

# Financial Stability Report

October 2008 | Issue No. 24



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 can 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 and supplier of liquidity 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, as 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.

## **The Financial Stability Board:**

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Andrew Bailey  
Charles Bean  
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Mervyn King  
Paul Tucker

This document was delivered to the printers on 27 October 2008 and, unless otherwise stated, uses data available as at 15 October 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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# Executive summary

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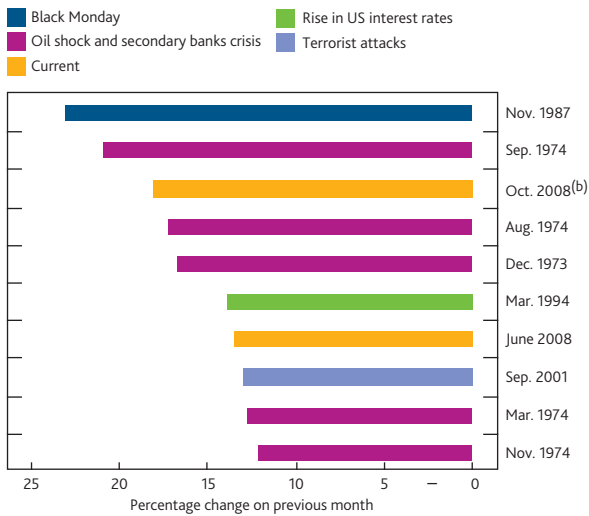
In recent weeks, the global financial system has undergone a period of exceptional instability. This instability was rooted in weaknesses within the financial system that developed during an extended global credit boom: rapid balance sheet expansion; the creation of assets whose liquidity and credit quality were uncertain in less benign conditions; and fragilities in funding structures. While these weaknesses had been identified, including by the Bank in previous *Reports*, few predicted that they would lead to such dislocation in the global financial system.

Over the past six months, rising macroeconomic uncertainty, partly due to tightening credit conditions, helped expose these weaknesses. Falling asset prices and a weakening economic outlook added materially to expected losses and increased uncertainty about the value of banks' asset portfolios. As counterparty risk rose, lenders became progressively more reluctant to offer term financing, accentuating pressures on institutions with a high dependence on wholesale funding. Banks and other financial institutions sought to protect their balance sheets through asset sales and tighter credit supply. But that led to further asset price falls and increased uncertainty about economic prospects and banks' viability, as an adverse cycle began to develop.

Towards the end of the summer, stress at the two largest US mortgage corporations and the failure of Lehman Brothers were followed by severe strains in the global interbank funding network and widespread institutional distress. In response, central banks provided additional liquidity and national authorities supplied or brokered new capital for specific institutions under stress or facilitated the merger or exit of firms without an independent future. While helpful, these institution-specific measures failed to forestall acute system-wide pressures on financial institutions during late September and early October.

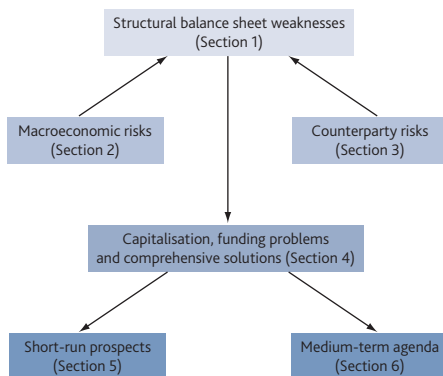
In response, on 8 October the UK authorities announced a comprehensive and system-wide support package that addressed directly weaknesses in UK banks' balance sheets. The package supports capital raising to bolster confidence in the resilience of UK banks. And an extension of the Special Liquidity Scheme and the provision of guarantees on new debt issuance offer assurance about banks' short-term and medium-term funding positions. Subsequently, other countries adopted system-wide measures with similar underlying principles.

These exceptional interventions by governments and central banks should help to stabilise the banking system in the period ahead. While there are still risks in the wider financial system, the immediate response to the measures has been positive. Over time, against the backdrop of an economic downturn, banks will need to adjust their balance sheets and funding models, weaning themselves off current high levels of official sector support. Lending growth is likely to remain slower than in recent years. Looking further ahead, recent events have highlighted the need for a fundamental rethink internationally of appropriate safeguards against systemic risk, including through the development of macroprudential policies to dampen the financial cycle.

**Chart 1** Falls in UK bank equity prices, 1970–2008<sup>(a)</sup>

Sources: Thomson Datastream and Bank calculations.

- (a) Monthly data are the average of the daily observations in the month. The labels show events occurring around the time of the dates on the chart.  
 (b) October 2008 figure used in the calculation is the average of daily observations to 20 October.

**Figure A** Overview of *Financial Stability Report* structure

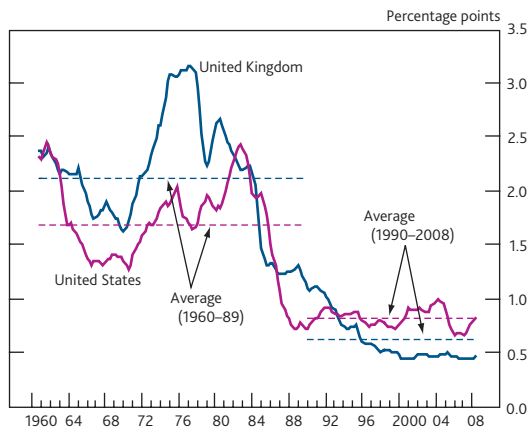
## Introduction

This *Report* has been prepared against the backdrop of exceptional instability in the UK and global financial system. Investor appetite for risky assets has collapsed internationally. Declines in UK bank equity prices over the past month have been comparable to those in previous episodes of severe UK financial stress (**Chart 1**). Pressures on the UK banking system have been arguably as severe as at any time since the beginning of the First World War. Strains in the global interbank funding network have placed financial institutions under intense pressure and a number have failed. These developments have prompted national authorities to take unprecedented actions aimed at underpinning the banking system.

The *Report* aims to:

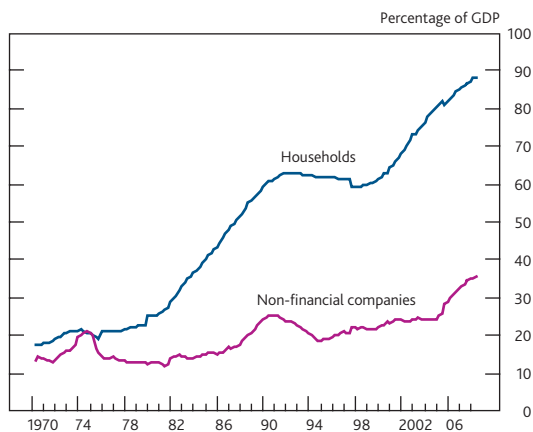
- Provide a perspective on financial developments over recent years (Section 1) — and since the publication of the Bank's April 2008 *Report* (Section 2) — that culminated in the severe turmoil of recent months.
- Highlight the key phases of the turmoil and outline the initial responses of the authorities (Section 3).
- Explain why further exceptional measures taken by the authorities during October were needed, how they were designed and how they are expected to work (Section 4).
- Set out the Bank's view on prospects for the financial system (Section 5) and the medium-term policy agenda for strengthening financial stability (Section 6).

**Figure A** sets out schematically the key dimensions of the crisis and how they relate to the structure of the *Report*. An Annex provides a detailed timeline of events since the start of the sub-prime crisis.

**Chart 1.1** Volatility of real GDP growth<sup>(a)</sup>

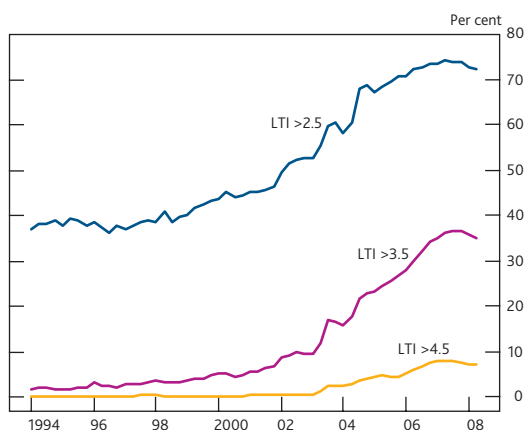
Sources: ONS, Thomson Datastream and Bank calculations.

(a) Five-year rolling average of annualised volatility of quarter-on-quarter growth rate. 2008 data are to Q2.

**Chart 1.2** Bank lending to households and non-financial companies in the United Kingdom<sup>(a)</sup>

Sources: Bank of England, Thomson Datastream and Bank calculations.

(a) Data include the value of loans that have been securitised.

**Chart 1.3** Loan to income ratios for house purchases in the United Kingdom<sup>(a)(b)</sup>

Sources: FSA, Survey of Mortgage Lenders and University of Essex.

(a) Chart shows the proportion of mortgages with loan to income ratios greater than 2.5, 3.5 and 4.5.

(b) FSA data are used from 2005 Q2 onwards. The back-run has been constructed using the changes in the series from the Survey of Mortgage Lenders data set.

## 1 An extended global credit boom

### *Rising savings and global imbalances...*

Over the past year, financial market participants have been struggling to manage vulnerabilities that are the legacy of a prolonged spell of balance sheet expansion. The seeds of this boom can be traced back to the development of financial and trade imbalances among the major economies over the past decade, as discussed in previous *Reports*. Increased borrowing in a number of developed countries was in part financed with inflows of foreign capital, leading to greater integration in international capital markets. The counterpart was growing current account surpluses in oil-exporting countries and in some Asian economies, which reached around US\$1 trillion in 2007. The latter developed as national saving increased in the wake of the 1997–98 currency crises in that region.

### *...led to low interest rates and a rise in borrowing...*

High savings in Asia contributed to low global long-term real interest rates. Cheap exports from China and elsewhere in Asia, along with growth in world trade, contributed to falls in inflation in a number of developed countries. Nominal short-term interest rates were reduced to very low levels. At the same time, economic conditions remained stable by historic standards, a period described by some as the 'Great Moderation' (Chart 1.1).

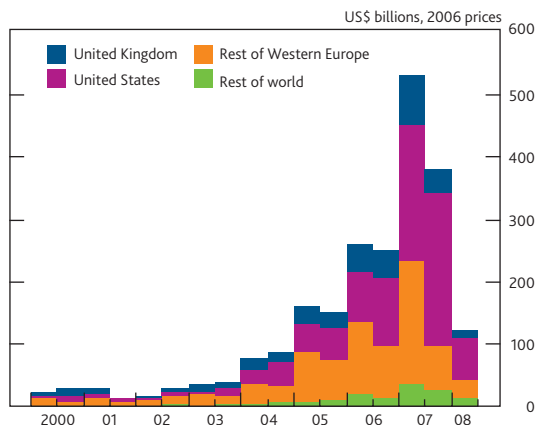
Benign economic conditions helped anchor expectations of continued stability. This, along with rising asset prices and low global real interest rates, boosted the demand for and supply of credit in a number of developed economies. Household and corporate borrowing rose rapidly, including in the United Kingdom (Chart 1.2). Over time, banks took on progressively more credit risk by lending to, for example, households with high loan to income (LTI) ratios (Chart 1.3), leveraged buyout firms (Chart 1.4) and, in the United States, to the sub-prime sector.

### *...inducing a 'search for yield' in financial markets...*

As discussed in previous *Reports*, apparent reductions in macroeconomic uncertainty and strong competitive pressures to maintain returns encouraged investors and financial firms to take on ever greater risk. Financial market liquidity rose steadily (Chart 1.5) and asset prices increased sharply (Chart 1.6), reflecting a 'search for yield'. This was further evident in lower discrimination between instruments of differing credit quality and the development of a wave of ever more complex financial instruments employing leverage to generate higher returns. This enabled banks increasingly to package and distribute assets internationally.

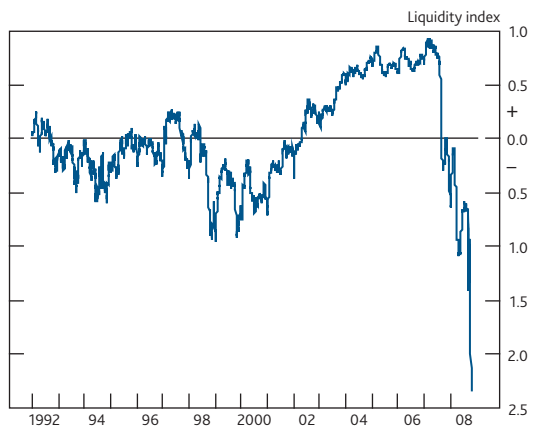
### *...a greater dependence on wholesale and overseas funding...*

Although falling saving ratios in the United Kingdom and some other developed economies constrained retail deposit funding,

**Chart 1.4 Real leveraged buyout loan issuance<sup>(a)</sup>**

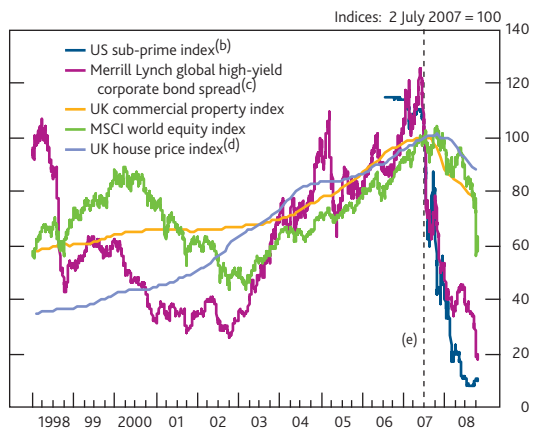
Sources: Dealogic, US Bureau of Economic Analysis and Bank calculations.

(a) Bi-annual syndicated lending deflated by US GDP deflator. Data include refinancing of leveraged buyouts and dividend recapitalisation — a loan taken out to pay dividends.

**Chart 1.5 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. The recent fall in the indicator is largely due to a sharp decline in the interbank market liquidity measure.

**Chart 1.6 Selected asset prices<sup>(a)</sup>**

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

(a) Data to close of business on 20 October 2008.  
 (b) Sub-prime series is the A-rated 2006, H2 vintage ABX.HE index.  
 (c) Series inverted.  
 (d) Average of Halifax and Nationwide house price indices.  
 (e) Dashed line shows start of July 2007.

UK banks were able to expand lending by tapping funds from international wholesale markets. In 2001, UK customer lending was comparable to customer deposits. But by 2008 H1, the surplus of lending over deposits — the customer funding gap — was £700 billion (Chart 1.7). Much of this funding was ultimately sourced overseas. In particular, the United States acted as an intermediary, attracting capital inflows from the rest of the world and exporting these funds to other countries. Chart 1.7 shows that foreign interbank deposits rose from 2001, supporting a rise in the customer funding gap.

#### *...and a rapid expansion in banks' balance sheets.*

These developments led to a near tripling in the value of large complex financial institutions' (LCFIs)<sup>(1)</sup> assets between 2001 and 2007. In the United Kingdom, the major banks'<sup>(2)</sup> balance sheets rose by a similar proportion (Chart 1.8). This growth was driven by a rapid rise in trading book activity and lending, leading to sharp increases in leverage ratios — assets relative to equity — at some banks (Chart 1.9). The relatively low risk weighting of some assets meant, however, that regulatory capital ratios remained broadly flat over the period.

Moreover, this growth in bank balance sheets understated the broader expansion in risk-taking. Many financial institutions exploited strong demand for yield from elsewhere in the financial system — including among conduits and structured investment vehicles — to generate higher profitability. As discussed in the April 2007 Report, this led to a decline in the quality of credit risk assessment in the system and a high dependence on sustained market liquidity. A by-product of the development of this 'originate and distribute' business model was a significant increase in interconnectedness internationally, both within the banking system and between banks and other financial institutions.

