by 42% and increased the proportion of its lending to the market for a term of at least three months from 31% to 74%. It has also expanded the range of high-quality assets accepted in its three-month lending operations to include mortgage-backed securities. At the time of the announcement of the scheme, the stock of outstanding lending in three-month operations was £25 billion.

It had been hoped that problems in the interbank market would be resolved as markets returned to normal. But it became clear during the early months of this year that there was no immediate prospect of markets in asset-backed securities operating normally.

Against this background, the UK authorities concluded that decisive action was needed to tackle the overhang, to improve the liquidity of the UK banking system and to increase confidence in financial markets. Under the Special Liquidity Scheme announced on 21 April, institutions eligible to use the Bank's Standing Facilities can enter into long-term swaps with the Bank to obtain Treasury bills (TBs) in exchange for high-quality, but currently illiquid, collateral.<sup>(1)</sup>

The range of securities that participants can offer as collateral in long-term swaps with the Bank is little different from that eligible for the Bank's three-month extended collateral long-term open market operations (OMOs) introduced in December. The particular features of the scheme that distinguish it from existing Bank facilities are:

- Asset swaps will be for a period of one year, but are renewable at the Bank's discretion for a total of up to three

years. So the liquidity being provided is of longer duration than is typical of Bank operations.

- The Debt Management Office will supply the Bank with the necessary TBs. The banks will be able to borrow these for a fee based on the spread between the three-month Libor and the rate for borrowing against government bonds, subject to a floor.
- The risk of losses on their loans remains with the banks. Collateral has to be highly rated and is subject to significant haircuts to protect the Bank, and so ultimately the taxpayer, from remaining credit and market risks.
- The major UK banks have agreed to participate in the scheme, with the maintenance of a minimum commitment by each participant. Drawdowns under the scheme can be undertaken for a period of six months from 21 April 2008.
- The swaps are available only for assets on the balance sheet of the participating bank at the end of 2007 and cannot be used to finance new lending. Assets will be valued by the Bank using observed market prices. If an independent market price is unavailable, the Bank will use its own calculated price. The Bank's valuation is binding.
- Collateral provided by the Bank in the form of highly marketable TBs rather than cash, gives banks the option to continue to hold them, to use them in the Bank's regular OMOs or to swap them for cash with market counterparties.
- Volumes are large. Usage will depend on market conditions, but discussion with the banks suggests that initial use of the scheme will be around £50 billion.
- The scheme is a one-off operation with a finite life. By October 2011, all assets will have been returned to the banks and all TBs to the Bank. The scheme will then close.
- The scheme will be ring-fenced from, and independent of, the Bank's money market operations and so will not interfere with the implementation of monetary policy.

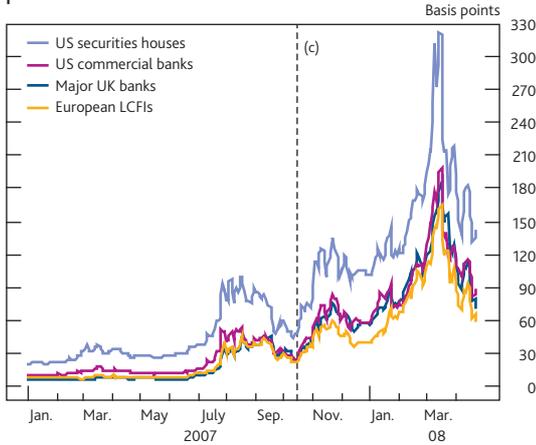
(1) Details of the Scheme are given in the Bank's Market Notice of 21 April 2008, [www.bankofengland.co.uk/markets/money/marketnotice080421.pdf](http://www.bankofengland.co.uk/markets/money/marketnotice080421.pdf).

firms and households (**Chart 12**). That has contributed to weaker growth expectations in the United States and, to a lesser extent, in the United Kingdom.

*The most likely outcome is that risks to financial stability will decrease gradually...*

The most likely outcome is that market conditions improve in the period ahead, supported by measures to improve market

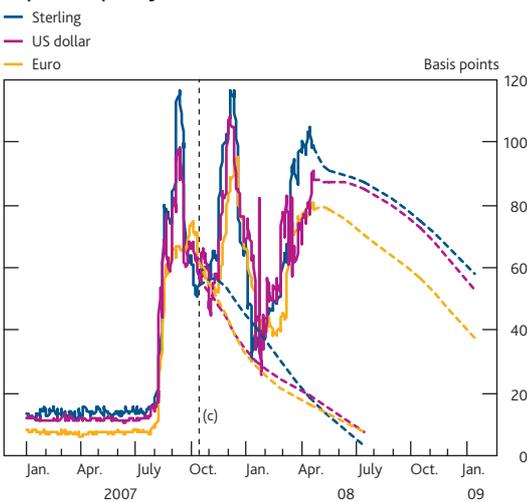
**Chart 9 Major UK banks' and LCFIs' credit default swap premia<sup>(a)(b)</sup>**



Sources: Markit Group Limited, Thomson Datastream, published accounts and Bank calculations.

(a) Data to close of business on 22 April 2008.  
 (b) Asset-weighted average five-year premia.  
 (c) October 2007 Report.

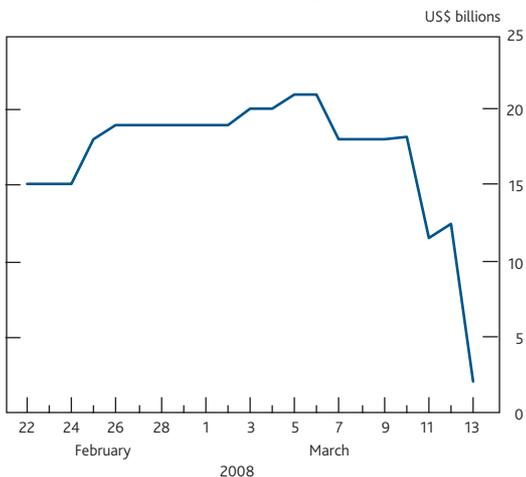
**Chart 10 Three-month interbank rates relative to expected policy rates<sup>(a)(b)</sup>**



Sources: Bloomberg and Bank calculations.

(a) Spread of three-month Libor to three-month overnight indexed swap (OIS) rates.  
 (b) Dashed lines show forward spreads derived from forward rate agreements as at 15 October 2007 and 22 April 2008.  
 (c) October 2007 Report.

**Chart 11 Bear Stearns' liquidity pool**



Source: SEC.

functioning and to bolster confidence in financial institutions. Indeed, there are some signs of an improvement in credit market sentiment in recent weeks. As uncertainty falls and market liquidity improves, it should become clearer that some assets appear cheap relative to credit fundamentals, which should in turn encourage a recovery in confidence and risk appetite by speculative and long-term investors. In that environment, firms may find that previous mark-to-market loss estimates have been overstated and some write-backs of reported losses may occur. Over a longer horizon, better pricing of risk and stronger risk management and supervision should strengthen financial institutions' balance sheets.

*... though some pickup in distress among more risky borrowers should be expected...*

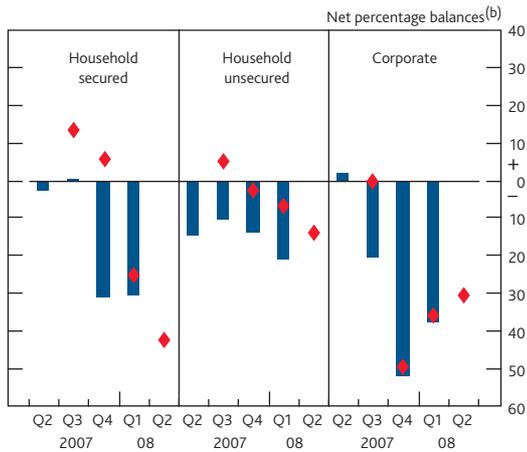
Although market conditions should improve over time, credit availability is unlikely to return to the loose conditions prevailing before the turmoil — indeed, that would be undesirable. As a consequence of that adjustment, some rise in financial stress can be expected in the United Kingdom from current low levels. Borrowers who had taken on heavy debt burdens while credit conditions were unsustainably loose and economic conditions were more benign are likely to be most affected. Areas of vulnerability discussed in the Report include:

- Parts of the commercial property sector (page 21 and Box 2 on page 31), where prices have fallen and where weaker economic growth could lower rental income growth.
- Leveraged non-financial companies (page 22), including those taken private in recent years, where default rates are expected to rise (Chart 13).
- Highly indebted households, adverse credit borrowers and buy-to-let investors (page 21), as the housing market slows.
- Emerging markets, particularly in countries in Central and Eastern Europe with large current account deficits and rapid domestic credit growth (page 16).

*... and tail risks to financial stability remain.*

But there are still tail risks to financial stability. Table B summarises the Bank's judgement on the key sources of these tail risks and how they have changed since the October 2007 Report (Box 5 on page 50 describes these vulnerabilities in greater detail). Chart 14 sets out the Bank's current judgement on their level of materiality. As Section 3 discusses (page 49), the likelihood of those vulnerabilities being exposed has risen over the past six months, as the growth outlook has weakened and credit conditions have tightened. With confidence in banks currently low, the potential adverse impact on stability if these tail risks were to crystallise has also generally increased.

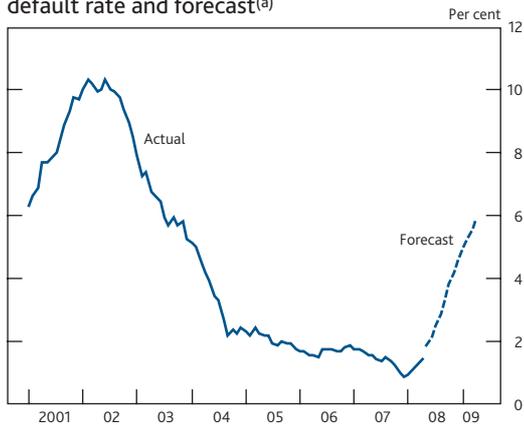
**Chart 12 Credit availability in the United Kingdom<sup>(a)</sup>**



Source: Bank of England Credit Conditions Survey, 2008 Q1.

- (a) Net percentage balances are calculated by weighting together the responses of those lenders who answered the survey questions on the change in the availability of credit. The blue bars show the responses over the previous three months. The red diamonds show expectations for the quarter in question, as measured three months earlier.
- (b) A positive balance indicates that more credit is available.

**Chart 13 Moody's speculative-grade corporate bond default rate and forecast<sup>(a)</sup>**



Source: Moody's Investors Service.

- (a) Global trailing twelve-month issuer-weighted speculative-grade corporate bond default rate.

**Table B Sources of tail risk in the period ahead: change in assessment since October 2007**

Vulnerability	Change in assessment since October 2007	
	Probability <sup>(a)</sup>	Impact <sup>(b)</sup>
High risk premia	A slight increase	A significant increase
Global corporate debt	A slight increase	A significant increase
Institutional distress	A slight increase	A significant increase
Infrastructure disruption	Broadly unchanged	A slight increase
Global imbalances	Broadly unchanged	A slight increase
UK household debt	A slight increase	A slight increase

Source: Bank of England assessment.

- (a) Assessed change in the probability of a severe crystallisation of a vulnerability at some point over the next three years.
- (b) Assessed change in the expected impact on financial stability if a vulnerability is triggered in a severe scenario.

Chart 14 indicates that the Bank judges there is a risk that currently elevated risk premia in some markets will persist, prompting a further reduction in risk appetite by banks and other market participants. That could lead to a self-fulfilling adverse cycle in which persistent market illiquidity and falling asset prices further undermine confidence in banks and result in a sharper tightening in credit conditions, repeating events of the past six months.

Some signs of a feedback loop have already been apparent in the United States, prompting a sharp easing in monetary policy. Just as benign economic and financial conditions went hand in hand in the boom, a wider dispersion in views about the US outlook is now associated with increased market volatility and heightened concerns about some US financial institutions. That underlines the importance of action to insure against that risk playing out in the United Kingdom.

### Restoring financial stability

Substantial work is under way domestically and internationally to respond to the turmoil. At the G7 level, the Financial Stability Forum has proposed actions to restore confidence in the global financial system. In the United Kingdom, the tripartite authorities are consulting on initiatives to reduce the likelihood and impact of bank failure. These initiatives are discussed in detail in Section 4.

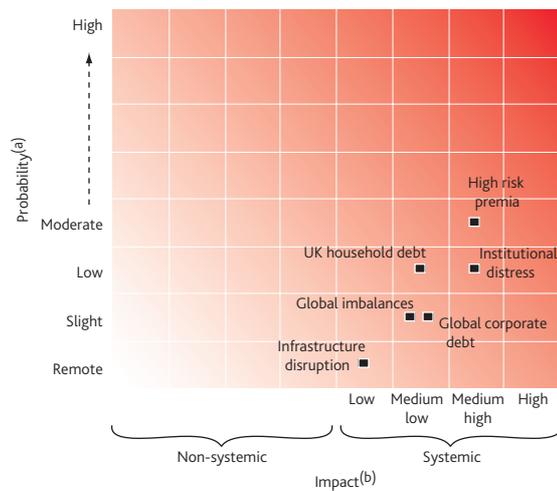
The adjustment in risk pricing is needed and any actions that inhibit this process should be avoided. Against that backdrop, the analysis in this Report underlines the importance of measures that: (1) help banks to finance and unwind the overhang of assets on their balance sheets; (2) bolster confidence in banks' resilience; and (3) ensure that financial institutions price and manage risks better in the future.

#### Measures are needed to support the repricing of risk and to rebuild confidence...

In addition to the Special Liquidity Scheme announced by the Bank, the Report highlights other near-term actions (Table C) that would help to break the adverse interaction between asset prices and balance sheets seen over recent months including:

- **Larger bank capital buffers (page 56).** Higher capital buffers would improve confidence by increasing banks' resilience to sudden changes in market sentiment and by strengthening their capacity to handle a potential downturn in the macroeconomy. Some banks have already begun to bolster their capital positions. From the perspective of the financial system and broader economy, this balance sheet strengthening would be better achieved by raising new capital than by sharply reducing lending growth, which could be self-defeating. While tighter credit availability by a bank in isolation may help protect it from potential losses, the

**Chart 14** Judgement on levels of likelihood and impact of key sources of tail risk



Source: Bank assessment.

(a) Probability of a severe crystallisation of a vulnerability at some point over the next three years.

(b) Expected impact on financial stability if a vulnerability is triggered in a severe scenario.

adverse impact on economic growth of a collective tightening in credit conditions by many banks may lead to increased losses across the system as a whole.

- **Improved disclosure by banks (page 55).** Banks should supply more consistent, frequent and co-ordinated information on their financial positions. This should set out key valuation assumptions and the inevitable uncertainties around exposures and mark-to-market loss estimates.
- **Clarity on the application of mark-to-market accounting (page 55).** Authoritative guidance is needed on the application of fair-value accounting rules when market prices are dislocated from fundamental values.
- **Provision of enhanced information on complex instruments (page 56).** Originators, arrangers and distributors should provide better information on the distribution of underlying assets at issuance and through the life of a security, to help rating agencies and end-investors assess the value of instruments.

*...and to enhance the ongoing stability of the system.*

Actions are also needed to tackle the sources of the overextension of credit and leverage that took place in the boom, to help avoid a recurrence of the turmoil (Table D). They include:

- **Better governance of risk management (page 57).** Management should review whether the structure and effectiveness of risk management in their firms are commensurate with the risks run in their business models.
- **Improved liquidity risk management (page 60).** Firms should increase their liquidity buffers and recognise and prepare for potential interactions between market liquidity, funding availability and credit risk in times of stress. There is a need for stronger and more consistent international regulatory standards of liquidity management.
- **Differentiated ratings information (page 57).** Agencies should differentiate ratings of structured products from single-name ratings and provide fuller information on the uncertainties around, and drivers of, structured finance ratings.
- **Sharper regulatory incentives to recognise risk (page 63).** The greater risk-sensitivity of Basel II is a significant improvement on previous rules. But recent events have highlighted that more capital needs to be held against some securitisation exposures and off balance sheet commitments.
- **Consideration of countercyclical prudential tools (page 64).** Basel II is unlikely to reduce significantly tendencies in the financial system towards overextending

**Table C** Key actions to rebuild confidence

- The Bank of England has announced a new scheme to enable banks and building societies to swap assets that are currently illiquid in exchange for UK Treasury bills.
- Higher capital buffers would improve confidence by increasing banks' resilience to sudden changes in market sentiment and by strengthening their capacity to handle a potential downturn in the macroeconomy.
- Banks should supply more consistent, frequent and co-ordinated information on their financial positions, including on key assumptions used in, and uncertainties around, valuations.
- Authoritative guidance is needed on the application of fair-value accounting rules when market prices are dislocated from fundamental values.
- Originators, arrangers and distributors should provide enhanced information on the composition of complex structured instruments.

**Table D** Key actions to improve ongoing financial stability

- Firms should review whether the structure and effectiveness of risk management in their firms are commensurate with the risks run in their business models.
- Firms need to improve their planning for liquidity disruption in times of stress, supported by stronger regulatory liquidity standards.
- Rating agencies need to differentiate better between ratings on different types of instruments and provide more information on the drivers of, and uncertainties around, ratings.
- Basel II will strengthen incentives to recognise risk, but areas for review include the treatment of some securitisation exposures and off balance sheet commitments.
- Potential procyclicality in Basel II needs to be monitored. Consideration should also be given to countercyclical prudential policies to counteract the inherent procyclicality in the financial system.
- Central banks need to review, and where necessary, adapt their operations in the light of the lessons from the turmoil.
- Crisis management arrangements need strengthening, including through the introduction in the United Kingdom of a special resolution regime for banks. Internationally more effective practical arrangements are needed for handling cross-border crises.

credit in good times and then retracting sharply when conditions change. In fact, it could lead to additional procyclicality in the system (Box 7 on page 65). Authorities should examine where incentive structures, for example remuneration schemes or market share objectives, may be distorting risk appetite and risk pricing. Consideration should also be given to whether existing capital rules should be supplemented by more explicit countercyclical prudential policies.

- **Improved central bank operations (page 69).** Central banks need to review, and where necessary, adapt their money market operations in the light of the lessons from the turmoil.
- **More effective crisis management arrangements.** The United Kingdom needs a special resolution regime (Box 8 on page 67) and more effective deposit insurance arrangements to deal with failing banks (page 68). Practical arrangements for handling cross-border crises also need improving (page 69).

## Conclusion

A necessary repricing of risk and deleveraging is taking place, which will inevitably have costs for some market participants and borrowers. But this adjustment is being hampered by poorly functioning markets. Confidence among market participants has been dented by falls in credit market prices and large mark-to-market losses which are likely to reflect large, and temporary, discounts for illiquidity and uncertainty, as well as expected future credit losses. In effect, risk premia have swung from being unusually low to temporarily too high relative to credit fundamentals. That is leading to heightened concerns about banks' resilience, continued strains in money markets and reductions in credit availability. That in turn is retarding the return of confidence and risk appetite in financial markets.

The most likely path ahead is that confidence and risk appetite gradually turn as market participants recognise that some assets look cheap on a fundamentals basis. That could generate a virtuous cycle of rising asset prices and improving bank balance sheets, reversing the cycle of the past six months. But there is still a possibility that high risk premia in some markets could persist, undermining confidence and potentially setting in train a further adverse cycle. The Bank's recently announced Special Liquidity Scheme is intended to help reduce that risk. But banks can also bolster confidence in their resilience by improving their disclosure and by raising capital as a signal of strength in turbulent market conditions. Further ahead, it is important that banks and the official sector respond not just to problems that have surfaced in the current episode, but also tackle the underlying sources of the overextension of credit in recent years.

# 1 Shocks to the financial system

Credit conditions have changed dramatically since mid-2007. The credit boom has come to an abrupt end, increasing financial market instability and macroeconomic uncertainty. Falling asset prices, deleveraging by some financial institutions and reduced risk appetite are creating illiquidity in credit markets and hampering price discovery. Prices in some credit markets have become detached from credit fundamentals due to unusually high discounts for illiquidity and uncertainty — the mirror image of the underpricing of risk during the upswing. As a result, mark-to-market losses on credit securities probably overstate the potential for future credit losses and the likely costs to the economy of the financial market disruption. This is lowering confidence and delaying the recovery of risk-taking. There is a risk that negative sentiment and weak collateral values in the short term will lead to an overtightening of credit conditions and amplify economic and financial costs.

This section discusses developments in the global economy and financial markets since the October 2007 *Report* that affect the risks to the UK financial system.

## *The credit boom has come to an abrupt end.*

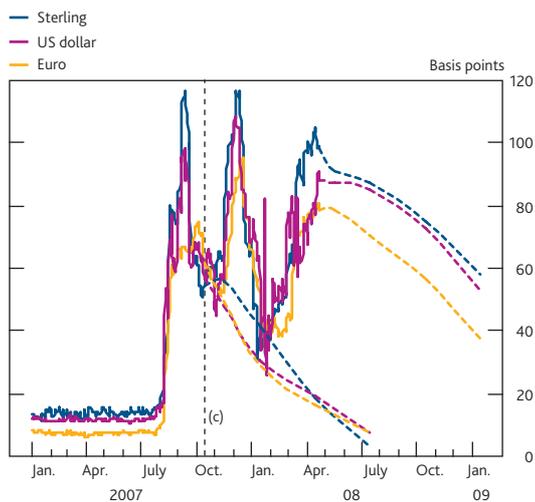
During the summer of 2007, the credit boom came to an end. The October 2007 *Report* explained how rising default rates on US sub-prime mortgages undermined confidence in structured credit products generally, causing sharp falls in financial asset prices and acute funding difficulties for many financial institutions. But **Chart 1.1** illustrates that, at the time of that *Report*, three-month interbank spreads had fallen from their peaks in September and pressures were expected to dissipate, albeit slowly, over the following six months.

In the event, credit markets have not improved over that period. Financial asset prices have fallen further. Interbank funding remains difficult and is expected to ease only slowly over the rest of the year. Liquidity in some asset markets has dried up completely and banks have found themselves funding more long-term credit exposures than expected. To protect their balance sheets, banks in the major developed economies have progressively tightened credit availability to the financial and non-financial sectors.

## *Growth prospects have weakened but inflationary pressures have increased...*

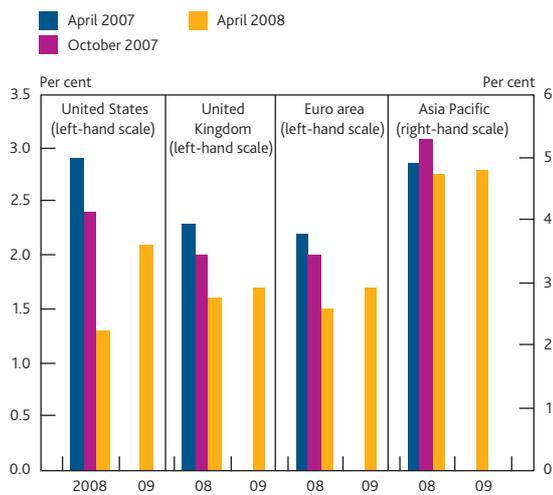
As credit conditions have tightened, forecasts for international growth in 2008 have been cut, particularly for the United States (**Chart 1.2**). In the February 2008 *Inflation Report*, UK GDP growth was expected to fall back markedly in early 2008 before picking up during 2009. At the same time, global inflationary pressures have intensified due to rising food,

**Chart 1.1** Three-month interbank rates relative to expected policy rates<sup>(a)(b)</sup>

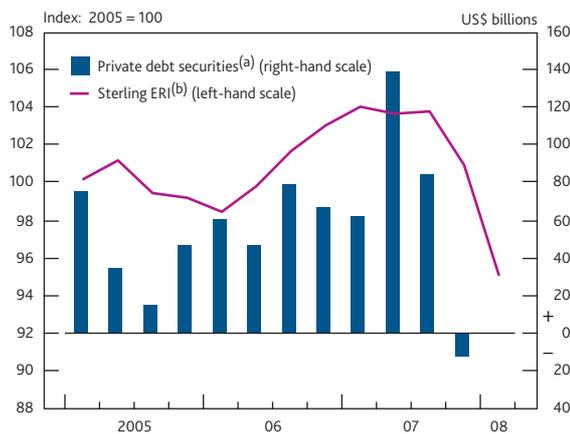


Sources: Bloomberg and Bank calculations.

- (a) Spread of three-month Libor to three-month overnight indexed swap (OIS) rates.  
 (b) Dashed lines show forward spreads derived from forward rate agreements as at 15 October 2007 and 22 April 2008.  
 (c) October 2007 *Report*.

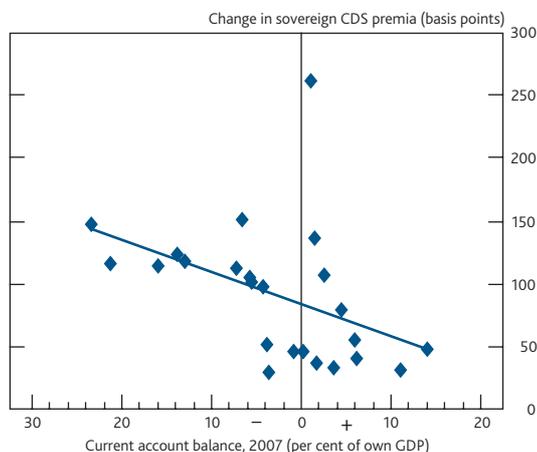
**Chart 1.2 International GDP growth forecasts**

Source: Consensus Economics Inc.

**Chart 1.3 Foreign portfolio investment in the United Kingdom and sterling ERI**

Sources: Bloomberg, ONS and Bank calculations.

- (a) Foreign transactions in commercial paper, certificates of deposits, bonds and notes issued by UK non-governmental sectors. Data up to 2007 Q4.  
 (b) Quarterly average.

**Chart 1.4 Change in sovereign credit default swap premia<sup>(a)</sup> versus current account balances for selected emerging market economies<sup>(b)</sup>**

Sources: Bloomberg, IMF World Economic Outlook and Thomson Datastream.

- (a) Since October 2007 Report.  
 (b) Data to close of business on 22 April 2008.

energy and commodity prices. Oil prices, for example, have risen by over 30% since the October 2007 Report to above US\$100 a barrel. Over the same period, *The Economist* all-items commodity price index has risen by over 20%.

*...and exchange rates have moved sharply...*

There has also been substantial adjustment in exchange rates, reflecting changes in relative expected growth and interest rates and falls in demand for financial assets. For example, the sterling ERI has fallen sharply at the same time as an abrupt drop in net foreign demand for UK private debt securities (Chart 1.3). Since the October 2007 Report, the US dollar has fallen by 10% against the euro and 14% against the yen. It has also fallen by 7% against the renminbi, as the Chinese authorities have allowed the rate of appreciation to quicken.

These exchange rate moves will allow smoother international adjustment to shocks. And real appreciation will likely reduce the rate of reserve accumulation among Asian countries and some other capital-exporting countries. This will help bring about a rebalancing of global savings and investment patterns. But capital-importing countries may find they have to pay higher interest rates, potentially adversely affecting their economic performance. Emerging market economies (EMEs) have so far proved resilient to the widespread repricing of risk. However, some countries are vulnerable to a further tightening of credit conditions. Chart 1.4 shows that EMEs with the largest current account deficits, located mainly in Central and Eastern Europe (CEE), have experienced the sharpest increases in sovereign bond default swap spreads since the October 2007 Report. CEE countries appear particularly vulnerable because domestic credit has been expanding rapidly, often denominated in foreign currency.<sup>(1)</sup> Concerns about the availability of foreign currency liquidity increased funding pressures on Icelandic banks in the second half of March 2008.

*...increasing economic uncertainty and financial market volatility...*

As a result of these international forces, macroeconomic uncertainty and financial market instability have increased significantly and in parallel for many countries, particularly relative to the benign conditions of recent years. Chart 1.5 shows a much wider dispersion of Consensus near-term US GDP growth forecasts, which has been mirrored in sharply higher equity return implied volatility.<sup>(2)</sup>

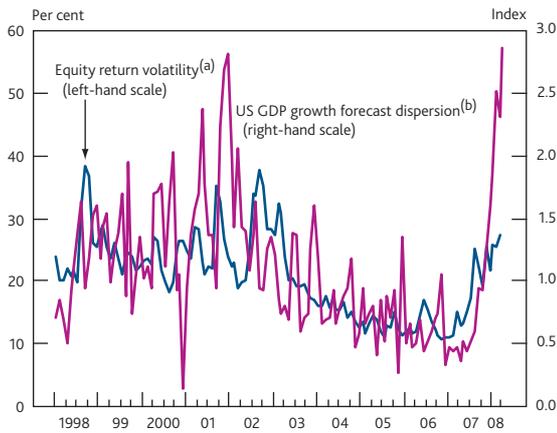
*...and resulting in policy interest rates being cut and liquidity provision increased.*

Reflecting the balance of these risks, monetary conditions have been eased, at least relative to expectations, since the

(1) See Felices *et al* (2008), 'Capital inflows into EMEs since the millennium: risks and the potential impact of a reversal', *Bank of England Quarterly Bulletin*, Spring, pages 26–36.

(2) A widening of the range of modal forecasts by individual survey participants need not correspond to an increase in their uncertainty about their forecasts.

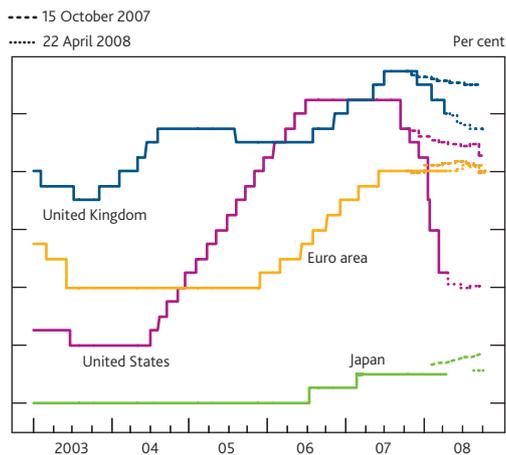
**Chart 1.5** US GDP growth forecast dispersion and option-implied equity market volatility



Sources: Consensus Economics Inc., Thomson Datastream and Bank calculations.

- (a) Option-implied volatility of future S&P 500 equity returns as captured by the VIX index.  
 (b) Based on the standard deviation of forecasts of current and year-ahead GDP growth collected by Consensus Economics Inc. A value of one indicates average dispersion of forecasts.

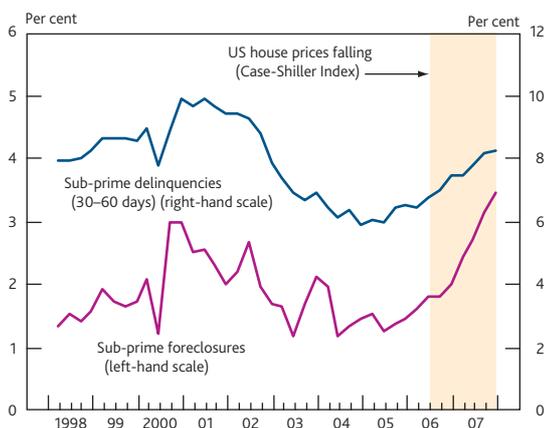
**Chart 1.6** Official interest rates<sup>(a)</sup>



Sources: Bloomberg, Reuters and Bank calculations.

- (a) Solid lines are historical official rates. Dotted lines for the United Kingdom, the United States and the euro area are derived from OIS contracts. Dotted lines for Japan show one-week forward rates.

**Chart 1.7** US sub-prime mortgage delinquency rates versus foreclosure rates



Source: Thomson Datastream.

October 2007 *Report* (Chart 1.6). The US Federal Reserve has cut the target funds rate by 2.5 percentage points and the market expects further easing in coming months. Over the same period, the Bank of England has cut Bank Rate by 0.75 percentage points to 5%. The ECB and Bank of Japan have kept policy rates unchanged, whereas markets previously had expected them to increase policy rates. Central banks have also used their balance sheets to increase the availability of liquid assets in the financial system (Box 6 in Section 4).

Short-term government bond yields have fallen in line with the expected path of policy rates. Medium and longer-term rates have also fallen, with ten-year yields down by a little under 1 percentage point in the United States since the previous *Report*, by around 0.5 percentage points in the United Kingdom and 0.4 percentage points in Germany and Japan.

### *Losses in the US sub-prime mortgage market continue to rise...*

The US sub-prime mortgage market provided the first signs of the ending of the credit boom. As described in the October 2007 *Report*, lending standards in this market progressively deteriorated, particularly in 2006 and early 2007, as banks and mortgage originators chased volume to satisfy strong demand for structured credit products. At the end of 2006, large numbers of mortgages came to the end of introductory 'teaser' interest rates, making it increasingly hard for borrowers to meet repayments. At the same time, US house prices started to fall. Since sub-prime borrowers had little or no net equity in the houses they owned, those who went into delinquency had little incentive to avoid foreclosure. Chart 1.7 shows that trend foreclosure rates have risen much faster than during the previous period of stress in the US housing market in 2000–01. Falling house prices also reduce the amount banks can recover following foreclosure.

Banks wanting to hedge mortgage risk or speculate on the outlook for the US housing market tend to use the sub-prime credit default swap (CDS) market and, in particular, the ABX index.<sup>(1)</sup> Box 1 explains how prices of the tranches of the ABX index can be used to estimate the distribution of implied ultimate financial losses on US sub-prime mortgages. Chart 1.8 shows that these have shifted sharply upwards over the past six months. To put this in context, the modal loss rate of 38% on the 2007 H1 vintage is consistent with a loss given default of 50% and a risk-neutral probability of default of 76%, both of which would be unprecedented. This suggests these prices may have become detached from the expected path of the real economy and hence from credit fundamentals.

(1) The ABX index is a collection of credit derivatives indices offering default protection against baskets of US home equity loan asset-backed securities of different credit qualities and vintages.