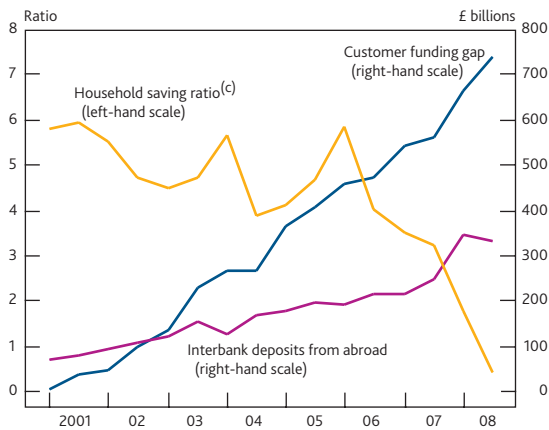
#### *Rising sub-prime defaults ended this boom...*

Previous Reports highlighted a number of these vulnerabilities. They were triggered ultimately by rising defaults on US sub-prime mortgages. Losses spilled over across global financial markets with unexpected virulence and breadth, turning the previous cycle of rising asset prices and credit quality into reverse. Securitisation markets used to distribute assets broke down as the extent of the deterioration in credit standards was revealed. Valuation uncertainty rose sharply, particularly for more complex products where informational problems were most acute, as end-investors lost confidence in

(1) LCFIs include the world's largest banks and other financial intermediaries that carry out a diverse and complex range of activities in major financial centres. For this Report, the group of LCFIs is: 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. Lehman Brothers is included in the peer group to 15 September 2008.

(2) 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.

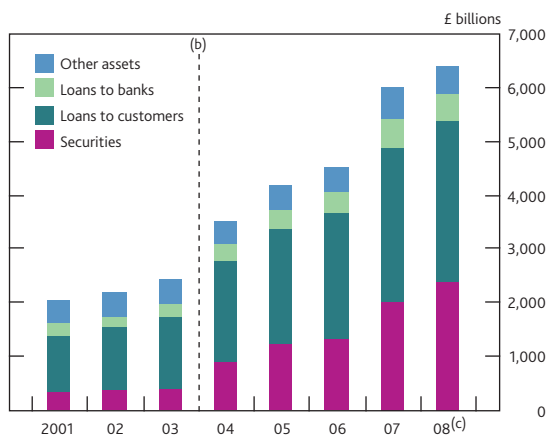
**Chart 1.7** Major UK banks' customer funding gap,<sup>(a)</sup> household saving ratio and foreign interbank deposits<sup>(b)</sup>



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

- (a) Customer funding gap is customer lending less customer funding, where customer refers to all non-bank borrowers and depositors.  
 (b) Data exclude Nationwide.  
 (c) UK household savings as a percentage of post-tax income.

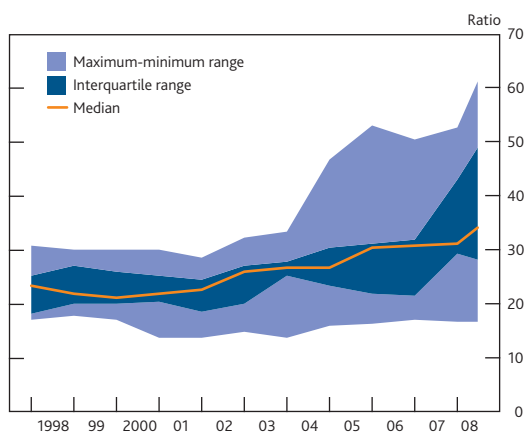
**Chart 1.8** Major UK banks' assets<sup>(a)</sup>



Sources: BankScope published by Bureau van Dijk Electronic Publishing, published accounts and Bank calculations.

- (a) Excludes Nationwide due to lack of interim data.  
 (b) IFRS break.  
 (c) 2008 H1.

**Chart 1.9** Major UK banks' leverage ratio<sup>(a)(b)</sup>



Sources: Published accounts and Bank calculations.

- (a) Leverage ratio defined as total assets divided by total equity excluding minority interest.  
 (b) Excludes Nationwide due to lack of interim data.

credit rating methodologies. Asset prices fell below levels that could be explained by credit fundamentals alone, as liquidity and uncertainty premia increased significantly. And opacity in the distribution of exposures across institutions added to perceptions of heightened counterparty credit risk in interbank markets.

*... exposing vulnerabilities within the financial system.*

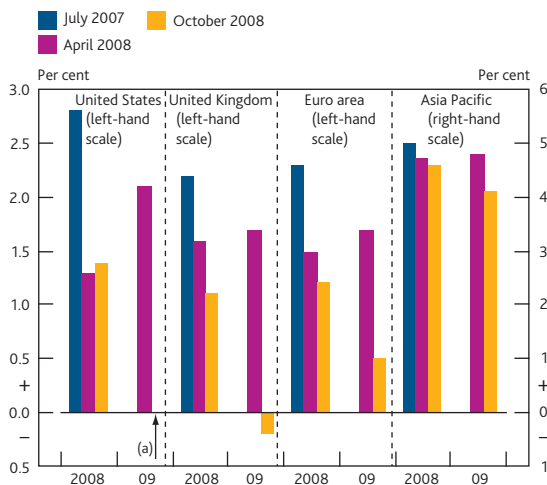
Some observers expected the resulting market turmoil to be short-lived. But over time it became increasingly clear that problems within the banking system were deep seated, rooted in structural weaknesses in banks' balance sheets that had developed during the boom years. These weaknesses included:

- Inflated aggregate balance sheets, whose expansion had in many cases far outpaced growth in the real economy.
- Expansion into certain assets whose underlying value, credit quality and liquidity were uncertain — whether lending to higher-risk households and corporates or the holding of complex securities.
- Liability structures which were overly reliant on the sustained availability of wholesale funding and whose maturity was often short.
- Capital levels which, given these asset and liability structures, became in some cases low relative to underlying balance sheet risks.
- Underappreciated, but potent, interconnections between firms in the global financial system.

These structural problems laid the foundations for the sharp increase in instability in the summer, which culminated in large-scale government interventions to support financial stability during October.



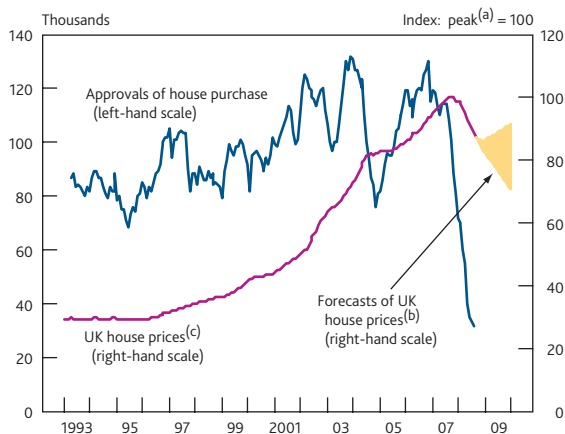
**Chart 2.1 International GDP growth forecasts**



Source: Consensus Economics Inc.

(a) October 2008 forecast of US GDP growth in 2009 was zero.

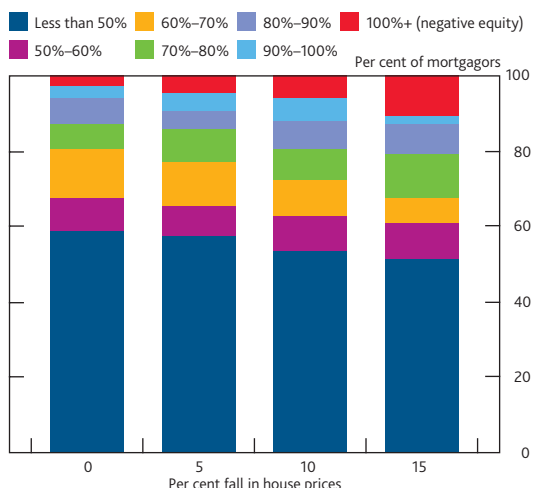
**Chart 2.2 UK house prices and activity**



Sources: Bank of England, Halifax, HM Treasury, Nationwide and Bank calculations.

(a) October 2007.  
 (b) House price projections are based on a range of forecasts from 'Forecasts for the UK economy: a comparison of independent forecasts', October 2008 (compiled by HM Treasury), as represented by the orange shaded area.  
 (c) Average of Halifax and Nationwide house price indices.

**Chart 2.3 Loan to value ratios in selected UK house price fall scenarios<sup>(a)</sup>**



Sources: 2008 NMG Research survey and Bank calculations.

(a) NMG Research survey conducted between 19 September and 2 October 2008.

## 2 An adverse spiral develops

### *A self-fulfilling spiral of falling confidence...*

Against the backdrop of structural balance sheet problems, the April 2008 *Report* set out two possible paths ahead for the financial system. Conditional on banks raising sufficient new capital, the most likely path was judged to be a gradual recovery in market sentiment and confidence in financial institutions. That path envisaged a progressive adjustment in balance sheet structures, and higher bank losses as the economy slowed, but did not anticipate acute financial distress. For a while, during May and June, events looked to be evolving in line with this path. But the *Report* also highlighted the danger of an adverse cycle in which falling asset prices and a deteriorating economic outlook further undermined confidence in banks, leading to a sharper and more extended tightening in credit conditions and thus a weakening in economic prospects. That risk has materialised in recent months and has been amplified by the system-wide loss of confidence in financial institutions that accompanied the failure of Lehman Brothers. This chain of events exposed long-standing vulnerabilities in the financial system.

### *...triggered by deteriorating macroeconomic prospects...*

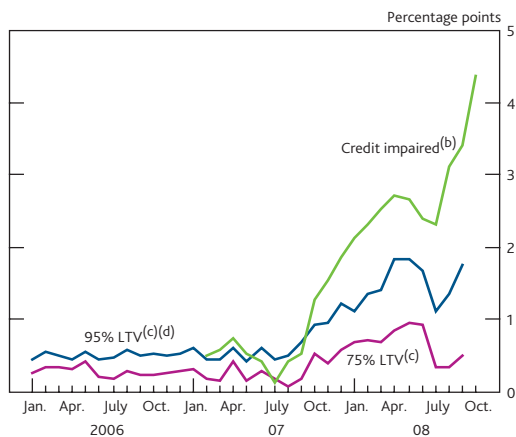
A key trigger for the deterioration since the April *Report* was the weakening international and UK macroeconomic outlook (**Chart 2.1**). A slowdown had been widely anticipated in response to tighter credit conditions, but sharp rises in commodity and food prices earlier this year led markets to expect both higher interest rates over the next two years and a more rapid and pronounced slowdown. These downward revisions to international growth forecasts were also associated with an increase in macroeconomic uncertainty. This increased risks to UK and global banks' asset portfolios, much of which are either directly or indirectly linked to developments in the household and corporate sector.

### *...with weakening housing markets internationally...*

Weak real income growth, greater uncertainty about employment prospects, falling house and equity prices and tighter credit conditions have raised concerns about household debt vulnerabilities in a number of countries. US house prices continued to decline and in July 2008 the Case-Shiller house price index was 19% below its level in June 2006. UK house prices have fallen by 13% from their peak in October 2007, a faster rate of decline than that seen in the United States and nearing the total nominal fall in UK house prices in the early 1990s. UK housing market activity has also weakened with approvals reaching their lowest level on record in August 2008. House price forecasts suggest further falls, although the size of these falls is highly uncertain (**Chart 2.2**).

While house prices were rising, many households had accumulated substantial buffers of housing equity. Falls in house prices reduce the size of these buffers and, for some

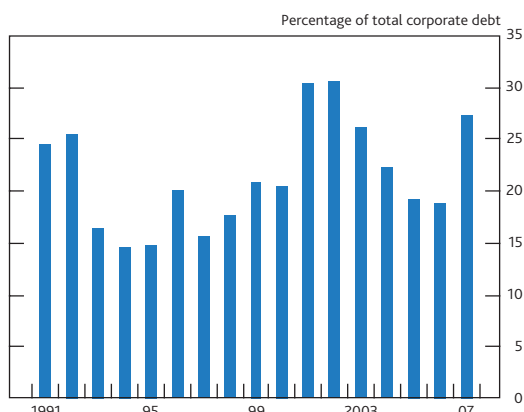
**Chart 2.4** Spreads on mortgage products by credit quality of borrower<sup>(a)</sup>



Sources: Bank of England, Bloomberg, Moneyfacts Group and Bank calculations.

- (a) Spread of quoted mortgage rates over final observation of maturity-matched swap rate from previous month.  
 (b) Average of three-year fixed-rate mortgages.  
 (c) Five-year fixed-rate mortgage. September 2008 data provisional.  
 (d) The size of the sample on which these data are based has fallen markedly since the start of the financial market turmoil: the most recent data (September 2008) are based on only three products; in July 2007, data were based on a sample of twelve products.

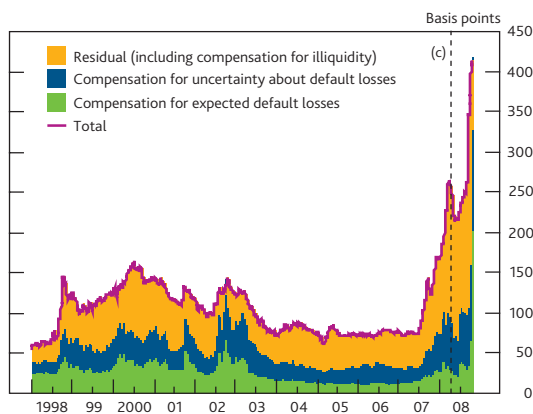
**Chart 2.5** Share of corporate debt accounted for by businesses with interest payments greater than profits<sup>(a)(b)</sup>



Sources: Bureau van Dijk and Bank calculations.

- (a) Non-financial firms of at least 100 employees.  
 (b) Profits are defined as earnings before interest and tax.

**Chart 2.6** Decomposition of sterling-denominated investment-grade corporate bond spreads<sup>(a)(b)</sup>



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

- (a) Webber, I 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.  
 (c) April 2008 Report.

borrowers, could result in negative equity. There are a variety of estimates of the prospective scale of negative equity.

**Chart 2.3** provides some estimates of negative equity for different falls in house prices using Bank calculations based on data from the 2008 NMG survey.

*...affecting recent first-time buyers and buy-to-let mortgagors.*

Falls in house prices are likely to affect in particular borrowers with high loan to value (LTV) ratios and buy-to-let (BTL) landlords. Since 2000, LTVs for first-time buyers have averaged 90%, compared to 80% for all mortgages for house purchase. In the BTL market, tighter credit conditions, combined with falling house prices and rising LTVs, are likely to lead to substantial refinancing costs for many landlords. In recent years, expected capital gains from house price appreciation may have made landlords willing to subsidise these costs. But falling house prices — and expectations of further falls — may erode this willingness and lead to increased arrears and/or selling of properties. The BTL sector accounted for 11% of the total mortgage debt outstanding in 2008 Q2, compared to just 2% in 2000.

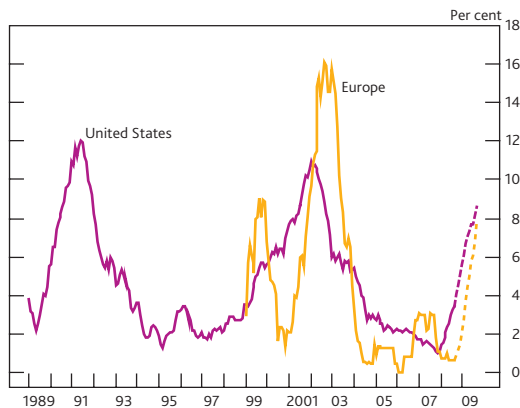
The Bank of England 2008 Q3 *Credit Conditions Survey* suggested that credit conditions had tightened since the middle of 2007 and were expected to tighten further over the next few months.<sup>(1)</sup> This tightening has been particularly acute for high-risk borrowers — for example, high LTV and adverse credit borrowers (**Chart 2.4**). Higher-risk borrowers may find themselves only able to refinance on standard variable rate products. In that case, they are likely to face a mortgage payment jump of perhaps around 2 percentage points. Since the April Report, Bank Rate has fallen by 50 basis points, and market expectations suggest it may fall by a further 100 basis points over the next six months which, if realised, would tend to offset these jumps.