## Box 1 Comparison of measures of sub-prime losses

Over the past few months, there have been a number of high-profile reports of 'losses' resulting from the crisis in financial markets. The IMF, for example, recently estimated that securities backed by US sub-prime mortgages, commercial mortgages and corporate debt have collectively lost around US\$720 billion in market value, while unsecuritised residential and commercial mortgages and consumer and corporate loans could incur a further US\$225 billion in credit losses.<sup>(1)</sup> Greenlaw *et al* (2008) estimated that the market value of sub-prime securities had fallen by US\$371 billion as of end-February.<sup>(2)</sup> These measures stand in some contrast to announced write-downs by the major banks, which have totalled a little over US\$100 billion on sub-prime exposures (Table 2.A). A simple comparison of the two could lead to expectations of considerable further losses still to be disclosed.

This box examines different definitions of estimated financial system losses. It concludes that some may exaggerate the impact of recent events on the economy and financial system.

### Whole economy versus financial sector losses

Ultimate losses to the economy depend on the impact on real assets, such as houses, factories, land and human capital. The financial crisis will only cause real losses to the extent that there is a reduction in the stock of these assets or a fall in the value of the goods and services they produce. Mortgage default does not necessarily imply real losses because a house that is transferred from one owner (a household) to another (a bank) in perfect condition at a lower price does not necessarily cause any reduction in the flow of economic benefits. This is simply a transfer of wealth from the old to the new owner of the property. The creation of financial contracts does not alter this underlying logic, although these contracts do determine who gains or loses from changes in the value of the house.

That is not to say that the distribution of gains and losses in the economy will have no effect on the performance of the economy's real assets. For example, a key way in which winners and losers from asset price changes do matter is through effects on the flow of intermediation. Losses recorded by financial institutions erode their capital, which may reduce their ability to offer finance to other households and corporations. This may have a detrimental impact on economic performance. But it is at least partly offset by the household sector being in a less weak state than if its mortgage debts had had to be repaid in full.

None of the estimates of financial loss provided so far take account of these offsetting effects; they only consider losses incurred by the financial sector. So all of them are potentially

significant overestimates of the losses within the wider economy associated with the financial market crisis.

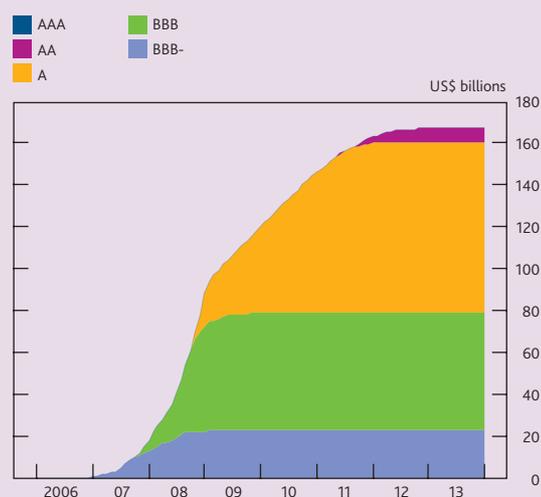
### Credit versus mark-to-market losses

A second respect in which the loss estimates may be misleading is because they confuse true credit losses and losses implied by market prices. These two approaches can differ markedly at times when market prices deviate significantly from credit fundamentals — for example, when illiquidity and uncertainty discounts in market prices are large, as at present. This can be illustrated by looking at two different estimates of sub-prime losses.

### Credit losses

Future credit losses can be estimated by extrapolating forward delinquency rates. In particular, it is assumed that serious delinquency rates of US sub-prime mortgages of different issuance 'vintages' continue to rise at their average rates to date until the mortgages are four years old, at which point the rate is assumed to plateau.<sup>(3)</sup> This is a stylised representation of the way that serious delinquency rates of older sub-prime mortgages have evolved. This method results in peak delinquency rates of 34% for mortgages issued before 2006 H1, rising to 42% for mortgages issued in 2007 H2. Upon becoming seriously delinquent, mortgages are assumed to default with at least 75% probability after one year,<sup>(4)</sup> and to have a loss given default (LGD) rate of 50%.<sup>(5)</sup> **Chart A** shows the resulting projection, in which credit losses eventually reach around US\$170 billion.

**Chart A** Projected cumulative credit losses on US sub-prime mortgage-backed securities



Sources: Bank of America, BlackRock, Dealogic, JPMorgan Chase & Co., Moody's Investors Service and Bank calculations.

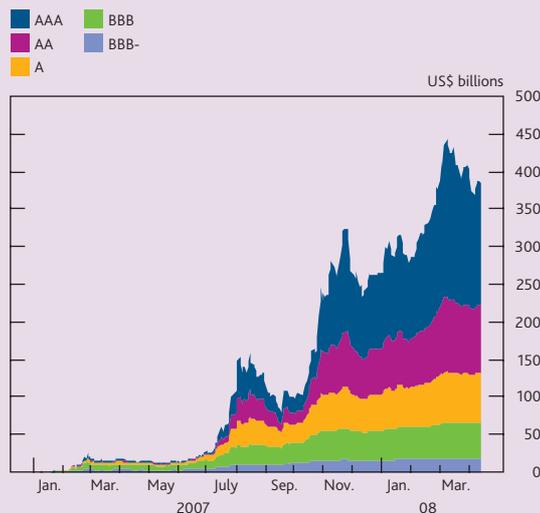
**Chart A** also shows how the projected losses affect securities of different seniority. The more junior securities, with lower credit ratings, bear the first losses. But losses are projected to rise to levels that would eventually affect AA-rated securities.

AAA-rated securities do not incur losses in this projection. But there is sufficient uncertainty that even these top-rated securities could conceivably bear some losses. For example, if all seriously delinquent mortgages defaulted after a year and the LGD rate was 55%, projected credit losses would reach US\$193 billion, or 23% of outstanding principal. This loss rate would be high enough to affect some AAA-rated sub-prime mortgage-backed securities.

### Mark-to-market losses

The loss of market value of sub-prime securities can be estimated by multiplying together the outstanding principal of sub-prime mortgage-backed securities of different vintages and ratings and changes in the prices of corresponding ABX indices. ABX indices offer credit protection on home equity loan (HEL) asset-backed securities. The HEL asset class is comprised mainly of US sub-prime mortgages, but it also includes other mortgages with high loan to value ratios, second mortgages and home equity lines of credit. As **Chart B** illustrates, the loss of market value of sub-prime securities since early 2007 totals around US\$380 billion — more than twice the implied estimate built up from projected delinquency rates. The difference largely reflects the fact that market prices have fallen for reasons other than expectations of increased credit losses. In particular, prices may have fallen due to increased uncertainty about eventual credit losses, greater investor aversion to such uncertainty or because investors require bigger discounts to invest in illiquid markets.<sup>(6)</sup>

**Chart B** Estimated loss of market value of US sub-prime mortgage-backed securities



Sources: Bank of America, BlackRock, JPMorgan Chase & Co. and Bank calculations.

A lack of depth in the market for sub-prime securities may have contributed to the magnitude of price falls as key investors have withdrawn. Demand from asset-backed commercial paper conduits and structured investment vehicles has fallen particularly sharply as they have suffered a

withdrawal of money market mutual funds from markets for their debt. That has reduced demand for AAA-rated securities in particular and this has put downward pressure on the prices of these securities relative to others, perhaps helping to explain the significant contribution of AAA-rated mortgage-backed securities to estimated losses in **Chart B**. Indeed, AAA losses account for the vast majority of the difference in the two loss estimates.

This is supported by **Table 1**, which shows estimates of the loss of market value of sub-prime securities using valuations implied by a model rather than market prices. These estimates are obtained by applying a collateralised debt obligation (CDO) valuation model, described in the December 2005 *FSR*, to the ABX indices to find distributions of ultimate credit losses that collectively explain the prices of ABX indices of different ratings (see, for example, **Chart 1.8**).<sup>(7)</sup> The model assumes that credit risk is the only factor that determines prices, so differences between actual and model-implied prices reflect the relative importance of non-credit factors, such as market liquidity. The difference between actual and model-implied prices is notably greater for the AAA ABX indices than at lower rating levels (**Chart 1.21**). **Table 1** shows that if the loss of market value of sub-prime securities had been calculated using these model-implied values instead of actual ABX prices, the estimate would be some US\$64 billion lower.

**Table 1** Estimated loss of market value of US sub-prime mortgage-backed securities based on actual and model-implied prices<sup>(a)(b)</sup>

US\$ billions

	Vintage of sub-prime mortgage-backed securities					Total
	Pre-2006 H1	2006 H1	2006 H2	2007 H1	2007 H2	
<b>Estimated loss of market value based on ABX prices</b>						
AAA	13	34	49	54	9	159
AA	10	22	27	25	4	88
A	11	19	19	15	2	66
BBB	11	14	11	10	2	47
BBB-	5	6	5	4	1	20
<b>Total</b>	<b>50</b>	<b>95</b>	<b>110</b>	<b>108</b>	<b>17</b>	<b>381</b>

	Vintage of sub-prime mortgage-backed securities					Total
	Pre-2006 H1	2006 H1	2006 H2	2007 H1	2007 H2	
<b>Estimated loss of market value based on model-implied prices</b>						
AAA	7	28	18	31	5	89
AA	15	30	27	25	4	101
A	11	19	16	14	2	62
BBB	9	14	11	9	2	45
BBB-	4	6	5	4	1	19
<b>Total</b>	<b>46</b>	<b>97</b>	<b>77</b>	<b>84</b>	<b>14</b>	<b>317</b>

Sources: Bank of America, BlackRock, Dealogic, JPMorgan Chase & Co. and Bank calculations.

(a) Changes in 2006 H1 ABX index prices were applied to all sub-prime mortgage-backed securities issued before 2006 H1.

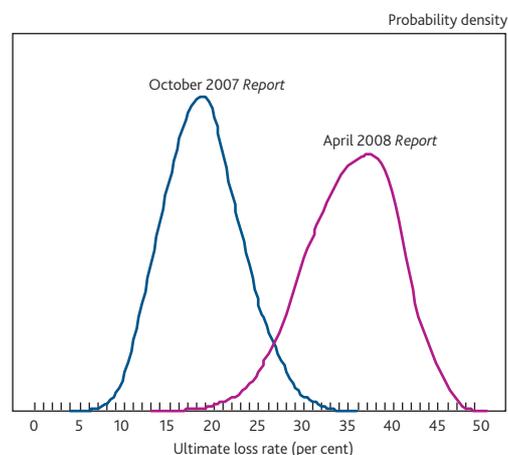
(b) Totals may differ from the sum of their constituents due to rounding.

### Conclusion

The above analysis suggests that using a mark-to-market approach to value illiquid securities could significantly exaggerate the scale of losses that financial institutions might ultimately incur. It will exaggerate to an even greater extent the potential damage to the real economy that these losses might inflict, since there are always winners and losers to financial contracts. This does not deny, however, the possibility of some adverse consequences for the real economy as a result of recent events — for example, due to a higher cost of capital for some borrowers.

- (1) International Monetary Fund (2008), *Global Financial Stability Report*, April, pages 46–52.
- (2) Greenlaw *et al* (2008), 'Leveraged losses: lessons from the mortgage market meltdown', *US Monetary Policy Forum Conference*, February.
- (3) 'Serious delinquencies' refer to mortgages that are 90+ days in arrears, in the process of foreclosure or awaiting sale of property by the lender.
- (4) Mortgages 90+ days in arrears were assumed to default with 75% probability, those in foreclosure with 95% probability and those awaiting sale of property by the lender with 100% probability.
- (5) This high LGD rate reflects forecast falls in house prices, fraudulent reports of initial property values and administrative fees in foreclosing mortgages and selling properties.
- (6) To the extent that the decline in market value reflects expected credit losses, it reflects the increase in those losses since early 2007. So, to estimate expected credit losses implied by market prices, it would be necessary to add to this change an initial estimate of expected credit losses in early 2007. At this time, estimates of ultimate credit losses were typically around 6% of principal or US\$54 billion. It would also be necessary, however, to correct for the influence of other factors on market prices, as discussed above.
- (7) See 'A simple CDO valuation model', Bank of England *Financial Stability Review*, Box 1, December 2005, pages 105–06.

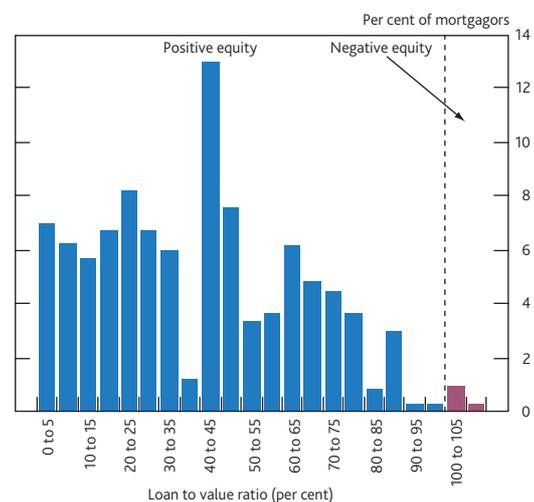
**Chart 1.8** Market-implied expectations of ultimate loss rates on US sub-prime mortgages<sup>(a)(b)</sup>



Source: Bank calculations using data from JPMorgan Chase & Co.

- (a) Based on the collateralised debt obligation (CDO) model used in 'A simple CDO valuation model', Bank of England *Financial Stability Review*, Box 1, December 2005, pages 105–06, applied to 2007 H1 ABX tranches, assuming these prices reflect only credit risk.
- (b) The model estimates a market-implied probability of default of the underlying mortgages. This is a 'risk-neutral' default probability. In the likely case that investors are averse to risk, the perceived probability of default will be lower than under the risk-neutral measure.

**Chart 1.9** Distribution of loan to value ratios among mortgagors



Sources: 2007 NMG Research Survey and Bank calculations.

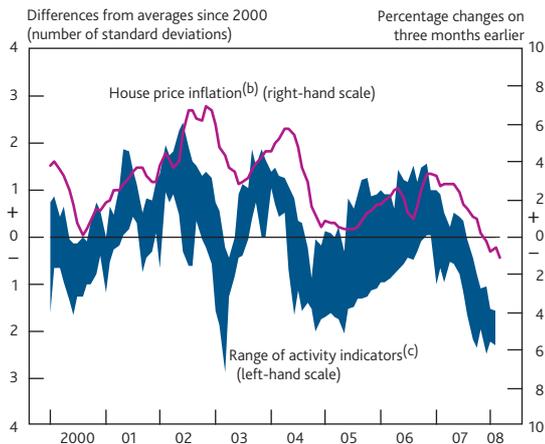
ABX prices are often used to estimate mark-to-market losses on sub-prime securities. These loss estimates have also risen, to around US\$380 billion. These losses have often acted as a benchmark for public commentary on possible bank write-downs. But as Box 1 explains, estimates based on projected credit losses are considerably lower, suggesting there are large illiquidity and uncertainty premia in the ABX market. So although ultimate realised losses on sub-prime mortgage securities could be high, market prices appear to be giving an overly pessimistic impression of their eventual scale. This may be one important factor weighing on market confidence and retarding the recovery of risk appetite.

*...with concerns spreading to other US households...*

Falling house prices, tighter credit conditions and difficulties in remortgaging are creating problems beyond the US sub-prime mortgage market. Delinquencies on US Alt-A, a market about the same size as sub-prime, have also risen. And total delinquencies on prime mortgages, a market which is four times the size of sub-prime, have risen from 2.3% in 2006 Q1 to 3.2% in 2007 Q4. Delinquency rates are also increasing on US credit card loans. Loans from across these markets were often pooled into collateralised debt obligations (CDOs), which were then given higher average ratings than the underlying securities because of perceived diversification benefits. So a more generalised increase in US household distress could create further falls in the price of these instruments.

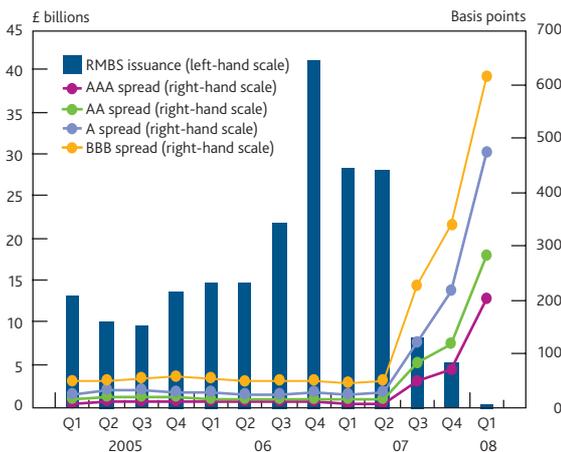
*...and possibly the United Kingdom.*

The Bank of England 2008 Q1 *Credit Conditions Survey* suggests that UK banks have markedly tightened secured and unsecured credit availability to UK households and intend tightening it further over the next few months. Previous *Reports* have noted that most UK households have significant net assets. Most homeowners have substantial net housing equity, boosted by strong house price appreciation over the past decade, and the tail of mortgagors with negative equity at present is small at around 1% (**Chart 1.9**). But house prices have fallen by 3% since October 2007, according to the average of the Nationwide and Halifax house price indices.

**Chart 1.10 UK residential property market<sup>(a)</sup>**

Sources: Bank of England, Halifax, Home Builders Federation (HBF), Nationwide and the Royal Institute of Chartered Surveyors (RICS).

- (a) House price data are up to March 2008. Activity data are up to February 2008.  
 (b) Average of Halifax and Nationwide data. The published Halifax index has been adjusted in 2002 by Bank staff to account for a change in the method of calculation.  
 (c) The blue area shows the range between the minimum and maximum readings of five indicators: HBF site visits, HBF net reservations, RICS new buyer enquiries net balances, the RICS sales to stocks ratio and the number of loan approvals for house purchase.

**Chart 1.11 UK prime residential mortgage-backed security issuance and spreads<sup>(a)</sup>**

Sources: Dealogic, Lehman Brothers and Bank calculations.

- (a) Quarterly average five-year spread over Libor.

And a range of leading indicators point to downside risks to the UK housing market (Chart 1.10).

An important factor contributing to the contraction in mortgage credit supply has been the effective closure of the UK residential mortgage-backed securities (RMBS) market. Chart 1.11 shows that issuance has fallen from a peak of £42 billion in 2006 Q4 to £0.4 billion in 2008 Q1. Secondary market spreads on prime UK RMBS have also risen sharply. A simple measure of the risk-neutral annual implied loss rate on these prime loans has risen to around 2.7%, from 0.6% in July 2007.<sup>(1)</sup> Although the outlook for the UK housing market has deteriorated, there is little evidence to support such an increase in projected loss rates, particularly as arrears rates remain at low levels. Market contacts report that, as in the case of US sub-prime mortgages, there are large illiquidity and uncertainty premia in the UK prime RMBS market at present, with asset prices having become detached from credit fundamentals.

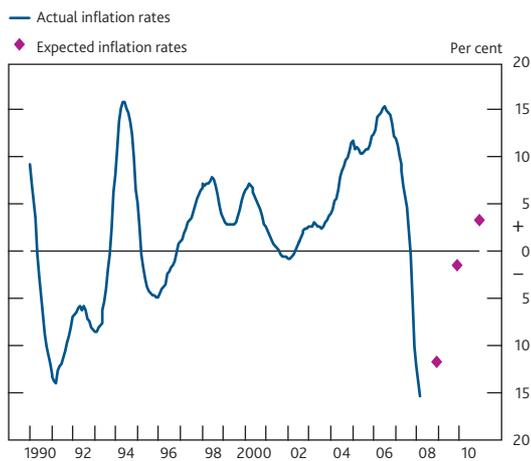
*Highly indebted households, adverse credit borrowers and buy-to-let investors are particularly vulnerable...*

Credit supply has tightened sharply for high-risk borrowers, such as high loan to value (LTV) households, those with adverse credit histories and buy-to-let investors. As a proportion of the stock of outstanding UK mortgages, adverse credit and buy-to-let loans had risen from 9% at the end of 2004 to 14% at the end of 2007. Some lenders that specialised in lending to these groups have exited the market and remaining lenders have withdrawn high-risk and buy-to-let mortgage products or priced them less competitively to deter demand. Many high-risk borrowers may find that they are unable to refinance expiring fixed-rate mortgage deals and will instead move onto the standard variable rate. This will result in a jump in their average effective mortgage rate of around 2.5 percentage points. As in the United States, this repayment shock is occurring at the same time as house prices are falling. Those who bought in recent years with high loan to income multiples and/or high LTV ratios will be particularly vulnerable to further shocks to their disposable income, such as higher inflation or unemployment.

*...as is the commercial property sector.*

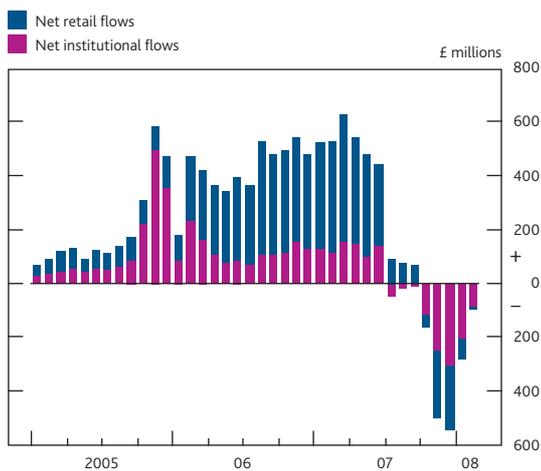
By March 2008, commercial property prices had fallen 16% from their June 2007 peak. Derivatives contracts suggest prices are expected to keep falling for the next couple of years (Chart 1.12). Taken at face value, these contracts imply a peak to trough fall of about 20%–25% although, as with the US ABX index, illiquidity in the market and hedging may cause derivatives indices to overstate potential price falls.

(1) These figures were estimated by adding up five-year RMBS spreads weighted by their size in the capital structure as a proxy for the credit risk compensation attached to a typical UK prime mortgage exposure. This was used to calculate an implied annual risk-neutral loss rate from a simple bond pricing formula.

**Chart 1.12** UK commercial property capital values<sup>(a)</sup>

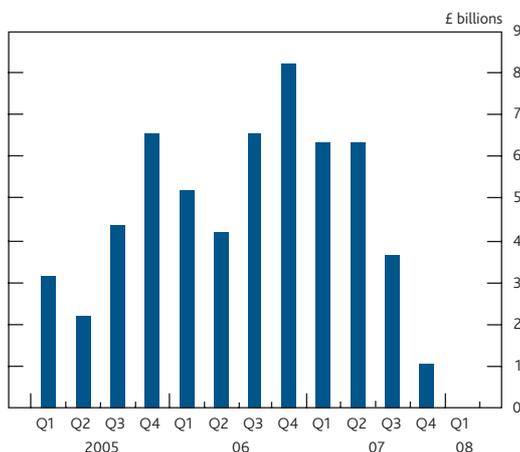
Sources: Fenics, IPD, Thomson Datastream and Bank calculations.

(a) Implied property price forecasts were calculated on 22 April 2008 by using the value of derivatives contracts on total returns adjusted for projected future income returns, which are assumed to revert to their long-run average over the next three years.

**Chart 1.13** UK property funds net inflows<sup>(a)</sup>

Source: Investment Management Association.

(a) Based on data for 32 UK on-shore property funds with total funds under management of approximately £12.5 billion at the end of December 2007.

**Chart 1.14** UK commercial mortgage-backed securities issuance

Source: Dealogic.

Nevertheless, there have been large withdrawals from UK property investment funds, forcing some to freeze redemptions (**Chart 1.13**). On the back of this, issuance of UK commercial mortgage-backed securities (CMBS) fell to zero in 2008 Q1 (**Chart 1.14**). Commercial property companies' default rates have remained low because, although falls in collateral values and tighter credit conditions have reduced their ability to borrow, rental income has continued to grow. But according to the Investment Property Forum, rental income growth is expected to slow in 2008 and 2009. Box 2 in Section 2 discusses the implications of commercial property valuations for UK banks.

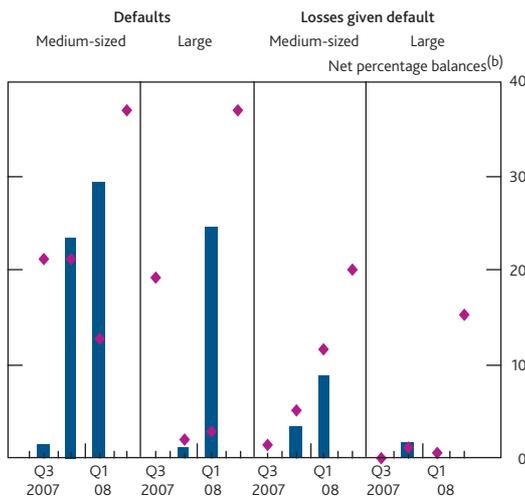
### *The UK corporate sector is generally robust...*

For the UK corporate sector as a whole, default rates remain near record low levels. As described in previous *Reports*, the majority of the UK corporate sector has moderate leverage and healthy buffers of liquidity. And UK companies took advantage of the abundant credit availability of recent years to extend the maturity of their debt and to secure committed credit lines.

But since 2007 Q4, the Bank of England *Credit Conditions Survey* has indicated a tightening in the supply of credit to the corporate sector and higher default losses on medium and large corporate lending (**Chart 1.15**). Highly leveraged corporates are particularly exposed to a change in credit conditions. **Chart 1.16** shows that borrowing costs for a hypothetical, but representative, leveraged buyout deal have almost doubled since the middle of 2007. Secondary market prices for UK leveraged loans have fallen sharply. But here, too, the fall in market prices probably overstates the underlying rise in credit risk. Market contacts suggest that these price moves may have been amplified by the unwinding of collateralised loan obligations (CLOs) and the actual and potential sale of loans held on banks' balance sheets, rather than being driven solely by credit fundamentals. In recent weeks, several banks have managed to sell some substantial leveraged loan exposures, indicating some return of confidence in this market.

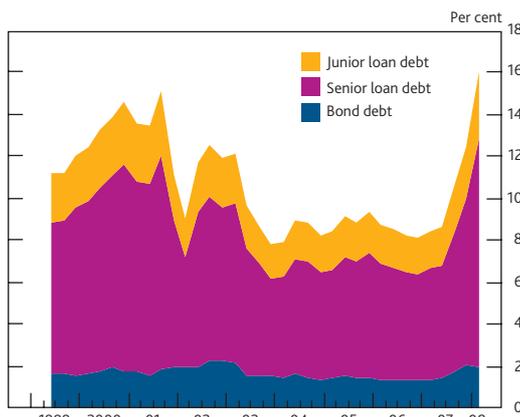
### *...but liquidity risk in corporate credit markets has increased sharply...*

Spreads on lower-risk corporate credit instruments have also risen sharply since the October 2007 *Report*, despite the UK corporate sector having remained robust to date. **Chart 1.17** shows that investment-grade corporate bond spreads are at their highest level since the early 1980s, despite a record low insolvency rate. Once again there is evidence that credit spreads are not providing a complete measure of credit risk. This is supported by the more sanguine outlook implied by corporate equity prices. Although the FTSE 100 has fallen by 12% since the October *Report*, the rise in implied risk is considerably less than in corporate credit markets. The

**Chart 1.15** Survey of PNFC default rates and losses<sup>(a)</sup>

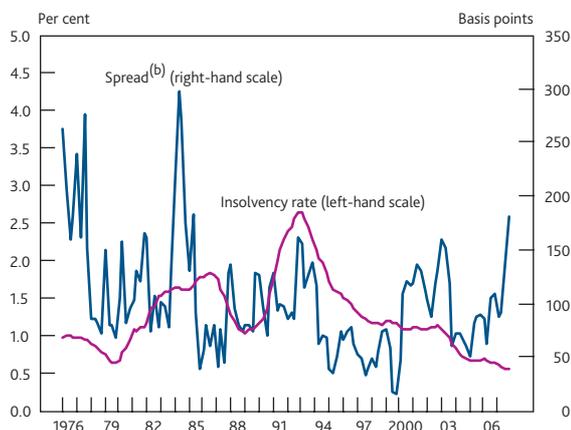
Source: Bank of England 2008 Q1 *Credit Conditions Survey*.

- (a) The blue bars show the responses over the previous three months. The magenta diamonds show the expectations over the next three months. Expectations balances have been moved forward one quarter so that they can be compared with the actual outcomes.  
 (b) A positive balance indicates an increase in default rates.

**Chart 1.16** Annual debt-servicing cost for a hypothetical leveraged buyout<sup>(a)</sup>

Sources: Bloomberg, Loan Pricing Corporation, Merrill Lynch and Bank calculations.

- (a) Assumes that the overall deal structure is 80% loan (80% senior, 20% junior) and 20% bond; that the loan is priced off three-month sterling Libor; and that the debt is amortising.

**Chart 1.17** UK investment-grade corporate bond spreads and insolvency rate<sup>(a)</sup>

Sources: Companies House, Global Financial Data, The Insolvency Service and Bank calculations.

- (a) Provisional 2007 Q4 figure from The Insolvency Service.  
 (b) Three-month rolling average using end-month observations.

decomposition of credit spreads in **Chart 1.18** uses equity price data to infer underlying expected credit losses. It suggests that there has been a substantial increase in liquidity and other risk premia in UK corporate credit markets over the past six months.

*...reflecting problems in structured credit markets.*

Liquidity premia have risen particularly sharply on structured credit securities, into which a significant amount of credit risk was transferred. Structured credit products are constructed by pooling together large numbers of loans and forming tranches of different levels of priority on the resulting payment flows. Senior tranches were given AAA credit ratings and typically accounted for about 80% of the capital structure. The lower-rated, more risky, tranches were held by originating banks to demonstrate confidence in the loans, as well as by speculative investors such as hedge funds and proprietary trading desks of investment banks.

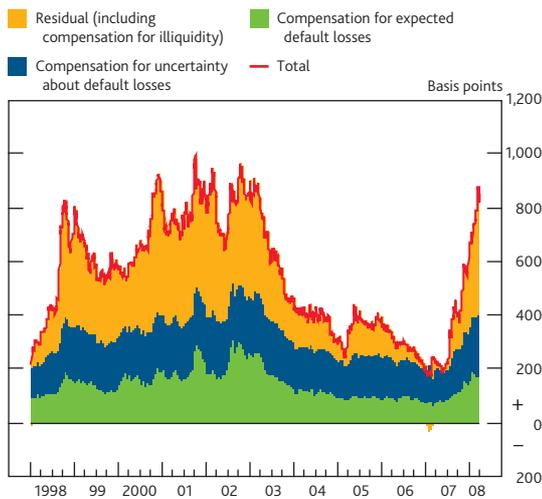
The senior tranches of structured securities were typically held by banks and risk-averse investors, such as insurance companies with ratings-based mandates. They were also held by structured investment vehicles (SIVs) and off balance sheet conduits, which were funded through the issuance of short-term collateralised securities such as asset-backed commercial paper (ABCP). In turn, this ABCP was also rated AAA on the basis of insurance of the collateral extended by monolines and the expectation that their liquidity would remain high so that these vehicles could be wound up before investors experienced any credit losses.

*Significant market losses on AAA securities...*

This expectation of high liquidity was sustainable as long as credit losses on the underlying loans were low and idiosyncratic. But as default rates rose, losses on many AAA-rated US sub-prime securities became a non-trivial possibility. As **Chart 1.19** illustrates, at the onset of the crisis, prices of AAA securities moved closely together across US sub-prime mortgages, commercial mortgages and securitisations linked to corporate credit quality. Correlated underlying and mark-to-market losses undermined the assumption of diversification at the heart of resecuritisations, such as CDOs of asset-backed securities (ABS) and CDO-squareds. Resecuritisations have experienced a much higher proportion of ratings downgrades and losses than securities with only one layer of structuring. Correlated losses also affected the creditworthiness of monoline insurers, which in turn undermined the value of the protection they provided on AAA securities (Box 3 in Section 2).

In the face of rising risks on these securities, money market mutual funds and other risk-averse investors in ABCP decided not to roll over their exposures at maturity. Overall,

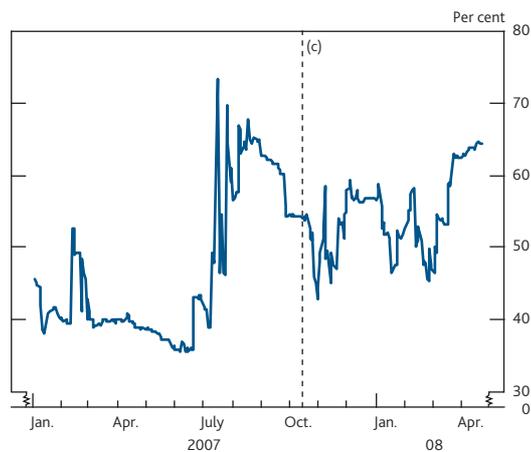
**Chart 1.18** Decomposition of sterling high-yield corporate bond spreads<sup>(a)(b)</sup>



Sources: Bloomberg, Merrill Lynch, Thomson Datastream and Bank calculations.

- (a) Weber, L and Churm, R (2007), 'Decomposing corporate bond spreads', Bank of England Quarterly Bulletin, Vol. 47, No. 4, pages 533–41.  
 (b) Option-adjusted spreads over government bond yields.

**Chart 1.19** Comovement between AAA-rated US structured financial instruments<sup>(a)(b)</sup>



Source: Bank calculations using data from JPMorgan Chase & Co.

- (a) Proportion of the variation in exponentially weighted daily changes in credit default swap premia for the most senior tranche of the ABX.HE 2006 H1, CMBX.NA series 1 and CDX.NA explained by the first principal component over a three-month rolling window.  
 (b) Data to close of business on 22 April 2008.  
 (c) October 2007 Report.

ABCP outstanding has fallen by around US\$420 billion since its peak in early August 2007. This is equivalent to about half of the value of outstanding US sub-prime RMBS. **Chart 1.20** shows that falls in ABCP have coincided with spikes in interbank rates as funding pressure intensified. Money market mutual funds also scaled back on placing unsecured deposits with banks and shortened the maturity of such funding.

*...have made them highly illiquid...*

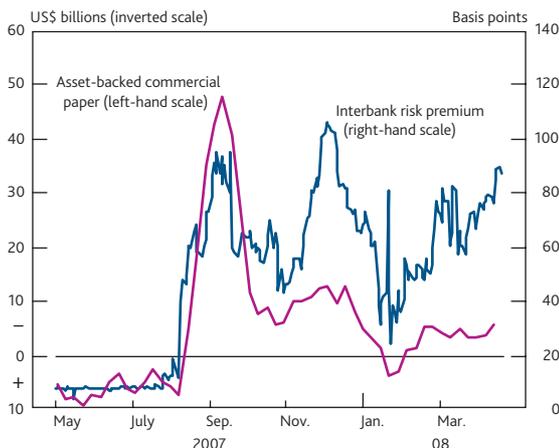
Against this backdrop, it appears to be senior tranche investors who have been the most affected by the developments of the past nine months. **Chart 1.21** provides support for this hypothesis by showing that, based on model estimates, AAA tranches are out of line with the pricing of other tranches exposed to the same underlying assets.<sup>(1)</sup> This suggests that spreads on senior tranches of structured credit products have been dominated by illiquidity and uncertainty premia and a large relative fall in demand for AAA tranches rather than credit risk over the recent period. This is consistent with the analysis in Box 1, which suggests that the largest gap between mark-to-market and cash-flow based estimates of losses on sub-prime securities is in the AAA tranches.

If this were the case, long-term and unleveraged investors could potentially profit by holding these AAA tranches to maturity. But **Chart 1.22** shows that, until very recently when AAA tranches have risen in price, an investor following this strategy would have suffered a string of negative month-on-month returns over the past year. And as discussed in Section 3, many long-term investors often face implicit short-term performance targets and increasingly have to mark their portfolios to market, even when they have no intention of selling securities. The prospect of such volatile returns may well be deterring both short and long-term investors from buying AAA securities which appear, on the face of it, cheap.

One additional factor contributing to the current illiquidity of structured products markets is that many instruments contain market value triggers. These triggers give senior noteholders an option to vote on whether to accelerate payments to themselves or liquidate the underlying assets. **Table 1.A** shows that over recent months these options have been exercised. This further complicates the pricing of these securities and thereby adds to their illiquidity.

(1) A pricing model of CDO tranches was fitted to all of the classes of tranches of the 2007 H1 sub-prime ABX index, imposing across the structure a common risk-neutral default probability and correlation between defaults in the underlying pool. Since the returns on the tranches reflect the expected behaviour of the pool as a whole, they might be expected to be priced on common assumptions. The pricing model was simulated repeatedly to minimise the sum of absolute pricing errors to find the best-fitting common default probability and correlation assumption. **Chart 1.21** illustrates the gap between the actual price and the best-fitting model-implied price. The AAA index price stands out as being considerably lower relative to the others — or equivalently, the AAA tranches are accurately priced but with a much higher assumed risk-neutral probability of default or correlation rate than the other tranches. To square this circle, this would be consistent with a substantial increase in risk aversion among AAA investors and/or an increase in the premium for illiquidity.

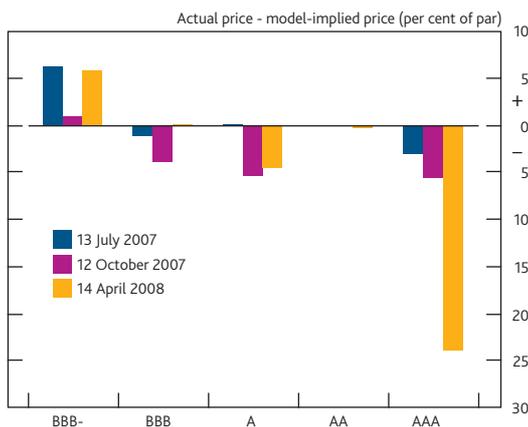
**Chart 1.20** US interbank risk premium and declines in US asset-backed commercial paper<sup>(a)(b)</sup>



Sources: Bloomberg, Board of Governors of the Federal Reserve and Bank calculations.

- (a) Blue line shows three-month dollar Libor spread over three-month OIS rate. Magenta line shows five-week rolling average of week-on-week changes in US ABCP outstanding.  
 (b) Data to close of business on 22 April 2008.

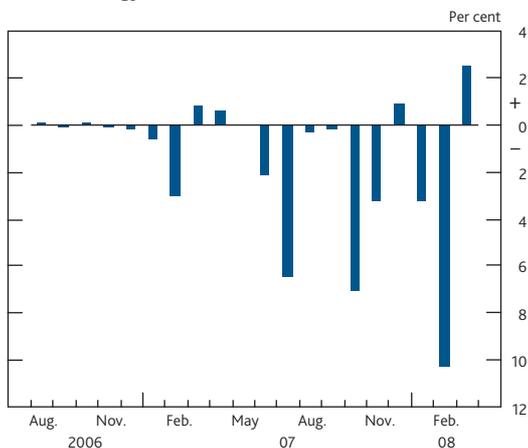
**Chart 1.21** Anomalies in the prices of the ABX sub-prime index (2007 H1 vintage)<sup>(a)(b)</sup>



Source: Bank calculations using data from JPMorgan Chase & Co.

- (a) The pricing model is an adaptation of that used in 'A simple CDO valuation model', Bank of England *Financial Stability Review*, Box 1, December 2005, pages 105–06.  
 (b) The loss given default rate on the underlying collateral is uncertain, but is assumed for the purposes of this chart to be 50%.

**Chart 1.22** Monthly returns on a hypothetical hedge fund strategy<sup>(a)</sup>



Source: Bank calculations using data from JPMorgan Chase & Co.

- (a) Long ten units of AAA ABX.HE, long ten units of AAA CMBX.NA, short four units of BBB ABX.HE and short two units of BBB CMBX.NA.

Without buyers for a significant proportion of the capital structure, global private issuance of ABS and CDOs fell rapidly in 2007 and is forecast to remain low in 2008 (**Chart 1.23**). Issuance of sub-prime RMBS, CLOs and CDOs of ABS has fallen particularly sharply, from a combined total of around US\$250 billion in 2007 Q2. The volume of prime RMBS issuance has also fallen sharply. Although the issuance of ABS of credit cards, auto loans and student loans has remained fairly steady, as explained in Section 2, the inability to securitise assets more broadly is making it difficult for banks to raise wholesale funding.

*...increasing pressures on banks and other leveraged institutions.*

**Chart 1.1** suggests that there have been three phases of acute stress in the interbank market. At the start of the crisis, the immediate problem facing banks was the rapid increase in their funding requirements when they could not securitise or otherwise distribute their loan warehouses. Banks began to hoard liquidity to meet actual and potential increases in these funding requirements, causing interbank rates to spike during August and September 2007.

Towards the end of 2007, banks began announcing substantial losses on their own holdings of structured credit products. An element of counterparty credit risk began to influence interbank lending decisions. Some banks could not gain unsecured funding, amplifying their financing difficulties. As the end of the year approached, banks sought to increase their liquid asset positions, in part to strengthen the appearance of their reported balance sheets. This was a major contributing factor to the rise in London interbank offered rates (Libor) internationally in early December. This was alleviated to some extent by co-ordinated central bank action on 12 December 2007 causing money market conditions to improve during January 2008.

In February and March 2008, however, money markets tightened again as banks reported significant additional write-downs on ABS and the prospect of losses on exposures insured by monolines increased. Central banks provided a second round of co-ordinated liquidity provision on 11 March 2008. The Bank of England launched its Special Liquidity Scheme on 21 April 2008 designed to improve the liquidity of the UK banking system and raise confidence in financial markets (Box A in the Overview).

*Overall there is a risk that the tightening of credit conditions is excessive in the short run.*

The outlook for the UK economy and financial system are closely intertwined. Uncertainty about macroeconomic prospects has risen markedly and volatility in financial market prices has increased in tandem and remains high. Markets are struggling to find prices that can reallocate long-term credit risk. Leveraged short-term investors want to reduce their

**Table 1.A** Mortgage-related collateralised debt obligations event-of-default (EOD) notices<sup>(a)(b)(c)</sup>

Type of CDO	Volume of transactions with EOD notice (US\$ billions)			
	EOD notice only	Acceleration	Liquidation	Total
CDO-squareds	5	6	3	14
High-grade CDOs of ABS	33	21	8	63
Mezzanine CDOs of ABS	31	24	14	68
<b>Total</b>	<b>69</b>	<b>51</b>	<b>25</b>	<b>145</b>

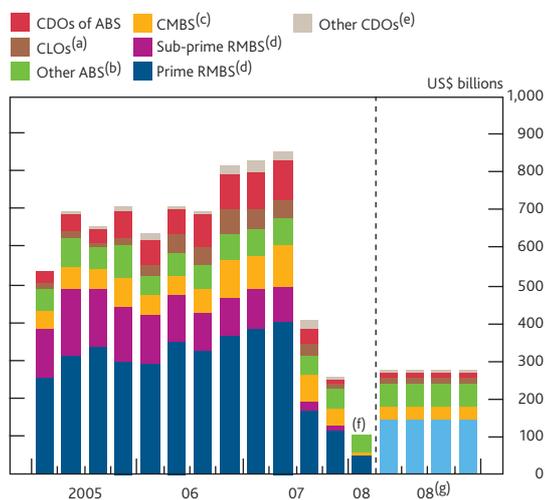
Source: Standard and Poor's.

(a) EOD notices were typically triggered by the failure of an overcollateralisation test, ie the ratio of the CDOs' rating-adjusted or market-value-adjusted assets to liabilities fell below a predetermined threshold. The CDOs are backed by ABS linked to US sub-prime mortgages.

(b) As of 17 March 2008.

(c) Totals may differ from the sum of their constituents due to rounding.

**Chart 1.23** Global issuance of asset-backed securities and collateralised debt obligations



Sources: Dealogic and Sifma.

(a) Collateralised loan obligations.

(b) 'Other ABS' includes auto, credit card and student loan ABS.

(c) Commercial mortgage-backed securities.

(d) Residential mortgage-backed securities.

(e) 'Other CDOs' includes corporate and mixed-collateral CDOs.

(f) 2008 Q1 data for CDO issuance are not yet published.

(g) Full-year forecasts from Barclays Capital, Citi, JPMorgan Chase & Co. and Lehman Brothers, allocated evenly over four quarters. Light blue bars show total non-agency RMBS issuance.

exposure to assets which are complex and highly sensitive to even minor changes in underlying economic circumstances. But the price discount on these assets required to induce more risk-averse investors to take on this risk, at a time when the economic outlook is uncertain, is likely to be high. That has been reflected in sharply lower financial asset prices over the period.

Some correction from the unusually low risk premia of recent years was desirable. In particular, there was a need to increase the compensation for credit and liquidity risk. But prices in at least some credit markets appear now to have overshot during the correction phase. In this situation, speculative and long-term investors would be expected to purchase these cheap assets. But both are currently constrained, either by funding problems or fears of making mark-to-market losses. A period of stability in financial markets that supports a gradual recovery in confidence is needed to persuade these investors to put their risk capital back to work.

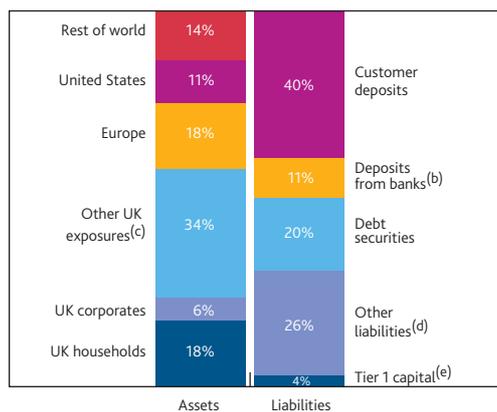
In the meantime, overly high risk premia and the closure of key funding markets for banks restrict their ability to supply credit to households and corporates. Some tightening of credit conditions was always likely, and its effect on household and corporate balance sheets will take time to be revealed. The adjustment path to this new equilibrium will have some real costs. But estimates of the ultimate losses to the financial system and real economy implied by current market prices are a significant overestimate. Overpessimism about these losses may itself be denting confidence and may be delaying the return of investor risk appetite and the recovery of asset prices.

## 2 Structure of the financial system

Confidence in the strength of global banks' balance sheets has declined over the past six months. Banks have been unable to distribute loans off their balance sheets due to the sustained impairment of liquidity in credit markets. Funding conditions in the interbank markets have also remained difficult, as lenders have been keen to preserve their own liquidity and concerns about counterparty credit risks have heightened. In consequence, secured lending to UK households by UK banks has slowed significantly over recent months. Although lending to the UK corporate sector was relatively strong during the latter half of 2007, particularly to commercial real estate companies, contacts report that corporate credit conditions have also tightened.

Revenue prospects for banks internationally have been revised downwards, as reflected in lower equity prices. There are signs that some large complex financial institutions (LCFIs) have shed risk from their balance sheets. And hedge funds have come under pressure from market losses and because prime brokers have restricted credit availability. In March, faced with a sudden loss of confidence, Bear Stearns was forced to seek financial support, highlighting the potential vulnerability of banking sector balance sheets. In the current environment, there are clear benefits to banks seeking to strengthen their balance sheets by raising capital rather than risk exacerbating the economic slowdown by shrinking lending.

**Chart 2.1** Major UK banks' aggregate balance sheet as at end-2007<sup>(a)</sup>



Sources: Bank of England, FSA regulatory returns, published accounts and Bank calculations.

- (a) Nationwide data are as at end-September 2007.  
 (b) Includes borrowing from major UK banks.  
 (c) Includes (among other items) loans to UK-resident banks and other financial corporations and holdings of UK government debt.  
 (d) Includes Tier 2 capital, short positions, insurance liabilities and derivative contracts with negative marked-to-market value.  
 (e) Assets are not risk weighted. As a percentage of risk-weighted assets, Tier 1 capital is 8%.

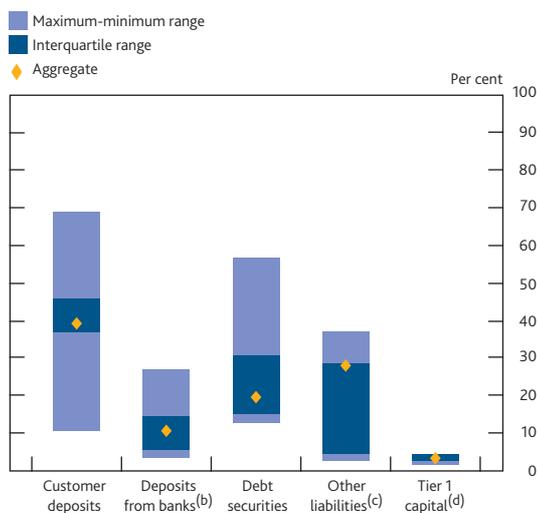
This section discusses recent developments among the set of financial institutions that are core to the structure of the UK financial system. These include the major UK banks<sup>(1)</sup> and key participants in the asset and funding markets in which they operate, including LCFIs.<sup>(2)</sup>

### *Overview of risks to the UK financial system.*

The major UK banks are the primary providers of financial services to the UK household and corporate sectors. They account for the vast majority of UK household deposits and are the main suppliers of credit in the form of secured and unsecured loans (**Chart 2.1**). Over recent months, the major UK banks have tightened their lending criteria in response to the disruption of global credit markets. During the past decade, many banks have used these markets to support lending growth through an 'originate and distribute' business

- (1) Membership of the major UK banks group is based on the provision of customer services in the United Kingdom, regardless of the country of ownership. The following financial groups, in alphabetical order, are currently members: Alliance & Leicester, Banco Santander, Barclays, Bradford & Bingley, HBOS, HSBC, Lloyds TSB, Nationwide, Northern Rock and RBS. RBS data exclude ABN Amro unless otherwise stated.  
 (2) LCFIs include the world's largest banks, securities houses and other financial intermediaries that carry out a diverse and complex range of activities in major financial centres. The group of LCFIs is identified currently as: ABN Amro, Bank of America, Barclays, BNP Paribas, Citi, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan Chase & Co., Lehman Brothers, Merrill Lynch, Morgan Stanley, RBS, Société Générale and UBS. RBS and ABN Amro are treated separately unless otherwise stated.

**Chart 2.2** Major UK banks' funding sources as a share of total liabilities as at end-2007<sup>(a)</sup>



Sources: Bank of England, FSA regulatory returns, published accounts and Bank calculations.

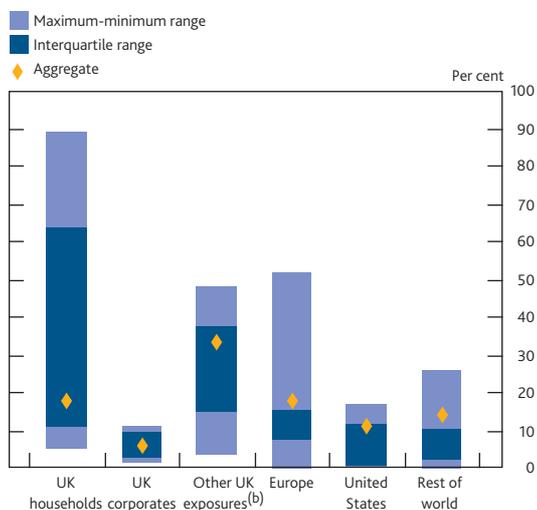
(a) Nationwide data are as at end-September 2007.

(b) Includes borrowing from major UK banks.

(c) Includes Tier 2 capital, short positions, insurance liabilities and derivative contracts with negative marked-to-market value.

(d) Assets are not risk weighted. As a percentage of risk-weighted assets, Tier 1 capital is 8%.

**Chart 2.3** Types of exposure as a share of major UK banks' total assets as at end-2007<sup>(a)</sup>



Sources: Bank of England, FSA regulatory returns, published accounts and Bank calculations.

(a) Nationwide data are as at end-September 2007.

(b) Includes (among other items) loans to UK-resident banks and other financial corporations and holdings of UK government debt.

model, under which credit exposures are sold to other financial institutions. As liquidity in credit markets has dried up, the funding positions of UK banks, and of banks internationally, have come under pressure.

In common with many of their international counterparts, the major UK banks finance their activities through a range of funding sources other than customer deposits, including interbank deposits and the issuance of debt securities, such as securitisations and covered bonds (**Chart 2.2**). There is significant variation in the reliance on wholesale funding sources across the peer group, but all banks have been affected to some extent by the continued impairment of global debt and interbank markets, described in Section 1. Some banks have experienced a shortening in the average maturity of their wholesale liabilities, as liquidity in term interbank markets has remained thin. And as the securitisation and covered bond markets have remained closed, alternative sources of long-term funding have been difficult and costly to obtain. These events have increased the vulnerability of the liability side of banks' balance sheets.

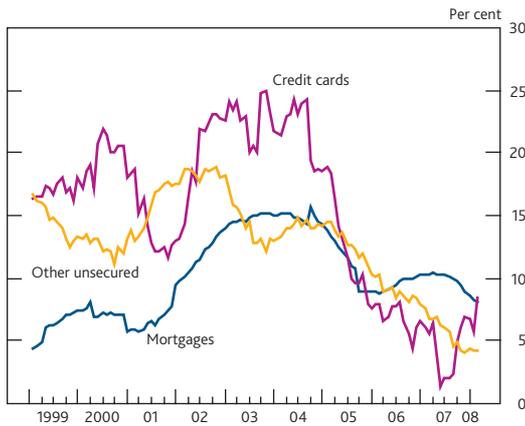
This has been accompanied by heightened concerns about the asset side of banks' balance sheets. Through their lending to the UK household and corporate sectors, all the major UK banks are exposed to domestic credit and interest rate risk, although there is significant variation among the group (**Chart 2.3**). The major UK banks are also exposed to counterparty credit risk through their lending to each other and to other financial institutions, most notably the non-UK LCFIs. Exposures to structured credit and to overseas borrowers are concentrated among the most internationally active of the major UK banks, the UK LCFIs. But other UK banks have also suffered write-downs as market prices of assets referenced to US sub-prime mortgages have continued to fall.

Since the previous *Report*, equity prices of global financial institutions have fallen, including for the major UK banks and non-UK LCFIs, reflecting a downward revision in prospects for future revenues. There has also been a further reappraisal of counterparty credit risk, exacerbating the funding problems experienced by some institutions. In March, Bear Stearns was forced to seek financial support from JPMorgan Chase & Co. and the Federal Reserve Bank of New York, as the wholesale funding markets lost confidence in the firm's ability to honour its obligations. The solvency position of monoline insurers, which provide insurance on municipal bonds and structured credit products, has also deteriorated. And there have been some high-profile casualties in the hedge fund sector. These events have underscored the pressures on financial institutions in the current environment.

#### *Growth in secured household lending has slowed sharply...*

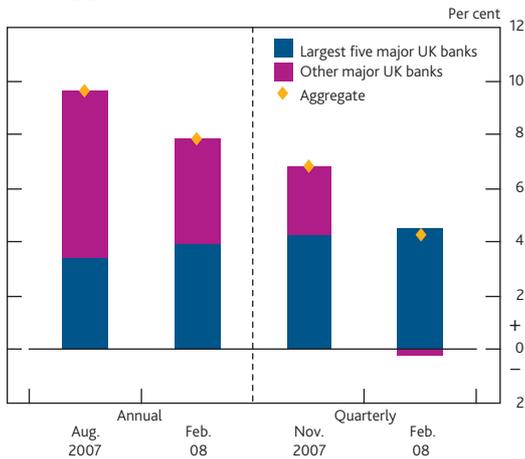
Growth in major UK banks' lending to UK households has slowed overall, despite a sharp rise in the annual rate of credit

**Chart 2.4** Annual growth in major UK banks' lending to UK households



Sources: Bank of England and FSA regulatory returns.

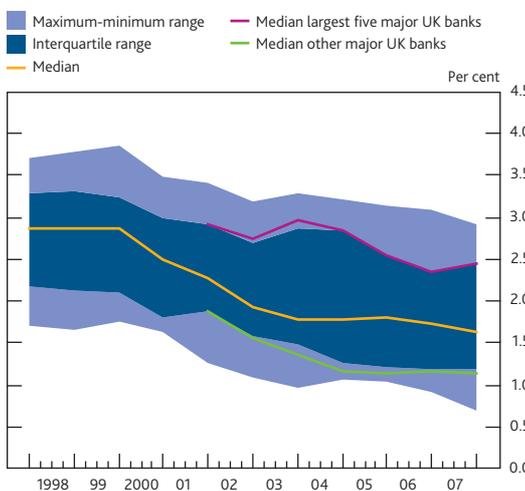
**Chart 2.5** Major UK banks' contributions to mortgage lending growth<sup>(a)</sup>



Sources: Bank of England, FSA regulatory returns and Bank calculations.

(a) The aggregate growth rate is constructed using the monthly growth rates for each major UK bank weighted by its share of the peer group's total mortgage lending in the previous month. By construction, this is slightly lower than the growth rate of total mortgage lending presented in Chart 2.4.

**Chart 2.6** Major UK banks' net interest margin<sup>(a)(b)</sup>



Sources: Published accounts and Bank calculations.

(a) Data exclude Banco Santander.  
(b) Barclays' figures estimated from 2005 from annual accounts.

card loan growth from the unusually low levels of mid-2007 (Chart 2.4). Around 89% of the overall stock of lending to UK households by the major UK banks is accounted for by loans secured on residential property. Annual growth in secured lending has fallen by around 2 percentage points since August 2007, all of which is explained by a fall in the contribution of the smaller banks in the peer group, including Northern Rock (Chart 2.5). Over the most recent quarter, all of the growth in secured lending by the major UK banks to UK households was, in aggregate, accounted for by the five largest institutions.<sup>(1)</sup>

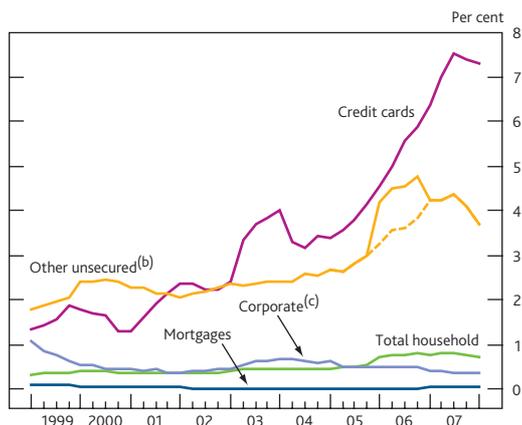
In recent years, strong mortgage lending growth has been associated with increased market penetration by the smaller UK banks, and by other specialist lenders, facilitated by the availability of cheap funding through the issuance of residential mortgage-backed securities (RMBS) and covered bonds. This led to a compression of net interest margins across the UK banking sector (Chart 2.6) and a loosening of credit conditions. With the effective closure of the RMBS and covered bond markets since the late summer of 2007, competition has become less intense. The smaller, lower-rated, lenders have had to revert to more expensive sources of funding and have raised their mortgage lending rates accordingly. This has allowed the larger, higher-rated, UK lenders, which typically have access to cheaper sources of funding, to re-establish spreads on their new mortgage lending, while at the same time increasing market share.

A few of the major UK banks have built up sizable exposures to the buy-to-let (BTL) market in recent years, although they have recently tightened lending conditions. While BTL loan performance has remained robust, with continued low rates of arrears, this market has yet to be tested through an economic downturn. Contacts report that rental income is currently insufficient to cover the mortgage obligations of the more highly geared BTL investors. This may lead to an increase in defaults in this market, the losses from which would be amplified by any decline in house prices.

The major UK banks' exposure to the UK mortgage market is predominantly to prime borrowers. Despite annual write-off rates on these loans remaining extremely low in 2007 (Chart 2.7), the major UK banks have tightened their lending criteria. Respondents to the Bank's *Credit Conditions Survey* in 2008 Q1 reported that credit scoring had been tightened and maximum loan to value (LTV) ratios reduced. The major UK banks have also withdrawn products that combine secured and unsecured loans to give an LTV ratio of over 100%. According to the 2008 Q1 *Survey*, most lenders are planning to tighten credit conditions further, allowing them to align lending growth with available funding and to improve the quality of

(1) The five largest major UK banks (excluding Banco Santander) by asset size are: Barclays, HBOS, HSBC, Lloyds TSB and RBS.

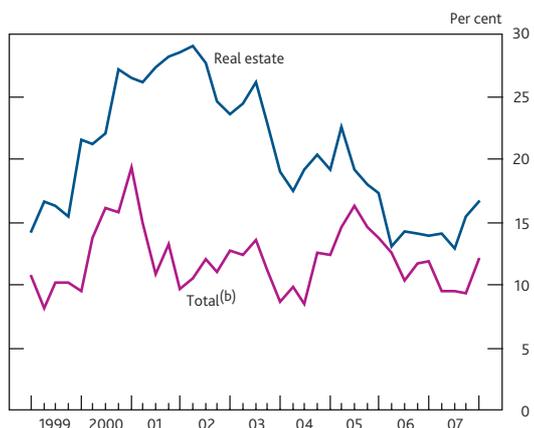
**Chart 2.7 Major UK banks' annual write-off rates<sup>(a)</sup>**



Sources: Bank of England, FSA regulatory returns and Bank calculations.

- (a) Calculated quarterly as write-offs over previous year divided by average stock of lending.
- (b) Dashed line shows the rate excluding a one-off write-off of £0.7 billion in 2005 Q4, which distorted the series.
- (c) Data exclude Nationwide.

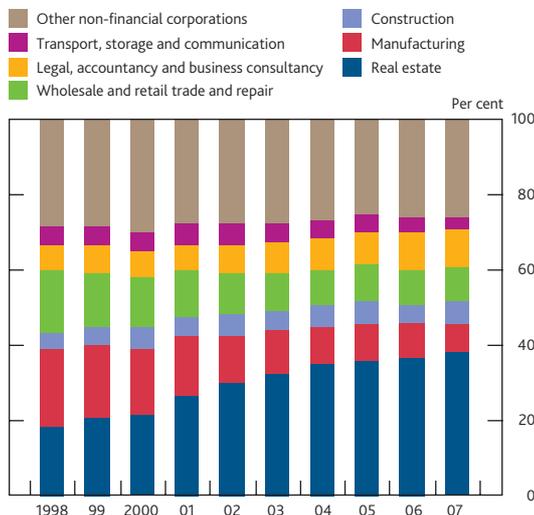
**Chart 2.8 Annual growth in major UK banks' lending to UK private non-financial corporations<sup>(a)</sup>**



Source: Bank of England.

- (a) Data exclude Nationwide.
- (b) Includes lending to real estate companies.

**Chart 2.9 Major UK banks' stock of lending to UK private non-financial corporations<sup>(a)</sup>**



Source: Bank of England.

- (a) Data exclude Nationwide.

their mortgage books. Estimates by the Council of Mortgage Lenders suggest that net mortgage lending to UK households in 2008 may be only half last year's level.<sup>(1)</sup>

With mortgage demand currently remaining firm, whether or not this contraction in net lending materialises may depend on the collective actions of the major UK banks. Over the past few months, banks have tightened lending terms in order to avoid an unintentional increase in market share following actions by other lenders to restrict loan growth. This has had the consequence of tightening aggregate credit conditions by more than would have been implied by the deterioration in funding conditions. There are, however, some tentative signs of this situation stabilising, with a few major banks recently announcing their intention to take advantage of the current climate to gain market share.

*...while corporate credit conditions have also tightened...*

As with mortgage lending, the major UK banks' annual write-off rates on lending to UK private non-financial corporations (PNFCs) have remained low (Chart 2.7). But as described in Section 1, lenders expect losses to increase over the next few months. According to the Bank's 2008 Q1 *Credit Conditions Survey*, UK banks have consequently tightened the availability of credit to PNFCs, through wider spreads, higher fees and tougher non-price terms, such as loan covenants and maximum credit lines.

At the same time, the annual rate of lending growth by the major UK banks to UK PNFCs increased in 2007 Q4 (Chart 2.8). Lending growth to commercial real estate companies<sup>(2)</sup> increased despite declines in commercial property prices since June 2007 and the weaker outlook for the market, described in Section 1. Commercial property lending now accounts for 38% of the stock of major UK banks' lending to UK PNFCs, compared to 19% in 1998 (Chart 2.9). Over the same period, there has been a fourfold increase in the value of off balance sheet commitments to commercial real estate companies, to just over £40 billion. This compares to the major UK banks' outstanding stock of commercial property lending of £134 billion at end-2007. These exposures are concentrated among a few of the largest UK banks. The potential impact of lower commercial property prices on the major UK banks is discussed further in Box 2.

The divergence between the reported tightening of corporate credit conditions and observed growth rates in corporate lending may reflect lags between the approval and extension of loans, particularly for commercial property lending. Some of these loans may have been intended for distribution through the issuance of commercial mortgage-backed

(1) See [www.cml.org.uk/cml/filegrab/CMLAnnualLunchspeech2008.pdf?ref=5829](http://www.cml.org.uk/cml/filegrab/CMLAnnualLunchspeech2008.pdf?ref=5829).

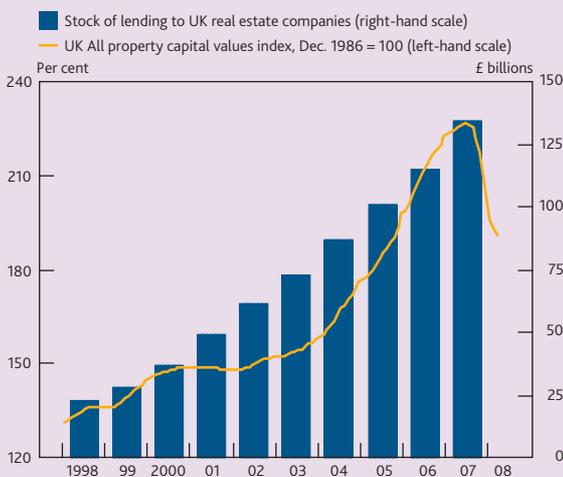
(2) This includes companies involved in the development, buying and selling of real estate. Exposures do not include banks' holdings of commercial mortgage-backed securities or loans to other companies collateralised by UK real estate.

## Box 2

### Major UK banks' exposures to commercial real estate

UK commercial property values rose sharply between 2002 and June 2007, coinciding with strong growth in lending to commercial real estate companies by the major UK banks (Chart A). But as described in Section 1, the risk of significant declines in UK commercial property values, highlighted in previous *Reports*, has crystallised.

**Chart A** Major UK banks' exposures to commercial real estate<sup>(a)</sup>



Sources: Bank of England, IPD and Thomson Datastream.

(a) Data exclude Nationwide.

Contacts have reported concerns about commercial property valuations for some time, in part because the initial rental yield on property declined in 2006 below the cost of finance (as proxied by the five-year swap rate). Nevertheless, the magnitude and speed of the recent fall in property values has surprised many in the market because, unlike the sharp price falls experienced in the early 1990s, it has occurred against a benign macroeconomic backdrop. This box considers the impact of recent property value falls on the major UK banks. There are two primary channels:

#### Direct lending to commercial property companies

Declining commercial property values may increase the riskiness of loans held on balance sheet. Falls in property values erode the equity buffer with which borrowers can withstand financial shocks, implying higher losses on commercial property loans in the event of default. At the same time, lower collateral values could result in commercial property companies finding it increasingly difficult to refinance existing loans, which may increase the probability of default. Contacts report no increase in default rates associated with the recent fall in commercial property values so far, although there have been some breaches of loan to value covenants.

Taking the conservative assumption that such breaches translate into default, Table 1 outlines the impact on UK banks of higher defaults. This suggests that a very large increase in default rates would be needed to have a material impact on UK banks' average profits.