*Corporate sector prospects have deteriorated...*

Despite the slowing economy, corporate insolvency rates remain near historical lows. Many companies extended debt maturities during the recent boom, with Dealogic data suggesting that only about 10% of the stock of sterling-denominated bonds and loans outstanding are due to mature in 2009. But within that aggregate picture, there are pockets of vulnerability. Company accounts suggest that the proportion of debt held by businesses whose profits were not large enough to cover their debt interest payments picked up sharply in 2007 to around a quarter of the outstanding stock of debt (**Chart 2.5**). As the economy slows profit growth is likely to weaken, increasing corporate vulnerability: particularly at businesses heavily dependent on the retail and property markets and some highly leveraged companies.

(1) The survey is available at [www.bankofengland.co.uk/publications/other/monetary/creditconditions.htm](http://www.bankofengland.co.uk/publications/other/monetary/creditconditions.htm).

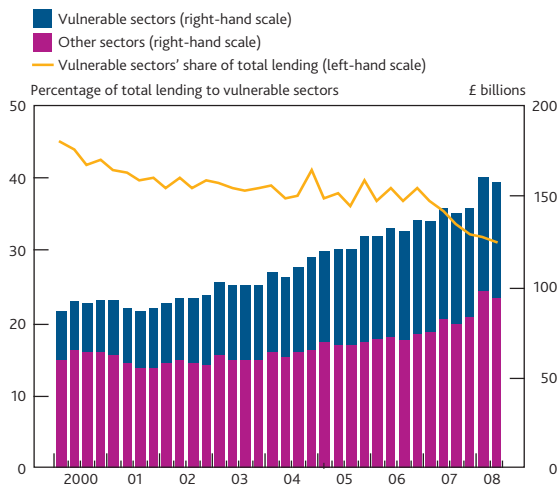
**Chart 2.7** European and US speculative-grade corporate default rates and forecasts<sup>(a)(b)</sup>



Source: Moody's Investors Service.

(a) Trailing twelve-month issuer-weighted speculative-grade corporate default rates.  
(b) Solid lines show historical data. Dashed lines show Moody's forecasts for October 2008 to September 2009.

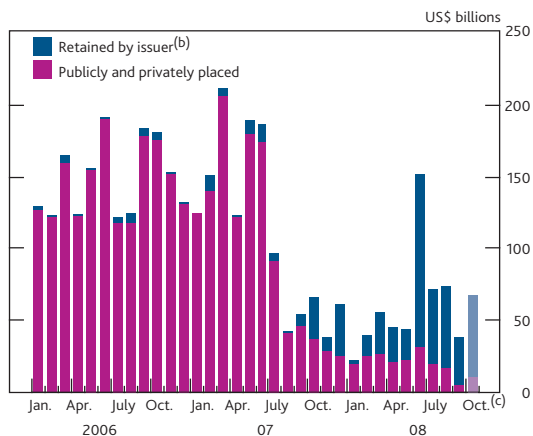
**Chart 2.8** Major UK banks' undrawn NFC credit facilities<sup>(a)(b)(c)</sup>



Sources: Bank of England and Bank calculations.

(a) Credit facilities include all undrawn overdrafts, loans and advances to non-financial corporates (NFC). Excludes facilities related to banks' securities holdings in corporates.  
(b) Data exclude Nationwide.  
(c) Sectors identified as vulnerable are real estate, construction, retail and wholesale.

**Chart 2.9** Global residential mortgage-backed securities issuance<sup>(a)</sup>



Sources: Dealogic and Bank calculations.

(a) Non-retained issuance proxied by issuance eligible for inclusion in underwriting league tables. Retained issuance proxied by issuance not eligible for inclusion.  
(b) This includes RMBS used as collateral in central bank operations.  
(c) Shaded area is total up to 20 October 2008.

By September 2008, UK commercial property prices had declined by 24% from their June 2007 peak. With falling prices pushing more commercial property loans into negative equity, rental growth slowing sharply (by 3.2 percentage points to 0.8% in September 2008) and tighter credit availability, covenant breaches are likely to increase. This may force some commercial property businesses to refinance or default.

Reflecting these pressures, corporate bond spreads have risen sharply since the start of the turmoil, with the rise in UK spreads since the April 2008 Report largely accounted for by an increase in expected default losses (Chart 2.6). Moody's projections suggest that default rates are also expected to rise sharply across Europe and in the United States over the next year (Chart 2.7).

In aggregate, non-financial corporates have large undrawn credit facilities with UK banks (Chart 2.8). If drawn upon, these would substantially increase UK banks' exposures to corporates in general — by around £160 billion — including to those sectors most exposed to the current economic slowdown.

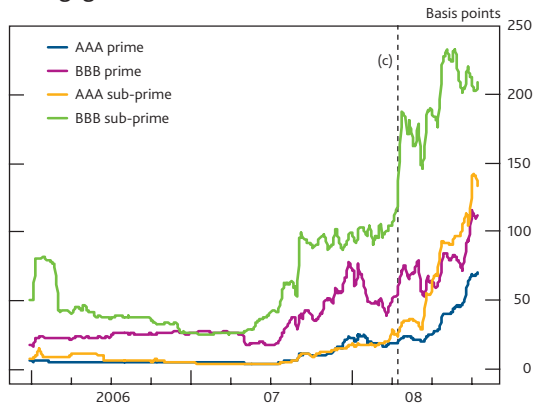
*...with further falls in asset prices and sustained market illiquidity...*

Deteriorating economic prospects have been reflected across a broad range of financial instruments. Spreads in US secondary credit markets widened further, not only for sub-prime related securities but also for a range of other asset classes, including prime mortgages, automobile loans and credit card lending. New issuance of residential mortgage-backed securities (RMBS) has remained very low internationally, other than securitisations of assets for use as collateral in borrowing from central banks (Chart 2.9).

Secondary market prices continue to embody significant discounts for illiquidity and uncertainty. Reflecting this, bid-ask spreads on UK RMBS have widened further since the April Report (Chart 2.10). These premia reflect an overhang of supply and a reluctance by investors with cash to invest while prices may yet fall further. That has led to a lack of price discovery, amplifying uncertainty about asset values and mispricing. For example, there remains significant variation and inconsistencies between the prices of US sub-prime RMBS tranches (Chart 2.11).

Falling market prices have resulted in high mark-to-market losses on securitised instruments, including UK prime RMBS. Box 1 suggests that implied mark-to-market losses on securitised credit instruments and corporate bonds have roughly doubled since the April Report. Across the United Kingdom, the United States and euro area, these mark-to-market losses are now estimated to be around US\$2.8 trillion. The eventual expected loss of economic value on these assets is expected to be lower. As Box 1 sets out, for

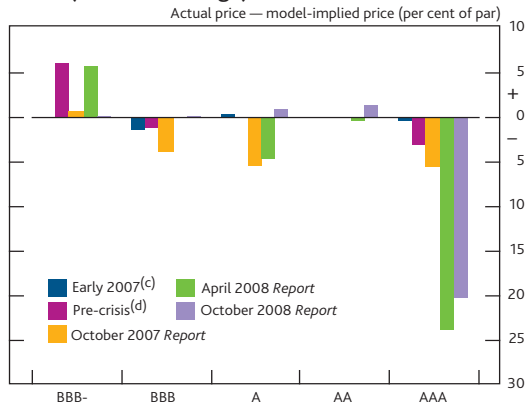
**Chart 2.10 Bid-ask spreads on UK residential mortgage-backed securities<sup>(a)(b)</sup>**



Sources: Markit Group Limited and Bank calculations.

- (a) Spread between the average bid and ask prices quoted by dealers for UK RMBS.
- (b) Five-day centred rolling average.
- (c) April 2008 Report.

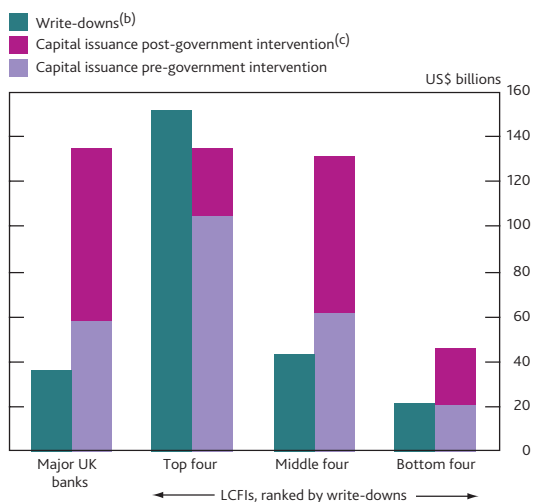
**Chart 2.11 Anomalies in prices of the ABX sub-prime index (2007 H1 vintage)<sup>(a)(b)</sup>**



Sources: JPMorgan Chase & Co. and Bank calculations.

- (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) For the purposes of this chart, the loss given default rate is assumed to be 50%.
- (c) 19 January 2007.
- (d) 13 July 2007.

**Chart 2.12 Major UK banks' and LCFIs' write-downs and capital issuance since 2007 Q3<sup>(a)</sup>**



Sources: Bloomberg, company releases, published accounts and Bank calculations.

- (a) Issuance qualifying for total capital must have been completed or announced between 2007 Q3 and 20 October 2008. Total capital raised was US\$460 billion, of which 37% was common equity.
- (b) Includes write-downs due to mark-to-market adjustments on trading book positions where details have been disclosed by firms.
- (c) Issuance announced on or after 13 October 2008.

UK prime RMBS the loss of economic value built up from projections of underlying cash flows is estimated at around 54% of the current loss of market value since the start of the crisis; and for US sub-prime RMBS it is around 63%.

*... causing rising and more broadly based losses...*

As economic prospects have deteriorated, concerns about future loan quality have increased. Financial institutions have raised provisions and impairments on their banking book positions. They have also made further write-downs on their trading book assets which, as the economic deterioration became more broadly based, became more prominent among assets other than sub-prime mortgage-backed securities.

Write-downs and impairments reduced banks' revenues and led to further pressure on some banks' capital positions. Capital raised by UK and global banks earlier in the year (prior to the government measures announced in October 2008) was for most banks sufficient to cover reported write-downs up to that point (Chart 2.12). But banks' capital raising did not necessarily make allowance for a further sharp deterioration in future loan quality, as macroeconomic prospects deteriorated.

Some institutions — including the US securities houses — sought to strengthen their position by reducing the size of their balance sheets. In some cases, this required sharp price discounts as traditional bearers of risk — including hedge funds and institutional investors — were either credit constrained or reluctant to buy assets whose prices could fall further. Banks also sought to limit asset growth by tightening further credit availability.

*... and heightened concerns about institutional risk.*

Falling asset prices and tighter credit conditions further weakened sentiment about the economic outlook, feeding back to declining confidence in the banking system, as an adverse spiral developed. Taken together, these developments increased concerns about the future profitability, and in some cases viability, of an increasing number of financial institutions.

## Box 1

### Losses on financial assets

The April 2008 *Report* explained how investor demand for structured financial instruments rapidly dried up as default losses on securities backed by US sub-prime mortgages began to accelerate in the second half of 2007. Since then, structured credit markets have remained impaired internationally and the prices of securitised financial assets have fallen substantially. Demand for residential mortgage-backed securities (RMBS) has remained particularly weak, including in the United Kingdom. These developments partly reflect the deterioration in the global macroeconomic outlook, and the likely increase in impairments on loans to households and corporates that are used to back securitised assets. But current market valuations are also likely to reflect substantial discounts for uncertainty about eventual collateral performance and market illiquidity across structured product markets.

This box describes how mark-to-market losses on securitised credit instruments, and unsecuritised corporate bonds, have risen since the April *Report*. It then examines the extent to which falls in the *market values* of UK prime RMBS and US sub-prime RMBS can be reconciled with their likely *economic values*, by projecting forward credit losses on those securities because of defaults on the underlying collateral.<sup>(1)</sup>

### Market value losses on financial assets

**Table 1** provides estimates of the loss of market value that investors have incurred on selected securitised credit instruments and corporate bonds since the start of 2007, before the financial crisis began. Mark-to-market losses have increased substantially since the April *Report* across the majority of instruments, roughly doubling for the United Kingdom and the United States, and rising by even more for the euro area.<sup>(2)</sup> Total mark-to-market losses across the three currency areas have risen to around US\$2.8 trillion.<sup>(3)</sup> This is equivalent to around 85% of banks' pre-crisis Tier 1 capital globally of US\$3.4 trillion, though only some of these market value losses are directly borne by banks.

There are important differences in the prospects for collateral performance across UK and other markets which, other things being equal, ought to be reflected in market valuations. For example, the performance of US sub-prime loans is likely to be markedly weaker than for UK prime mortgages. Further, the mortgage collateral pools backing the majority of UK RMBS vary over the lifetime of the security,<sup>(4)</sup> unlike most US RMBS which are backed by static pools. Despite these differences in the scale of likely credit losses and in instrument structuring, AAA-rated UK prime RMBS spreads and US sub-prime RMBS spreads have, until recently, tracked each other very closely

**Table 1** Mark-to-market losses on selected financial assets<sup>(a)(b)</sup>

	Outstanding amounts	Losses: Apr. 2008 Report	Losses: Oct. 2008 Report
<b>United Kingdom (£ billions)</b>			
Prime residential mortgage-backed securities	193	8.2	17.4
Non-conforming residential mortgage-backed securities	39	2.2	7.7
Commercial mortgage-backed securities	33	3.1	4.4
Investment-grade corporate bonds	450	46.2	86.5
High-yield corporate bonds	15	3.0	6.6
<b>Total</b>		<b>62.7</b>	<b>122.6</b>
<b>United States (US\$ billions)</b>			
Home equity loan asset-backed securities (ABS) <sup>(c)</sup>	757	255.0	309.9
Home equity loan ABS collateralised debt obligations (CDOs) <sup>(c)(d)</sup>	421	236.0	277.0
Commercial mortgage-backed securities	700	79.8	97.2
Collateralised loan obligations	340	12.2	46.2
Investment-grade corporate bonds	3,308	79.7	600.1
High-yield corporate bonds	692	76.0	246.8
<b>Total</b>		<b>738.8</b>	<b>1,577.3</b>
<b>Euro area (€ billions)</b>			
Residential mortgage-backed securities <sup>(e)</sup>	387	21.5	38.9
Commercial mortgage-backed securities <sup>(e)</sup>	34	2.8	4.1
Collateralised loan obligations	103	6.8	22.8
Investment-grade corporate bonds	5,324	283.8	642.9
High-yield corporate bonds	175	29.1	75.9
<b>Total</b>		<b>344.1</b>	<b>784.6</b>

Source: Bank calculations.

(a) Estimated loss of market value since January 2007, except for US collateralised loan obligations which are losses since May 2007.

(b) Data to close of business on 20 October 2008.

(c) 2005 H1 to 2007 H2 vintages. The home equity loan asset class is comprised mainly of US sub-prime mortgages, but it also includes, for example, other mortgages with high loan to value ratios. Home equity loans are of lower credit quality than US Alt-A and prime residential mortgages.

(d) High-grade and mezzanine ABS CDOs, excluding CDO-squareds.

(e) Germany, Ireland, Italy, Netherlands, Portugal and Spain.

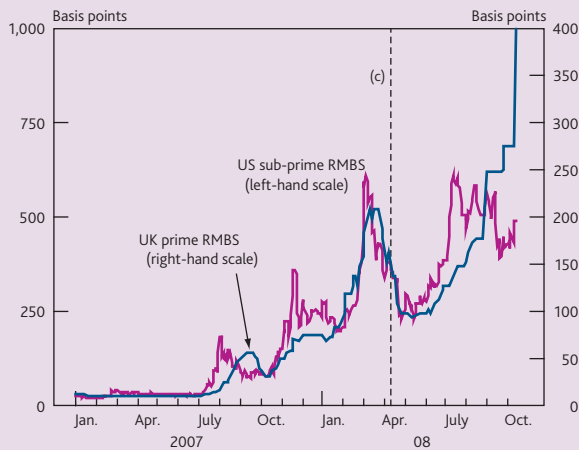
since the start of the crisis (**Chart A**). This comovement is consistent with investors demanding common uncertainty and illiquidity premia for even very highly rated structured credit exposures.