**Table 1** Impact of defaults on main UK commercial property lenders

	Baseline <sup>(a)(b)</sup>	Sensitivities	
Loss given default (per cent)	40	40	40
Default rates (per cent)	1.5	5	10
Exposures of main UK lenders at end-2007 <sup>(c)</sup> (£ billions)	127	127	127
Implied write-offs (£ billions)	0.8	2.5	5.1
<b>Implied write-offs (per cent of pre-tax profits)</b>	<b>3</b>	<b>9</b>	<b>19</b>

Sources: Bank of England and De Montfort University survey.

(a) Based on the minimum loss given default on secured lending under the internal ratings-based approach of Basel II.

(b) Based on the proportion of loans in breach of covenants at 2007 H1.

(c) Exposures via direct lending to UK commercial property companies.

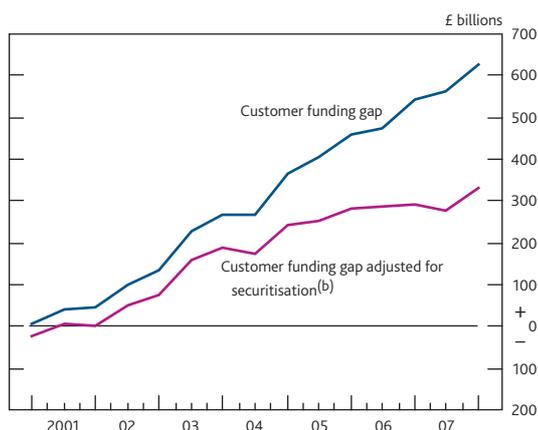
#### Exposure to structured credit markets

The steep decline in UK commercial property values will also have added to negative sentiment in the market for structured credit products referenced on loans to commercial property, such as commercial mortgage-backed securities (CMBS). This may affect UK banks in one of two ways:

- *Mark-to-market losses on trading book holdings of CMBS.* At end-2007, UK banks held around £16 billion of highly rated CMBS.<sup>(1)</sup> If banks used secondary market prices for investment-grade CMBS referenced on UK assets (2006 vintage), this would suggest marking these securities at 90%–95% of par. This implies mark-to-market losses on these holdings of up to £1.6 billion for UK banks, although this could be an overestimate of credit losses given there is an illiquidity premium in CMBS prices.
- *Losses incurred due to inability to distribute loans via CMBS.* UK CMBS issuance by UK lenders fell by £5 billion in 2007 compared to 2006. Assuming this amount represents loans not distributed as planned, these exposures will have incurred unanticipated funding and capital costs. If these exposures are held on a fair-value basis, they will have been subject to similar marks as CMBS holdings, suggesting an additional £0.5 billion loss.

While material, neither of these channels suggests that the risk to UK banks from commercial property is critical overall. The effect on UK banks would be greater, however, if an increase in default rates on commercial property lending coincided with a general deterioration in the health of the corporate sector, as it did in the early 1990s.

(1) Some of this may have been referenced to non-UK loans.

**Chart 2.10** Major UK banks' customer funding gap<sup>(a)</sup>

Sources: Dealogic, published accounts and Bank calculations.

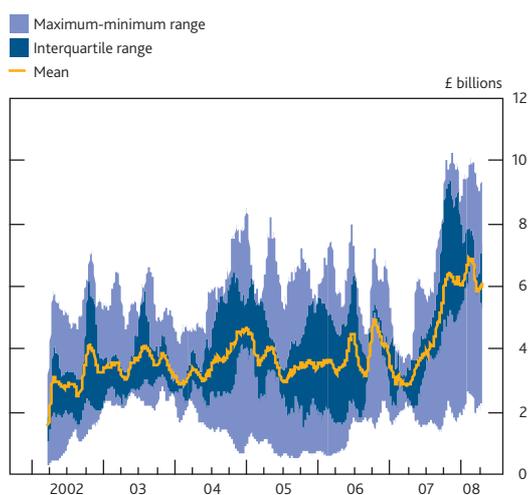
(a) Data exclude Nationwide.

(b) Customer funding gap less securitised debt. Where not available, stocks of securitisations are estimated from issuance data.

securities (CMBS), for which the primary market has remained closed. Leveraged loans retained on balance sheet also account for some of the divergence. During the last quarter of 2007, the major UK banks acted as lead arranger<sup>(1)</sup> on a further £14 billion of leveraged loans. Around 10% of this amount represented bridge loans, which are typically drawn when the lead arranger is unable to distribute loans to other investors. Market contacts suggest that increased drawdown of revolving loan facilities, established as part of earlier transactions, will have further contributed to total leveraged lending in 2007 Q4.

*...as UK banks' liquidity positions have deteriorated...*

As credit risks have continued to accumulate on banks' balance sheets, further pressure has been placed on those wholesale funding markets that remain open to finance customer loans. This is evidenced by the increasing customer funding gap<sup>(2)</sup> of the major UK banks (Chart 2.10). The gap shows the shortfall in customer deposits relative to customer lending and hence the amount of loans that need to be financed in the wholesale markets. This gap increased to around £625 billion at end-2007, from just over £540 billion a year earlier. In recent years, the customer funding gap had been met increasingly with funding from securitisations. These reduce the maturity mismatch between assets and liabilities, thus limiting the major UK banks' need to roll over short-term funding to finance customer lending. But as banks have been unable to securitise loans, a significant pool of wholesale funding subject to rollover risk has accumulated, in particular in interbank markets.

**Chart 2.11** Sterling intraday liquidity buffers<sup>(a)(b)</sup>

Source: Bank of England.

(a) Data are for the five major UK banks that are members of CHAPS Sterling.

(b) Thirty-day moving average.

This has increased pressures within the interbank market, causing spreads to widen further and maturities to shorten. Some of the smaller major UK banks have found it more difficult than others to obtain financing for their lending activity in the interbank markets. They have had to pay higher rates of interest to obtain wholesale funds — there has been some 'tiering' in funding markets. In some cases, this has been exacerbated by credit rating downgrades.

The larger UK banks have continued to maintain high sterling liquidity buffers since the October 2007 Report. As members of CHAPS Sterling,<sup>(3)</sup> these banks hold sterling liquid assets as collateral against intraday payments. Since the financial turmoil began in August 2007, collateral held in excess of payments made has been consistently high (Chart 2.11). Contacts report that large UK banks also continue to maintain high levels of liquidity by lending at very short maturities. The

(1) Lead arrangers are the set of banks that manage the syndication process, including selling the deal to the market and offering bridging finance, a facility that may or may not be used.

(2) The customer funding gap is customer lending less customer funding, where customer refers to all non-bank borrowers and depositors.

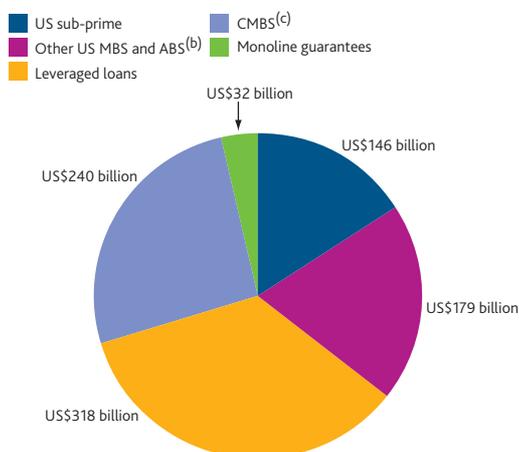
(3) CHAPS is the United Kingdom's high-value payments system. The five major UK banks that are members of CHAPS Sterling are: Barclays, HBOS, HSBC, Lloyds TSB and RBS.

**Table 2.A** Major UK banks' and LCFIs' structured credit and monoline-related write-downs and exposures<sup>(a)(b)</sup>

US\$ billions					
		Major UK banks	European LCFIs	US securities houses	US commercial banks
Total write-downs <sup>(c)</sup>	2007 H2	14	32	39	30
	2008 Q1	– <sup>(d)</sup>	5 <sup>(d)</sup>	13	17
Of which:					
US sub-prime		11	26	33	33
Other US MBS and ABS <sup>(e)</sup>		1	2	4	2
CMBS <sup>(f)</sup>		0	2	1	1
Leveraged loans		1	4	7	8
Monoline guarantees		1	3	7	3
Remaining exposures <sup>(g)</sup>		192	232	295	195
Memo item					
Total assets		11,215	11,748	4,086	5,579

Sources: Bank of England, Bloomberg, published accounts and Bank calculations.

- (a) Includes write-downs and exposures where information has been disclosed.  
 (b) Balance sheet data for US securities houses and US commercial banks at end-2008 Q1 and for other institutions at end-2007.  
 (c) Total write-downs on trading book assets and available-for-sale financial instruments announced on or before 24 April 2008.  
 (d) Excludes provisional write-downs made by Deutsche Bank (US\$4 billion), RBS (US\$12 billion) and UBS (US\$19 billion).  
 (e) Mortgage-backed securities and asset-backed securities. Principally includes US prime and Alt-A residential mortgage-backed securities.  
 (f) Commercial mortgage-backed securities.  
 (g) RBS data for end-2007 include ABN Amro.

**Chart 2.12** Major UK banks' and LCFIs' outstanding exposures to selected structured credit markets and leveraged loans<sup>(a)</sup>

Sources: Bank of England, published accounts and Bank calculations.

- (a) Exposures at end-2007, except for the US securities houses, US commercial banks and Credit Suisse, which are recorded at end-2008 Q1. Not all firms disclosed exposures to all categories.  
 (b) Mortgage-backed securities and asset-backed securities. Principally includes US prime and Alt-A residential mortgage-backed securities.  
 (c) Commercial mortgage-backed securities.

reluctance of these larger banks to commit funds at longer maturities reflects both pressures on their own funding positions and uncertainty around the strength of counterparties' balance sheets. The former reflects the potential for contingent liabilities, such as liquidity lines extended to asset-backed commercial paper conduits, to crystallise, adding to balance sheet funding needs. Other potential lenders in the interbank markets, including non-UK LCFIs, have been subject to similar pressures.

### ...reflecting sustained pressure on banks' balance sheets globally.

Table 2.A shows the write-downs reported to date by the major UK banks and non-UK LCFIs on their structured credit exposures. The US LCFIs, which are the smallest of the peer groups by balance sheet size, have so far posted the largest total write-downs in absolute terms. The major UK banks' exposures to structured credit instruments are concentrated among the three UK LCFIs, which have the largest trading assets and greatest reliance on dealing profits. As Section 3 discusses, uncertainty remains around the appropriate valuation of certain securities and institutions appear to have adopted a wide range of valuation methods.

Given uncertainty around the economic outlook, the potential remains for further write-downs by banks internationally. Outstanding exposures to structured credit products referenced to US sub-prime mortgages remain large, along with US Alt-A and prime mortgages (Chart 2.12). Together, the major UK banks and non-UK LCFIs also have significant exposures to CMBS, of around US\$240 billion, and to leveraged loan holdings, of some US\$318 billion.<sup>(1)</sup>

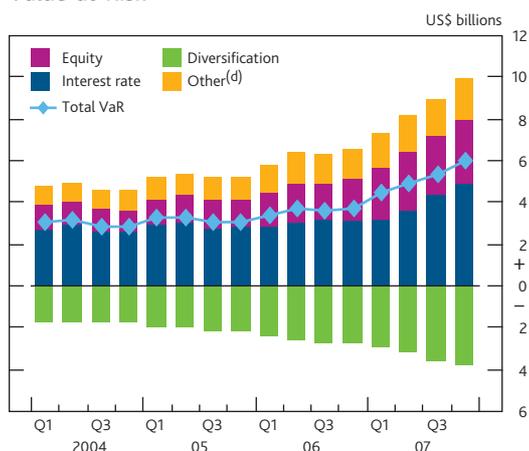
Continued weak investor risk appetite makes it difficult to distribute leveraged loans without realising losses. According to market contacts, the UK banks have managed to reduce the £15.5 billion of leveraged loans that had been stuck on their balance sheets in 2007 Q3 to around £8–£10 billion.<sup>(2)</sup> But this has only been achieved by offering investors significant inducements, such as selling loans at discounts to par and providing investors with protection against the interest rate risk arising from borrower prepayment. More recently, some US and European LCFIs have created collateralised loan obligations referenced to leveraged loans currently held on balance sheet. Tranches have been sold to investors on a private placement basis, but with more junior (higher-risk) tranches being retained by the issuer.

The exposure of the major UK banks and LCFIs to market risk is a further source of potential loss. In contrast to previous years, reported trading book Value-at-Risk (VaR) measures rose

(1) The major UK banks' exposure to CMBS is US\$43 billion and to leveraged loans is US\$66 billion.

(2) See Box 3 of the October 2007 Report, pages 32–33.

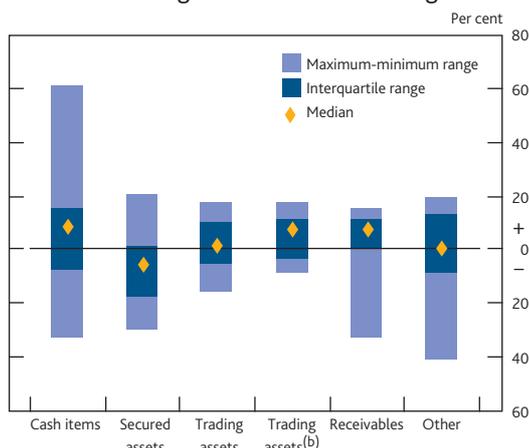
**Chart 2.13 Major UK banks' and LCFIs' Value-at-Risk<sup>(a)(b)(c)</sup>**



Sources: Bank of England, published accounts and Bank calculations.

- (a) Standardised to US dollar 99% confidence interval and a ten-day holding period.
- (b) Data for selected institutions. Where unavailable, quarterly data are inferred from annual and semi-annual data.
- (c) Banco Santander included from 2005 Q1 only.
- (d) Includes (among other items) commodities and foreign exchange.

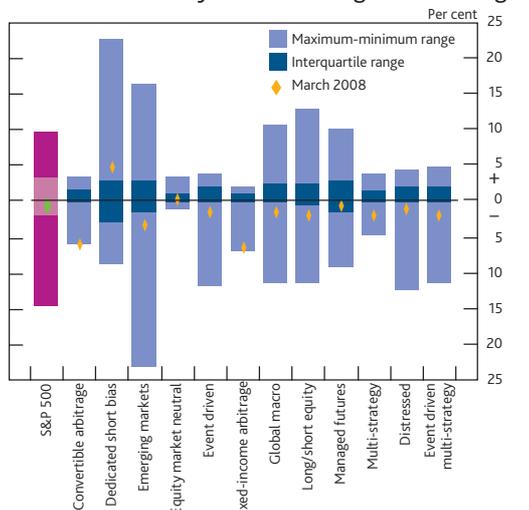
**Chart 2.14 Changes in LCFIs' assets during 2007 H2<sup>(a)</sup>**



Sources: Published accounts and Bank calculations.

- (a) BNP Paribas excluded due to lack of data on secured assets.
- (b) Trading assets adjusted for write-downs.

**Chart 2.15 Monthly return on hedge fund strategies<sup>(a)</sup>**



Sources: Bloomberg, CSFB/Tremont and Bank calculations.

- (a) Maximum-minimum range and interquartile range calculated monthly from January 1994 to March 2008.

strongly during the second half of 2007 (Chart 2.13). This can in large part be explained by an increase in the volatility of asset returns as this mechanically increases VaR for existing exposures.<sup>(1)</sup> Financial institutions may have found it difficult to shed some of this risk during the current turmoil given the closure of certain markets.

*Some financial institutions are deleveraging...*

Nonetheless, there are signs that some of the world's largest financial institutions have been reducing risks on their balance sheets, although it is too early to obtain a clear and consistent picture from the available data. During 2007 H2, there were reductions reported by some LCFIs in all asset classes (Chart 2.14). But there is significant variation across the peer group, with deleveraging largely driven by those institutions that reported the largest write-downs on their structured credit exposures.

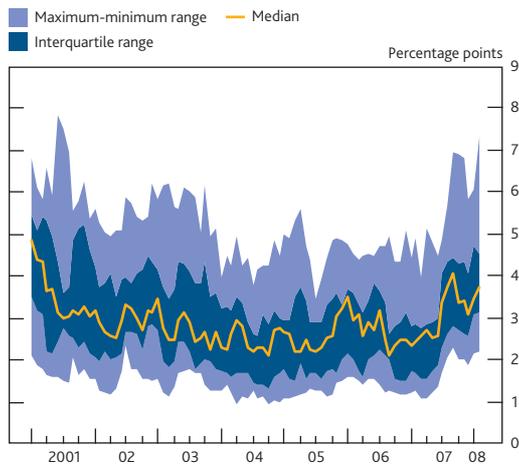
The median half-yearly change in assets during 2007 H2 was negative only for secured assets. These assets include loans to other financial institutions through sale and repurchase agreements and securities borrowing. The reduction in secured assets held by some LCFIs will in part reflect a tightening of credit availability to hedge funds, through prime brokerage services. Market contacts report that, since the autumn of 2007, prime brokers have gradually been raising the margins required to secure lending to hedge funds against credit instruments. More recently, this has resulted in some hedge funds being unable to post sufficient collateral and so being forced to unwind positions. In March, a number of funds, including Carlyle Capital Corporation, Peloton Partners and Blue River Asset Management, went into liquidation, while others have needed financial support from a parent institution in order to survive.

The more highly leveraged funds — for example, fixed-income and convertible arbitrage strategy funds — had the worst-performing strategies in the sector in March 2008 (Chart 2.15). Over recent years, funds within a particular strategy have, on average, tended to perform to a similarly high level (Chart 2.16). But the dispersion of returns picked up significantly during the latter half of 2007 and several strategies began to experience more frequent negative monthly returns than previously. Since January, losses have become larger and more widespread across the sector.

Looking forward, one concern is that this deterioration in performance will prompt higher levels of investor redemptions, tightening funding availability to hedge funds further. According to the latest available data, there were tentative signs that investors were looking to redeem funds towards the end of last year.

(1) See Box 4 of April 2007 Report, page 33.

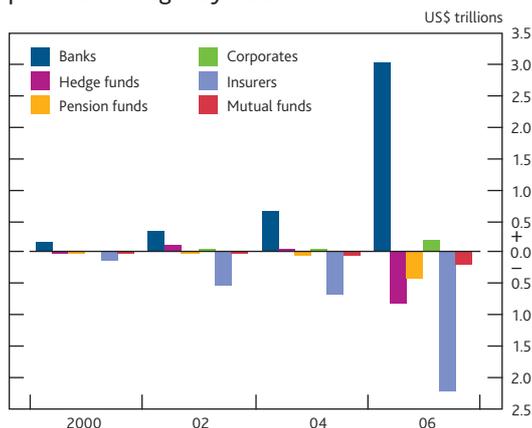
**Chart 2.16** Dispersion of hedge funds' returns by strategy<sup>(a)</sup>



Sources: CSFB/Tremont and Bank calculations.

(a) Dispersion calculated for each strategy as a three-month moving average of the standard deviation of monthly returns across hedge funds.

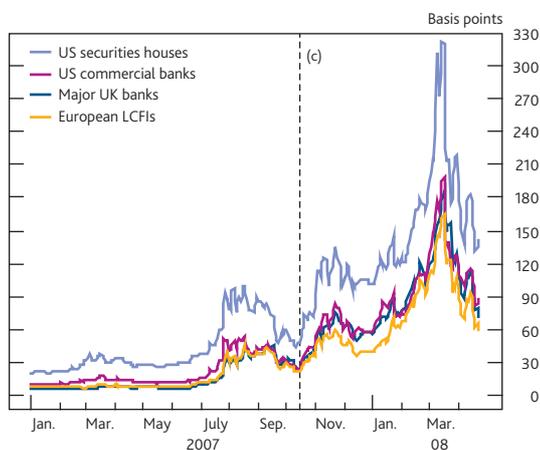
**Chart 2.17** Outstanding global amounts of credit protection bought by institution<sup>(a)</sup>



Sources: BBA and Bank calculations.

(a) Amounts netted across long and short positions.

**Chart 2.18** Major UK banks' and LCFIs' credit default swap premia<sup>(a)(b)</sup>



Sources: Markit Group Limited, Thomson Datastream, published accounts and Bank calculations.

(a) Data to close of business on 22 April 2008.

(b) Asset-weighted average five-year premia.

(c) October 2007 Report.

*...with potential implications for market liquidity...*

As discussed in the April 2007 Report,<sup>(1)</sup> hedge funds account for a high proportion of financial market activity — for example, in international equity and credit default swaps (CDS) markets. They are also major investors in structured credit markets. According to market contacts, hedge funds have been particularly active in investing in the equity and mezzanine tranches of structured credit products. These higher-risk tranches are needed to provide credit protection against losses on the senior parts of the structure, so that these can then be sold as lower-risk instruments to other investors, such as pensions funds. Alongside the willingness of more risk-averse investors to buy structured credit instruments, the ongoing ability of hedge funds and other financial institutions to provide credit protection will be an important element in determining the re-opening of primary markets in such products.

Hedge funds have also been a net provider of credit protection through CDS in recent years (Chart 2.17). This provided funds with a useful source of income during the recent period of relatively benign macroeconomic conditions. If these hedge funds default, their counterparties will be left with no protection against their credit exposures and will incur costs of securing replacement hedges, at a time of heightened concerns about the strength of financial institutions' balance sheets.

A similar problem could arise in the event of further deterioration in the capital position of the monoline insurers. As described in Box 3, these institutions provide banks with insurance against losses incurred on structured credit instruments and, in so doing, have been a major source of support for those markets. The recent weaknesses within the monoline sector will tend to slow the recovery in structured credit markets and could further aggravate banks' balance sheet fragilities.

*...as the cost of insuring against counterparty credit risk has risen...*

This combination of pressures on financial institutions' balance sheets is reflected in the cost of insuring against counterparty credit risk. Despite a sharp fall in recent weeks, this is significantly higher for all financial institutions than at the October 2007 Report, as indicated by CDS premia (Chart 2.18). Increases in the CDS premia of the major UK banks have been broadly in line with those for commercial banks globally. CDS premia on the US securities houses have increased by most, widening the spread over the premia of the UK, European and US commercial banks. While CDS prices reflect liquidity premia as well as credit risk, the rise is at least partly related to higher demand for credit protection. This points to a widespread upward reappraisal of banking sector credit risk.

(1) See Box 5 of the April 2007 Report, pages 36–37.

### Box 3

## Monoline distress and the implications for banks

Monoline insurers are an established part of the institutional infrastructure of the financial system. In return for a fee, they provide a financial guarantee or 'wrap' on a security, agreeing to make scheduled interest and principal payments if the security defaults before maturity.<sup>(1)</sup> Monolines differentiate themselves from other providers of protection against credit risk by specialising in certain markets, enabling them to develop an expertise for credit risk assessment and, in turn, to provide an unconditional and irrevocable guarantee.<sup>(2)</sup> Monolines adopt a corporate structure and underwriting and risk management standards that support their business as insurance providers. Traditionally, these features have meant that most monolines had a 'AAA' credit rating.

A monoline guarantee reduces the cost of borrowing for a security issuer by raising the credit rating of a security (typically to the same rating as the monoline). It broadens the pool of potential investors (for example, by enabling investors with ratings-based mandates to invest in securities that would otherwise be rated too low). And the higher credit rating reduces the regulatory capital charge for banks, making them more willing or able to take certain types of credit risk on their balance sheets. This is particularly important at the current time when banks' capital positions are under pressure.

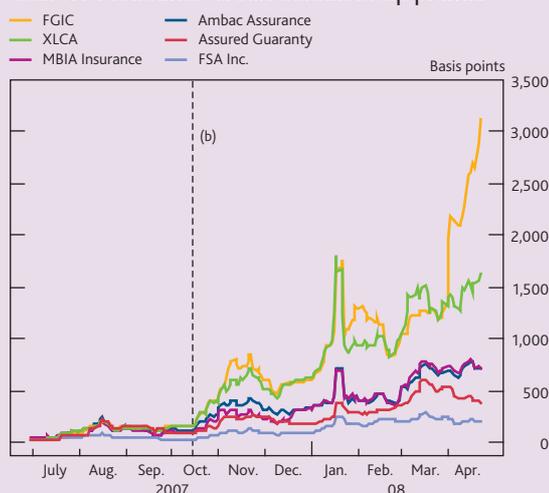
### Distress in the monoline sector

Since the October 2007 Report, the financial strength of several of the monolines has deteriorated significantly. This is reflected in a marked increase in monolines' CDS premia (Chart A) and in credit rating downgrades (Table 1).

Traditionally, monolines guaranteed public finance securities, including US state and municipal government debt. However, as margins in that business diminished and securitisation markets developed, they expanded their business to structured finance assets — for example, by providing guarantees on sub-prime RMBS and investment-grade tranches of CDOs of sub-prime related RMBS (Chart B). While this expansion supported monolines' revenues, the recent period of stress in credit markets has highlighted the extent to which monolines underestimated the risk on these securities. As the expected default rate on insured securities has increased, rating agencies have revised their assessments of the level of claims that monolines will have to meet. In some cases, this has exceeded capital buffers, resulting in downgrades.

Because the major monolines typically had a 'AAA' rating prior to the crisis, investors are likely to have held little additional protection against the credit risk of the monoline itself. This

Chart A Monolines' credit default swap premia<sup>(a)</sup>



Sources: Markit Group Limited, Thomson Datastream and published accounts.

(a) Data to close of business on 22 April 2008.

(b) October 2007 Report.

Table 1 Current credit ratings for major monolines<sup>(a)(b)</sup>

	Fitch Ratings Ltd.	Moody's Investors Service	Standard and Poor's	Net par insured <sup>(c)</sup> US\$ billions
Ambac Assurance	AA 12 Mar. 08	Aaa 12 Mar. 08	AAA 12 Mar. 08	524
Assured Guaranty	AAA 12 Dec. 07	Aaa 14 Mar. 08	AAA 31 Jan. 08	94
FGIC	BBB 26 Mar. 08	Baa3 31 Mar. 08	BB 28 Mar. 08	314
FSA Inc.	AAA 24 Jan. 08	Aaa 11 Mar. 08	AAA 31 Jan. 08	406
MBIA Insurance	AA 4 Apr. 08	Aaa 26 Feb. 08	AAA 25 Feb. 08	679
XLCA	BB 26 Mar. 08	A3 7 Feb. 08	A- 25 Feb. 08	18
CIFG	A- 31 Mar. 08	A1 6 Mar. 08	A+ 12 Mar. 08	95

Sources: Financial statements and rating agencies' reports.

(a) With the exception of Assured Guaranty and FSA Inc. and Moody's rating for CIFG, all the monolines have ratings with a negative outlook or are on review for downgrade.

(b) Date denotes last time rating was changed or affirmed. All ratings were AAA at June 2007.

(c) Par insured outstanding at end-2007, net of reinsurance and other reimbursement arrangements.

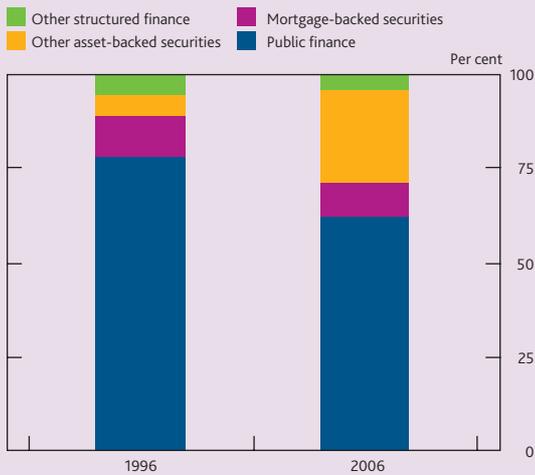
has compounded the impact on institutions that are exposed to monolines, including banks.

### The nature of banks' exposures to monolines

Regulators have been active in attempting to resolve monolines' difficulties because of concerns about the risk of spillovers to banks, as well as to other participants in the municipal bond and structured credit markets.

Banks are exposed to market losses if a monoline is downgraded or if there is a perception that the financial strength of the monoline has deteriorated, even if that is not reflected in a rating change. Banks' exposures to monolines

Chart B Decomposition of monoline insurance by value



Source: Association of Financial Guaranty Insurers.

can be classified into two categories: 'first-round' channels, where there could be an immediate impact if a monoline is downgraded; and 'second-round' channels, where monoline distress is likely to affect a market or activity to which banks are exposed (Figure 1).

#### First-round channels include:

- *direct exposures* via credit derivatives contracts where monolines have guaranteed payments on structured finance securities held by banks, and via banks' holdings of monoline securities;
- *indirect exposures* via banks' holdings of municipal bonds and asset-backed securities that include a credit enhancement provided by monolines; and
- *contingent exposures* as a result of banks having provided liquidity guarantees to SIV-type structures that invest in municipal bonds insured by monolines.

#### Second-round channels

Banks are also exposed to the impact of monoline distress on markets. There could be implications in the near term for the functioning of the credit derivatives market and in the longer term for bank activities that rely on credit derivatives markets, in particular securitisation activities and risk management. Asset managers could be forced to sell municipal bonds because of breaches of their ratings-based mandates, leading to forced selling.

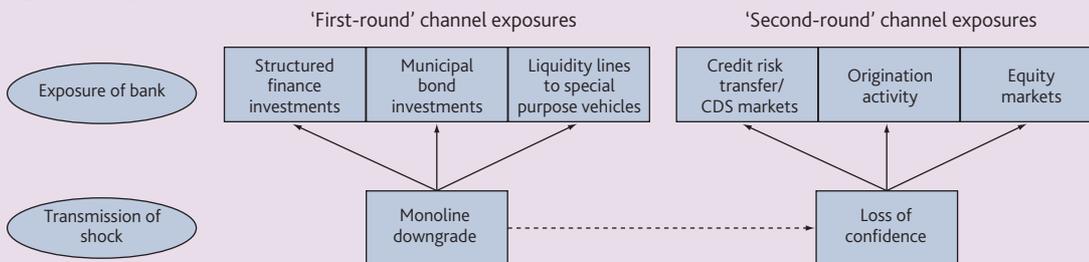
The major UK banks have reported exposures to monolines of US\$10.3 billion to date; the reported figure for the non-UK LCFIs is US\$21.3 billion. While the financial system has been resilient to monoline rating downgrades to date, the extent and complexity of exposures to monolines creates the possibility that further monoline downgrades could exacerbate broader stress across several markets and classes of investor.

#### Outlook for the monoline sector

Increased risk exposure and ratings downgrades have adversely affected monolines' business models. An 'AAA' rating is seen as core to monolines' business and consequently they have attempted to restructure themselves in order to regain or maintain their ratings. Some monolines have raised new capital, as well as reducing dividends and introducing restrictions on writing new business. Consideration is being given also to the possibility of splitting monolines' public finance and structured finance businesses, although that appears to present considerable obstacles. The immediate risks remain substantial.

Even if the monolines currently in distress were to address these problems, there is a risk that their business has been permanently affected. For example, municipal bond markets may reduce their reliance on monoline guarantees. Alternatively, new players, unencumbered by existing exposures, may enter the market.

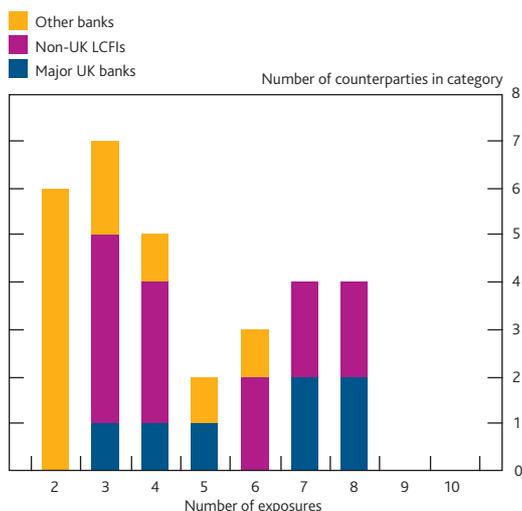
Figure 1 Diagrammatic representation of banks' exposures to monolines



(1) See Rule, D (2001), 'Risk transfer between banks, insurance companies and capital markets: an overview', *Financial Stability Review*, December, pages 137–59.

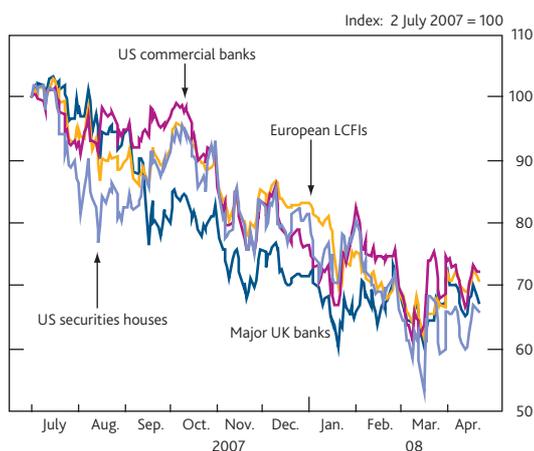
(2) In contrast to other types of credit risk protection, it is the issuer, rather than the investor, that pays the monoline to provide insurance. This makes the monoline better placed to understand the risks. In turn they agree to guarantee payments regardless of the reason for default and cannot withdraw the guarantee.

**Chart 2.19** Incidence of common 'large exposure' counterparts during 2007 Q4



Sources: FSA regulatory returns and Bank calculations.

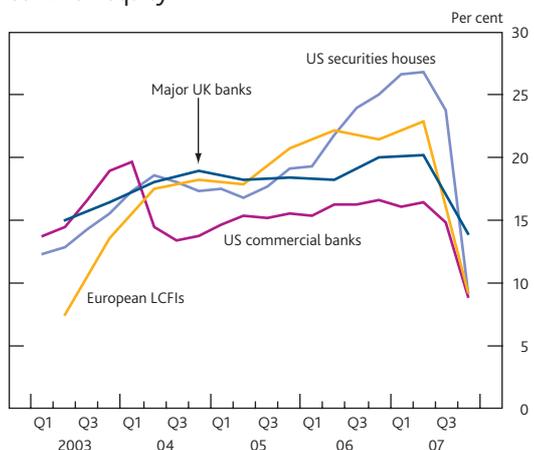
**Chart 2.20** Major UK banks' and LCFIs' equity prices<sup>(a)</sup>



Sources: Bloomberg and Bank calculations.

(a) Data to close of business on 22 April 2008.

**Chart 2.21** Major UK banks' and LCFIs' return on common equity<sup>(a)(b)(c)</sup>



Sources: Bloomberg and Bank calculations.

(a) Data for European LCFIs and major UK banks are half-yearly.  
 (b) Data exclude Nationwide.  
 (c) RBS data for end-2007 include ABN Amro.

Banks are exposed to this reappraisal of risk not only through potential increases in their own medium-term funding costs, but also through the large volumes of business they transact with one another. Market contacts report that banks have reduced counterparty limits to one another in an effort to contain the increase in risk on their balance sheets. Regulatory 'large exposures' capture major exposures of the UK banks to each other and to other financial institutions (as well as non-financial institutions), through both on and off balance sheet transactions.<sup>(1)</sup> From a systemic viewpoint, the incidence of common large exposure counterparts to the major UK banks is important — the higher the incidence, the greater the potential loss to UK banks were that counterparty to fail. During 2007 Q4, there were thirteen financial institutions that five or more of the major UK banks shared as large exposure counterparties (Chart 2.19), down from fourteen in the same quarter of 2006.

*...and prospects for future banking sector earnings have been revised downwards...*

The reappraisal of global banking sector credit risk, alongside the potential impact of further deleveraging on the real economy and on financial markets, has been accompanied by a severe downgrade in market perceptions of future revenue growth by global banks. This is reflected in equity prices (Chart 2.20). Since the beginning of July 2007, the equity prices of all banking peer groups have fallen by between 25% and 35%. These movements are consistent with falls in the return on equity (RoE) across the global banking sector (Chart 2.21), from levels of around 15%–25% before the crisis to around 10%–15% currently. Commensurate with their higher write-downs, the US securities houses have recorded the largest falls, with RoEs more than halving between the third and fourth quarters of 2007. The major UK banks have experienced the smallest reductions in RoE.

In recent years, growth in the structured credit markets has allowed LCFIs to generate revenues not only through their origination and distribution activities, but also through fees and commissions on underwriting debt issues. Data on lead arrangers and book runners show that the US securities houses have been particularly dominant in arranging market-based forms of credit (Table 2.B). Their presence is particularly noticeable in higher-risk structured credit markets (collateralised debt obligations and sub-prime RMBS), which are unlikely to re-open for some time, if at all. All the LCFIs are active in leveraged lending, while US commercial banks are particularly prevalent in high-yield corporate debt and asset-backed securities issuance.

A loss of fee-based income from these and other activities will have the largest effect on the US securities houses, for which

(1) For regulatory purposes, 'large exposures' are defined as any exposures that exceed 10% of eligible capital (Tier 1 plus Tier 2 capital, less any regulatory deductions). Large exposures data do not capture intraday exposures or exposures that arise during the time taken to settle foreign exchange trades.

**Table 2.B** LCFIs' market shares as lead arrangers and book runners<sup>(a)</sup>

Percentage of primary market share

		US securities houses	US commercial banks	European LCFIs	UK LCFIs
RMBS <sup>(b)</sup>	Prime	19	14	24	11
	Sub-prime <sup>(c)</sup>	53	13	7	18
Syndicated lending	Non-leveraged	3	21	15	11
	Leveraged	18	28	14	7
Corporate debt	Investment grade	17	18	22	12
	High yield	18	22	15	9
ABS <sup>(d)</sup>	Excluding CDO <sup>(e)</sup>	11	43	14	15
	CDO	27	21	22	3

Sources: Dealogic and Bank calculations.

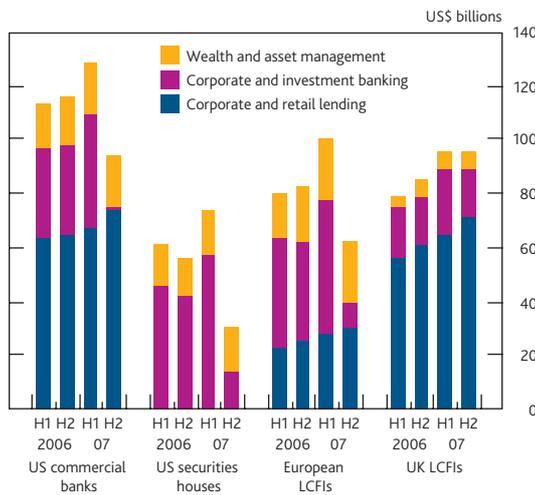
- (a) For period 1 October 2007 to 14 March 2008.
- (b) Residential mortgage-backed securities.
- (c) Data include RMBS backed by sub-prime and non-first lien mortgages.
- (d) Asset-backed securities excluding RMBS issuance.
- (e) Collateralised debt obligations.

revenue sources are relatively undiversified (Chart 2.22). Wealth and asset management has provided one source of diversification, although many of these activities are located at the riskier end of the spectrum — for example, via hedge funds. These firms may have to adjust their business models in response to a decline in certain areas of fee-based income. Commercial banks are better diversified through corporate and retail lending, but at the same time may be adversely affected by a global deterioration in credit conditions.

*...contributing to worsening perceptions of balance sheet vulnerability...*

Market uncertainty about certain banking sector business models, coupled with concern about the build-up of asset and liability balance sheet vulnerabilities, has been reflected in the implied volatilities of banks' equity prices. Since the previous Report, these have edged higher, from the low levels experienced prior to the financial turmoil (Chart 2.23).

**Chart 2.22** LCFIs' major revenue sources<sup>(a)</sup>

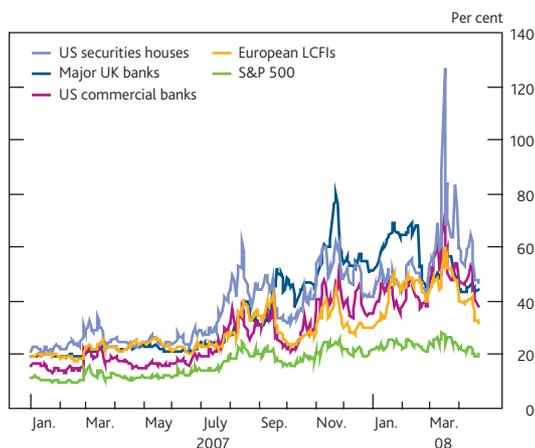


Sources: Bank of England, published accounts and Bank calculations.

- (a) RBS data for end-2007 include ABN Amro.

Negative market sentiment towards individual banks has already been demonstrated to have damaging consequences. In March, concerns about Bear Stearns, a US securities house, resulted in a wholesale funding run. In that instance, it was noticeable that, not only did unsecured markets close to the firm, but Bear Stearns was also unable to obtain funding on a secured basis, through sale and repurchase agreements against high-quality collateral. Against that backdrop, Bear Stearns' sizable pot of liquid assets was very quickly exhausted. The firm was forced to seek financial support from JPMorgan Chase & Co. and the Federal Reserve Bank of New York. In the ensuing days, Lehman Brothers came under pressure and, in the United Kingdom, negative market rumours led to a short-lived sharp fall in the equity price of HBOS, the United Kingdom's largest mortgage lender. While these incidents clearly differ, both in terms of the type of institution affected and the subsequent outcome, they demonstrate again the importance of measures to sustain market confidence.

**Chart 2.23** Major UK banks' and LCFIs' equity option implied volatility<sup>(a)(b)</sup>



Sources: Bloomberg and Bank calculations.

- (a) Mean option-implied volatility.
- (b) Data to close of business on 22 April 2008.

*...amid wider concerns about capitalisation levels.*

Banks' capital ratios have deteriorated, particularly for those institutions that experienced outright losses in the second half of 2007. Any meaningful comparison of capital levels across different financial sectors is hampered by differences in accounting and provisioning policies and regulatory regimes. For example, the US commercial banks have yet to adopt Basel II, while some UK banks have been operating under the revised approach for calculating risk-weighted assets for up to a year. For ease of comparison, the Tier 1 capital ratios presented in Chart 2.24 are calculated on a Basel I basis. This shows that capital ratios have deteriorated on average for all the US and European commercial banks, as did the equity/asset ratio for the US securities houses. The capital position of the major UK banks is discussed in greater detail in Box 4.

## Box 4

### Assessing the capital position of UK banks

The regulatory capital ratios of the major UK banks are broadly in line with international peers (**Chart 2.24** on page 42). But investor focus on the capital position of UK banks has intensified in recent months, as market participants have reappraised prospects across a range of banking sectors. These agents have placed increased emphasis on measures of banks' capital ratios that are more conservative than regulatory capital measures. This emphasis matters because banks that are — or are perceived to be — in a relatively weak capital position are more vulnerable to a rapid reappraisal of counterparty credit risk.

This box outlines the UK regulatory definition of capital,<sup>(1)</sup> highlights alternative measures of capital adequacy used by some market participants and assesses the health of the major UK banks on the basis of those alternatives.

#### Regulatory definition of capital

Capital is used to absorb unexpected losses. When a bank is in liquidation, there are three tiers of regulatory capital available to absorb losses. On a 'gone concern' basis, Tier 1, 2 and 3 capital all serve to increase the amount of a firm's assets available to meet the claims of senior creditors, including depositors. On a 'going concern' basis, loss absorption is possible when a capital instrument allows a bank to suspend scheduled payments to the security holders, but without deferring those obligations to some future period or creating new obligations. This protects the claims of depositors and senior creditors and helps to maintain confidence in the bank. From a regulatory perspective, Tier 1 capital is intended to fulfil this role.

To qualify as Tier 1, a capital instrument must have the flexibility to suspend scheduled payments, thereby conserving financial resources during periods of stress. The instrument must also be available to absorb losses as they materialise by showing a suitable degree of 'permanence', either by being undated or having clauses that allow the instrument to remain in place when losses arise.

Tier 1 capital can be subdivided into three types of instrument:

- **Core equity:** This includes ordinary share capital, reserves, retained earnings and equity minority interests. These instruments are undated (delivering the required permanence), are non-cumulative (delivering the flexibility to suspend scheduled payments), and are junior to all other instruments in a 'gone concern' scenario.
- **Non-innovative hybrid instruments, including perpetual non-cumulative preference shares:** Like equity, these

instruments have coupon flexibility, permanence and subordination to other capital instruments, but they rank ahead of equity in the event of liquidation. They typically have a call date, or series of call dates, that allow the issuer to redeem the capital (with approval from the regulator).

- **Innovative Tier 1** (up to 15% of Tier 1 capital): In addition to the presence of a call option, these instruments have a step-up provision (resulting in an increase in the coupon rate beyond a specific date). This provides an economic incentive for the issuer to call the instrument at the first opportunity.

#### Metrics for measuring the capital position of banks

The focus on more conservative measures of bank capital by some market participants reflects increased uncertainty around the value of banks' assets and a lack of consensus on whether all instruments permitted to be included in Tier 1 capital unambiguously achieve absorption of unexpected losses. Among the range of alternative measures available to market analysts, two have received particular attention:

##### (i) The leverage ratio

The leverage ratio expresses Tier 1 capital as a proportion of total assets.<sup>(2)</sup> The lack of risk-sensitivity in this metric makes it a crude measure of capital adequacy that cannot reflect structural differences in business models across a heterogeneous set of banks.

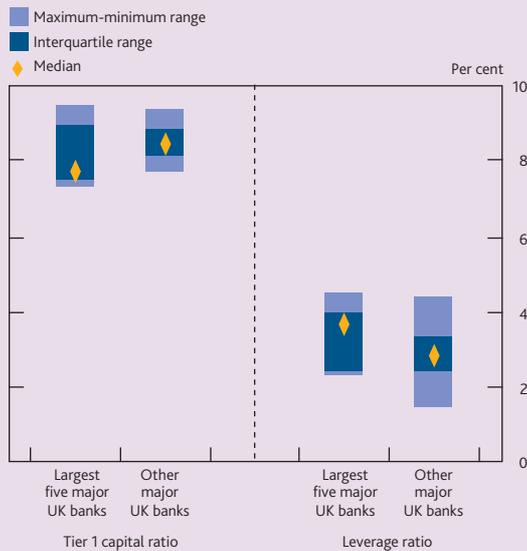
This is well illustrated by the set of major UK banks, where business models (and thus the riskiness of banks' assets) vary considerably across the peer group. The riskiness of assets held by UK LCFIs with large trading books is fundamentally different to that of smaller banks focused primarily on mortgage lending. Under the risk-sensitive Basel II regulatory regime, the smaller UK banks had a median Tier 1 capital ratio of 8.5% at end-2007 compared to 7.7% for the largest five banks. But the median leverage ratio for the smaller banks was 2.9%, lower than that of the largest five at 3.7% (**Chart A**).

##### (ii) The core (equity) Tier 1 capital ratio

This measure excludes all non-equity components when considering a bank's Tier 1 capital base. The remaining equity component is then expressed as a proportion of risk-weighted assets. This measure retains the risk-sensitivity of regulatory ratios. It is primarily equity investors who use this ratio, reflecting their focus on the value of their equity holdings: a bank that has relatively low core equity may, other things being equal, be more likely to raise new equity and dilute the value of existing shareholdings.

In recent years, the UK banks have increased the proportion of Tier 1 capital issued in the form of non-equity instruments. While these instruments typically contain a call option allowing the issuer to redeem the security at a given date, the

**Chart A** Major UK banks' Tier 1 and leverage ratios, end-2007<sup>(a)(b)(c)(d)(e)</sup>



Sources: FSA regulatory returns, published accounts and Bank calculations.

- (a) Ratios measured on a Basel II basis except Nationwide and RBS.  
 (b) Leverage ratio estimated as Tier 1 capital divided by total assets adjusted for goodwill and other intangible assets.  
 (c) Nationwide data are as at end-September 2007.  
 (d) Data exclude Banco Santander.  
 (e) RBS data for end-2007 include ABN Amro.

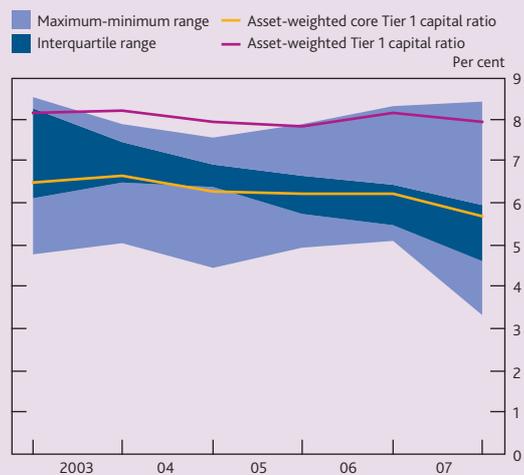
ability not to exercise the option provides the degree of permanence required to absorb losses if necessary. At the same time, however, the market has evolved to expect the issuers of instruments with step-up obligations to call these at the first call date — so not exercising the call option could surprise investors, potentially raising the future cost of capital and signalling financial distress to the wider market. This establishes strong incentives for issuers to exercise call options, which potentially lessens the perceived degree of permanence exhibited by callable Tier 1 instruments. Excluding these instruments removes uncertainty around the set of factors (including regulatory approval) that determines whether an instrument is called, but will underestimate the resilience of banks to unexpected losses.

### The core capital position of the major UK banks

On average, the major UK banks have experienced a moderate fall in their core Tier 1 capital ratio (on a Basel I basis) since 2002. As at end-2007, the asset-weighted median ratio had fallen from 6.5% to 5.7% (Chart B), reflecting the increasing use by some UK banks of hybrid capital instruments. Over the same period, the UK banks' regulatory Tier 1 capital ratio remained broadly flat, with the asset-weighted median falling from 8.1% to 7.9%.

The reduction in core Tier 1 capital ratios has come into sharper focus as market participants have reassessed counterparty credit risk and prospects for the global banking sector. The ratios can be improved in a number of ways. The

**Chart B** Major UK banks' core (equity) and regulatory Tier 1 capital ratios<sup>(a)(b)(c)(d)</sup>



Sources: FSA regulatory returns, published accounts and Bank calculations.

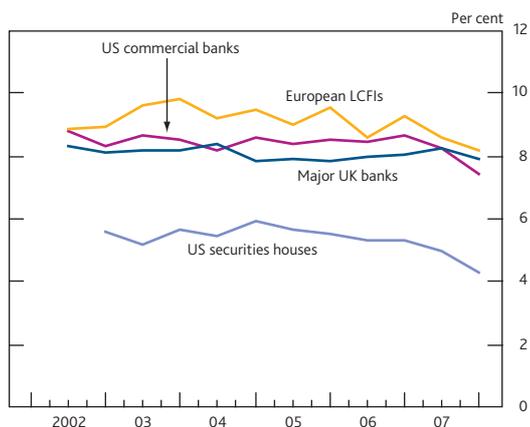
- (a) Ratios measured on a Basel I basis.  
 (b) Core equity includes ordinary share capital, reserves and equity minority interests.  
 (c) Data exclude Banco Santander and Nationwide.  
 (d) RBS data for end-2007 include ABN Amro.

most direct is to raise fresh equity, as some banks have or have announced they will do. But there are also other options available to banks. Banks could seek to increase retained earnings by lowering dividend payouts. Or banks could raise capital ratios by lowering their risk-weighted assets. This could be achieved by reducing lending or through outright sales, particularly of those assets that are less central to banks' franchises. Alternatively, banks could purchase credit risk protection.

As part of a comprehensive capital plan, such actions could improve the capital position of UK banks, strengthening the buffer against any further write-downs on assets and enabling them to support credit extension to UK households and companies.<sup>(3)</sup>

- (1) The FSA published a discussion paper on the definition of capital in December 2007. See [www.fsa.gov.uk/pages/Library/Policy/DP/2007/07\\_06.shtml](http://www.fsa.gov.uk/pages/Library/Policy/DP/2007/07_06.shtml).  
 (2) In the United States, assets are adjusted for goodwill, intangibles and certain other items as required by the Federal Reserve.  
 (3) In the Bank of England *Credit Conditions Surveys* for 2007 Q4 and 2008 Q1, a net balance of lenders reported that tighter conditions for raising new capital acted as a constraint on the amount of credit available to non-financial corporate borrowers.

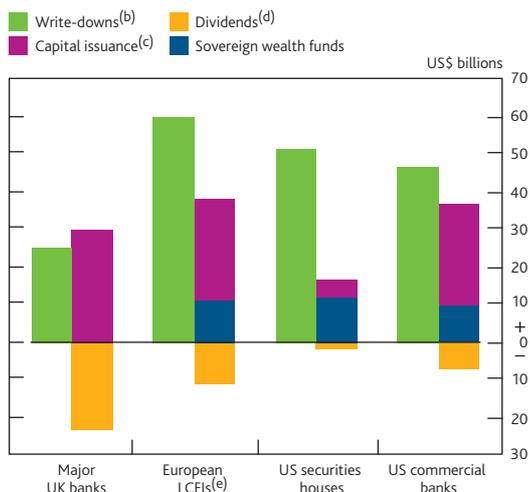
**Chart 2.24 Tier 1 capital ratios<sup>(a)(b)(c)</sup>**



Sources: Bloomberg, published accounts and Bank calculations.

- (a) Weighted by total assets.
- (b) Capital ratios measured under Basel I except for US securities houses. Capital ratios for US securities houses measured as ratio of tangible common equity to total assets adjusted for secured assets, segregated assets, derivative liabilities, identifiable intangible assets and goodwill.
- (c) RBS data for end-2007 include ABN Amro.

**Chart 2.25 Major UK banks' and LCFIs' dividend payments and capital raising since end-2007<sup>(a)</sup> and total write-downs**



Sources: Dealogic, company releases and Bank calculations.

- (a) Refers to the end of each firm's financial year. Goldman Sachs, Lehman Brothers and Morgan Stanley report to end-November, whereas the other institutions report to end-December.
- (b) Total write-downs announced on or before 24 April 2008. Includes Q1 trading updates for Deutsche Bank, RBS and UBS.
- (c) Issuance qualifying for Tier 1 capital completed or announced on or after end-2007. Excludes issuance to sovereign wealth funds, which is recorded separately.
- (d) Dividends announced or paid on or after end-2007.
- (e) Includes a rights issue by UBS (US\$15 billion), approved by shareholders on 23 April, which was not included in this chart in the printed version of the Report.

In the near term, capital ratios are likely to come under further pressure as banks pay out dividends proposed in their annual results announcements. And market expectations of capital ratios further ahead are being affected by uncertainty over the macroeconomic outlook.

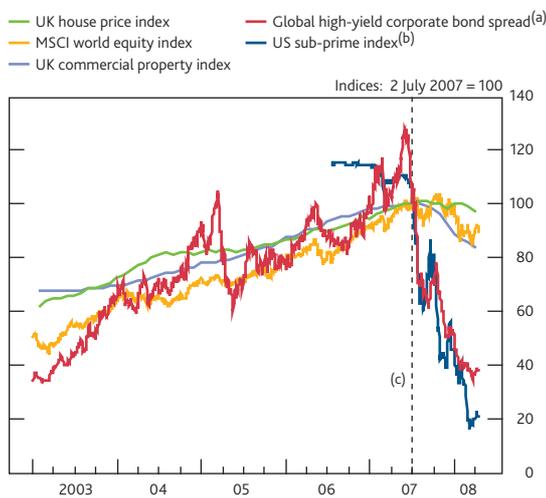
In these circumstances, global financial institutions are seeking to bolster market confidence by strengthening their balance sheets. This would be better achieved by raising new capital than by shrinking lending. The latter could ultimately prove self-defeating were it to lead to a further tightening of global credit conditions and a slowing of the global macroeconomy, causing further losses to crystallise. Since the end of the reporting year, some banks have announced, and in some cases have executed, plans to raise additional equity, largely sourced from sovereign wealth funds and public offerings (**Chart 2.25**). Under some circumstances, capital raising by an individual institution can be interpreted negatively by the market. But with some banks having already taken these steps, this stigma risk has been diminished. There are clear benefits to banks seeking to strengthen their capital positions on a collective basis, as a means of stimulating market confidence in banks' balance sheets and in asset markets.

# 3 Prospects for the UK financial system

Asset prices have fallen across many financial markets. Prices in some credit markets are now at levels that appear unusually low given credit fundamentals. This has led to an adverse interaction between asset prices and banks' balance sheets. Estimates of mark-to-market losses may give an overly pessimistic impression of the ultimate cost of the financial turmoil to the financial system and the real economy.

Looking ahead, the most likely outcome for the financial system is that conditions improve gradually as measures — such as those described in Section 4 — are taken to restore market functioning and to bolster confidence in the resilience of financial institutions. Low prices should induce investors to return to markets, leading to a recovery in asset values and a strengthening of balance sheets. But this is likely to take some time as the disruption in markets reflects, in part, structural factors such as information and incentive problems. While this adjustment takes place, risks to financial stability remain high.

**Chart 3.1** Asset prices during the recent market turbulence



(a) Series inverted.  
 (b) Sub-prime series is the A-rated 2006 H2 vintage ABX.HE index.  
 (c) Dotted line shows start of July 2007.

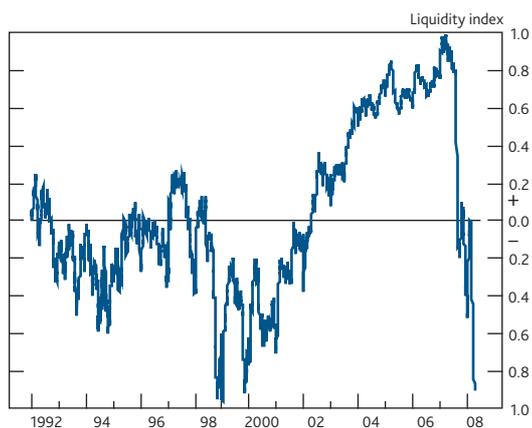
Section 1 described falls in a range of asset prices (**Chart 3.1**). Prices in some credit markets have fallen to levels that appear to include large discounts for illiquidity and uncertainty. Summary indicators suggest that financial market liquidity has fallen sharply (**Chart 3.2**).<sup>(1)</sup> As explained in Section 2, asset price falls have led to write-downs on banks' and other financial firms' investments. The effective closure of some asset-backed securities markets has made it difficult for banks to finance an overhang of assets created during the earlier credit boom. These forces have contributed to continued tightness in term interbank markets, which has increased the weakness of financial institutions' liability structures.

This section describes the factors that have been contributing to the continuation of the disruption in financial markets. It also considers risk management at financial institutions and the impact that this has had on their resilience. It concludes by assessing implications for the stability of the financial system in the period ahead.

## 3.1 Financial system resilience

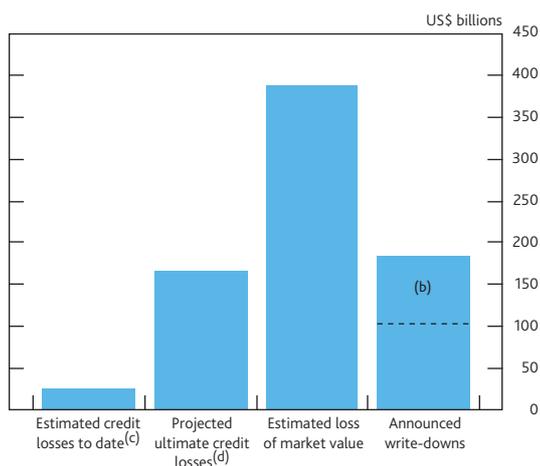
A resilient financial system is one that is able to absorb adverse shocks effectively. That depends on the strength of financial institutions' balance sheets, in particular their profitability,

(1) The methodology behind this indicator is explained in Kerry, W (2008), 'Measuring financial market liquidity', *Journal of Risk Management in Financial Institutions*, Vol. 1, No. 2, pages 181–90. See also, 'Financial market liquidity', Bank of England *Financial Stability Report*, April 2007, Box 2, page 18.

**Chart 3.2** Financial market liquidity<sup>(a)</sup>

Sources: Bank of England, Bloomberg, Chicago Board Options Exchange, Debt Management Office, London Stock Exchange, Merrill Lynch, Thomson Datastream and Bank calculations.

(a) The liquidity index shows the number of standard deviations from the mean. It is a simple unweighted average of nine liquidity measures, normalised on the period 1999–2004. The series shown is an exponentially weighted moving average. The indicator is more reliable after 1997 as it is based on a greater number of underlying measures.

**Chart 3.3** Losses on sub-prime asset-backed securities<sup>(a)</sup>

Sources: Banks' financial statements, Bank of America, BlackRock, Dealogic, JPMorgan Chase & Co., Moody's Investors Service, Standard and Poor's and Bank calculations.

(a) See Box 1 on pages 18–20 for details.

(b) Area below dotted line shows net write-downs by major UK banks and LCFIs since the start of 2007 to 22 April 2008, while total height of bar shows an S&P estimate (published on 13 March 2008) of write-downs by all investors.

(c) In the absence of data on realised losses, this estimate is derived from data on actual delinquency rates on outstanding mortgages by vintage, and an assumption about the transition from delinquency to default, as described in Box 1.

(d) This estimate is derived in the same way as for estimated credit losses, but assuming that serious delinquency rates on different vintages continue to rise at their average rate to date until the mortgages are four years old, when they are assumed to be plateau. See Box 1 for details.

capital and liquidity positions; the effective functioning of financial markets, as many banks use these markets to obtain funding, as well as to distribute and manage risks; and a sound financial infrastructure. Over the past six months, the adverse feedback between asset prices, financial markets and financial institutions' balance sheets — on both the asset and liability sides — has reduced the resilience of the financial system as a whole.

#### *Falling asset prices have led to write-downs...*

One example of this interaction between financial markets and financial institutions' balance sheets is in the marking to market of positions. In illiquid markets, where there is little information on asset prices, disclosures of write-downs by one financial institution may set the benchmark for other firms to value their assets. The subsequent disclosure of losses by these firms could then lead to further rounds of write-downs putting downward pressure on, and thereby validating, low asset prices. This adverse mark-to-market spiral appears to have been operating at times over the past few months.

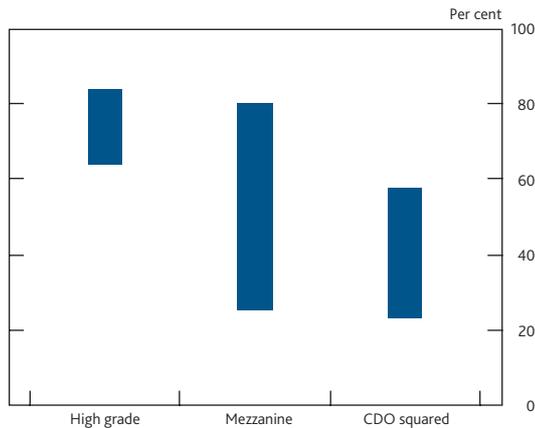
Chart 3.3 shows that estimated realised credit losses on sub-prime ABS are much lower than the write-downs that have been announced by financial institutions. This is reportedly because firms have been using market indices to inform judgements about the values of some of their assets in the absence of market prices. Furthermore, announced write-downs are much lower than system-wide losses estimated using market prices. That may have raised expectations that further large write-downs are to come and thereby added to concerns about counterparty credit risk.

But loss estimates based on market prices are likely to overstate significantly banks' losses as they will reflect factors such as illiquidity and uncertainty, which are unrelated to credit fundamentals and should ease over time. So unless there is a significant deterioration in the economic outlook, well beyond that currently anticipated, financial institutions in aggregate are unlikely to suffer losses on anything like the scale implied by market prices; indeed some banks may eventually write back part of the losses announced to date if they have been based on estimates implied by market prices.

#### *...affecting investor demand for structured credit products...*

Concerns about further price volatility in illiquid markets are affecting investor demand for structured credit products. Even long-term investors, who might be expected to profit from the current low prices in these markets, are reported to be reluctant to invest because their performance is often assessed on a short term, mark-to-market basis. Some hedge funds may be unable to invest given problems in obtaining liquidity from prime brokers, who face their own funding pressures. Contacts report that trading desks in major firms may also be inhibited from investing because of a rise in the internal cost of funding.

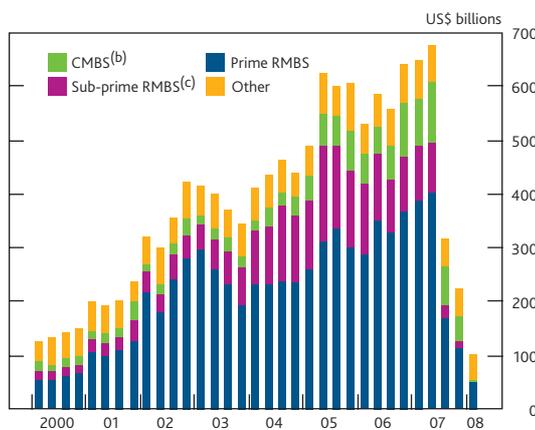
**Chart 3.4** Illustrative implied marks on CDO super-senior tranches<sup>(a)(b)(c)</sup>



Sources: SEC filings, company reports and Bank calculations.

- (a) Data are for six LCFIs. Not all firms have reported data in each of the categories. Super-senior tranches are those that are above senior tranches in the capital structure.  
 (b) For two banks, reported average marks on positions are used. Otherwise, an implied mark is calculated as reported net exposures at end-2007, relative to these net exposures plus net losses in that year. Estimating marks on the basis of net, rather than gross, figures is problematic as it does not take into account any changes in hedges. The calculation also does not allow for purchases and sales of assets. In one case an adjustment is made for disclosed changes in hedges and purchases/sales.  
 (c) Figures include liquidity commitments on CDOs where disclosed.

**Chart 3.5** Global issuance of asset-backed securities<sup>(a)</sup>



Source: Dealogic.

- (a) Quarterly issuance. 'Other' includes auto, credit card and student loan ABS.  
 (b) Commercial mortgage-backed securities.  
 (c) Residential mortgage-backed securities.

Demand for structured credit is also being affected by potential investors' ongoing difficulties in evaluating the underlying risks in these products, particularly where securitised assets have been repackaged. For example, as confidence has fallen in the ability of credit ratings to capture all the risks in complex structured credit products, some investors have been left without readily available and reliable measures of asset quality.

Variations in the disclosure of write-downs may also be impairing market participants' ability to assess risks at banking counterparties. Market contacts suggest that there is currently little consensus on valuation methodologies for collateralised debt obligations (CDOs) and that financial institutions have disclosed a range of write-downs on similar assets. The assumptions underlying valuations and the uncertainties around point estimates of losses are also often unclear.

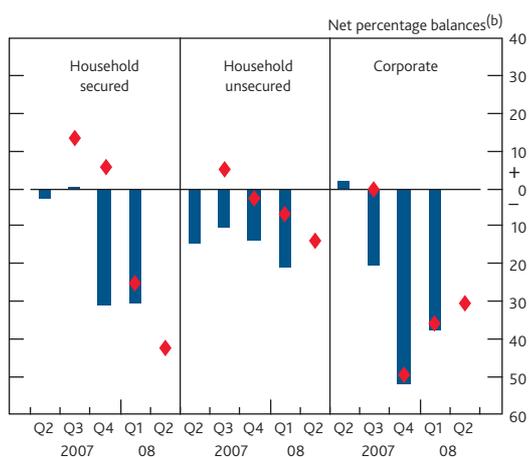
**Chart 3.4** shows illustrative estimates of the marks on CDO 'super-senior' tranches held by a selection of large complex financial institutions (LCFIs), implied by net write-downs and remaining net exposures. The variation could be due to the inclusion of different types of assets in disclosed losses, could reflect the performance of hedging and trading strategies, or could be the result of different valuation methodologies. On the basis of current disclosures, it is difficult to identify consistently the sources of this variation across firms, which may add to uncertainty about firms' underlying risk exposures. Over time, investors' concerns might be alleviated through more authoritative guidance from standard setters on valuation methodologies, improvements in the information content of third-party risk assessments and enhanced disclosure by firms, as described in Section 4.