### Projected credit losses on US sub-prime RMBS

Box 1 from the April 2008 *Report* projected that a central estimate of credit losses on US sub-prime RMBS because of defaults on the underlying mortgages could ultimately reach around US\$170 billion. This was significantly less than the estimated mark-to-market loss at the time of some US\$380 billion. The difference between these two figures was attributed to market participants demanding substantial discounts for uncertainty about the eventual scale of credit losses and illiquidity in the secondary market for US sub-prime RMBS.

This analysis has been updated to account for the deterioration in the US housing market since the April *Report*, and to incorporate improved estimates of the volume and distribution by age and rating of sub-prime loans that remain

**Chart A** AAA-rated UK prime RMBS and US sub-prime RMBS spreads<sup>(a)(b)</sup>



Sources: JPMorgan Chase & Co. and Nomura.

(a) ABX.HE 2006-1 credit default swap premia and five-year UK prime RMBS spread over Libor.  
 (b) Data to close of business on 20 October 2008.  
 (c) April 2008 Report.

outstanding. Projected credit losses on US sub-prime RMBS are now larger (at around US\$195 billion), but remain significantly lower than the estimated loss of market value (of around US\$310 billion), consistent with investors continuing to demand substantial uncertainty and illiquidity premia.<sup>(5)</sup>

### Projected credit losses on UK prime RMBS

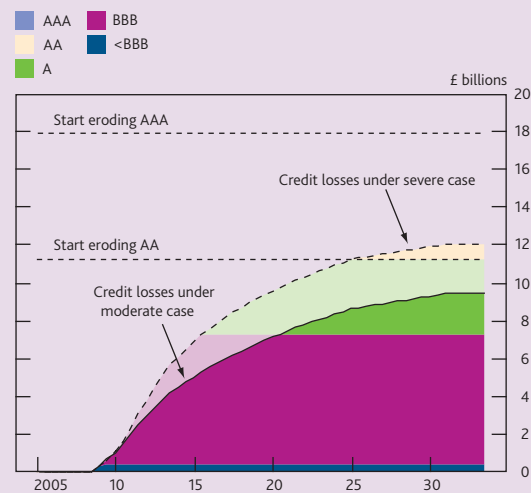
The likely scale of eventual credit losses on tranches of UK prime RMBS can be estimated by projecting forward UK mortgage arrears<sup>(6)</sup> and tracking default losses on the collateral backing those securities.<sup>(7)</sup> However, because UK prime RMBS mortgage collateral pools are not static, it is also necessary to project forward the pool composition until the RMBS tranches mature. This box assumes a legal maturity date in 25 years' time.

The current composition of the representative collateral pool backing UK prime RMBS can be estimated from the stock of RMBS outstanding and the flow of secured lending over the recent past, to match a given average amount of seasoning for the mortgages in the collateral pool.<sup>(8)</sup> The evolution of the pool going forward can then be estimated by assuming that (at least some of) the oldest mortgages are pre-paid as time elapses. Part of the total amount pre-paid in each period is used to amortise the principal balance of RMBS claims outstanding, with the remainder being used to buy new mortgage receivables for the collateral pool.<sup>(9)</sup>

By combining the projected composition of the collateral pool at each point in time and the per-period projected foreclosure rate with an illustrative loss given default, or loss severity, of 45%,<sup>(10)</sup> aggregate credit losses can be estimated across the collateral pool. They can then be allocated to the current stock of RMBS tranches outstanding, taking into account the relative seniority of the claims.

If, over the next three years, mortgage arrears were to roughly double from their current levels to 2.8% before steadily falling back ('moderate case'), credit losses on UK prime RMBS would cumulate over time to reach a little over £9.4 billion after 25 years — relative to a current principal outstanding of £193 billion. This loss rate of 4.9% is insufficient to erode fully the A-rated tranche (**Chart B**). If, instead, arrears were to increase more abruptly over the next three years to 4.4%<sup>(11)</sup> — a little under three quarters of the peak seen in the early 1990s — losses would accumulate to just over £12 billion, but even then would erode only a fraction of the AA-rated tranche ('severe case'). Under these moderate and severe projections for mortgage arrears rates, very high loss severities of around 85% and 65% respectively would be needed for the AAA-rated tranche to be affected.

**Chart B** Credit losses on UK prime RMBS<sup>(a)(b)</sup>



Source: Bank calculations.

(a) Loss of principal assuming a loss given default of 45%, and adjusting the composition of the collateral pool every six months to account for partial principal amortisation using mortgage pre-payments.  
 (b) AA-rated and AAA-rated tranches start to be eroded when loss rates on the mortgage collateral pool reach 5.8% and 9.2% respectively.

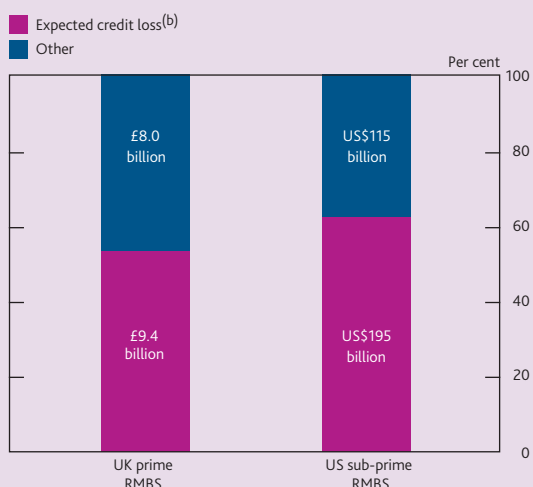
### Comparison of mark-to-market and credit losses

As **Chart C** shows, it is difficult to reconcile the outlook for expected credit losses on UK prime RMBS (**Chart B**), and hence the likely economic value of those securities, with current implied market values (**Chart A**). Based on this comparison, it is estimated that a little under half of the loss of market value of UK prime RMBS is likely to reflect discounts for uncertainty about future collateral performance and market illiquidity.<sup>(12)</sup> And around one third of mark-to-market losses on US sub-prime RMBS can be attributed to the premia demanded by investors for uncertainty and market illiquidity.

### Drivers of illiquidity in the UK prime RMBS market

Before the start of the financial crisis, banks and their vehicles — including structured investment vehicles (SIVs) and conduits, which were often held off balance sheet — accounted for roughly half of the investor base in AAA-rated

**Chart C** Comparison of mark-to-market losses on UK prime RMBS and US sub-prime RMBS<sup>(a)</sup>

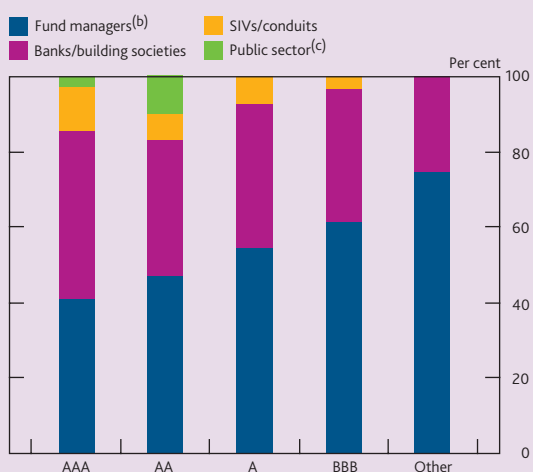


Source: Bank calculations.

(a) Data to close of business on 20 October 2008.

(b) Percentage of mark-to-market losses explained by expected credit losses. Actual credit losses are likely to be significantly lower for UK prime RMBS than US sub-prime RMBS.

**Chart D** Estimated pre-crisis investor base in UK prime RMBS by institution type and rating<sup>(a)</sup>



Sources: Citi, European Securitisation Forum, JPMorgan Chase & Co. and Bank calculations.

(a) Estimated from a number of investment bank surveys relating to the period 2004–06.

(b) Includes money market funds.

(c) Includes supranational, sovereign wealth funds and agencies.

UK prime RMBS (Chart D). Money market mutual funds were also key investors, both directly and also indirectly through the financing of SIVs and conduits by purchasing the asset-backed commercial paper (ABCP) they issued.

As the sensitivity of certain structured credit exposures to deteriorating economic conditions has been revealed, demand from money market mutual funds for such instruments and the ABCP issued by SIVs has abruptly dried up, making the off balance sheet model increasingly unviable. Combined with the growing impairment of loans held on banks' balance sheets, the pre-crisis investor base for large parts of the UK prime RMBS capital structure has all but disappeared. This

dislocation has led to substantially lower liquidity in the UK prime RMBS market, and contributed to the falls in the market values of such instruments to below their likely economic values if they were held to maturity (Chart C).<sup>(13)</sup>

## Summary

Mark-to-market losses on securitised credit instruments and corporate bonds have increased substantially since the April Report overall, and have been extremely volatile over the period. Implied mark-to-market losses are very large since the start of 2007. But they continue to reflect significant premia for uncertainty about future collateral performance and illiquidity in secondary markets.

Under both moderate and severe projections for UK mortgage arrears, AAA-rated UK prime RMBS claims do not experience fundamental credit losses. The economic values of these assets lie significantly above their current market values. But investor appetite for these exposures remains weak and spreads on AAA-rated tranches have risen since the April Report. In part, this reflects the abrupt dislocation in the pre-crisis investor base for UK prime RMBS. It may also reflect the risk of forced asset sales by distressed institutions which, if crystallised, would put further downward pressure on the prices of securitised mortgage bonds. Short-term downside risks to prices are likely to be deterring some investors from participating in the UK prime RMBS market.

(1) This distinction is important given the growth in banks' trading books and in the use of mark-to-market accounting over the recent past. See also Section 6.

(2) For domestic investors in each of the three currency areas. For example, losses for UK investors holding non-UK assets will be affected by movements in sterling bilateral exchange rates since the start of the crisis.

(3) The estimated mark-to-market losses on US securitised assets shown in Table 1 are broadly consistent with those recently published in the IMF's *Global Financial Stability Report*. The losses on US investment-grade and high-yield corporate bonds reported in Table 1 are substantially larger than reported by the IMF following the abrupt falls in the prices of such securities between the end of September and mid-October.

(4) Generally, UK prime RMBS are 'Master Trusts', in which the trust manager can buy new mortgages for the collateral pool as old ones are repaid.

(5) These figures reflect a decline in the estimated volume of outstanding US sub-prime mortgages, a shift in the distribution of mortgages outstanding towards older and more highly valued securities, and more severe assumed profiles for cumulative loss rates on recent vintages of US sub-prime loans.

(6) Assuming that the current transition rate (of 6% per quarter) from mortgages that are three or more months in arrears to repossession remains fixed going forward.

(7) This has close parallels with the stress-testing approach described in Box 4.

(8) 3.1 years, based on the average seasoning for six large Master Trusts.

(9) The seller is initially assumed to own 20% of the trust, and must maintain ownership of at least 4%, based on the characteristics of six large UK prime RMBS deals. The balance of the collateral pool is therefore larger than the amount of RMBS outstanding. Credit losses are allocated on a *pro-rata* basis between the part owned by the seller and the part owned by RMBS investors.

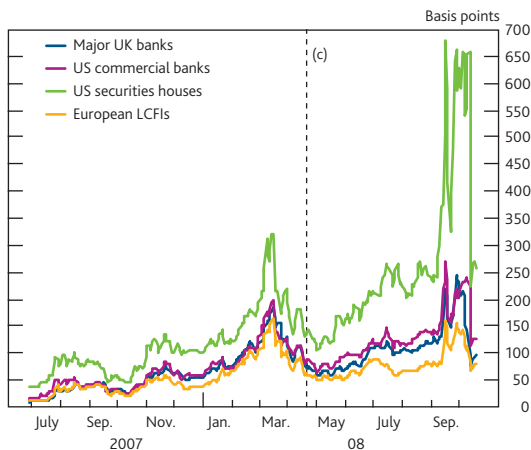
(10) This includes legal fees incurred by the mortgage lender after repossession and any shortfall of the property value below the outstanding loan balance.

(11) As used in the stress scenario described in Box 4.

(12) Absent risk premia for uncertainty and market illiquidity, a loss severity of more than 80% is required to reconcile current mark-to-market losses.

(13) On 15 October 2008, the European Commission adopted amendments to existing accounting standards to allow European firms to reclassify trading assets as being held to maturity, with the aim of partially mitigating the recent volatility in financial market prices.

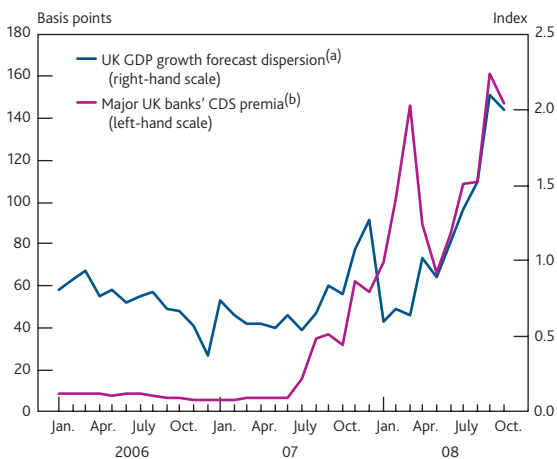
**Chart 3.1** Major UK banks' and LCFIs' credit default swap premia<sup>(a)(b)</sup>



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

- (a) Data to close of business on 20 October 2008.  
 (b) Asset-weighted average five-year premia.  
 (c) April 2008 Report.

**Chart 3.2** UK GDP growth forecast dispersion and major UK banks' credit default swap premia



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

- (a) 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 between January 1998 and October 2008.  
 (b) Monthly average of asset-weighted five-year CDS premia except for last estimate, which is the average to close of business on 20 October 2008.

### 3 Institutional risks materialise

Institutional pressures were evident through the summer in progressive rises in the cost of insurance against bank defaults (**Chart 3.1**). Against the backdrop of deteriorating economic prospects, increased concerns about counterparty credit risk (**Chart 3.2**) sustained tight conditions in money markets (**Chart 3.3**), despite measures by central banks to enhance liquidity (**Table 3.A**).

A number of prominent financial institutions failed towards the end of the summer. The structural vulnerabilities of some institutions made them susceptible to spillovers, which were propagated across a highly interconnected global financial system. Fragility increased with each successive institutional failure, as confidence in the viability of other institutions fell and counterparty credit risk rose.

There were three key phases of institutional distress.

#### *Problems started with Fannie Mae and Freddie Mac...*

The first phase was distress at US financial institutions. As the US housing market continued to weaken, concern about the solvency of the US mortgage finance agencies Fannie Mae and Freddie Mac picked up markedly in mid-summer (**Chart 3.4**). Market analysts concluded, on the basis of mark-to-market valuations of the agencies' assets and expectations of further losses, that the agencies were poorly capitalised (**Chart 3.5**). This fuelled doubts about the agencies' ability to support the US housing market, further compounding the negative outlook for the US economy. On 7 September, the agencies were placed into conservatorship<sup>(1)</sup> by the Federal Housing Finance Agency and given access to capital and funding from the US Treasury in order to avoid unacceptably large dislocations in the financial sector and the economy as a whole. While that action reduced the expectation of default on agency unsecured debt and securitisations, it caused losses for the agencies' equity and subordinated debt holders.

#### *...and then shifted to the major US securities houses...*

The severe problems at Fannie Mae and Freddie Mac sharpened the market's focus on other financial institutions. Banks' equity prices fell and their credit default swap (CDS) premia increased sharply (**Chart 3.1**). Investors were particularly concerned about some of the major US securities houses<sup>(2)</sup> (**Chart 3.4**) due to a combination of exposures to distressed assets (**Chart 3.6**) and wholesale funding dependencies. As concerns about the survival of these institutions became more acute, access to secured funding became restricted in already tight interbank markets. Some of

(1) Conservatorship is a legal process whereby control of an entity is transferred to another entity — the conservator — by court order, or in the case of regulated business enterprises, via statutory or regulatory authority.