*... creating difficulties in funding markets...*

There has also been an adverse interaction between the asset and liability sides of banks' balance sheets. Some securitisation markets are effectively closed and there has been a marked fall in the issuance of asset-backed securities (**Chart 3.5**). As a result, some financial institutions have been left holding legacy portfolios of warehoused or impaired assets, which they need to fund. The disruption to securitisation markets, which some banks had relied on heavily as a source of funds, has also created difficulties for banks in funding new assets. Funding pressure, along with declining confidence in bank resilience and concerns about further calls on liquidity, has led to tight conditions in term interbank markets. This has led to a greater reliance by banks on shorter-term wholesale funding, thereby exposing them to greater rollover risk than previously.

*... leading to a tightening of credit and a rise in credit risk.*

Banks have reacted to these funding difficulties by tightening the availability of credit to households and companies (**Chart 3.6**). Respondents to the Bank's *Credit Conditions Survey* expect a further tightening in credit over the next three

**Chart 3.6 Credit availability in the United Kingdom<sup>(a)</sup>**

Source: Bank of England *Credit Conditions Survey*, 2008 Q1.

- (a) Net percentage balances are calculated by weighting together the responses of those lenders who answered the survey questions on the change in the availability of credit. The blue bars show the responses over the previous three months. The red diamonds show expectations for the quarter in question, as measured three months earlier.
- (b) A positive balance indicates that more credit is available.

months, particularly for household mortgages. That could reduce the ability of some vulnerable households and companies to meet their outgoings, increasing the likelihood of defaults by some borrowers. Given falling prices of property held by banks as collateral against loans, the loss that banks would face in the event of default may also be rising. In this way, pressure on the liability side of banks' balance sheets could affect the credit risk on the assets held by those banks.

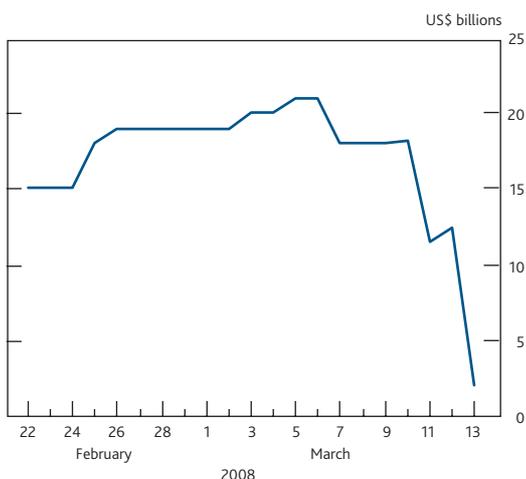
#### *Weaknesses in risk management have been revealed at major firms...*

The interaction between falling asset prices and weakening balance sheets has posed particular challenges for the management of risks.<sup>(1)</sup> The scale of losses reported by financial institutions indicates that risk management may not have adapted sufficiently to the changing nature of risks arising from market developments in recent years, including the rapid expansion in the use of structured credit products.

One clear shortcoming has been banks' and other financial institutions' over-reliance on credit ratings in determining the risk inherent in structured products. Some financial firms appear also to have been too confident about the continuation of the previously stable macroeconomic environment. As discussed in previous *Reports*, competitive pressures and the benign conditions of recent years encouraged firms to believe that concerns about financial risks were less important than the potential loss of business associated with a scaling back of exposures. Remuneration structures that are skewed towards the upside may have created further incentives to act in this way. Finally, some financial institutions appear to have discovered that, despite improvements over the past decade, their risk management systems were not able to measure risks across different business lines with accuracy.

#### *...including inadequate planning for liquidity risks...*

The October 2007 *Report* highlighted a number of inadequacies in the management of liquidity risk.<sup>(2)</sup> These have become more apparent as difficulties in funding markets have continued. The particular importance of funding liquidity risk was highlighted by the problems at Bear Stearns in March, which suffered a wholesale funding run in both secured and unsecured markets, resulting in a very rapid draining of their liquidity pool (**Chart 3.7**). More broadly, stress tests and contingency funding plans at firms have not generally assessed the impact of simultaneous disruption to securitisation and interbank markets. **Chart 3.8** shows that average spreads on UK RMBS rose sharply in August 2007, at the same time as spreads on sterling term interbank lending. Spreads in both

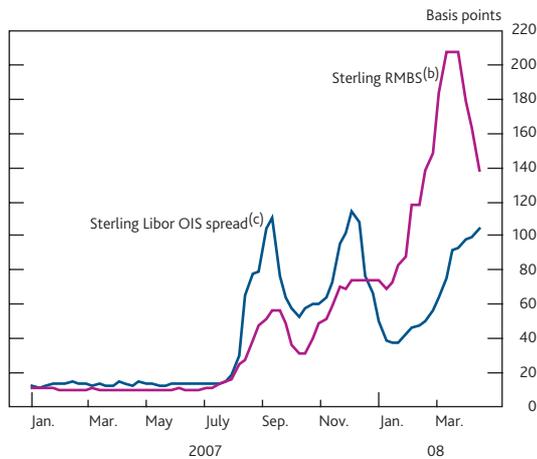
**Chart 3.7 Bear Stearns' liquidity pool**

Source: SEC.

(1) For a detailed discussion on risk management see Senior Supervisors Group (2008), *Observations on risk management practices during the recent market turbulence*, available at [www.fsa.gov.uk/pubs/other/SSG\\_risk\\_management.pdf](http://www.fsa.gov.uk/pubs/other/SSG_risk_management.pdf).

(2) These issues are also discussed in Nigel Jenkinson's speech, 'Strengthening regimes for controlling liquidity risk: some lessons from the recent turmoil', 24 April 2008, available at [www.bankofengland.co.uk/publications/speeches/2008/speech345.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech345.pdf).

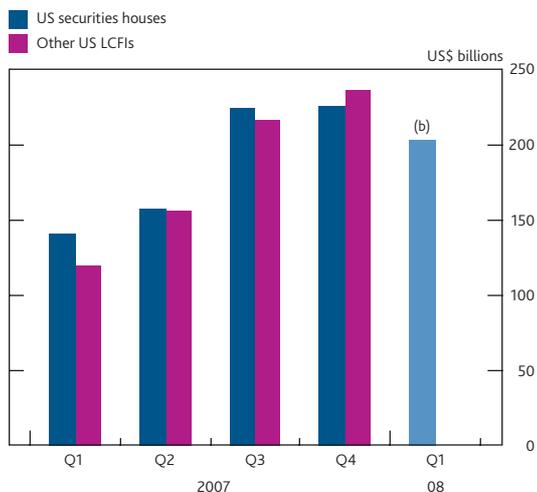
**Chart 3.8** Spreads on interbank lending and in residential mortgage-backed securities markets<sup>(a)</sup>



Sources: Bloomberg, Lehman Brothers and Bank calculations.

- (a) Data to close of business on 22 April 2008.  
 (b) Weekly five-year spread on AAA-rated UK prime residential mortgage-backed securities over Libor.  
 (c) Weekly average spread of three-month Libor to expected policy rates, as implied by three-month overnight indexed swap rates.

**Chart 3.9** US LCFIs' level 3 assets<sup>(a)</sup>



Sources: SEC filings and Bank calculations.

- (a) Level 3 assets are those that are valued using unobservable inputs which are significant to the measurement of their value.  
 (b) 2008 Q1 US securities houses series includes data from three of the four US securities dealers. The holdings of level 3 assets at these three securities houses has increased since 2007 Q4.

markets increased again in February. Off balance sheet contingent liquidity exposures appear not to have been priced adequately into internal models at firms. Reputational risks, which have crystallised as firms acted in support of these vehicles and other entities whose prospects were perceived to influence their franchise value, also appear not to have been accounted for in contingency liquidity planning.

*...difficulties with hedging strategies...*

Further problems have surfaced through risks that firms had thought they had insured or hedged. For example, as discussed in Box 3, some banks have bought protection on structured credit products from monolines, but this insurance has become less effective as monolines have been subject to the same stress as the exposures that were being hedged. This episode raises some wider concerns about banks' use of credit default swaps to hedge risks, should the counterparties offering this protection come under financial pressure. This would particularly be the case in a situation in which a number of protection sellers were affected by a common shock. In addition, investors — including LCFIs — who bought super-senior tranches of structured credit products, with the expectation that subordinated tranches would absorb losses, have found they have received less protection than originally anticipated, especially where the underlying collateral had already been securitised.

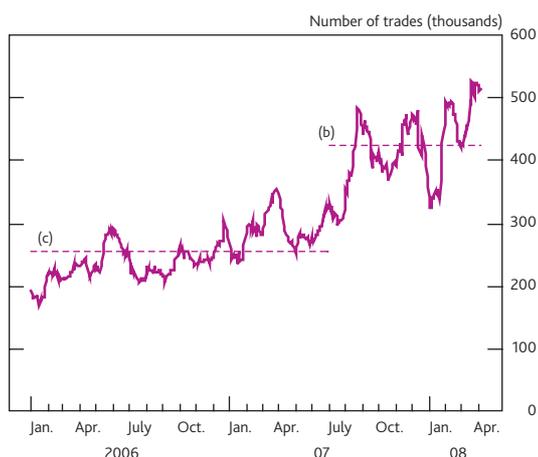
*...and with the use of models in managing risks.*

The disruption to credit markets has also led to problems in the modelling of asset values. The illiquidity in credit markets is reported to have made it difficult to find appropriate inputs for valuation models. Also, some new models have been developed over a short period, with little time for independent model validation. **Chart 3.9** shows the rise in US LCFIs' holdings of 'level 3' assets, which are particularly reliant on models as their valuation is based on inputs that are not observable from market prices.

Backward-looking models take time to respond to sudden changes in market conditions. This can be true of models used for pricing assets, but also those used to manage market risk. As noted in previous *Reports*, in benign financial conditions, Value-at-Risk models may understate the risk that is actually being taken.<sup>(1)</sup> These models are based on estimates of the volatility of asset returns and the correlations between them. A change in either of these estimates can have a considerable impact on a firm's Value-at-Risk. This highlights the importance of using forward-looking stress testing, with sufficiently severe scenarios, in assessing market risk.

(1) Value-at-Risk models are discussed in 'Assessing the sensitivity of Value-at-Risk to measures of stress', Bank of England *Financial Stability Report*, April 2007, Box 4, page 33.

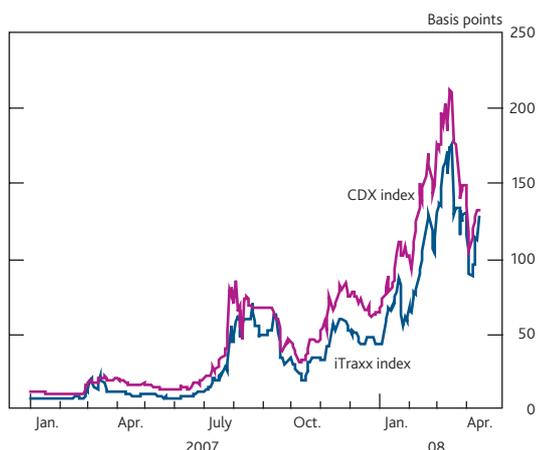
**Chart 3.10** Volumes settled in CLS<sup>(a)</sup>



Sources: CLS Bank International and Bank calculations.

- (a) Chart shows a 20-day moving average of the number of trades submitted to Continuous Linked Settlement (CLS).
- (b) Average volume settled from July 2007 to date.
- (c) Average volume settled from January 2006 to June 2007.

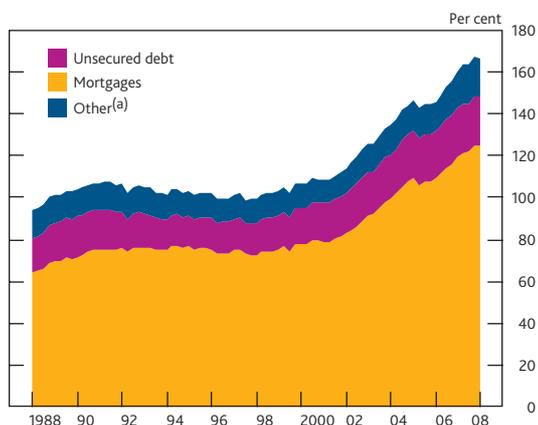
**Chart 3.11** Six-month implied volatility of credit default swap index spreads<sup>(a)(b)</sup>



Sources: JPMorgan Chase & Co. and Bank calculations.

- (a) Chart shows at-the-money implied volatility of options with residual maturities that range from four to seven months. The options are written on five-year on-the-run indices.
- (b) The CDX is an index of 125 North American investment-grade credit default swaps. The iTraxx index is the European equivalent.

**Chart 3.12** Ratio of household sector debt to annualised post-tax income



Sources: ONS and Bank calculations.

- (a) Households' total financial liabilities excluding secured and unsecured debt (including bills that are due to be paid).

*Financial infrastructure could come under pressure.*

The capacity of payment infrastructures has proved so far to be sufficient to absorb sustained high payment volumes in some financial markets, such as those in Continuous Linked Settlement (CLS), the main global foreign exchange settlement system (**Chart 3.10**). Settlement in the core payment systems in the United Kingdom has continued to take place on a timely basis.<sup>(1)</sup> Stability has been underpinned by the strong performance of payment systems and of internal processing systems of large banks. This robustness has been important because, in times of market stress, any operational problems encountered by members of payment and settlement systems could be misinterpreted as a reflection of liquidity problems at those member banks.

Information from market contacts suggests that, although significant progress has been made in reducing credit derivatives backlogs, the number of outstanding confirmations in these markets has increased since its low point at the end of 2006. This may reflect, in part, a doubling in the volume of activity in these markets over the same period. It is important that this build-up in backlogs is reversed in the period ahead.

### 3.2 The financial system in the period ahead

Prospects for financial stability depend critically on the interplay between asset markets on the one hand and balance sheets on the other. Over the period since October 2007, the two have weakened together as adverse news from asset prices has fed back to balance sheets and *vice versa*. Just as benign economic and financial conditions went hand in hand during the credit boom, heightened concerns about some financial institutions is now associated with increased uncertainty about the outlook.

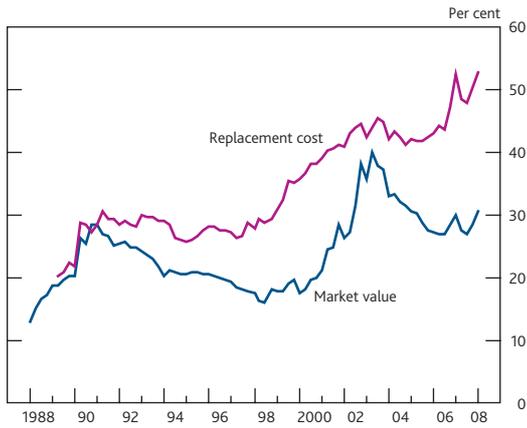
*Looking ahead, market conditions should improve...*

The most likely outcome is that market conditions improve in the period ahead, supported by the implementation of measures — such as those described in Section 4 — to restore market functioning and to bolster confidence in financial institutions. Over a longer horizon, better market functioning and stronger risk management should improve the resilience of the financial system.

The Bank has revised its judgement on the risks associated with pricing in asset markets in the light of recent market falls. As discussed above, some asset prices now appear to include unusually large discounts for uncertainty and illiquidity. This may have detached prices from credit market fundamentals. In that sense, risk premia have gone from being unsustainably low prior to the crisis, to being probably too high now in some

(1) Developments in payment systems over the past year are described in detail in Bank of England (2008), *Payment Systems Oversight Report 2007*, February, Issue 4, available at [www.bankofengland.co.uk/publications/psor/index.htm](http://www.bankofengland.co.uk/publications/psor/index.htm).

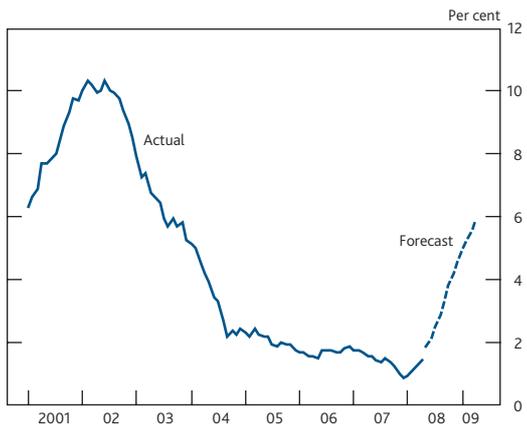
**Chart 3.13** UK PNFCs' capital gearing<sup>(a)(b)</sup>



Sources: ONS and Bank calculations.

- (a) Private non-financial corporations.
- (b) Gearing is calculated as the ratio of debt, net of liquid assets, to the market value or replacement cost of capital.

**Chart 3.14** Moody's speculative-grade corporate bond default rate and forecast<sup>(a)</sup>



Source: Moody's Investors Service.

- (a) Global trailing twelve-month issuer-weighted speculative-grade corporate bond default rate.

**Table 3.A** Sources of tail risk in the period ahead: change in assessment since October 2007

Vulnerability	Probability <sup>(a)</sup>		Impact <sup>(b)</sup>	
	A slight increase	A significant increase	A slight decrease	A significant decrease
High risk premia				
Global corporate debt				
Institutional distress				
Infrastructure disruption				
Global imbalances				
UK household debt				

Source: Bank of England assessment.

- (a) Assessed change in the probability of a severe crystallisation of a vulnerability at some point over the next three years.
- (b) Assessed change in the expected impact on financial stability if a vulnerability is triggered in a severe scenario.

markets (see Box 5 for a fuller description of this vulnerability). As investors recognise that these assets are cheap relative to credit fundamentals, buyers should return to markets and assets should start to recover in value. In the leveraged loan market, there are signs of this beginning to occur. But this process is unlikely to be rapid, as some of the current disruption to financial markets reflects structural factors, such as the information and incentive problems in structured credit markets, that may be resolved more slowly. For example, **Chart 3.11** shows that the volatility of credit default swap spreads is expected to remain high for at least the next six months.

*...and balance sheets should strengthen...*

As asset prices rise, confidence in the asset side of financial institutions' balance sheets should start to return. This should help to reduce counterparty credit concerns in interbank markets. An improvement in the functioning of securitisation markets should begin to ease some of the funding pressures in the banking sector, helping the stability of the liability side of banks' balance sheets. Combined with a reduction in uncertainty over future liquidity commitments, this should reduce the level of precautionary funds held by banks. Taken together, these developments should improve conditions in interbank markets and help to reverse some of the previous adverse cycle of falling asset markets and weakening balance sheets.

*...though some credit risks could emerge.*

In the light of past shocks, it should be expected that default rates will rise among some highly leveraged borrowers, as the lagged effect of tighter credit conditions feeds through to demand growth. This is likely to lead to a rise in losses on bank loans to some households and companies that have become highly indebted in recent years. **Chart 3.12** shows that the ratio of household debt to income in the United Kingdom has risen to over 160%, from around 100% at the beginning of 2001. UK companies have also taken on more debt relative to their capital over the same period (**Chart 3.13**). Highly leveraged companies, including those that have been taken into private ownership recently, may be most vulnerable. The commercial property sector could also come under pressure from possible falls in rental income growth. **Chart 3.14** shows that speculative-grade corporate default rates are expected to rise, albeit from a low level. Households with high levels of borrowing relative to their income, or investors in the buy-to-let sector who may have been relying on increases in house prices, may also be at risk.

*But there is a risk of a more severe scenario.*

Although the most likely outcome is that markets recover over time, there is a possibility that the current disruption to the financial system continues for a more prolonged period. **Table 3.A** shows the Bank's assessment of changes in the probability and impact of financial stability tail risks. The

## Box 5

### Key sources of vulnerability to the UK financial system: an update

The October 2007 *Report* provided a list of six key vulnerabilities to the UK financial system. Recent developments have highlighted different aspects of these vulnerabilities which financial firms should be prepared for, to help mitigate the associated stresses in the financial system should they crystallise.

**Unusually high risk premia** in some markets. Risk premia in many asset-backed securities markets have risen sharply as information and incentive problems in these markets have been exposed, as uncertainty about the economic outlook has increased and as market liquidity has dried up. They are now higher than appears justified on the basis of credit fundamentals. If risk premia in these markets remain elevated for a prolonged period, banks' profitability, capital and funding could be adversely affected, potentially leading to a more severe tightening of credit conditions in the wider economy.

**Exposures to commercial property companies and some highly indebted corporates** have risen markedly during recent years while the price of corporate default risk has been low. Highly leveraged companies may be particularly susceptible to tighter credit conditions and slower growth in demand. Commercial property prices have fallen sharply recently and a weaker economic outlook could threaten future rental income growth.

**Distress at an LCFI or another significant financial institution** could have a large impact in fragile market conditions, as the spillovers from the problems at Bear Stearns highlighted. Recent losses at some LCFIs have reduced their capital and highlighted some important risk management weaknesses. And severe distress at an LCFI or a major internationally active bank could expose shortcomings in the practical arrangements for handling cross-border crises.

**Dependence on market infrastructures.** While infrastructures have been robust to recent high trading volumes, the effect of any disruption could be particularly marked at a time of financial market turmoil and low confidence.

**High household sector indebtedness.** Earlier low pricing of, and provisioning for, household sector credit risk by the UK financial sector was associated with a sustained and rapid build-up of mortgage debt. Most households have significant net assets. But there is a tail of households who appear vulnerable to a tightening of credit conditions.

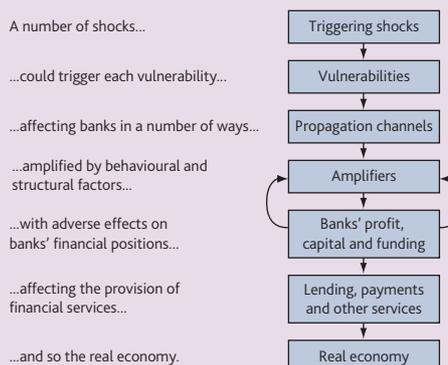
**Large financial imbalances** among the major economies have been associated with significant cross-border flows of capital. Sharp exchange rate adjustment has already occurred. But there remains the potential for further disorderly asset price movements in the event of a sudden adjustment in these financial flows.

### Mapping risks to the UK financial system

The key vulnerabilities identified by this and previous *Reports* are typically structural and slow moving, arising as a result of exposures, imbalances or dependencies. To further understand these vulnerabilities, it is important to consider the range of possible shocks that could expose them and assess how their effects would subsequently be transmitted through the financial system.

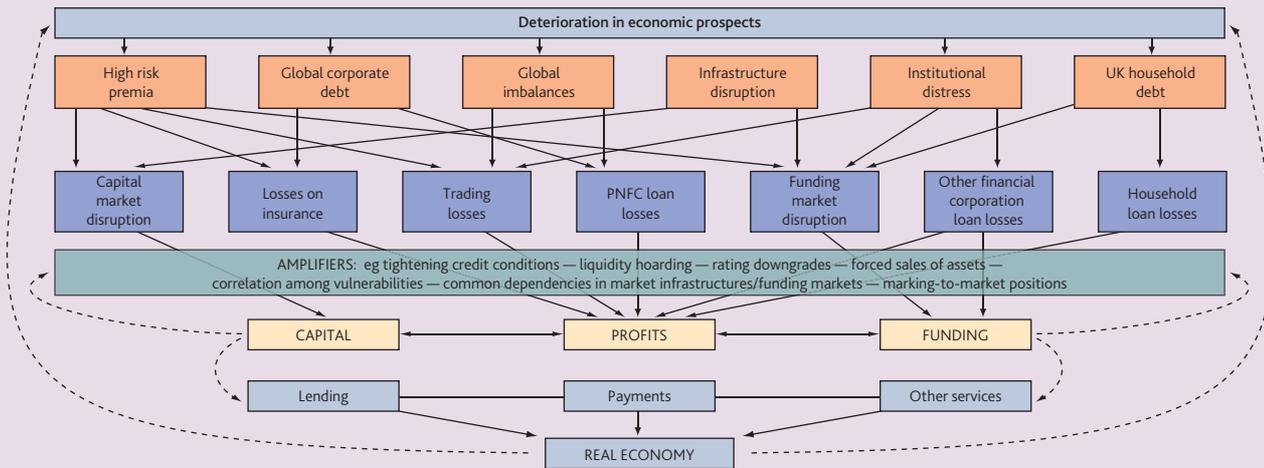
**Chart A** provides an illustration of this process.<sup>(1)</sup> It highlights how vulnerabilities would generally be exposed by an adverse shock within the financial system or in the real economy. The effects would subsequently be propagated through a number of transmission channels, related, for example, to banks' balance sheet exposures. Structural features of the financial system, such as margin calls and the use of ratings mandates, and the responses of banks and other financial market participants, might amplify those effects. If banks' profitability, capital and funding were affected, there could be possible feedback effects, including through forced asset sales. Finally, the impact on banks' financial positions could reduce their ability to lend and to provide other financial services, with an adverse impact on the wider economy.

**Chart A** Stylised transmission map of financial stability risk



While vulnerabilities are often broad and deep-seated, there are likely to be many potential triggering shocks and these will tend to change over time. For example, while low risk premia in financial markets were identified as a vulnerability by the Bank and others for a number of years, the ultimate trigger was a marked deterioration in the US sub-prime market — a small part of global financial assets. So considering a set of the most likely shocks and how these change over time forms an important part of the risk assessment process (see Section 1).

Chart B Stylised transmission map of a deterioration of macroeconomic conditions



Mapping how the crystallisation of vulnerabilities is transmitted through the system allows for a better identification of the key channels of propagation and amplification. For example, as risk premia adjusted over the past nine months, their impact was propagated by disruption in funding markets and amplified by ratings downgrades and forced sales of assets. As financial institutions' balance sheets expanded, following the disruption of markets for distributing risk, funding problems and latterly capital concerns led to the current tightening of credit conditions and weakened economic outlook.

Vulnerabilities are unlikely to be independent because they may be triggered by common shocks. For example, a wider deterioration of economic prospects — either from a tightening of credit conditions or from a further economic shock — could expose many of the Bank's key vulnerabilities, leading to a further round of propagation and amplification (as shown in **Chart B**). Alternatively, the effects of one vulnerability materialising could cause others to crystallise. This could arise, for example, were current high premia for bearing risk to be prolonged.

### Levels of risk

The transmission map also helps inform the assessment of risk levels. For example, the number of potential triggers identified as relating to particular vulnerabilities, and their probability of materialising, helps inform an assessment of the level of likelihood of a given vulnerability crystallising.

The potential impact will partly depend on the importance of the propagation channels and the strength of amplifiers. For some vulnerabilities, such as the household and corporate risks, those effects would be likely to come through banks' loan exposures. These can be quantified relatively easily and can readily be used to inform stress tests, such as those in previous *Reports*. For other vulnerabilities, such as from high risk premia and infrastructure disruption, the effects may

come through capital market and funding market disruption channels, which are more difficult to gauge.

Estimating the size of amplifying factors is more difficult still, given that they often depend upon the reaction of other banks and investors. Recent financial market turbulence has shown how powerful these system-wide amplifiers — such as tightening credit conditions, liquidity hoarding, ratings downgrades and forced asset sales — can be. The Bank is developing an integrated model of systemic risk that aims to capture better these effects.<sup>(2)</sup>

Ultimately, the impact on financial intermediation and so the real economy will depend importantly on the level of resilience of the financial system. Resilience will depend on the size of capital and liquidity buffers, and the strength of firms' risk management systems.

### Links to risk reduction

The transmission map also helps show how risk mitigation initiatives can address financial stability risks. In some cases, initiatives may be able to help reduce the probability of shocks arising — for example, oversight of payment systems can reduce the chance of an outage that could trigger the infrastructure vulnerability. Changes to regulation and aspects of firms' risk management, such as contingency planning based on severe stress-test scenarios, can mitigate direct channels and amplifiers. And regulatory policies for capital and liquidity buffers, as well as improvements to firms' risk management, are key to enhancing resilience to unexpected disturbances. By assessing the importance of various aspects of the transmission map, risk reduction work may be more effectively prioritised.

(1) This stylised risk transmission map builds on previous work on maps of transmission, as presented in the July 2006 *Report* and Haldane, A, Hall, S and Pezzini, S (2007), 'A new approach to assessing risks to financial stability', Bank of England *Financial Stability Paper No. 2*.

(2) Jenkinson, N (2007), 'Developing a framework for stress testing of financial stability risks', comments to the ECB High Level Conference on 'Simulating Financial Instability', 12–13 July. Available at [www.bankofengland.co.uk/publications/speeches/2007/speech318.pdf](http://www.bankofengland.co.uk/publications/speeches/2007/speech318.pdf).

sources of these vulnerabilities, together with a map showing how risks could be transmitted through the financial system, are described in Box 5.

There is some risk of events over the past six months repeating themselves. Asset prices and financial market activity might persist at low levels, prompting further risk reduction by banks and other market participants. Such actions could generate significant selling pressure, leading to further falls in asset prices, and potentially disrupting wider market functioning. Amplifying mechanisms in financial markets could reduce asset prices further.<sup>(1)</sup> These factors have increased concerns about the vulnerability of the financial system to high risk premia, compared to the assessment in the October 2007 *Report*, when uncertainty in risk pricing was seen as a greater threat.

The risk of further price falls and deleveraging in parts of the financial sector, together with write-downs on assets, continued funding pressure and revealed weaknesses in risk management, is judged to have increased the likelihood of distress at an LCFI or other significant financial institution. A prolonged disruption to financial markets could also lead to a sharp reduction in the availability of credit, and an adverse impact on economic activity. This would raise the probability of a more severe crystallisation of credit risk in the corporate and UK household sectors.

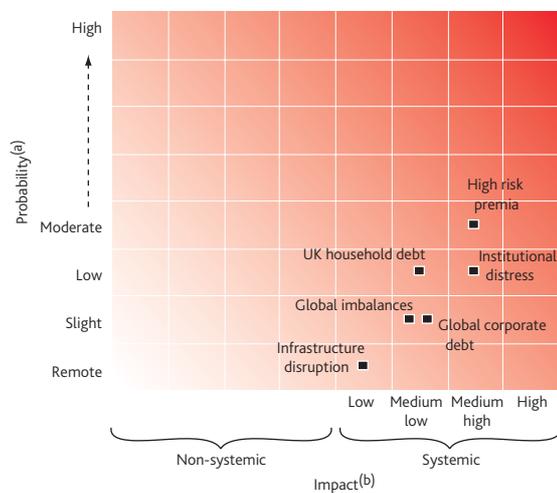
If a prolonged adverse feedback between asset prices and balance sheets was set in train, this would sustain low confidence in the banking sector, reduce the resilience of the financial system further and increase the potential impact of the key vulnerabilities relative to the assessment in the October 2007 *Report*. For the global imbalances' vulnerability, which is assessed to be unchanged, this assessment is tempered by the effect of the recent moderation in US growth and fall in the US dollar.

Chart 3.15 provides the Bank's judgement on the *level* of risk posed by each of the key vulnerabilities. The greatest concern is thought to be a prolonged period of high risk premia in credit markets. Judgements on risk levels are based on a variety of different sources, such as UK banks' loan exposures and the results of stress tests, together with an assessment of the importance of amplifying factors, such as the potential responses of banks and investors. These issues are discussed in Box 5.

### 3.3 Summary

Asset prices have fallen and, in some markets, appear to include large discounts for illiquidity and uncertainty. As such,

**Chart 3.15** Judgement on levels of likelihood and impact of key sources of tail risk



Source: Bank assessment.

- (a) Probability of a severe crystallisation of a vulnerability at some point over the next three years.  
 (b) Expected impact on financial stability if a vulnerability is triggered in a severe scenario.

(1) More information on these amplifying mechanisms is available in 'Financial market amplifiers', Bank of England *Financial Stability Report*, July 2006, Box 5, page 33.

mark-to-market losses based on these prices are likely to overstate the ultimate costs of the financial market turmoil to the financial system and real economy as a whole. This overshoot has contributed to an adverse interaction between asset prices and balance sheets over the past six months that has affected sentiment about financial market prospects.

The most likely outcome for financial stability in the United Kingdom in the period ahead is that conditions improve gradually as measures — such as those described in Section 4 — are taken. Low prices should encourage investors to return to markets, so that assets recover in value and balance sheets strengthen, reversing the recent cycle. In the near term, as this adjustment takes place, risks to financial stability remain elevated. But these risks should abate and the financial system should emerge stronger in the medium term, with risk better priced and risk management systems improved.

## 4 Mitigating risks to the UK financial system

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Since the *October 2007 Report*, there has been an opportunity for further assessment of the lessons learnt from the market turmoil — both for market participants and for the authorities. Although sentiment remains fragile, there is now a better understanding of the underlying behaviour and structural factors that contributed to the crisis. This section describes the immediate actions required by market participants and the authorities to improve market functioning and support a gradual recovery in confidence. It also sets out the emerging medium-term lessons for strengthening risk management, the management and regulation of liquidity, the new capital regime, and arrangements for handling financial crises.

Earlier sections of the *Report* have identified key areas requiring further risk mitigation work; these are expanded on in more detail here. Domestically, HM Treasury, the Financial Services Authority and the Bank published a consultation document in January, outlining measures to improve financial stability.<sup>(1)</sup> Internationally, the Financial Stability Forum (FSF) — which brings together central banks, regulators and finance ministries — has been co-ordinating efforts in the official sector to respond to recent events. It has published a detailed report, including a wide-ranging set of policy recommendations.<sup>(2)</sup> This section sets out the key issues arising from this work for the UK financial system.

### 4.1 Immediate action to restore confidence

This *Report* has identified two important related features of the UK financial system which have driven behaviour over the past six months — the low liquidity in a number of securities markets and the perceived vulnerability of banks' balance sheets. Both of these need to be addressed in order to ease the immediate difficulties, and to insure against the risk of a more prolonged and costly adjustment for the financial system and the real economy. This will require greater transparency by banks to improve the pricing of risk. But it also highlights the advantages of banks seeking to raise capital to strengthen confidence in the ability of the system to withstand potential future shocks. Meanwhile, there are measures that central banks can undertake to help improve the liquidity of banks' balance sheets and to rebuild confidence. The Bank of England launched such a scheme on 21 April (Box A).

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(1) Bank of England, HM Treasury, Financial Services Authority (2008), *Financial stability and depositor protection: strengthening the framework*, Cm 7308, January.

(2) Financial Stability Forum (2008), *Report on enhancing markets and institutional resilience*, April.

*There is pressing need for better disclosures by market participants to improve the pricing of risk...*

A key factor in the ongoing market disruption is a lack of confidence in counterparties. This has not been fully resolved by the disclosures made by firms to date. The gradual emergence of disclosures on exposures to complex financial instruments that differ in form and content has prolonged uncertainty over the location and scale of potential losses. This suggests that there may be merit in more frequent disclosures to a common template, both in normal times but especially in times of stress. The types of exposures that should be covered, as set out in the FSF report, include: collateralised debt obligations (CDOs); residential mortgage-backed securities (RMBS); other special purpose entities; and leveraged finance. Some firms have already enhanced their disclosure practices — some examples of leading practice have been compiled by a group of senior supervisors<sup>(1)</sup> — but more widespread adoption of such approaches would contribute to a better understanding of, and therefore ability to price, counterparty risk. There is also a case for some greater degree of co-ordination of the timing of announcements, as the drip-feed nature of recent disclosures has tended to increase uncertainty.

*...while recognising the difficulties in valuing certain assets in current circumstances.*

As highlighted in Section 3, there is fundamental uncertainty about how much some complex financial instruments are currently worth. It would be helpful if the nature and extent of this uncertainty could be made more transparent to the market through disclosures. This suggests that institutions should reveal both the critical assumptions that underpin the estimated values that they assign to their assets and the possible range or margin of error around those estimates.<sup>(2)</sup>

Under fair-value accounting (FVA) rules, firms are required to mark to market when an active market exists and a price is observable. This is the appropriate way to ensure that those parts of the balance sheet that are subject to FVA reflect current market values. But difficulties can arise when markets suffer the types of dislocation outlined in Section 1 — that is, when prices may be distorted by temporary factors, such as poor or no liquidity. In these circumstances, accounting standards setters need to provide authoritative guidance on the valuation of financial instruments when markets are no longer active and on what constitutes an active market. And audit standards setters need to provide robust guidance that promotes consistent auditing practices.

(1) Senior Supervisors Group (2008), *Leading-practice disclosures for selected exposures*, April.

(2) This is also suggested by the US Securities and Exchange Commission (SEC). See SEC (2008), 'Sample letter sent to public companies on Management's Discussion and Analysis disclosure regarding the application of SFAS 157 (fair value measurements)', March.

*Market participants should also provide enhanced information on the composition of complex structured instruments.*

As set out in the FSF report, market disclosures on structured products, both at issuance and beyond, need to improve. Originators, arrangers and distributors of securities should work towards standardising information on the distribution of underlying assets by type, industry and credit rating (where available). This information should be disclosed at issuance and at regular intervals in the life of the securities. In addition, originators and issuers should be transparent to investors and credit rating agencies about the underwriting standards for the underlying assets. Ongoing initiatives by international industry bodies — such as the European Securitisation Forum — to address these concerns are welcome.

*Banks should consider raising capital, to signal their ability to withstand potential shocks...*

Section 2 notes that UK banks' capital is broadly in line with their international peers (Chart 2.24). But there are strong arguments in favour of banks holding higher levels of capital in the current environment — for example, to demonstrate increased resilience to potential future shocks. This would help to strengthen balance sheets and reduce banks' funding costs. A number of banks in the United Kingdom and abroad have begun to raise capital over recent months, which may help reduce any stigma attached to such operations. In other words, there are co-ordination benefits to capital raising.

Where banks have experienced unexpected growth in their balance sheets recently — for example, from absorbing previously off balance sheet vehicles — there is a risk that they may tighten the supply of credit in order to conserve capital. Although this reaction is individually rational, there could be significant adverse effects on the financial system and macroeconomy should all or many banks choose to do so at the same time. In other words, there are co-ordination disadvantages to strengthening balance sheets by cutting lending. As the credit cycle turns, it is important for the financial system and the economy that banks can continue to take new risks onto their balance sheets. The creation of an additional capital cushion would enable them to do so.

*...supported by provision of liquidity by central banks.*

Central banks have sought to co-ordinate efforts to provide liquidity to the market in a series of interventions since the October 2007 Report. Details of the types of interventions that have taken place are set out in Box 6. On 21 April, the Bank of England launched a swap facility — the Special Liquidity Scheme — to allow banks to finance part of the overhang of currently illiquid assets on their balance sheets, by exchanging them temporarily for more easily tradable assets; Box A gives the details. By tackling decisively the overhang of assets in this way, the scheme aims to improve the liquidity

position of the banking system and increase confidence in financial markets.

## 4.2 Strengthening risk management

*There are some key messages for risk management practices of individual firms...*

As Section 3 discusses, the turmoil has highlighted some risk management failings at financial institutions. **Table 4.A** sets out aspects of good firm-wide risk management identified in a recent report from a group of senior supervisors from the United States, France, Germany, Switzerland and the United Kingdom. The results are useful both for supervisors and for firms, as a best practice benchmark for risk management. Similar messages emerge from a recent industry review of market best practices.<sup>(1)</sup>

Many of the issues set out in these reports have been identified previously. In order to make genuine progress, senior management needs to respond to these messages by remedying current shortcomings. The effectiveness of senior management oversight was found to be critical to the ability of individual firms to withstand volatile market conditions. There also needs to be greater and more consistent enforcement of the key lessons by the regulatory community.

*...and the role of rating agencies in structured finance is under detailed review.*

Credit rating agencies are a key element of the infrastructure supporting structured finance markets, through their role in providing information to end-investors.<sup>(2)</sup> The turmoil has raised questions about the information content of ratings, and the high dependency on ratings, both by investors and within the regulatory framework, as outlined in the *October Report*.

There are already some emerging lessons for rating agencies. There should be greater differentiation between structured finance ratings and single-name ratings, to encourage a more discerning use of structured finance ratings within investment mandates. The information that rating agencies gather on structured finance products should be made more accessible to investors — for example, to allow greater comparison between different classes of structured finance products — and should contain more information on the underlying drivers of, and uncertainties associated with, structured finance ratings. For example, rating agencies could highlight more clearly the particular risks inherent in resecuritisations (such as CDOs of asset-backed securities (ABS)) versus ‘single layer’ securitisations (such as RMBS or ABS).

**Table 4.A** Aspects of good firm-wide risk management identified by the Senior Supervisors Group

- |  |
|--|
| (1) Effective firm-wide identification and analysis of risk, including:  |
| <ul style="list-style-type: none"> <li>information sharing across the organisation, particularly between senior management and business lines; and</li> <li>firm-wide plans to reduce exposures or hedge risks.</li> </ul>               |
| (2) Consistent application of independent and rigorous valuation practices, including:   |
| <ul style="list-style-type: none"> <li>development of in-house expertise to assess the credit quality of assets underlying complex securities; and</li> <li>testing the accuracy of valuation estimates.</li> </ul>                      |
| (3) Effective management of funding liquidity, capital and balance sheet positions for the consolidated group, involving:  |
| <ul style="list-style-type: none"> <li>close alignment of treasury functions and risk management processes; and</li> <li>internal pricing mechanisms which charge business lines for building contingent liquidity exposures.</li> </ul> |
| (4) Informative and responsive risk measurement and management reporting and practices involving:  |
| <ul style="list-style-type: none"> <li>use of a wide range of measures of risk with variable assumptions; and</li> <li>integration of measures of market risk and counterparty risk across businesses.</li> </ul>                        |

Source: Senior Supervisors Group (2008), *Observations on risk management practices during the recent market turbulence*, March.

(1) Senior Supervisors Group (2008), *Observations on risk management practices during the recent market turbulence*, March, and Institute of International Finance (2008), *Interim report of the IIF Committee on market best practices*, April.

(2) For a more detailed discussion of the role of credit rating agencies, and lessons for them from the turmoil, see Box 6 of the *October 2007 Report*, page 56.

## Box 6

### Central bank operations

Central banks use short-term money market operations to ensure that overnight rates are broadly in line with monetary policy rates and to manage banking system liquidity in routine and stressed conditions. Over the past nine months, central banks have used both their published frameworks and innovative operations to support the implementation of monetary policy and to respond to financial stability concerns.

#### Background

Banks in the United States, the euro area and the United Kingdom are required to meet prescribed, or target, reserves requirements. These are applied on average over a 'maintenance period' of two weeks in the United States and of four or five weeks (between monetary policy meetings) in the euro area and the United Kingdom. Banks can vary their day-to-day reserves holdings within the maintenance period. These reserves balances represent a source of liquidity on which banks can draw in any circumstances.

The Bank of England, the European Central Bank (ECB) and the Federal Reserve Bank of New York (Federal Reserve) offer to provide, through their operations, the reserves that banks need to meet their targets or requirements within each maintenance period. A unique feature of the UK system is that banks choose the level of reserves that they will target ahead of the start of each maintenance period. So the Bank of England supplies whatever liquidity banks ask for through their setting of voluntary targets. Recently, banks in aggregate have accessed more central bank money by setting higher targets. By April 2008, UK banks' aggregate reserves targets had increased by 42% compared to August 2007.

The Bank of England, the Federal Reserve and the ECB provide reserves via open market operations (OMOs). All of the central banks conduct 'repo' operations, whereby funds are lent to counterparties for a fixed term on a secured basis against eligible collateral. But the operations differ slightly in routine circumstances in terms of the frequency and maturity of operations, the counterparties that are eligible to participate and the collateral that will be accepted by the respective central banks.

For example, the Federal Reserve conducts 'temporary' repo operations with maturities between one and fourteen days and 'permanent' operations to purchase Treasury securities outright. In contrast, the ECB and the Bank of England hold one-week repo operations, overnight 'fine-tuning' repo operations on the last day of the maintenance period, and monthly long-term repo operations (with three-month maturity in the case of the ECB and three, six, nine and twelve-month maturities in the United Kingdom). The Bank

has also begun to buy government bonds on a 'permanent' basis. For OMOs, the type of eligible collateral accepted by the ECB is broader than that of the Bank or the Federal Reserve. The Bank's list of eligible collateral is the broadest by currency.

#### Initiatives since Summer 2007

Central banks have used both their published frameworks and innovative operations in response to the stresses in money markets since Summer 2007, including operations to cover the calendar year end. For example, they have:

- increased the maturities of their lending;
- expanded the types of collateral against which they are prepared to lend; and
- extended the range of institutions to which they are prepared to lend.

A number of the initiatives were announced as part of co-ordinated announcements by a group of central banks in December 2007 and March 2008. The approaches taken by the Federal Reserve, ECB and the Bank of England are set out below and in **Table 1**.

#### Federal Reserve

The Federal Reserve has generally maintained a routine pattern of reserve provision with the exception of early August 2007, when more reserves were supplied than banks needed to meet their aggregate requirements. There have, however, been significant changes in the way in which reserves have been supplied.

In December 2007, the Federal Reserve established a Term Auction Facility (TAF) to provide term funds to a broader range of institutions than is eligible to participate in its regular operations. These funds can be secured against a wider range of collateral than in OMOs, but identical to that eligible at the Discount Window (for borrowing on demand by banks at a penalty interest rate). In addition to the TAF, the maturity of reserves provided by the Federal Reserve in routine OMOs has also been increased through the introduction of longer-maturity repo operations.

In March, the Federal Reserve introduced an extension of its existing overnight securities lending facility in the form of the Term Securities Lending Facility (TSLF). The TSLF allows primary dealers to borrow bonds held by the Federal Reserve against a broader range of collateral, for a period of up to 28 days. This is a facility for primary dealers to upgrade the quality of collateral they hold in return for a fee set by auction.

Subsequently, in the wake of difficulties faced by Bear Stearns, the Federal Reserve introduced a Primary Dealer Credit Facility, whereby non-bank 'primary dealers' could access funds on

**Table 1** Timeline of central bank operations

	Federal Reserve	European Central Bank	Bank of England
August/September 2007	Supplied additional reserves. Extended maturity of Discount Window loans.	Began front-loading supply of reserves. Introduced exceptional three-month longer-term repos.	Supplied additional reserves. Widened range within which reserves remunerated.
December 2007	<i>Conducted exceptional operations to cover calendar year end.</i>		
	Established Term Auction Facility to lend against Discount Window collateral.	<b>Co-ordinated central bank announcement:</b> Entered into swap agreement with Federal Reserve to provide US dollars to European Central Bank counterparties.	Extended size and collateral of three-month long-term repo in December and January.
March 2008	Announced single-tranche open market operations programme to lend for longer maturities.  Introduced Term Securities Lending Facility to lend Treasuries against broader range of collateral. Announced Primary Dealer Credit Facility to lend bilaterally to primary dealers.	<b>Co-ordinated central bank announcement:<sup>(a)</sup></b> Announced enlarged swap agreement to provide US dollars to European Central Bank counterparties. Announcement of a six-month maturity longer-term repo operation.	Announced that expanded three-month long-term repos would be maintained in March and April.
April 2008			Extended size of three-month long-term repo in April. Announced Special Liquidity Scheme.

Sources: Bank of England, Board of Governors of the Federal Reserve and European Central Bank.

(a) In the hard copy of this document the announcement by the European Central Bank of a six-month maturity longer-term repo operation was incorrectly attributed to the Bank of England. Correspondingly, the announcement by the Bank of England that expanded three-month long-term repos would be maintained in March and April was incorrectly attributed to the European Central Bank.

demand, secured against a subset of Discount Window eligible collateral.

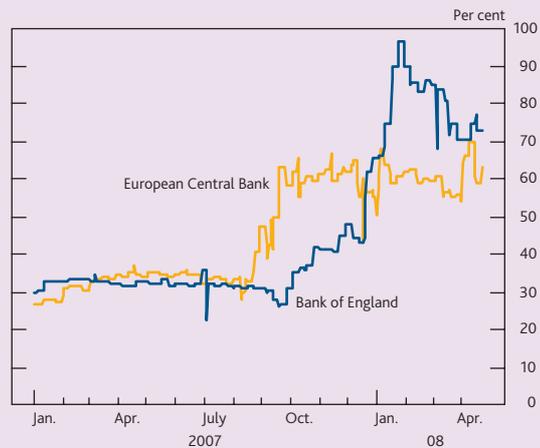
In order to avoid providing more liquidity than banks required to meet reserves targets (which might cause overnight market interest rates to fall), the Federal Reserve has offset the provision of liquidity via these additional measures, by simultaneously 'draining' reserves. This was initially achieved by allowing Treasury bills held within the Federal Reserve's 'permanent' portfolio to mature, thereby allowing the maturing funds to be lent as reserves in other ways. More recently, liquidity has been drained through the outright sale of holdings of bills and bonds and through temporary 'reverse' repo operations.

### European Central Bank

Since August, the ECB has 'front-loaded' the provision of reserves, by supplying additional reserves early in each maintenance period and draining them later in the period. The supply of reserves in each maintenance period as a whole has been unaffected and the level of reserves has been relatively stable.

In addition, the ECB has introduced exceptional long-term repo operations to provide a larger proportion of reserves in three-month and more recently six-month operations (Chart A).

The ECB (and Swiss National Bank) has also extended the Federal Reserve's TAF auctions to their own counterparties by means of temporary reciprocal currency arrangements ('swap lines') with the Federal Reserve.

**Chart A** Proportion of stock of open market operations provided through long-term repos<sup>(a)(b)</sup>

Sources: Bank of England and European Central Bank.

(a) Long-term repos, defined as those with maturity beyond one maintenance period, as a proportion of long-term repos, short-term repos and fine-tuning repos.  
(b) Data to close of business on 22 April 2008.

### Bank of England

In addition to the voluntary increase in reserves targets described above, the Bank has used other tools in its published framework.<sup>(1)</sup> First, in September 2007 and March 2008 in response to heightened pressures in short-term money markets, it offered to supply additional reserves, above the amount required to meet the targets set by banks. Subsequent to each operation, short-term market rates traded closer to Bank Rate. And in order to accommodate that additional supply (and subsequently to provide banks with extra flexibility to manage their day-to-day liquidity), in September the Bank widened the ranges around banks' reserves targets within which reserves are remunerated.

In addition, the Bank increased the size of its scheduled long-term repo operations held in December and January, lending more at three months against a wider range of high-quality collateral, including AAA residential mortgage-backed securities and covered bonds. These operations were offered again in March and April, in the latter case in increased size. The Bank has also provided reserves through drawings by Northern Rock on the liquidity facility available to it, which has had the effect of reducing the amount of reserves that needs to be supplied via short-term repo operations. **Chart A** shows the proportion of OMOs provided through long-term repos for the two central banks

whose systems are most similar — the Bank of England and the ECB.

In April 2008, the Bank announced and implemented a Special Liquidity Scheme, allowing banks to swap a wide range of high-quality collateral for Treasury bills for up to three years. The details of this scheme, which is outside the Sterling Monetary Framework, are presented in Box A.

(1) See *The Framework for the Bank of England's Operations in the Sterling Money Markets*, available at [www.bankofengland.co.uk/markets/money/publications/redbookjan08.pdf](http://www.bankofengland.co.uk/markets/money/publications/redbookjan08.pdf).

The rating agencies have already made proposals for improvements to rating structured finance products — for example, on whether to use differentiated ratings for structured products.<sup>(1)</sup> But the Committee of European Securities Regulators (CESR) has indicated that they need to go further to improve the transparency of ratings processes and methodologies, strengthen resourcing of the rating process and its performance, and reduce the potential for conflicts of interest.<sup>(2)</sup> The International Organisation of Securities Commissions (IOSCO) has proposed changes to its Code of Conduct for rating agencies to address these issues.<sup>(3)</sup>

### 4.3 Liquidity risk management and regulation

#### *Firms need to ensure high standards of liquidity risk management...*

As noted in Section 3, recent events have highlighted that firms need to consider a wider range of more severe scenarios in their liquidity stress testing which capture the realities of operating, and seeking funding, in highly integrated global markets. In particular, firms need to consider the behavioural responses of customers and counterparties, and the marketability of different asset classes, in stressed conditions.

Recent experience has shown it is not sufficient simply to run a broad range of stress tests, however exacting: senior management needs to act on the results, if necessary taking actions to reduce the firm's exposures and/or being able to respond quickly if the risks crystallise. **Table 4.B** outlines some elements that firms should consider in designing their contingency funding plans (CFPs). In addition to these, it is important that CFPs are regularly tested by, for example, drawing down committed lines. This should help to reduce the potential adverse signal and resulting stigma that might

**Table 4.B** Elements of a robust contingency funding plan (CFP)

#### Design of the CFP:

- Integrate with, and build upon, the results of stress tests.
- Have a clear risk appetite against which the adequacy of the CFP can be judged.
- Consider the reputational risk associated with actions outlined in the CFP.

#### Contents of the CFP:

- Diverse range of funding options.
- Establish counterparty relationships in advance.
- Make realistic assumptions about the marketability of assets, in particular securitised products, asset-backed commercial paper and loan books.
- Consider the potential for strain in foreign exchange swap markets.

#### Rehearsal and implementation of the CFP:

- Fully operational and ready to be implemented at short notice.
- A rehearsed and well-understood implementation plan.
- Legal documentation for transactions relied upon in the CFP is in place in advance.
- Communication and understanding of the CFP throughout the institution.

(1) For example, Moody's (2008), 'Should Moody's consider differentiating structured finance and corporate ratings?', February.

(2) 'The role of credit rating agencies in structured finance', CESR/08-036, February 2008.

(3) 'IOSCO consults on changes to Code of Conduct for Credit Rating Agencies', IOSCO/MR/003/2008, March 2008.

arise if firms need to implement their CFPs under stressed conditions.

As noted by the Senior Supervisors Group, there is also scope for improvements in the governance of liquidity risk management within firms. Better communication between treasury functions and individual business lines can help to ensure that all relevant parts of the organisation take responsibility for the liquidity implications of any transactions undertaken. An internal pricing mechanism that explicitly recognises the liquidity costs and benefits of specific business activities is also useful in this respect, particularly with regard to contingent liquidity risk, such as the provision of liquidity lines to conduits and structured investment vehicles. This will help to ensure that internal incentives are better aligned with the overall risks the organisation is running.

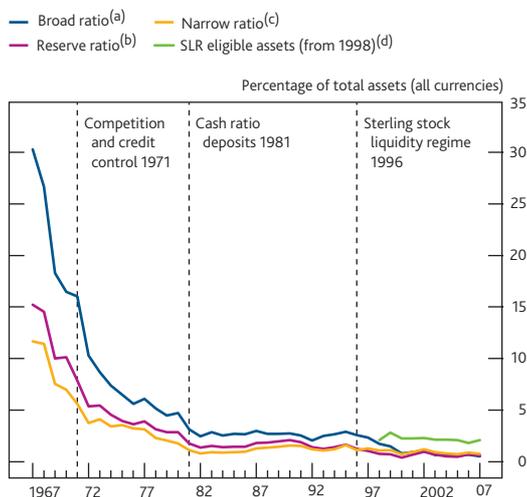
The difficulties that market participants have had in determining their counterparties' liquidity positions have strengthened calls for greater public disclosure of firms' liquidity risk management plans and controls. There are some risks in greater disclosure — for example, if information signals distress to counterparties — and there are measurement challenges too. But greater transparency in this area could reduce uncertainty and enhance market discipline.

*...and supervisors are acting to ensure that banks are more resilient to liquidity shocks.*

While firms themselves have strong incentives to be resilient to liquidity shocks, they may make less provision for liquidity risk than is desirable for the system as a whole. This can arise, for example, because they do not adequately consider the impact of their own liquidity problems on other agents, the financial system and the economy more broadly. They may also underinsure in anticipation of public support. **Chart 4.1** shows how some measures of sterling liquid reserves have fallen since 1967. Banks have diversified their liquid asset holdings beyond those shown — for example, to include other currencies — and increased their use of repo markets, but the overall historical pattern is one of a marked decline in cushions of high-quality liquid assets.<sup>(1)</sup> The public sector has an important role in setting liquidity standards to guard against the risk that resilience of the system to liquidity shocks is too low.

Supervisors have accelerated work, domestically and internationally, to tighten liquidity standards in the light of recent events. In particular, a set of initiatives to strengthen international standards for liquidity risk management and supervision is under way, notably through the Basel Committee for Banking Supervision (BCBS) and in parallel in the EU through the Committee of European Banking

**Chart 4.1** Sterling liquid assets relative to total asset holdings of UK banking sector



Source: Bank calculations.

- (a) Cash + Bank of England balances + money at call + eligible bills + UK gilts.  
 (b) Proxied by: Bank of England balances + money at call + eligible bills.  
 (c) Cash + Bank of England balances + eligible bills.  
 (d) For banks covered by sterling stock liquidity regime (SLR) only.

(1) See the speech by Nigel Jenkinson, 'Strengthening regimes for controlling liquidity risk: some lessons from the recent turmoil', 24 April 2008, available at [www.bankofengland.co.uk/publications/speeches/2008/speech345.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech345.pdf).

**Table 4.C** Diversity in national liquidity regimes

## Reasons for diversity in national liquidity regimes:

**(1) Protection of local entities**

- National supervisors have a duty to help ensure the resilience of local entities to protect local depositors.
- International crisis resolution can be complicated by cross-border exposures.

**(2) Challenges in transferring liquidity in certain circumstances**

- Dependence upon liquidity of foreign exchange swap markets.
- Technical factors, such as market settlement conventions and time differences across payment and settlement systems.

## Implications of diverse regimes for supervisors and cross-border firms:

**(1) Level-playing field and competition considerations**

- Different liquidity regimes raise questions about the evenness of competition and the scope for regulatory arbitrage.

**(2) Supervisory co-ordination**

- National regulators may be uncertain about the level of resilience provided by other regimes.

**(3) Reporting and communication**

- Different reporting requirements may hamper effective communication between supervisory authorities and impose costs on firms.

Source: Basel Committee on Banking Supervision (2008), *Liquidity risk: management and supervisory challenges*, February.

**Table 4.D** Summary of initial lessons for liquidity risk management and supervision from the current episode of stress

<b>Stress testing</b>	Stress testing by firms was not severe enough to capture the nature, magnitude and duration of the recent market-wide liquidity shock.
<b>Contingency funding plans</b>	Contingency funding plans need to be integrated with stress tests, ready to be implemented at short notice, and include cautious assumptions about the marketability of assets.
<b>Off balance sheet activity and contingent commitments</b>	Stress tests underestimated the likelihood of providing liquidity support to conduits and off balance sheet vehicles, particularly on reputational grounds.
<b>Internal transfer pricing</b>	The extent to which firms' internal transfer pricing systems assessed business lines for building contingent liquidity exposure varied from extensively to little or none; business lines need to work together to manage potential contingent liquidity risks.
<b>Capital</b>	Even well-capitalised banks can face severe liquidity problems, demonstrating the need for strong liquidity risk management by banks and the importance of well-designed liquidity regimes.
<b>Supervisory and market information</b>	Many supervisors upgraded reporting templates and increased the intensity of monitoring. In some cases, financial markets sought additional information on the liquidity positions of banks.
<b>Central bank facilities</b>	Use of certain central bank lending facilities can be interpreted by market participants as a signal of funding difficulties, risking an exacerbation, rather than an easing, of funding pressure.
<b>Cross-border issues</b>	The location of liquidity within legal entities and across jurisdictions was important in some cases.

Source: Basel Committee on Banking Supervision (2008), *Liquidity risk: management and supervisory challenges*, February.

Supervisors. In February, the BCBS published a stock take of liquidity supervision, including analysis of the reasons for, and implications of, diversity in national liquidity regimes (Table 4.C) and initial lessons from the current episode of severe liquidity strain (Table 4.D).

The increasing prevalence of international banking groups, operating in multiple markets and jurisdictions, reinforces the need for national authorities to develop consistent methods of treating such groups. Since liquidity standards applied in one jurisdiction have implications for financial stability in other jurisdictions, a more consistent approach to liquidity supervision internationally, as well as improved communication and co-operation among supervisors, is desirable. It should ensure that each liquidity regime delivers a sufficient level of resilience, especially for those international banking groups that manage liquidity on a centralised basis.

The BCBS is now revising its *Sound Practices for Managing Liquidity in Banking Organisations* (2000) to reflect both recent experience and changes in financial markets since 2000. This will cover all elements of liquidity risk management, including disclosure and market discipline, and the role of supervisors. The updated *Sound Practices* will also cover intraday liquidity management, which is a more significant issue as a result of changes in the design of payment and settlement systems in the past few years. They will be released for consultation in the early summer. It is crucial that regulatory authorities follow up this work by ensuring that these revised practices are adopted and rigorously applied.

#### *The FSA has outlined proposals for reform of liquidity regulation in the United Kingdom.*

In December, the FSA published a discussion paper that reviewed the existing UK liquidity regime for banks and building societies and set out potential areas for reform in the light of recent events.

The paper recognised the role of certain *quantitative* liquidity requirements to ensure that banks maintain sufficient liquidity to be able to survive for reasonable periods following a range of shocks, without resorting to forced sales of illiquid assets or emergency liquidity support from the central bank. Quantitative requirements could include restrictions on the funding mismatches that banks are able to run, and/or requirements to hold a minimum buffer of high-quality liquid assets.

The paper also advocated strengthening the application of *qualitative* requirements for banks, such as those for stress testing and CFPs, as part of a broader intention to carry out more rigorous supervision of firms' liquidity risk management practices. This includes improving the content and the frequency of firms' reports to the FSA on their liquidity positions. Improved reporting would also enable 'early

warning indicators' to be developed, giving the authorities a timely indication of the need for supervisory intervention to remedy a weak liquidity position.

## 4.4 The role of capital regulation

### *The details of Basel II may need adapting...*

The ongoing disruption in financial markets is occurring during the transition to a new capital adequacy regime — Basel II.<sup>(1)</sup> Basel II is designed to provide a more risk-sensitive capital regime. It will deliver a more appropriate treatment of off balance sheet exposures; strengthened links between regulatory capital and risk-based supervision; enhanced market discipline by requiring better information about banks' risk profiles, measurement techniques and capital; and a system that is more robust to financial innovation. As such, it should tackle some of the underlying sources of the recent turmoil. Some of the key drawbacks to the previous framework — Basel I — and how they are being addressed by Basel II are outlined in **Table 4.E**.

The new regime is flexible and it is to be expected that improvements to it will be identified over time. The recent turmoil has already highlighted a number of areas that will need to change. The BCBS has recently announced it will:<sup>(2)</sup>

- establish higher capital requirements for certain highly rated securitisation exposures (for example, senior tranches of CDOs of ABS);<sup>(3)</sup>
- strengthen the capital treatment of liquidity facilities extended to support off balance sheet vehicles, such as asset-backed commercial paper conduits;
- improve capital requirements for credit exposures that are held within banks' trading books;
- issue more guidance on banks' risk management — for example, stress-testing practices and capital planning, the management of off balance sheet exposures and any reputational risks associated with these, and the risk management of securitisations; and
- re-examine the disclosures that will be required on complex securitisation exposures, conduits and the sponsorship of off balance sheet vehicles.

**Table 4.E** Summary of the key drawbacks to Basel I regime addressed by Basel II

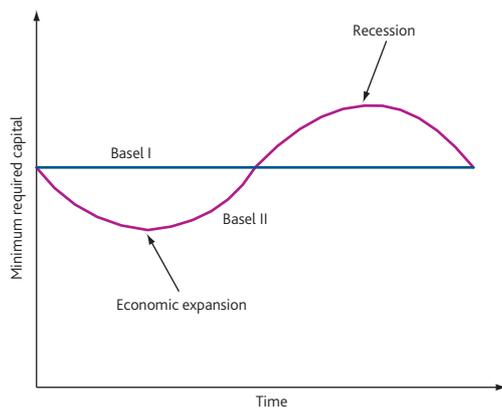
Main drawbacks to Basel I	Elements addressed in Basel II
Capital requirements relatively insensitive to different credit risks, eg only five risk weights: 0%, 10%, 20%, 50% and 100%.	Minimum capital requirements based on banks' own internal models (under more advanced approaches), allowing much greater risk-sensitivity. Greater risk-sensitivity in standard approach through the use of external credit assessments.
No explicit framework for securitisation exposures (treatment of securitised assets determined by national supervisors).	Explicit framework for the treatment of holdings of securitised assets; more detailed treatment of risks incurred by originators of securitisations.
Limited capital charges for off balance sheet exposures, eg zero for committed lines of credit of less than one year.	Capital charges introduced for off balance sheet exposures with a maturity of less than one year.
No capital charges for operational risk, and other risks, such as interest rate risk in the banking book, liquidity risk, concentration risk.	Minimum capital requirements set for operational risk. Supervisory review, with scope for capital add-ons, to take into account risks not included in minimum capital requirements.
Gap between regulatory capital requirements and banks' economic capital.	Attempt to take banks' economic capital calculations into consideration in the supervisory review.
No specific disclosure requirements.	Public disclosure requirements, which aim to encourage market discipline.

(1) Basel II has three elements: minimum capital requirements for credit, market and operational risk (Pillar 1); qualitative supervision with the scope for additional capital to be imposed by the supervisor (Pillar 2); and additional public disclosure requirements, including on securitisations (Pillar 3).

(2) BCBS (2008), 'Basel Committee on Banking Supervision announces steps to strengthen the resilience of the banking system', Press Release, 16 April.

(3) These have experienced a greater acceleration of losses than equivalently rated traditional corporate bonds, and therefore may not currently be calibrated correctly.

**Chart 4.2** Illustrative example of potential changes to Basel II minimum capital requirements over the economic cycle<sup>(a)</sup>



(a) This chart contrasts the volatility of Basel II minimum capital requirements for a fixed portfolio, relative to Basel I. The chart is not intended to make any statement about the level of aggregate Basel II capital requirements relative to Basel I at any stage in the economic cycle.

These measures aim to improve standards of risk management and align better the level of capital requirements with the risks arising from complex securitisations.

*...but concerns over the interaction between capital regulation and current economic conditions remain...*

Banks are required to maintain minimum capital levels related to the risks that they run, to provide them with protection against unexpected losses, including those arising from deteriorating economic conditions. An economic downturn can put downward pressure on regulatory capital ratios, including through losses that banks may incur, and through write-downs on the value of assets that banks are obliged to mark to market. Regulatory capital ratios can also deteriorate as the riskiness of banks' portfolios increases, in particular through the link to credit ratings. Ratings downgrades tend to increase during cyclical downturns. As discussed in previous *Reports*, this may lead to cyclical increases in minimum capital requirements (as illustrated in **Chart 4.2**).

Box 7 describes this procyclicality effect in more detail, and the safeguards against it that have been built into the Basel II regime. It is difficult to know in advance how important this procyclicality effect is likely to be, so it will need to be closely monitored. The Bank and FSA have developed a system for examining the sensitivity of aggregate minimum capital requirements to credit conditions, and to monitor the impact of changes in these requirements on both capital and lending.<sup>(1)</sup> The BCBS is also monitoring minimum requirements and capital buffers over the credit cycle.