(2) This includes the LCFIs formally designated as securities houses: Goldman Sachs, Lehman Brothers, Merrill Lynch and Morgan Stanley.



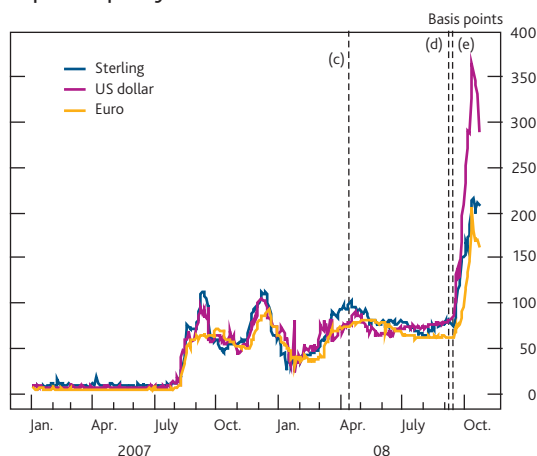
**Table 3.A** Major central bank operational announcements since April 2008<sup>(a)</sup>

	Bank of England	Federal Reserve	European Central Bank	Co-ordinated central bank announcements <sup>(b)</sup>
<b>May</b>	Announced that expanded three-month long-term repos would be maintained in June and July.	Expanded size of Term Auction Facility (TAF). Extended collateral of Term Securities Lending Facility (TSLF).		Expansion of agreements between Federal Reserve and European Central Bank.
<b>July</b>		Introduced 84-day TAF. Primary Dealer Credit Facility (PDCF) and TSLF extended to January 2009. Authorised the auction of options for primary dealers to borrow Treasury securities from the TSLF.	Announced that it would conduct operations under the 84-day TAF to provide US dollars to European Central Bank counterparties. Announced that supplementary three-month longer-term refinancing operations (LTROs) would be renewed in August and September.	
<b>September</b>	Announced that expanded three-month long-term repos would be maintained in September and October. Announced long-term repo operations to be held weekly. Extended drawdown period for Special Liquidity Scheme (SLS).	Expanded collateral of PDCF. Expanded size and collateral of TSLF. Announced provision of loans to banks to finance purchase of high quality asset-backed commercial paper from money market mutual funds.	Announced six-month LTROs would be renewed in October, and three-month LTROs would be renewed in November and December. Conducted Special Term Refinancing Operation.	Expansion of agreements between Federal Reserve and European Central Bank. Establishment of swap agreements between Federal Reserve and Bank of England, subsequently expanded. Bank of England and European Central Bank, in conjunction with Federal Reserve, announced operation to lend US dollars for one week over quarter end, subsequently extended to scheduled weekly operations.
<b>October</b>	Extended collateral for one-week US dollar repos and for three-month long-term repos. Extended collateral of all extended-collateral sterling long-term repo operations, US dollar repo operations, and the SLS to include bank-guaranteed debt under HM Government's bank debt guarantee scheme. Announced Operational Standing Facilities and a Discount Window Facility, which together replace existing Standing Facilities.	Announced payment of interest on required and excess reserve balances. Increased size of TAFs. Announced creation of the Commercial Paper Funding Facility.	Increased size of six-month supplementary LTROs. Announced reduction in corridor of standing facilities from 200 basis points to 100 basis points around the interest rate on the main refinancing operation. Introduced swap agreements with Swiss National Bank.	Announced schedules for TAFs and Forward TAFs for auctions of US dollar liquidity during the fourth quarter. European Central Bank and Bank of England announced tenders of US dollar funding at 7-day, 28-day, 84-day maturities at fixed interest rates for full allotment. Swap agreements increased to accommodate required level of funding.

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

(a) Data to close of business on 20 October 2008.

(b) Co-ordinated actions also involved on one or more occasions some or all of the Bank of Canada, Bank of Japan, Danmarks Nationalbank, Norges Bank, Reserve Bank of Australia, Sveriges Riksbank and Swiss National Bank.

**Chart 3.3** 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 rates.

(b) Data to close of business on 20 October 2008.

(c) April 2008 Report.

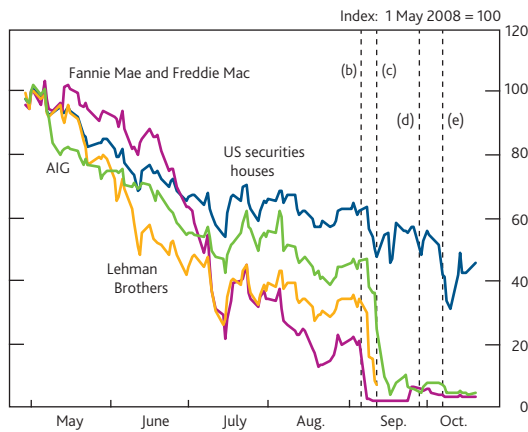
(d) Fannie Mae and Freddie Mac taken into conservatorship.

(e) Lehman Brothers Holdings files for Chapter 11 bankruptcy protection.

these institutions also found their liquidity position was vulnerable to the withdrawal of deposits by hedge funds on which they had come to rely for liquidity.

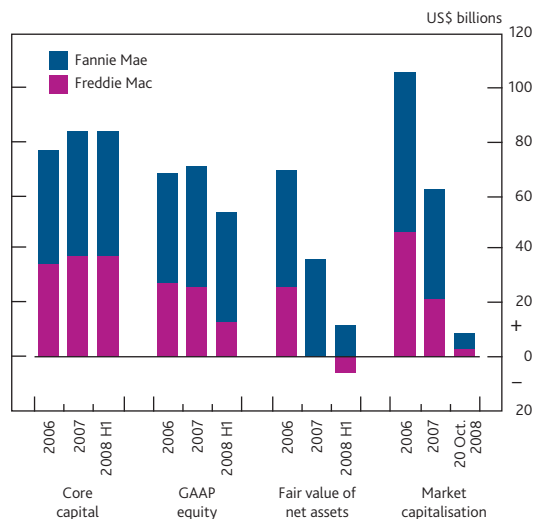
Lehman Brothers came under particular market scrutiny. Some investors believed the firm was significantly undercapitalised, in particular because of its exposures to commercial real estate (**Chart 3.6**). Counterparties became increasingly reluctant to roll over wholesale funding and confidence in the firm dwindled. On 15 September, the holding company and the European subsidiary went into administration, threatening losses to investors, debt holders and counterparties.

The possible collapse of AIG — a large US insurer — because of losses related to its substantial structured credit exposures, then became the dominant fear in US markets. On 15 September, AIG's credit rating was downgraded, forcing it to post a substantial amount of collateral to its counterparties. It was unable to liquidate sufficient assets quickly enough and on

**Chart 3.4** Equity prices of distressed institutions<sup>(a)</sup>

Sources: Bloomberg and Bank calculations.

- (a) Data to close of business on 20 October 2008.  
 (b) Fannie Mae and Freddie Mac taken into conservatorship.  
 (c) Lehman Brothers Holdings files for Chapter 11 bankruptcy protection.  
 (d) Benelux, Icelandic and UK governments nationalise or take stakes in banks.  
 (e) UK authorities announce comprehensive package of measures.

**Chart 3.5** Capital positions of Fannie Mae and Freddie Mac

Sources: Bloomberg and published accounts.

16 September the US government announced a support package, agreeing to lend US\$85 billion in return for a 79.9% stake.

Around that time, the remaining major US securities houses took steps to secure their positions. Merrill Lynch — which had had a similar level of exposure to distressed assets as Lehman Brothers (**Chart 3.6**) — was acquired by Bank of America. Goldman Sachs and Morgan Stanley came under increased pressure as the viability of the US securities houses' business model — taking leveraged positions funded in wholesale markets — was questioned, and the market capitalisation of US securities houses fell sharply (**Chart 3.7**). On 21 September, Goldman Sachs and Morgan Stanley announced plans to become bank holding companies. This opened up the prospect of building a base of retail deposits and provided access to the US Federal Reserve's discount lending window (in addition to the Primary Dealer Credit Facility).

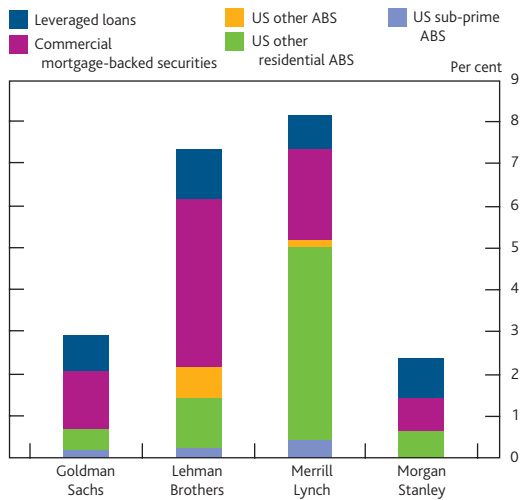
*...leading to an international breakdown of interbank funding markets...*

The second phase of the turmoil involved rapidly rising stress across funding and other financial markets. The failure of Lehman Brothers caused a step increase in market stress internationally as counterparties took steps to limit their exposures to the company and to other financial institutions. Lending maturities in the interbank market were shortened, with many banks and other institutions only able to borrow overnight. Three-month Libor spreads over official rates hit new highs (**Chart 3.3**). Money withdrawn from the market was reinvested in assets perceived to be a safe haven, such as gold and government debt. US Treasury bill yields fell towards, and briefly below, zero (**Chart 3.8**), reaching levels last seen during the Second World War.

The role of money market mutual funds (MMMFs) in contracting the supply of credit to banks was particularly significant.<sup>(1)</sup> Many investors withdrew money from US dollar MMMFs (**Chart 3.9**) after some funds made losses on holdings of Lehman Brothers' commercial paper (CP). Around 5% of assets under management were withdrawn in the second half of September alone. In addition, many clients switched investments from so-called 'prime' funds that invest in private sector debt, including CP, to funds that invest in government debt. That forced MMMFs to reduce their own investments in CP, contributing to a US\$74 billion (or 4.2%) fall in the total amount of dollar-denominated CP outstanding during the first week following the failure of Lehman Brothers, and a shortening in the maturity of new issuance (**Chart 3.10**).

(1) The characteristics and investment strategies of money market mutual funds are explained in Hilton, A (2004), 'Sterling money market funds', *Bank of England Quarterly Bulletin*, Summer, pages 176–82.

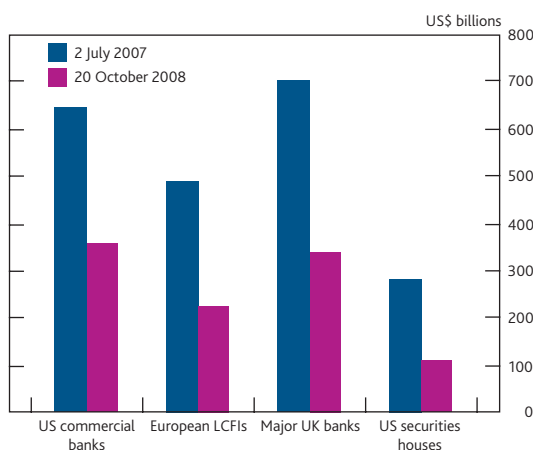
**Chart 3.6** US securities' houses exposures to structured credit as a proportion of total assets at end-2008 Q3<sup>(a)</sup>



Sources: Published accounts and Bank calculations.

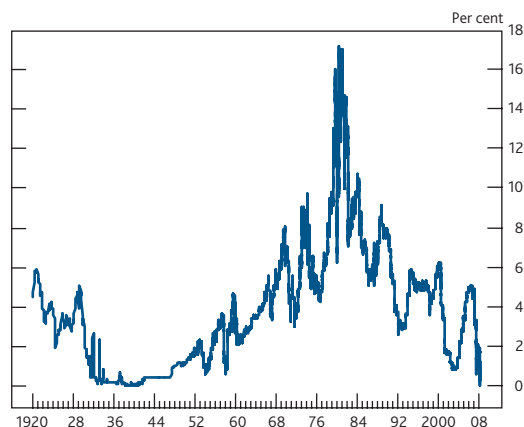
(a) Includes exposures to leveraged loans and asset-backed securities where details disclosed by firms.

**Chart 3.7** Major UK banks' and LCFIs' market capitalisation



Sources: Bloomberg and Bank calculations.

**Chart 3.8** 90-day US Treasury bill yield<sup>(a)</sup>



Source: Global Financial Data.

(a) Data to close of business on 20 October 2008.

*...and affecting wider financial markets.*

The complexity of Lehman Brothers' business and its cross-border structure also led to wider disruption in international financial markets. It took creditors time to determine their total exposure and some investors lost access to funds that had been held by Lehman Brothers. That disrupted their ability to trade in certain markets. A further consequence of Lehman Brothers' failure — and the earlier conservatorship of the US mortgage agencies — was the triggering of default clauses in credit derivative contracts. That meant banks had to hold cash to be ready to settle outstanding CDS linked to the debt of Fannie Mae, Freddie Mac and Lehman Brothers, by some estimates in the region of US\$1 trillion. Although ultimately this just led to a redistribution of liquidity — and in the end settlements were relatively modest — it temporarily intensified funding pressures and increased uncertainties in funding markets. Box 2 discusses lessons for over the counter (OTC) markets from recent events.

*Market infrastructure held up well...*

Despite elevated levels of activity related to the unwinding of trading positions with Lehman Brothers, UK and global payment and settlement infrastructures continued to function effectively. Following the default of Lehman Brothers, LCH.Clearnet was exposed to the risk of sharp market movements across a wide range of products. LCH.Clearnet successfully closed out its positions without using all of the margin it had available to support the post-default process. This illustrates the ability of a clearing house to protect market participants from bilateral counterparty risk, even in the event of default of a major participant.

*...and central banks and national authorities acted to ease funding pressures at financial institutions...*

Central banks took unprecedented action at this time to ease the intense funding pressures facing banks. Liquidity in open market and fine-tuning operations and long-term repurchase agreements was expanded significantly. And central banks lent to a wider range of financial institutions, for longer periods and against a broader range of collateral (Table 3.A).

Action was also taken to address the dislocation in foreign exchange swap markets (Chart 5.5 in Section 5), which occurred as institutions outside the United States with large US dollar funding needs attempted to exchange funds raised in other currencies for US dollars. On 18 September, a number of central banks in Europe introduced a US dollar swap facility with support from the US Federal Reserve (Table 3.A).

National authorities also intervened in specific markets. In the United States, the US Treasury offered a guarantee to all US MMMFs to help stem the withdrawal of investors and the reduction in MMMF's demand for CP, and the Federal Reserve also introduced measures to support bank CP markets.

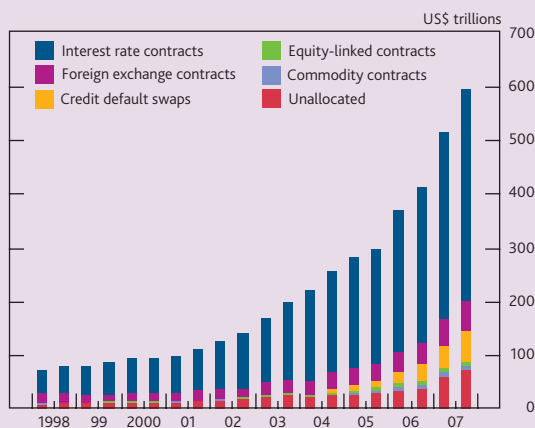
## Box 2 Counterparty credit risks in OTC derivatives markets

Recent work by the Counterparty Risk Management Policy Group (CRMPG)<sup>(1)</sup> and the Bank for International Settlements<sup>(2)</sup> has outlined weaknesses in arrangements supporting over-the-counter (OTC) derivatives markets. Market events over the past few months have highlighted the scale of risks inherent in these arrangements, particularly those arising from the default of a major counterparty.