*...raising the question of whether countercyclical regulatory policies have a role.*

One response to a decline in the regulatory capital ratio is for banks to issue new capital. But another potential response is to restrict asset growth, notably through the supply of credit. This could have wider macroeconomic implications. Individual firms are unlikely to take full account of the combined effect of their actions — for example on asset markets and on the credit cycle. And from a macroeconomic perspective, the authorities have an interest in banks being able to create credit in a downturn, while maintaining adequate capital levels to demonstrate their ongoing solvency.

One method of doing this would be to ensure that firms build up sufficient buffers of capital in periods of economic growth that they are able to draw upon during downturns. This can be encouraged within the current regulatory framework — in particular, by requiring that in good times firms 'stress test' their capital position. This approach is being adopted by the FSA, through the imposition of additional, firm-specific, capital requirements during the supervisory review process. Given

(1) For details of this early warning system, see Benford, J and Nier, E (2007), 'Monitoring cyclicality of Basel II capital requirements', Bank of England *Financial Stability Paper* No. 3.

## Box 7

### Procyclicality in the Basel II framework

Both internal and external credit ratings are used as inputs to determine Basel II capital requirements. If these are sensitive to the economic cycle, then capital requirements under Basel II may fall in upturns and rise in recessions. That may, in turn, introduce procyclicality — greater sensitivity of the supply of credit to economic conditions — unless adequate safeguards are in place.

#### Potential for procyclicality in Basel II

Under Basel I, capital requirements for credit risk exposures were set on the basis of the type of asset. A fixed risk weight was applied to each type of exposure (0% for qualifying sovereigns, 50% for retail mortgages, etc). Banks were required to maintain a ratio of capital, after deductions, to total risk-weighted assets of 8%. This lack of risk-sensitivity had two main problems. First, it encouraged regulatory arbitrage, such as securitising assets with high capital requirements relative to the underlying risk, while retaining high-risk exposures with relatively low capital charges on the balance sheet. Second, it did not properly align credit risk with regulatory capital because large differences in the credit risk of particular portfolios within each asset type were not taken into account. These shortcomings of Basel I led to the development of the Basel II framework.

Basel II ties capital requirements more closely to risks. At a minimum, banks have to apply the standardised approach, where capital requirements are based on credit agency ratings of the assets held. Assets with low credit ratings will be assigned a higher risk weighting. Since calculations of capital charges are based on risk-weighted assets (asset values multiplied by their risk weighting), low-rated assets attract larger capital charges than those with higher ratings.

Banks that meet certain standards will be allowed to use the internal ratings based (IRB) approaches. IRB banks will still use external credit ratings to determine the risk weighting of their securitisation exposures, but capital requirements for other banking book assets will be based on the outputs of banks' own rating systems. These outputs include their own estimates of the following parameters when calculating expected and unexpected loss: probability of default (PD); loss given default (LGD); and exposure at default.<sup>(1)</sup>

#### Safeguards against procyclicality in Basel II

A number of safeguards against excessive procyclicality have been built into Basel II. These safeguards aim to achieve a balance between capital requirements that are sensitive to risk and capital requirements that are relatively stable over the cycle. They are the following:

- Basel II allows rating 'through-the-cycle' (TTC) when estimating the PD necessary to calculate both expected and unexpected losses. In practice, banks tend to use models that are a hybrid between TTC and 'point-in-time' (PIT) ratings. Ratings from these models can be subject to significant downgrading during recessions. This will tend to increase the risk weights applied to a given portfolio of assets and hence increase capital requirements. The Capital Requirements Directive<sup>(2)</sup> and the FSA require firms to understand their rating systems and how they are affected by the economic cycle. Banks in the United Kingdom have scope to use scaling factors that modify the PD produced by their rating systems in order to limit the fluctuations in their capital requirements. The FSA has provided guidance that scaling methodologies should include a mechanism that describes how these factors evolve over the cycle.<sup>(3)</sup>
- Loss given default estimates reported by advanced IRB banks under Basel II should be based on 'downturn' recovery rates. This reflects the fact that, during an economic downturn, losses on defaulted loans are likely to be higher than those under normal business conditions because, for example, collateral values may decline. Using downturn LGDs could act as a countercyclical measure to some degree, by dampening the amplitude of the credit expansion during upturns.
- Basel II recognises that cyclical effects are not fully captured by the minimum capital requirements (Pillar 1). For that reason, the supervisory review process (Pillar 2) requires firms to stress test their capital plans against a significant economic downturn. Banks need to demonstrate that they hold adequate cushions above the regulatory minimum in normal conditions, in order to cope with a decline in those cushions during times of stress.

Authorities in the United Kingdom and internationally will monitor whether these safeguards are effective in containing the procyclicality in Basel II. The Bank and the FSA have put in place an 'early warning system' to track the behaviour of Basel II capital requirements as the majority of large UK banks start applying the IRB approaches from 2008. In parallel with this, international monitoring of procyclicality is being conducted within the EU and by the Basel Committee.

(1) There are two approaches within IRB: foundation and advanced. Banks on foundation IRB use their own estimates of PD, and take set values for the other parameters. Banks on advanced IRB, which includes the large UK banks, calculate PD, LGD and exposure at default.

(2) The Capital Requirements Directive transposes Basel II into EU legislation.

(3) FSA (2006), 'Use of long run probabilities of default, counter-cyclical scaling factors, and the interaction of these with economic cycle stress testing', FSA paper to the Credit Risk Standing Group.

competition between international banks, it is clearly important to ensure that regulators in different countries adopt a broadly consistent approach.

In addition, further consideration is required of the potential for prudential policies that can vary *countercyclically* over time as credit conditions change.<sup>(1)</sup> This would be a useful supplementary tool for policymakers in limiting the potential build-up in risk-taking and credit creation. And the authorities should examine where incentive structures, for example remuneration schemes or market share objectives, may be distorting risk appetite and risk pricing.

## 4.5 Measures to improve crisis handling

A consultation document from the UK authorities, published in January, proposed measures to strengthen the current framework for financial stability and depositor protection in the United Kingdom.<sup>(2)</sup> This subsection highlights key elements of these domestic reforms. It also explains international efforts to improve co-ordination and co-operation should difficulties arise at a cross-border financial institution.

### *Legislation has been proposed for a special resolution regime for banks...*

The consultation document includes measures designed to reduce the likelihood of a bank failing. But where regulatory intervention is not sufficient to turn round a failing bank, the authorities propose that there should be a range of tools available to help resolve the problems in an orderly fashion, thereby reducing the risk of spillovers to the wider financial system. Taken together, these tools would comprise a 'special resolution regime' for banks.

A special resolution regime would have a number of important elements, as outlined in Box 8. Such a regime would represent a significant strengthening of the authorities' ability to intervene in a failing bank, prior to insolvency. The United Kingdom and Sweden are the only countries in the G10 that do not have some form of special regime for managing the failure of a bank — and Sweden is currently considering its own proposals to do so. The proposals outlined in the consultation document would provide the authorities with a wider range of options than are currently available for dealing with a bank in difficulties, whatever the original cause of those problems.

(1) See speeches by Sir John Gieve, 'The return of the credit cycle: old lessons in new markets', 27 February 2008, and Paul Tucker, 'Monetary policy and the financial system', 2 April 2008; both are available at [www.bankofengland.co.uk/publications/speeches/2008/index.htm](http://www.bankofengland.co.uk/publications/speeches/2008/index.htm).

(2) Bank of England, HM Treasury, Financial Services Authority (2008), *Financial stability and depositor protection: strengthening the framework*, Cm 7308, January.

## Box 8

### A special resolution regime for banks

The main purpose of a special resolution regime for banks is to reduce the likely costs of a future banking crisis, by making it easier to handle a failing bank in an orderly way. By amending insolvency processes and allowing resolution before insolvency, it strengthens the authorities' powers when a bank gets into serious difficulties. Without it, resolution can be frustrated by narrow shareholder interests that can put wider financial stability at risk. In these situations, the public sector can come under pressure to support the bank, simply because it is unable to implement other possible solutions.

Previous issues of the *Report* have set out briefly the concept, and benefits, of such a regime. It enables the relevant financial authorities — one or more of the banking supervisor, central bank, deposit insurer and ministry of finance — to take temporary control from the failing bank's directors and shareholders. In doing so, the authorities stand a much better chance of effecting an orderly resolution of the bank than if they are reliant on normal corporate insolvency law. Specifically, such resolution is likely to cause less disruption to the depositors of a bank that has got into difficulties, either by supporting the continuity of banking services upon which they are relying or by facilitating a rapid payout by the deposit insurer. Furthermore, by triggering the regime before insolvency, the authorities can resolve a failing bank when it still has some value, which in turn may make the overall resolution less costly.

#### The international context

The United States and Canada are prominent examples of countries with such regimes. But there is some form of special arrangement for dealing with a failed bank in most other G10 countries (Belgium, France, Germany, Italy, Japan, the Netherlands and Switzerland). A number of other countries — for instance, Australia, New Zealand and Norway — have legislated for specific measures to effect a more orderly resolution of failed banks. Across the G10, Sweden and the United Kingdom are the only countries currently relying on normal corporate insolvency law to resolve failed banks. The Swedish authorities have been considering putting in place a special bank resolution regime for some time. The protracted difficulties they encountered during 2006 in closing Custodia (a small credit market company)<sup>(1)</sup> led the IMF last year to encourage the Swedish authorities to put in place such a regime.

#### A special resolution regime for the United Kingdom

The UK tripartite authorities have proposed the creation of a special resolution regime in their January 2008 consultation document.<sup>(2)</sup> The regime would comprise several elements, which — taken together — would form a coherent means of resolving in an orderly manner any failing bank for which the

FSA's regulatory remedies have been exhausted. The aims of the regime are to support the maintenance of financial stability and that resolution should be prompt, minimise costs and limit disruption to the failed bank's customers. In order to achieve this, the UK authorities have put forward a range of tools that they would expect to choose from when invoking a special resolution regime. **Table 1** summarises these key elements of the proposed resolution regime.

**Table 1** Proposed elements of a special resolution regime

- Triggers that define the point(s) at which a bank would become subject to the regime.
- Powers that would allow the authorities to accelerate transfers of banking business to a third party, such as another bank.
- Powers for the authorities to take control of all or part of the bank (via a 'bridge bank').
- Ensuring that financial support could be provided to the bank if necessary, such as through a public sector guarantee or capital injection.
- A modified insolvency procedure for banks, to ensure that depositors can receive payments quickly if the decision is made to close the bank.
- Powers to appoint a suitable person to carry out the resolution.

Source: Bank of England, HM Treasury, Financial Services Authority (2008), *Financial stability and depositor protection: strengthening the framework*, Cm 7308, January.

Once a special resolution regime is triggered, the authorities would choose the most appropriate of the proposed resolution tools, depending on the circumstances, and have the power to appoint suitable experts to undertake the resolution.

Under a private sector solution, some or all of the bank's business would be purchased (sometimes for a nominal sum) by one or more healthy bank(s). In practice, though, it can be difficult to find a private sector solution in the short time available prior to the special resolution regime being triggered. In these circumstances, setting up a 'bridge bank' would allow the authorities to take temporary control of the failing bank. This would help to minimise interruptions to banking services for its customers, while creating the time for potential acquirers to undertake the necessary due diligence before submitting any proposed bid to acquire ownership of some or all of the bank's business. In practice, a bridge bank would continue the bank's operations largely with its existing staff, until such a private sector solution could be effected.

The authorities would also continue to be able to provide financial support to the distressed bank if circumstances warranted. This might take several forms — for instance, a public sector guarantee, liquidity support or an injection of capital. Under some circumstances, closure of a bank may be the right policy option. It is therefore also important that the UK authorities have the option simply to close down a failed bank, with the deposit insurer paying out rapidly to depositors, as appropriate.

(1) 'Can Swedish authorities handle distressed institutions?', *Riksbank Financial Stability Report (2/2006)*, available at [www.riksbank.com/upload/Dokument\\_riksbank/Kat\\_publicerat/Artiklar\\_FS/fs\\_06\\_2\\_article1.pdf](http://www.riksbank.com/upload/Dokument_riksbank/Kat_publicerat/Artiklar_FS/fs_06_2_article1.pdf).

(2) Bank of England, HM Treasury, Financial Services Authority (2008), *Financial stability and depositor protection: strengthening the framework*, Cm 7308, January.

**Table 4.F** Proposed measures to improve the Financial Services Compensation Scheme (FSCS)

- Requiring banks to have information readily available on deposits that are eligible for payments from the FSCS.
- Enabling the FSA to collect and share data with the FSCS that it requires at an early stage.
- Simplifying the eligibility criteria for FSCS payments.
- Assigning the rights of claimants to the FSCS automatically (rather than requiring a form to be filled out by the depositor).
- Paying compensation without offsetting any loans that the depositor may hold with the failed bank.
- Removing the need for a formal claim to be made to the FSCS by depositors.
- Ensuring that the FSCS has immediate access to the funds it requires through borrowing facilities and, potentially, building up a reserve of funds in advance of a failure.

Source: Bank of England, HM Treasury, Financial Services Authority (2008), *Financial stability and depositor protection: strengthening the framework*, Cm 7308, January.

*...and for faster payouts from the deposit insurance regime.*

The consultation document also proposes measures to strengthen the United Kingdom's deposit insurance scheme, operated by the Financial Services Compensation Scheme (FSCS). These proposals aim to ensure that depositors clearly understand the compensation offered by the FSCS, and have the confidence that it will be delivered quickly and effectively, reducing the likelihood of a retail run. The measures that are required to ensure both a faster and simplified system are set out in **Table 4.F**.

An effective system of deposit insurance also requires credible sources of funding. The consultation document seeks views on alternative funding arrangements for the FSCS. It is currently funded on a 'pay-as-you-go' basis: annual payments are levied on the banking industry based on expected outgoings for the year. If unexpected payments need to be made, the FSCS can borrow around £50 million in a commercial loan facility to be repaid from subsequent levies. This has a number of disadvantages. Since banks are more likely to fail in an economic downturn, contributions are more likely to be required from the remaining banks when they are least able to afford such payments. And the failed bank will not itself have contributed to the cost of compensating its customers.

Building up a reserve through regular levies — so-called pre-funding — could resolve or reduce these problems. Although it is unrealistic to expect to build a fund large enough to insure against any bank failure (so bridge financing from the public sector is likely to be needed in some cases), the build-up of a pool of a small proportion of insured deposits would enable banks to spread their payments over the economic cycle. It would also reduce the likelihood that the FSCS would have to raise additional funds from the market or the public sector at short notice. The payments could be structured to reflect the riskiness of the individual banks paying into the scheme — riskier banks paying more, relative to their insured deposits, and safer banks paying less. Consumers should be reassured by the availability of a standing fund, which would improve the effectiveness of the FSCS. Indeed, 85% of deposit insurance schemes worldwide employ an element of pre-funding.<sup>(1)</sup>

*There are also lessons for the tripartite authorities.*

Recent events have also helped to identify some lessons for the way HM Treasury, the Bank and the FSA work together on financial stability. The consultation document proposes that the FSA and the Bank work more closely together, to build up their common understanding of the risks to financial stability and the actions required to mitigate those risks.

(1) Based on a World Bank survey in 2005/06 of over 140 countries and territories, 79 of which had explicit deposit insurance schemes; 67 of these employed an element of pre-funding.

As part of this, there will be improvements to the arrangements for informing the Bank about developments in individual institutions when they represent a risk to the stability of the system. And the Bank should be involved more directly with individual firms where there is a significant risk of emergency liquidity assistance (ELA) being required. This would enable preparations to take place so that any intervention required by the Bank could be implemented as smoothly and quickly as possible.

The Bank is currently reviewing the design of its lending facilities in times of stress, to maximise the chances that these are effective. The consultation document also proposes for consideration some amendments to the operation of ELA — for example, to permit a temporary delay in the disclosure of assistance to an individual firm and to make it easier to extend ELA to building societies. The consultation document also proposes that the Bank should be given a statutory role in financial stability, with formal oversight of that role being taken by the Bank's Court.

*Efforts to enhance cross-border co-operation have intensified...*

Recent events have also led to intensified efforts to strengthen arrangements for cross-border financial crisis management, including agreement of an updated Memorandum of Understanding for cross-border financial stability within the EU, and the creation of a BCBS group to review cross-border bank resolution.

*...with a need to improve the practical arrangements for cross-border crisis management.*

The complexities involved in cross-border crisis management suggest that crisis management planning issues can be most practically and flexibly addressed through small 'interest groups' of relevant authorities with common financial stability concerns (also known as 'cross-border stability groups'). This type of approach focuses on the issues relating to potential problems in specific firms, markets or infrastructures that are significant for all members of the group. Such interest groups, which concentrate on enhancing the ability to manage crises, would complement the focus of supervisory colleges on issues of ongoing supervision. The FSF recommended, in its recent report, that the most directly involved supervisors and central banks of the largest cross-border financial firms should establish a small group to address specific cross-border crisis management planning.

Supervisory colleges typically consist of staff involved in day-to-day supervision and focus on facilitating information exchange, developing a better understanding of the risk profile of a group, working towards consolidation of supervisory review and risk assessment, and the co-ordination of decisions by individual authorities. Reflecting their role as a forum for information exchange, colleges are likely to have a larger

membership than interest groups, though they may also meet in restricted composition (a 'core' college) to enable targeted discussions of the main activities of a group.

## 4.6 Summary

A number of immediate actions to be taken by market participants and the authorities have been identified. These would help to restore confidence in the financial system. They focus on greater transparency — of exposures to, and the composition of, complex financial instruments, of uncertainties surrounding valuations — to improve the pricing of risk. There is also a need to rebuild confidence in banks' balance sheets — through raising additional capital as a signal of resilience to potential future shocks, and through the provision of central bank liquidity. Further steps should also be taken to improve financial stability in the medium term. These include strengthening firm-wide risk management, improvements to the use and nature of ratings for structured finance products, developing higher standards for the management of liquidity risk, adapting some of the details of the operation of the Basel II regime, exploring ways to offset procyclicality and strengthening crisis management arrangements, both in the United Kingdom and internationally.

## Other financial stability publications

This section provides a short summary of other financial stability related publications and speeches released by the Bank of England since the October 2007 *Report*.

### Regular publications

#### *The Payment Systems Oversight Report 2007.*

The *Payment Systems Oversight Report* provides an account of how the bank is discharging its responsibility for oversight of UK payment systems.

[www.bankofengland.co.uk/publications/psor/index.htm](http://www.bankofengland.co.uk/publications/psor/index.htm)

#### *Markets and operations article, Bank of England Quarterly Bulletin, 2008 Q1.*

This article reviews recent developments in sterling financial markets since the 2007 Q4 *Quarterly Bulletin* up to the end of February 2008. It also reviews the Bank's official operations during this period.

[www.bankofengland.co.uk/publications/quarterlybulletin/qb0801.pdf](http://www.bankofengland.co.uk/publications/quarterlybulletin/qb0801.pdf)

### Speeches

#### *New markets and new demands: challenges for central banks in the wholesale market infrastructure.*

Nigel Jenkinson, Executive Director for Financial Stability, November 2007.

[www.bankofengland.co.uk/publications/speeches/2007/speech328.pdf](http://www.bankofengland.co.uk/publications/speeches/2007/speech328.pdf)

In this speech, Nigel Jenkinson discussed some of the structural changes in the trading, clearing and settlement infrastructure supporting financial markets. He observed that while central banks' typical objectives of monetary and financial stability emerged from an early role in settling claims between banks, the financial infrastructure has broadened and deepened over time, stretching beyond the traditional locus of central banks. And it has continued to evolve, driven by the forces of ever faster technological and financial innovation, regulatory change and the globalisation of banking. He noted that these developments were exposing new sources of risk, posing fresh policy challenges for central banks.

#### *Money and credit: banking and the macroeconomy.*

Paul Tucker, Executive Director for Markets and Monetary Policy Committee member, December 2007.

[www.bankofengland.co.uk/publications/speeches/2007/speech331.pdf](http://www.bankofengland.co.uk/publications/speeches/2007/speech331.pdf)

In this speech, Paul Tucker set out some thoughts on how money and credit matter for the macroeconomy. Though particularly relevant given the recent turmoil in banking and capital markets, his remarks were set against a backdrop of a decade of change in the structure of those markets. He described how these structural changes, in turn, altered both the demand for, and supplies of, money and credit; and challenged the view that the financial system has two independent engines, banking and capital markets. In considering the effect of developments in money and credit supplies on the real economy, he argued that policymakers need to distinguish changes in broad money from changes in credit; and within credit, to be clear about developments in total credit versus bank lending alone; and to understand the connections between them. Further, following the sort of adverse developments in credit conditions experienced recently, he cautioned against policymakers allowing vicious circles to take hold in which tighter liquidity/financial conditions and slower aggregate demand feed back on each other. Finally, he stressed the need for the central banking community to understand, and so to have data illuminating, the underlying drivers of credit expansions and their macroeconomic implications if it is to avoid the difficulties of relying entirely on 'mopping up' after 'bubbles' and guard against the risk of one economic imbalance leading to another.

#### *The impact of the financial market disruption on the UK economy.*

John Gieve, Deputy Governor, January 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech332.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech332.pdf)

In this speech, John Gieve discussed the recent financial market disruption and its impact on the UK economy. He noted that market sentiment remained fragile, with the introduction of new structured credit products leading to opacity and uncertainty over both the location and scale of losses. He concluded that many lessons for markets and authorities can be drawn from recent events. First, the financial shock had underlined the critical importance of liquidity in managing and regulating banks. Second, it had shown up the limitations of the models which underpinned the valuation and rating of structured products, and the excessive weight that had been given to them. Third, it had highlighted the adverse incentives that had been allowed to develop in the distribution chain for credit products, and may also have revealed flaws in compensation schemes in banks. He noted that measures of risk used by companies and regulators could be procyclical, encouraging more risk-taking at the top of the cycle, and warned that as a result of the shock, tighter credit conditions

could lie ahead, which might affect growth by influencing expectations and confidence.

### The Governor's speech in Bristol at a dinner hosted by the Institute of Directors South West and the Confederation of British Industry.

Mervyn King, Governor, January 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech333.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech333.pdf)

In this speech, the Governor discussed the evolution of the turmoil in financial markets, and explained how that turmoil would affect activity in the economy more widely. He noted that the substantial losses made by banks in the main financial centres as a result of the collapse of the US sub-prime mortgage markets posed a threat to the ability of the banking sector to finance continued economic growth. He discussed the sources of the crisis, tracing it back to investors who engaged in a 'search for yield' by buying risky assets without always understanding fully the risks attached to them. As default rates in the US mortgage market had risen, investors had started to question whether they were being adequately compensated for the risks they were bearing, causing the prices of those assets to fall and the markets for some instruments to virtually close. He observed that, at the outset of the crisis, banks had been concerned with protecting their liquidity position, but widespread uncertainty about the scale of banks' losses was now turning the attention towards capital adequacy. He urged banks to reveal losses, and, most importantly, raise new capital where necessary. The Governor warned of tighter credit conditions as a result of the market turmoil and recognised the possibility of a slowdown in economic activity. But the Governor also warned that at the same time, inflation was likely to pick up in the short term, driven by rising food and oil prices.

### The return of the credit cycle: old lessons in new markets.

John Gieve, Deputy Governor, February 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech338.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech338.pdf)

In this speech, John Gieve highlighted the return of the credit cycle and how some old lessons have re-emerged in the new credit markets. He noted that as in previous banking cycles, a period of strong growth, low interest rates and rapid increases in asset prices had led to overconfidence and bad lending at the top of the cycle; defaults, deleveraging and retrenchment had followed in the downswing. But the way this old story had unfolded through the new credit markets had sprung some unpleasant surprises, including the speed with which losses in just one market in one country — the housing market in the United States — had disrupted wider credit markets in all

advanced economies. After analysing the events of the past seven months, he concluded that authorities needed to consider again how far the regulatory regime for capital and liquidity can be made countercyclical, to create a system which raises requirements as the boom gathers pace in order to dampen the upswing and creates additional headroom for losses as the cycle turns — if this is not possible, an alternative may be to require larger capital and liquidity buffers across the whole cycle.

### Sovereign wealth funds and global imbalances.

John Gieve, Deputy Governor, March 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech339.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech339.pdf)

In this speech, John Gieve discussed how sovereign wealth funds (SWFs) were affecting financial markets. He observed that their recent expansion was related to the large current account surpluses that emerging market economies had been accumulating over the past decade. He welcomed the stabilising role SWFs had played in the recent turmoil by providing new capital to the banking sector, and through their long-term investments in a wider range of instruments. But he noted that there was a need for greater transparency of SWFs' strategies and objectives, and also of the recipient countries' approach to inward investment. He also emphasised that large and persistent global imbalances had helped create vulnerabilities in the financial system. There, he recognised the potentially important role that the SWFs could play in helping to avoid an abrupt unwinding of these imbalances if they allowed for an orderly diversification of their investment portfolios.

### Monetary policy and the financial system.

Paul Tucker, Executive Director for Markets and Monetary Policy Committee member, April 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech341.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech341.pdf)

In this speech, Paul Tucker discussed the challenges that the recent turmoil and fragility across financial markets posed to monetary policy and financial stability. On the financial system, the process of deleveraging was not complete and there was a risk that credit creation could be further impaired. Financial markets had moved from a period of prolonged underpricing of risk to plausibly overpricing risk on at least some products. This had been accompanied by a movement towards a much more restrictive supply of credit. Banks were faced with the choice between conserving capital and liquidity to support legacy business or deploying resources to write new business on what some regarded as apparently attractive terms and conditions. But it seemed that there might be reluctance to raise new capital in order to avoid sending

adverse signals to the market, or because they believed assets were fundamentally undervalued and so accounting measures of net worth were understating their strength. In addition, he noted that central bank provision of liquidity insurance was an important facet of the *de facto* Social Contract existing between the banking system and the authorities. But since the summer the technology for such insurance had broken down, due to the stigma on borrowing from Standing Facilities. More broadly, he suggested that a renewed debate was needed on policies to tame the credit cycle, but cautioned that there were formidable obstacles in finding a solution. Finally, as for the current situation, echoing previous speeches, he reiterated that monetary policy, liquidity policy and regulatory capital policy were among the instruments that the authorities needed to use.

#### Strengthening regimes for controlling liquidity risk: some lessons from the recent turmoil.

Nigel Jenkinson, Executive Director for Financial Stability, April 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech345.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech345.pdf)

In this speech, Nigel Jenkinson discussed the importance of liquidity risk management and drew out a number of key lessons for liquidity risk management and supervision from the experience of the past few months. He explained how market developments and changes in banking models over the past decade had increased vulnerability to liquidity risk. A benign macroeconomic background, combined with advances in technology and financial innovation had encouraged investors to seek out riskier investments in a 'search for yield'. These developments had stimulated changes in funding models as many banks took advantage of new, but more volatile, sources of wholesale funding such as securitisation. The resulting increase in exposure to market liquidity risk left banks' funding more vulnerable to a sudden shift in market conditions, as experienced in August 2007. He analysed the limitations of a range of defences employed by banks against a crystallisation of liquidity risk. He noted that reserves of high-quality liquid assets provided the most robust defence against a market-wide liquidity shock, but that these reserves were low. He then identified four emerging lessons from the current crisis. First, improvements to the measurement and modelling of liquidity risk under stressed conditions were required. Second, banks needed to develop stronger contingency funding plans. Third, banks needed to improve disclosure. Finally, supervision should ensure that banks' liquidity risk management was undertaken to a more robust standard, so that some of the costs of a bank failure on the wider financial system were internalised by firms. He welcomed the domestic and international work to deliver stronger standards.

## Financial stability papers

### Monitoring cyclical capital requirements.

James Benford and Erlend Nier, December 2007.

[www.bankofengland.co.uk/publications/fsr/fs\\_paper03.pdf](http://www.bankofengland.co.uk/publications/fsr/fs_paper03.pdf)

The use of credit ratings to set capital requirements under Basel II represents an important change to the way banks are regulated. While encouraging better risk management by banks, Basel II also raises the possibility that capital requirements might vary with economic conditions, increasing the sensitivity of the supply of credit to the economic cycle and so creating risks to the stability of the financial system. This paper offers some evidence on the likely magnitude of these effects. It then sets out a framework that will be used by the Bank and the FSA to monitor Basel II capital requirements. The Bank is particularly interested in possible implications of cyclical variability in capital requirements under Basel II for the UK banking sector in aggregate, while the FSA's focus is the capital adequacy of individual banks. The paper finally suggests that the industry, as well as market participants, can play a part in avoiding potential unintended consequences of Basel II — through careful capital planning by banks, and scrutiny by market participants of the outputs of banks' internal rating systems.

### Reforming the IMF's lending-into-arrears framework.

Paul Bedford and Gregor Irwin, April 2008.

[www.bankofengland.co.uk/publications/fsr/fs\\_paper04.pdf](http://www.bankofengland.co.uk/publications/fsr/fs_paper04.pdf)

Episodes of sovereign default are typically associated with significant economic costs. The International Monetary Fund can help to mitigate these costs in a variety of ways, including by lending into arrears. Careful design of the broad policy framework governing the Fund's involvement can help to ensure it has the maximum beneficial impact, without distorting the incentives of either the defaulting country or its creditors. This paper aims to identify some of the issues that are relevant to the design of such a framework, and which might helpfully be considered as part of the forthcoming review of the Fund's lending-into-arrears policy.

## Working papers

### Risks and efficiency gains of a tiered structure in large-value payments: a simulation approach.

Ana Lasaosa and Merxe Tudela, January 2008.

[www.bankofengland.co.uk/publications/workingpapers/wp337.pdf](http://www.bankofengland.co.uk/publications/workingpapers/wp337.pdf)

### The integrated impact of credit and interest rate risk on banks: an economic value and capital adequacy perspective.

Mathias Drehmann, Steffen Sorensen and Marco Stringa, January 2008.

[www.bankofengland.co.uk/publications/workingpapers/wp339.pdf](http://www.bankofengland.co.uk/publications/workingpapers/wp339.pdf)

### Financial innovation, macroeconomic stability and systemic crises.

Prasanna Gai, Sujit Kapadia, Stephen Millard and Ander Perez, February 2008.

[www.bankofengland.co.uk/publications/workingpapers/wp340.pdf](http://www.bankofengland.co.uk/publications/workingpapers/wp340.pdf)

### Efficient frameworks for sovereign borrowing.

Gregor Irwin and Gregory Thwaites, March 2008.

[www.bankofengland.co.uk/publications/workingpapers/wp343.pdf](http://www.bankofengland.co.uk/publications/workingpapers/wp343.pdf)

### Network models and financial stability.

Erlend Nier, Jing Yang, Tanju Yorulmazer and Amadeo Alentorn, April 2008.

[www.bankofengland.co.uk/publications/workingpapers/wp346.pdf](http://www.bankofengland.co.uk/publications/workingpapers/wp346.pdf)

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# Glossary and other information

## Glossary of selected data and instruments

**ABCP** – asset-backed commercial paper.

**ABS** – asset-backed security.

**ABX** – a set of indices linked to credit default swaps on US sub-prime home equity loans of specific vintage and rating.

**Alt-A** – a classification of mortgages where the risk profile falls between prime and sub-prime.

**CDO** – collateralised debt obligation.

**CDS** – credit default swap.

**CDX** – a family of indices offering credit default protection against groups of North American and emerging market companies of various quality and over a range of maturities.

**CLO** – collateralised loan obligation.

**CMBS** – commercial mortgage-backed security.

**CMBX.NA** – a set of indices linked to credit default swaps on US commercial mortgages of specific vintage and rating.

**ERI** – exchange rate index.

**GDP** – gross domestic product.

**iTraxx** – a family of indices offering credit default protection against groups of European and Asian companies of various quality and over a range of maturities.

**Libor** – London interbank offered rate.

**MBS** – mortgage-backed security.

**RMBS** – residential mortgage-backed security.

**SIV** – structured investment vehicles.

**TB** – Treasury bill.

**VIX index** – a measure of the 30-day option-implied volatility of S&P 500 index.

## Abbreviations

**BBA** – British Bankers' Association.

**BCBS** – Basel Committee on Banking Supervision.

**BTL** – buy to let.

**CEE** – Central and Eastern Europe.

**CESR** – Committee of European Securities Regulators.

**CFP** – contingency funding plan.

**CHAPS** – Clearing House Automated Payment System.

**CLS** – Continuous Linked Settlement.

**ECB** – European Central Bank.

**ELA** – emergency liquidity assistance.

**EME** – emerging market economy.

**EOD** – event of default.

**EU** – European Union.

**FRBNY** – Federal Reserve Bank of New York.

**FSA** – Financial Services Authority.

**FSCS** – Financial Services Compensation Scheme.

**FSF** – Financial Stability Forum.

**FTSE** – Financial Times Stock Exchange.

**FVA** – fair-value accounting.

**G7** – Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.

**G10** – Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States.

**HBF** – Home Builders Federation.

**HEL** – home equity loan.

**HM Treasury** – Her Majesty's Treasury.

**IMF** – International Monetary Fund.

**IoD** – Institute of Directors.

**IOSCO** – International Organisation of Securities Commissions.

**IPD** – Investment Property Databank.

**IRB** – internal ratings based.

**LCFI** – large complex financial institution.

**LGD** – loss given default.

**LTV** – loan to value.

**MoU** – Memorandum of Understanding.

**MSCI** – Morgan Stanley Capital International Inc.

**OIS** – overnight indexed swap.

**OMO** – open market operation.

**ONS** – Office for National Statistics.

**PD** – probability of default.

**PIT** – point in time.

**PNFC** – private non-financial corporations.

**RICS** – Royal Institute of Chartered Surveyors.

**RoE** – return on equity.

**S&P** – Standard and Poor's.

**SEC** – US Securities and Exchange Commission.

**SLR** – sterling stock liquidity.

**SWF** – sovereign wealth fund.

**TAF** – Term Auction Facility.

**TSLF** – Term Securities Lending Facility.

**TTC** – through-the-cycle.

**VaR** – Value-at-Risk.

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