### Size of OTC derivatives markets

The notional principal of outstanding OTC derivatives contracts has grown rapidly over the past decade to almost US\$600 trillion (**Chart A**). Interest rate contracts account for around two thirds of this total, while the share of credit default swaps (CDS) has increased substantially; the notional principal of outstanding CDS contracts is around US\$60 trillion.

**Chart A** Outstanding notional amounts of derivatives

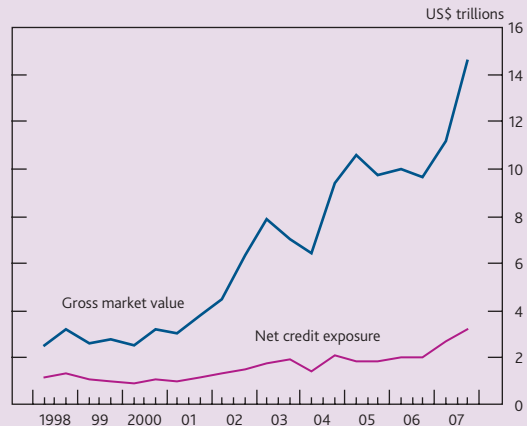


Source: BIS.

The extent of risk transfer delivered by OTC derivatives contracts may be better measured by gross market value: this is the absolute sum of all positive and negative market values of outstanding contracts (**Chart B**). This better captures the risk that has materialised on trades since their inception, or equivalently the cost of replacing them at current market prices. The gross market value of outstanding OTC derivatives was around US\$14.5 trillion at end-2007.

This rapid growth of OTC derivatives markets has been driven by demand for customised contracts that allow investors to tailor new risk exposures to suit their existing portfolios and risk preferences.

**Chart B** Gross market value and net credit exposures in OTC derivatives



Source: BIS.

### Management of counterparty risk in OTC derivatives markets

OTC derivatives can have any maturity, and maturities are often in excess of two years. Such maturities are not typically exchange traded. Parties to these transactions are dependent upon the ongoing creditworthiness, liquidity and operational robustness of their counterparties. This is particularly relevant for dealers, who act as market makers by accepting client trades and entering into matching contracts with other participants.

Market participants manage counterparty credit risks through:

- netting bilateral positions and margining or hedging the residual net exposure;
- active counterparty credit monitoring and the use of counterparty position limits; and
- post-default, closing out derivatives positions with the defaulter. This involves terminating outstanding contracts, accelerating future payments and netting all outstanding amounts with any collateral posted into a single bilateral obligation due to, or from, the defaulter.

The bilateral netting process substantially reduces counterparty risk. At end-2007, the net credit exposure between counterparties was around US\$3.3 trillion (**Chart B**). Margining and collateralisation reduces exposures further, although not completely. In April, the International Swaps and Derivatives Association (ISDA) reported that 65% of market participants' OTC derivatives exposure was collateralised. The absence of full collateralisation reflects the fact that highly rated institutions may be margined lightly if at all. Nevertheless, arrangements can allow margin to be called automatically following credit rating downgrades. For

example, it was estimated that AIG would have been called on to add around US\$14.5 billion in collateral to the US\$16.5 billion already posted at end-July after its credit ratings were downgraded in September.

### Default of an OTC market participant

The default of Lehman Brothers — a significant participant in OTC derivatives markets, including the CDS market — highlighted the difficulties in dealing with counterparty default. It also added to uncertainties and funding premia at a time of acute market instability.

The default process is underpinned by the ISDA master agreement which is a standardised, bilateral contract supporting OTC derivatives transactions. Although ubiquitous among dealers and widely used by clients, lack of an agreement — or a delay in agreeing one — can open up significant bilateral risks for counterparties.

Although Lehman Brothers' dealer entity did not default, its parent — Lehman Brothers Holdings Inc. — declared bankruptcy on 15 September. This triggered default provisions under the ISDA master agreement and allowed counterparties to serve a termination notice on the dealer entity. From this point, counterparties had a 20-day window to calculate their net close-out position due to or from Lehman Brothers.

The 1992 version of the ISDA master agreement allows counterparties to determine the actual loss caused by a default, or to value contracts individually using dealer quotes. While the second method is more transparent, dealers proved unwilling or unable to provide quotes following Lehman Brothers' default given the complexity of the situation and the volatility in markets. Although less commonly used in the market, the 2002 version of the ISDA master agreement is more flexible in allowing counterparties to use market quotes or data to value either individual contracts or net positions to determine a total close-out amount.<sup>(3)</sup>

Valuation difficulties were reportedly compounded by some of Lehman Brothers' net positions in credit derivative markets as a seller of credit protection. Lehman Brothers' counterparties to these trades had gained on their positions with Lehman Brothers, as CDS spreads had widened given the deterioration in credit conditions. However, recent margin could not be called from Lehman Brothers over the weekend prior to default.

At the same time as participants sought to replace bought positions terminated after Lehman Brothers' default, CDS spreads widened by up to 40 basis points for investment grade CDS and around 100 basis points for sub-investment-grade. This aggravated loss positions for counterparties who had not closed out their positions and who were not able to call collateral from the defaulter.

An additional complication specific to the CDS market is the need to settle contracts following the default of a reference entity. Settlement payments from the protection seller to protection buyer are determined according to the value of the defaulting party's debt. The growing size of the market has increased the potential for disruption from such settlement, including through price squeezes on the underlying debt.

In 2005, ISDA introduced an auction process for large defaults which helps to set a market-agreed price for the calculation of settlement positions. As a result, recent settlement of CDS contracts referencing Lehman Brothers, Fannie Mae and Freddie Mac has proceeded relatively smoothly.

### OTC derivatives infrastructure

There have been recent calls from regulators and the private sector to establish a central counterparty (CCP) for the CDS market. Although commonplace in exchange-traded derivatives markets, CCP clearing is less common in an OTC context.

For a fee, a CCP interposes itself between counterparties to financial contracts, becoming the buyer to every seller and seller to every buyer. Compared with bilateral arrangements, a CCP ensures that full and regular margins are applied to trade counterparties. It can establish and monitor strict financial and operational criteria, helping to reduce counterparty risks and confirmation backlogs. Multilateral netting of positions reduces notional exposures and associated margin requirements compared with bilateral arrangements. Multilateral payment netting can also reduce liquidity needs.

Post-default, a CCP may also offer advantages over bilateral arrangements. Default management procedures are standardised and transparent, unlike master agreements which can be modified bilaterally and contain different valuation methodologies. A CCP can also act as a neutral co-ordinator, transferring, closing out or auctioning a defaulter's positions with the benefit of market-wide information. The success that a range of CCP clearers had in dealing with their Lehman Brothers' exposures relatively quickly and with little margin erosion helps to demonstrate this.

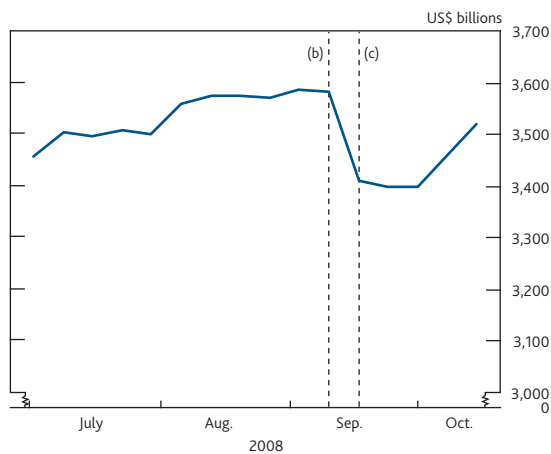
A CCP does, however, introduce its own risks, particularly as it represents a single point of failure. In addition, clearing OTC derivatives may present some challenges for a CCP. The non-fungibility of customised contracts limits the benefits of multilateral netting. Difficulties in pricing illiquid contracts also add to the complexity of margin models and other risk management tools. A CCP may address these problems by clearing only more liquid contracts; but this leaves riskier products to bilateral arrangements.

A number of market infrastructure providers have announced their intention to provide CCP clearing of CDS contracts, although none are operating at this stage. More broadly, it is evident that existing post-trade infrastructures need strengthening in light of the liquidity and counterparty risks which crystallised during this crisis. This applies not only with respect to the CDS market, whose size makes it systemically

important, but also to a range of OTC products in credit, foreign exchange and interest rate markets.

- (1) *Containing systemic risk: the road to reform* (August 2008); [www.crmppolicygroup.org/docs/CRMPG-III.pdf](http://www.crmppolicygroup.org/docs/CRMPG-III.pdf).
- (2) *New developments in clearing and settlement arrangements for OTC derivatives* (October 2007); [www.bis.org/publ/cps77.htm](http://www.bis.org/publ/cps77.htm).
- (3) The CRMPG has recommended implementation of the 2002 version among dealers followed by work on standardising and applying the methodology to client firms.

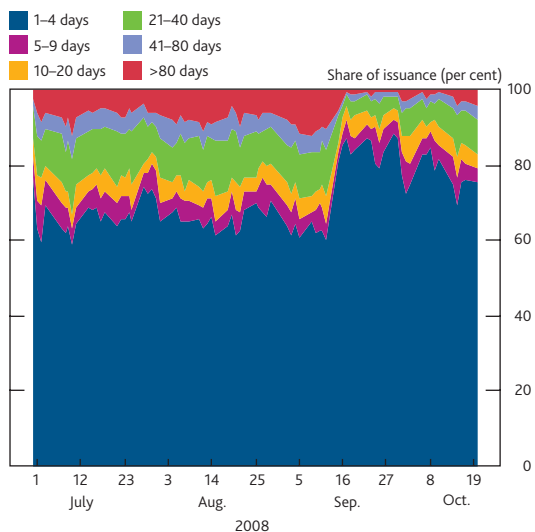
**Chart 3.9** US money market mutual funds' total assets under management<sup>(a)</sup>



Sources: Bloomberg and Investment Company Institute.

- (a) Comprises US dollar assets of retail and institutional funds.
- (b) Lehman Brothers Holdings files for Chapter 11 bankruptcy protection.
- (c) US Treasury announces temporary guarantee programme for US money market mutual funds.

**Chart 3.10** Maturity profile of US commercial paper issuance<sup>(a)</sup>



Source: Board of Governors of the Federal Reserve System.

- (a) Data to close of business on 20 October 2008.

Regulators in a number of countries restricted short selling of shares of financial institutions. A number of countries took measures to stabilise banks' retail, and in some cases wholesale, funding by increasing the value of insured retail deposits or by announcing guarantees on wholesale funding.

To help remove illiquid assets from the balance sheets of banks and other financial institutions, the US Congress approved a Troubled Asset Relief Program on 3 October to buy up to US\$700 billion of illiquid securities. This sought to address counterparty credit risk concerns by removing distressed assets from banks' balance sheets.

*...but failed to prevent broader institutional distress.*

These interventions failed, however, to stem a broad-based spillover of distress. This led to the third, and most violent, phase of the turmoil, with system-wide financial sector fragilities emerging internationally. In response, governments facilitated bank mergers or nationalised firms to stabilise the banking system. In the United Kingdom, Bradford & Bingley was partly nationalised, Alliance & Leicester was taken over by Banco Santander and Lloyds TSB instigated an acquisition of HBOS. UK institutional developments over the period are described in Box 3.

Several banks, including Wachovia and Washington Mutual in the United States and Dexia, Fortis and Hypo Real Estate in Europe, also experienced severe stress. Iceland's banks suffered the most significant problems as concerns rose about their ability to refinance their funding and about the impact on depositors in the event of default. The UK Government took action to support UK retail depositors in Icelandic banks.

### Box 3

## Changes to the composition of the UK banking sector

This box summarises the mergers, acquisitions and part-nationalisations involving banks and building societies in the United Kingdom that have been proposed or completed since the April 2008 *Report*.

These developments potentially represent a marked consolidation in the UK banking sector. Were all of the proposed deals below to be completed, around 74% of total lending to and deposit taking from UK households and private non-financial firms would be accounted for by the top five banks, compared with 63% for the top five banks prior to the deals.

### Completed deals

#### Alliance & Leicester

On 14 July 2008, a proposed acquisition of Alliance & Leicester by Banco Santander was announced by both firms. The proposal was approved by shareholders of both companies in September and was subsequently completed on 10 October 2008. Alliance & Leicester is now a wholly-owned subsidiary of Banco Santander.

The deal leaves Banco Santander with a market share of around 13% of the stock of UK mortgages, and 8% of the stock of UK unsecured personal loans.

#### Bradford & Bingley

On 29 September 2008, the Chancellor of the Exchequer announced that Bradford & Bingley's UK and Isle of Man retail deposit business along with its branch network had been transferred to Abbey National, a wholly-owned subsidiary of Banco Santander, by order (the Transfer Order) under the Banking (Special Provisions) Act 2008.

The remaining assets and liabilities of Bradford & Bingley — principally comprising its mortgage book, personal loan book, headquarters and relevant staff, treasury assets and its wholesale liabilities — were taken into public ownership through transfer to HM Treasury. HM Treasury and the Financial Services Compensation Scheme will recover payments in the wind-down of the remainder of Bradford & Bingley.

In the period prior to the announcement, Bradford & Bingley had found itself under increasing pressure as investors and lenders lost confidence in its ability to carry on as an independent institution. The FSA determined on 27 September 2008 that the firm no longer met its threshold conditions for operating as a deposit taker under the Financial

Services and Markets Act 2000 and FSA rules. The Government, on the advice of the FSA and the Bank of England, acted immediately to maintain financial stability and protect depositors, while minimising the exposure to taxpayers.

#### Heritable; Kaupthing Singer & Friedlander

On 8 October 2008, the Chancellor announced that the retail deposit business of Heritable (a UK-based banking subsidiary of Landsbanki), and the Kaupthing Edge deposit book of Kaupthing Singer & Friedlander (a UK-based banking subsidiary of Kaupthing Bank) had both been transferred to ING Direct, a wholly-owned subsidiary of ING Group. The remainder of the two businesses were put into administration.

The FSA had determined that both Heritable and Kaupthing Singer & Friedlander no longer met their threshold conditions, and were unlikely to continue to meet their obligations to depositors. The FSA concluded that both were in default for the purposes of the Financial Services Compensation Scheme. HM Treasury used the Banking (Special Provisions) Act 2008 to ensure a resolution that preserved financial stability and provided protection and continuity of business for depositors.

#### Proposed but not yet completed

#### Catholic and Chelsea Building Societies

On 7 June 2008, the boards of Chelsea Building Society and Catholic Building Society announced they had agreed in principle to merge. The merger was approved by Catholic's shareholders on 9 October and, subject to confirmation by the FSA, the effective date for the merger is expected to be 31 December 2008. Chelsea is the United Kingdom's fifth largest building society with assets of around £13 billion. Catholic is the 57th largest society with assets of around £51 million.

#### Cheshire, Derbyshire and Nationwide Building Societies

On 8 September 2008, Nationwide Building Society announced that it would merge with the Derbyshire and Cheshire Building Societies, which will transfer into the Nationwide Group by way of two separate transactions. Both firms separately and independently approached Nationwide as a prudent measure to ensure their financial strength and stability; both are expected to report pre-tax losses in the half-year to 30 June 2008.

The transaction with Derbyshire is expected to conclude on 1 December 2008. The transaction with Cheshire is expected to conclude before the end of the calendar year. Both transactions are subject to confirmation by the FSA and approval by the Office of Fair Trading. If completed, this will create a society with assets totalling £191 billion — around 54% of the total assets of the building society sector — and retail deposits of £122 billion.

### HBOS and Lloyds TSB

On 18 September 2008, Lloyds TSB and HBOS announced that they had reached agreement on the terms of a recommended acquisition by Lloyds TSB of HBOS. The terms of the proposed deal were subsequently revised on 13 October, based on: discussions with HM Treasury as to the additional capital the Government would require the two entities to hold to access the Government-backed provision of liquidity; the current market environment; and the future prospects of the combined group. Subject to regulatory and shareholder approval, the acquisition is likely to be completed early in 2009.

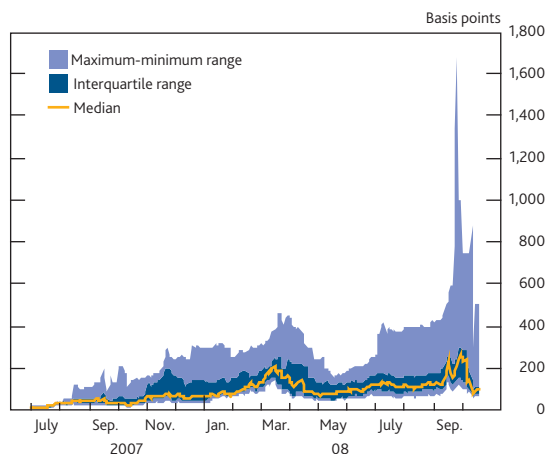
The combined group would have the largest market share in the following UK markets: mortgages (around 28% of the current stock), personal loans and cards, savings accounts and current accounts.

### Barnsley and Yorkshire Building Societies

On 22 October 2008, the Boards of Yorkshire Building Society and Barnsley Building Society announced they had agreed heads of terms for a merger. The proposal followed pre-emptive action from the board of Barnsley, who approached Yorkshire to seek a merger after the identification of potential losses from Barnsley's exposures to two Icelandic banks.

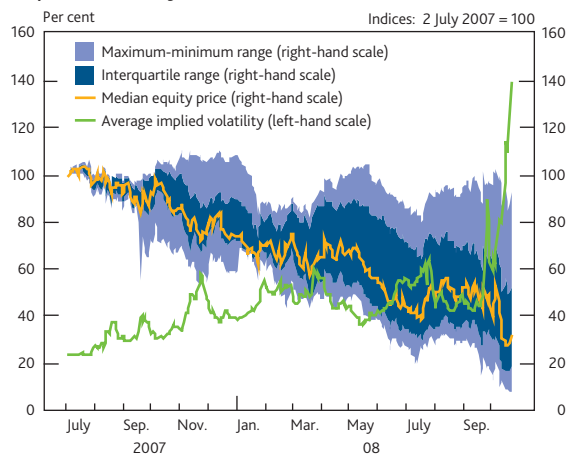
The merger is subject to confirmation by the FSA and is expected to complete on 31 December 2008. Yorkshire is the United Kingdom's third largest building society with total assets of over £20 billion. Barnsley is the 34th largest society with total assets of around £376 million.



**Chart 4.1** Major UK banks' credit default swap premia<sup>(a)</sup>

Sources: Markit Group Limited and Bank calculations.

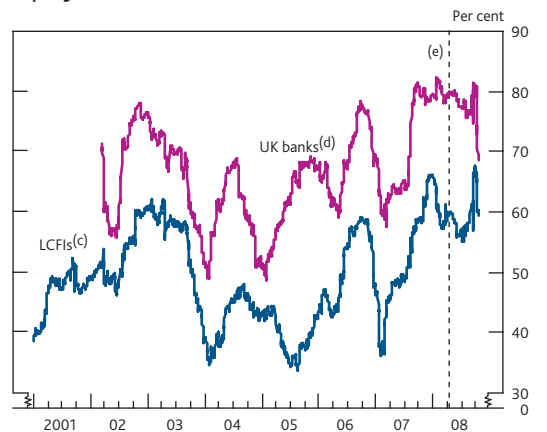
(a) Data to close of business on 20 October 2008.

**Chart 4.2** Major UK banks' equity price dispersion and implied volatility<sup>(a)(b)</sup>

Sources: Bloomberg and Bank calculations.

(a) Data to close of business on 20 October 2008.

(b) Data exclude Bradford &amp; Bingley and Northern Rock.

**Chart 4.3** Comovement between financial institutions' equity returns<sup>(a)(b)</sup>

Sources: Bank of England, Bloomberg and Bank calculations.

- (a) Proportion of variation in changes in daily equity price returns explained by the first principal component over a six-month rolling window. Returns expressed in common currency terms.  
 (b) Data to close of business on 20 October 2008.  
 (c) Bank of America, Barclays, BNP Paribas, Citi, Credit Suisse, Deutsche Bank, Goldman Sachs, HSBC, JPMorgan Chase & Co., Merrill Lynch, Morgan Stanley, RBS, Société Générale and UBS.  
 (d) Banco Santander, Barclays, HBOS, HSBC, Lloyds TSB and RBS.  
 (e) April 2008 Report.

## 4 A system-wide response

### *System-wide vulnerabilities were exposed...*

Despite various institution-specific measures, market pressures on financial institutions in the United Kingdom and internationally continued to mount during October. This was reflected in a rising cost of insuring against bank default: the median CDS premia for UK banks rose to a high of 258 basis points on 30 September (**Chart 4.1**). There were sharp falls in UK banks' equity prices and a threefold rise in their implied volatilities (**Chart 4.2**).

### *...rooted in uncertainties about the value of banks' assets...*

These concerns developed because the overextension in banks' balance sheets (discussed in Section 1) was exposed by rising uncertainty about banks' asset portfolios as macroeconomic risk increased (Section 2), and heightened counterparty risk (Section 3). Uncertainties about asset quality were compounded for many banks by concerns about their dependence on wholesale market funding. Financial markets began to perceive that banks globally, including in the United Kingdom, had potentially inadequate capital and assured sources of finance to insure against these balance sheet risks.

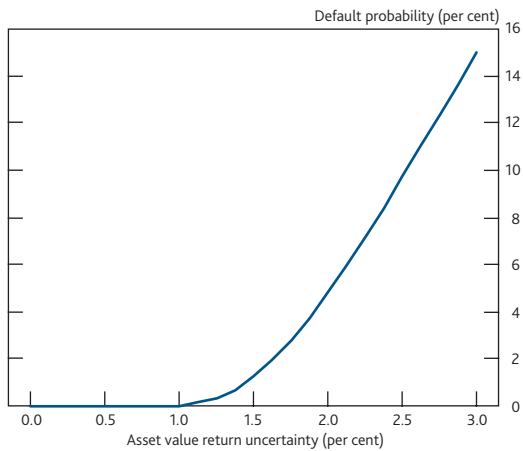
A key feature of the market pressures at this stage is that they were operating at a system-wide level. Heightened macroeconomic uncertainties were a common shock affecting the asset values of all institutions, as reflected in the high correlation between banks' equity returns in the United Kingdom and internationally (**Chart 4.3**). This valuation uncertainty in turn generated a system-wide rise in counterparty risk, which was amplified by the institutional failures which took place during the summer and early autumn. One consequence of this network contagion was a breakdown in interbank funding markets.

### *...amplified by excessive leverage...*

The uncertainty about the underlying values of banks' assets was amplified by the high leverage with which UK and global financial institutions entered the downturn. To give an illustrative example,<sup>(1)</sup> in the middle of 2008 major UK banks had assets of just over £6 trillion and equity capital of around £200 billion. So if the standard deviation of asset returns pre-crisis was, say 1.5% per year, then levels of UK banks' capital would have delivered a probability of default of a little over 1% a year (**Chart 4.4**). But if uncertainty doubled to 3% in the crisis — for example, as a result of higher

(1) Illustration using the model from Merton, R (1974), 'On the pricing of corporate debt: the risk structure of interest rates', *Journal of Finance*, Vol. 29, pages 449–70, which assumes that logarithmic asset returns are normally distributed. The model is used to calculate the likelihood of banks' assets falling below the implied level of their debt liabilities, or the default probability, assuming that capital is comprised exclusively of shareholders' equity. This default probability is from the perspective of a so-called risk-neutral investor that is indifferent between a given pay-off with certainty and a gamble with the same expected pay-off. In practice, banks' capital structures and investor behaviour are more complex than assumed in this illustration.

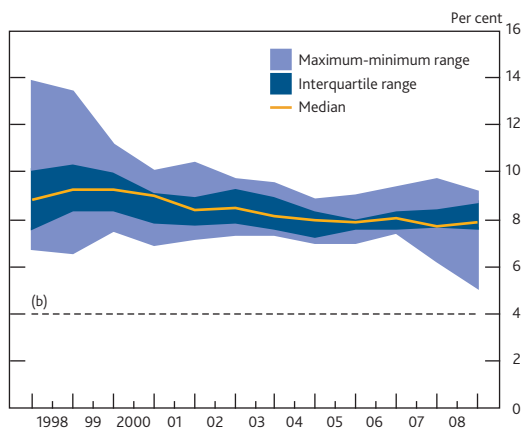
**Chart 4.4** Illustration of the variation of default probability with asset uncertainty<sup>(a)(b)</sup>



Source: Bank calculations.

- (a) Illustration using the Merton (1974) model and an average debt maturity of one year. In practice, banks' capital structures and investor behaviour are more complex than assumed in this model, but the interaction between uncertainty about asset returns and default probability is similar. Default probabilities are non-zero when uncertainty is non-zero, but may become very small before then.
- (b) For a so-called risk-neutral investor that is indifferent between receiving a pay-off with certainty and a gamble with the same expected pay-off.

**Chart 4.5** Major UK banks' Tier 1 capital ratios<sup>(a)</sup>



Sources: Published accounts and Bank calculations.

- (a) Data as at 2008 H1. Excludes Nationwide as interim data are unavailable.
- (b) Dashed line indicates the minimum Tier 1 capital ratio under regulatory standards.

macroeconomic and counterparty risk — then the implied default probability would rise to a little under 15%. In essence, that was what happened to UK and global banks during the summer, as the combination of asset valuation uncertainty and leverage markedly increased default fears and thus raised questions about the adequacy of banks' capitalisation. That was the case despite capital ratios being above regulatory minima throughout the period (**Chart 4.5**).

*... a change in the way some market participants perceived asset values...*

When the probability of default is low, the value of assets on banks' balance sheets is determined by their economic value — the value built up from underlying expected cash flows on those assets on the assumption that they are held to maturity. But as default probabilities rise, so do the chances of the assets needing to be liquidated prior to maturity at market prices. So as the expected probability of bank default rose during September (**Chart 3.1** in Section 3), it became rational for market participants to alter the way by which they assessed the underlying value of banks' assets, effectively placing more weight on the mark-to-market value of these assets. Given the high illiquidity and uncertainty premia in market prices (discussed in Section 2), this implied lower asset values and higher potential capital needs for banks. This valuation effect served as an additional amplifier of institutional distress.

**Chart 4.6** shows that the value markets placed on the UK banking sector, relative to that recorded in their accounts, fell to low levels during September. Box 4 discusses how alternative valuation approaches — economic values versus market values — can be used to generate illustrative estimates of the potential capital needed by UK banks to insure against asset valuation uncertainties.

*... and a snowballing of funding pressures.*

Uncertainties about asset valuations were further amplified by structural weaknesses in some banks' funding positions. The marked deterioration in financing conditions in the second half of September resulted in a progressive shortening in the maturity of bank funding. These problems were aggravated by the ongoing closure of securitisation and covered bond markets.

Market contacts reported that the collapse of Lehman Brothers and Washington Mutual in the United States, both of which were expected to result in losses for senior debt holders, reduced the appetite for all bank debt. That heightened concerns over financing the significant volume of debt due for renewal, in particular in 2009 (**Chart 4.7**).

Valuation uncertainty, falling equity prices and rising dividend yields (**Chart 4.8**) made it hard for some institutions to raise new capital to forestall these solvency concerns. In the United Kingdom, equity price falls tended to be largest — and

## Box 4 Recapitalising UK banks

The amount of capital to be raised by the five largest UK banks and Nationwide under the recapitalisation scheme is around £50 billion. This capital raising aims deliberately to provide banks with a substantial degree of insurance against future unexpected losses. Once in place, this capital insurance could be utilised in any future stress period, while still delivering a well-capitalised banking sector that can retain the confidence of wholesale funding markets.

This box sets out two alternative ways to assess the scale of capital injection required to achieve these objectives. The *economic value* of banks' assets can be derived by stress testing the capital position of the sector in the face of adverse macroeconomic scenarios. An alternative approach is to derive a *market value* of UK banks' assets based on marking-to-market their asset portfolio using prices of instruments of broadly comparable credit quality.

### Economic value of assets: a stress-testing approach

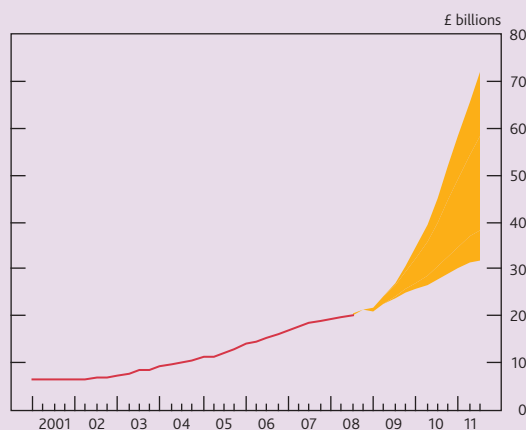
A stress-testing approach can be used to assess banks' potential losses on loan and trading book exposures in a downturn scenario. After making some assumptions about the evolution of bank profitability and risk-weighted assets, that can help provide some metrics on downside risks to UK banks' existing capital ratios.

This approach involves taking a severe but plausible macroeconomic risk scenario and considering the effect of this on UK banks' asset portfolios over a period of five years. The scenario was based around a sharp global economic slowdown, with output contracting and asset prices falling sharply. This risk scenario results in increased bank write-offs on lending to households and non-financial companies in the United Kingdom and overseas.

The impact of this downturn scenario on household and corporate arrears was generated using estimated models. For example, UK mortgage arrears are modelled as being driven up by rises in income gearing and unemployment and by falls in housing equity. In the stress scenario, mortgage arrears are estimated to rise to a peak of 4.4%, from 1.3% at present. UK corporate defaults rise as GDP growth and commercial property price inflation fall, and as corporate indebtedness and interest rates rise. Under the stress test, UK corporate insolvencies rise to 1.7% from 0.6% at present. Estimated arrears on banks' lending to households and companies in the United Kingdom and overseas were then translated into potential write-offs using estimated historical relationships between arrears and write-offs.

These estimates for credit losses are uncertain for two main reasons. First, because they rely on estimated equations there is uncertainty in the relationship between the macroeconomic scenario and the credit loss estimates. Second, because these losses are based on a single scenario which has a low probability of occurring, there is a wide range of uncertainty around outcomes. To illustrate this uncertainty, **Chart A** plots a range for domestic credit losses on household and corporate exposures of UK banks. It suggests that gross domestic credit losses might lie between £30 billion and £70 billion.

**Chart A** Major UK banks' cumulative write-offs on domestic lending<sup>(a)</sup>



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

(a) The red line shows historical data on cumulative write-offs on the major UK banks' lending to UK households and companies over three years on a rolling basis. The orange area shows a 90% confidence interval of cumulated potential write-offs, consistent with projections of UK household arrears and corporate insolvencies and with stressed estimates of loss given default.

To obtain total potential losses, estimates of domestic credit losses are combined with those for international credit losses and estimates of losses on assets held in banks' available for sale and trading book portfolios. Together, these sources generate significant losses for the five largest UK banks and Nationwide, of around £130 billion under the stress scenario (**Table 1**).

**Table 1** Stress-testing calibrations<sup>(a)</sup>

£ billions	Estimated credit losses over five years	Estimated net profits <sup>(b)</sup> over five years	Estimated capital shortfall
Total	130	80–130	0–50

Sources: Published accounts and Bank calculations.

(a) As estimated for Barclays, HBOS, HSBC, Lloyds TSB, Nationwide and RBS.

(b) Profits net of internal capital generation necessary to maintain current core Tier 1 capital ratios.

Ranges of potential capital depletion were estimated by assuming varying levels of underlying future profits before write-offs by UK banks. This delivers estimated capital shortfalls of up to £50 billion in aggregate to maintain UK banks' Tier 1 capital at current levels.

### Market value of assets: a mark-to-market approach

As Section 4 explains, as the estimated probability of default of a bank increases, it becomes rational for creditors to evaluate asset losses on the basis of market prices, as well as underlying economic values. As uncertainty about banks' assets has risen, some market participants appear to have placed increased emphasis on this valuation approach when gauging the net worth of some banks. In these circumstances, a mark-to-market approach provides a measure of how much capital might need to be raised to restore market confidence in banks' capitalisation.

UK banks' banking books can be marked to market by valuing categories of exposures using market prices for related traded instruments as valuation proxies. Applying the discount to par implied by the price of these instruments to the household, corporate and international exposures of UK banks generates mark-to-market losses of around £170 billion. But this will tend to overestimate losses accruing to a bank due to two factors:

- Maturity mismatch between the valuation proxies used and banking book exposures.<sup>(1)</sup>

- As Box 1 discusses, market prices of valuation proxies at present reflect large discounts for low market liquidity and for heightened uncertainty. The discount to par value for credit exposures will therefore be smaller than implied by market prices. The estimates in Box 1 suggest risk premia can account for between one third and one half of the underlying discount to par value.

Adjusting losses down by one third and assuming profits over the next few years in the same range delivers an aggregate capital shortfall of up to £35 billion in aggregate (**Table 2**).

**Table 2** Mark-to-market calibrations<sup>(a)</sup>

£ billions	Estimated MTM losses	Estimated net profits <sup>(b)</sup> over five years	Estimated capital shortfall
Total	115	80–130	0–35

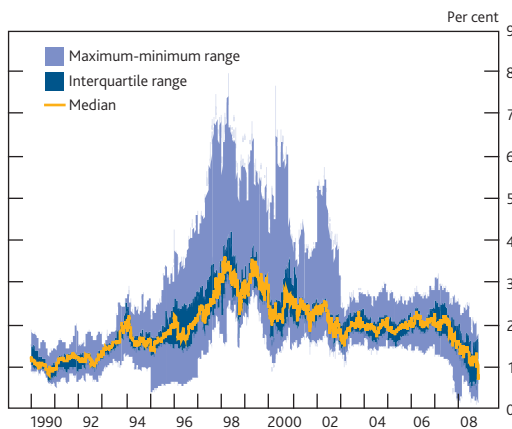
Sources: Published accounts and Bank calculations.

(a) As estimated for Barclays, HBOS, HSBC, Lloyds TSB, Nationwide and RBS.

(b) Profits net of internal capital generation necessary to maintain current core Tier 1 capital ratios.

- (1) For example, corporate bond indices used to value corporate loan books have maturities greater than ten years, longer than the typical maturity of bank loans. Assuming longer-maturity bond prices fall more as yields rise, corporate bond indices will overestimate the discount to par for corporate loans.

**Chart 4.6** UK banks' price to book ratio<sup>(a)(b)(c)</sup>



Sources: Thomson Datastream and Bank calculations.

(a) Data to close of business on 20 October 2008.

(b) Chart shows the ratio of the share price to the book value per share — the value of common equity divided by the number of shares outstanding at the company's fiscal year end.

(c) Due to the mergers and acquisitions of banks, the chart includes data for the bank peer group as used in 'A new peer group to analyse large UK-owned banks' resilience over time', *Financial Stability Review*, Box 7, December 2004, page 68.

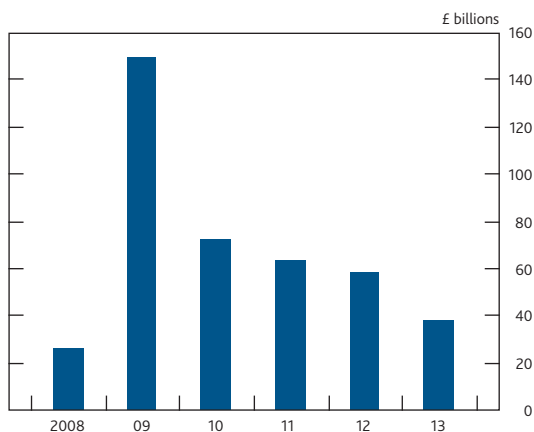
hence capitalisation concerns greatest — for those banks with both high exposures to the domestic mortgage market and a heavy dependence on wholesale funding (**Chart 4.9**). But by this stage uncertainty about the extent and breadth of balance sheet fragilities was adversely affecting almost the entire UK, as well as the global, banking sector.

### The United Kingdom's system-wide response...

Against that backdrop, the UK authorities announced on 8 October a comprehensive package of measures — described in Box 5 — to tackle these systemic problems. Underlying this package were two basic principles. First, the measures were aimed directly at tackling the balance sheet weaknesses of UK banks identified in Section 1. Second, the measures were system-wide rather than institution-specific. This recognised explicitly that the vulnerabilities facing the UK banks had systemic roots — common macroeconomic uncertainties and system-wide counterparty risk acting on impaired balance sheets.

A central feature of the package was government support to assist in the recapitalisation of UK banks. The support was intended to operate as insurance against downside macroeconomic risks. By reducing default risk, recapitalisation reverses the tendency of financial markets to value banks' assets at market, rather than economic, values. And by operating at a system-wide level, recapitalisation also reduces counterparty risk and so should help defuse pressures in funding and other markets. In other words, the recapitalisation directly tackles many of the system-wide externalities which banks faced in the run-up to October.

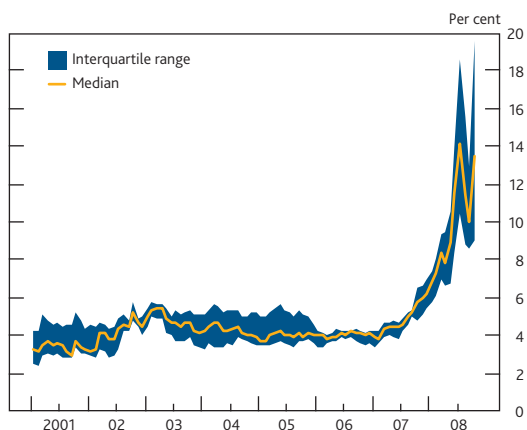
**Chart 4.7** Major UK banks' maturing bonds<sup>(a)</sup>



Source: Bloomberg.

(a) Data to close of business on 20 October 2008.

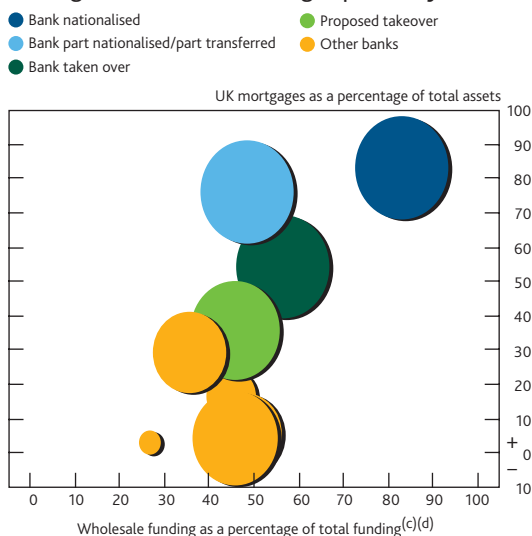
**Chart 4.8** Major UK banks' dividend yield<sup>(a)</sup>



Sources: Thomson Datastream and Bank calculations.

(a) Chart shows dividends per share. Northern Rock data omitted from September 2007.

**Chart 4.9** Major UK banks' equity prices, mortgage lending and wholesale funding dependency<sup>(a)(b)</sup>



Sources: Bloomberg, published accounts and Bank calculations.

(a) Data to close of business 20 October 2008.

(b) The size of the circles is proportional to the extent of equity price falls since 2 July 2007.

(c) Wholesale funding reliance equals debt securities in issue and interbank deposits as a proportion of debt securities in issue, interbank deposits, customer deposits and Tier 1 capital.

(d) Wholesale funding dependence was calculated at end-June 2008.

*...was scaled to remove solvency fears...*

To achieve those positive effects and restore market confidence, however, the scale of recapitalisation needed to be sufficient to insure against plausible adverse future outcomes for UK banks. One way of assessing this is to look at economic and market valuations of banks. As discussed in Box 4, this approach suggests a capital injection of around £50 billion would be a prudent level of insurance against a severe macroeconomic downturn, so as to restore market confidence. A recapitalisation of £50 billion boosts the median Tier 1 capital ratios of the five largest UK banks and Nationwide by around 2 percentage points, to 10.7%.

*...while addressing structural funding problems...*

At the same time as tackling concerns about future solvency, the package of measures also sought to address weaknesses in some UK banks' funding structures. This was achieved through the provision to UK banks of funding guarantees on new debt issuance refinancing maturing wholesale debt. These guarantees are available to banks with significant UK operations deemed by the UK authorities to be adequately capitalised. Take-up is expected to be around £250 billion in aggregate. In addition, it was announced that there would be an extension of the amounts available to UK banks under the Bank's Special Liquidity Scheme. On 16 October, the Bank also announced improvements to the functioning of its sterling market operations framework.<sup>(1)</sup> These measures in combination were designed to alleviate pressures within the interbank funding network, reverse the snowballing of funding requirements as refinancing maturities shortened and enable a lengthening of maturities on wholesale obligations.

*...and similar measures were adopted internationally.*

As discussed in Box 5, this comprehensive package by the UK authorities has been followed by the announcement of measures with similar underlying principles in a number of other countries. This co-ordinated international response should help ensure that risks to global banks in international markets are addressed on a system-wide basis, increasing the probability that they will prove collectively successful given the high degree of integration of capital markets.

(1) See Box 5. Further information on changes to the Bank of England's framework for market operations can be viewed at: [www.bankofengland.co.uk/publications/news/2008/071.htm](http://www.bankofengland.co.uk/publications/news/2008/071.htm).

## Box 5

### Government financial support to the banking industry

In early October, rising concerns over banks' capitalisation caused acute liquidity problems in global money markets. The comprehensive package announced by the UK Government on 8 October (with details of the implementation released on 13 October) was designed to address these issues for UK institutions.<sup>(1)</sup> Governments elsewhere have since introduced similar packages for their banking systems.

#### Aspects of the UK plan

The UK financial support package has three aspects.

First, there is to be a government-supported recapitalisation scheme for UK banks and building societies. The following major UK institutions have so far confirmed their participation: Abbey, Barclays, HBOS, HSBC Bank plc, Lloyds TSB, Nationwide Building Society, Royal Bank of Scotland, and Standard Chartered.

Each of these institutions committed to the Government to increase their Tier 1 capital by an agreed amount. The Government is prepared to subscribe capital in the form of preference shares or, if requested, ordinary equity. The 12% coupon on the preference shares, as well as ensuring that taxpayers are suitably compensated for their investment, will provide an incentive for banks to refinance them when their profitability strengthens. The issue of ordinary shares will allow banks to offer their existing shareholders a simple means of participation in the capital-strengthening exercise, while the shares the Government subscribes to will give it upside if share prices rise from currently low levels. Other UK banks (including UK subsidiaries of foreign institutions) which have a substantial business in the United Kingdom and building societies will be eligible for assistance in increasing their Tier 1 capital. For building societies, which are mutual organisations, the capital injection will take the form of permanent interest bearing shares (PIBS).<sup>(2)</sup>

Those institutions that receive government capital will be required to meet certain conditions on dividend policies and executive remuneration. In addition, they will need to make a commitment to support lending to small businesses and home buyers.

Second, all institutions taking part in the recapitalisation scheme and raising the appropriate amount of Tier 1 capital will be eligible to have the Government guarantee any chosen senior unsecured debt instruments for terms up to three years.<sup>(3)</sup> Commercial paper and certificates of deposit with the institution will also be eligible to be guaranteed. The

Government will charge a commercial fee for each issue that they guarantee: 50 basis points plus 100% of the institution's median five-year credit default swap (CDS) spread during the twelve months to 7 October 2008. For those institutions where there is no public CDS spread data available, HM Treasury will determine a charge. The charge is intended to strike a balance between supporting term lending given elevated current funding costs, but without encouraging excessive reliance on government-guaranteed funding once conditions normalise. The Government expects take-up of these guarantees to be of the order of £250 billion and each institution's share will be based on the size of its sterling liabilities. The scheme will be available to guarantee new issues for a period of six months with the possibility of an extension.

Third, the Bank of England's Special Liquidity Scheme will now make available at least £200 billion to banks. Until markets stabilise, the Bank will also continue to conduct auctions to lend sterling for three months and US dollars for one week against an extended range of collateral. Allowable collateral will include any debt issues guaranteed by the Government, as described above.

In addition, the Bank of England announced on 16 October three new proposals for its money market operations.<sup>(4)</sup> First, the replacement of the existing Standing Facilities with Operational Standing Facilities, the clear purpose of which will be to absorb technical problems and imbalances in the operation of money markets and payments but not to provide support to stressed firms. This should avoid any stigma being attached to banks using these facilities. Second, the establishment of a Discount Window Facility, enabling banks to borrow gilts or, at the Bank's discretion, cash, against a wide range of eligible collateral in order to provide liquidity insurance to commercial banks in the event of stress. Third, the introduction, after further consultation, of permanent long-term repo open market operations against broader classes of collateral, to be auctioned under a mechanism where counterparties bid separately and against different types of collateral. These measures have been designed to offer banks the tools necessary for managing their liquidity while avoiding encouraging imprudent practices.

#### Implementing the plan

Since the Government's announcement of the financial support framework, a number of banks have announced their capital raising plans. Some intend to raise the capital internally, some externally and others externally with the Government acting as an underwriter for the common share issue and subscribing for all the preference share issue.

**Table 1** Announced capital raising commitments from UK financial institutions<sup>(a)</sup>

	Current Tier 1 capital: <sup>(b)</sup>		Institution's capital raising commitments (£ billions):				New Tier 1 capital ratio following capital raising (per cent)
	ratio (per cent)	common shares	preference shares	other	dividend effect	Total	
Barclays <sup>(c)</sup>	9.1	3.6	3.0	1.5	2.0	10.1	>11.0
HBOS <sup>(c)(d)</sup>	8.6	8.5	3.0	0.0	0.0	11.5	12.0
HSBC <sup>(e)</sup>	8.8	0.75 <sup>(f)</sup>	0.0	0.0	0.0	0.75	8.8
Lloyds TSB <sup>(d)</sup>	8.6	4.5	1.0	0.0	0.0	5.5	12.1 <sup>(g)</sup>
Combined Lloyds TSB and HBOS <sup>(h)(d)</sup>		13.0	4.0	0.0	0.0	17.0	
Nationwide <sup>(i)</sup>	9.7			0.5 <sup>(j)</sup>		0.5	10.3 <sup>(k)</sup>
RBS <sup>(d)</sup>	9.1	15.0	5.0	0.0	2.0	22.0	12.1–13.1 <sup>(l)</sup>
Abbey/ Alliance & Leicester	Circa 8	1.0 <sup>(m)</sup>	0.0	0.0	0.0	1.0	Raised by 1.25 <sup>(n)</sup>
Total						51.4	

Sources: Press releases, published accounts and Bank calculations.

(a) Table updated to 24 October 2008.

(b) As at 2008 interim results.

(c) Data on a *pro forma* basis.

(d) No dividends to be paid on ordinary shares until preference shares have been repaid.

(e) HSBC group Tier 1 ratio.

(f) Injection from HSBC Holdings plc to UK subsidiary, HSBC Bank plc.

(g) Calculated using 2008 interim results plus capital raising commitments.

(h) Combined group would pay no dividends on ordinary shares until preference shares have been repaid. The combined group will have a core Tier 1 ratio in excess of 8.5% after the capital raising.

(i) As at full year 2007 results.

(j) Intention is for additional capital to be raised through normal market channels between 13 October 2008 and Nationwide's financial year end.

(k) Calculated using full year 2007 results plus capital raising commitments.

(l) Three to four percentage points improvement.

(m) Equity injection by Banco Santander.

(n) Percentage points.

Financial institutions have so far announced around £50 billion of capital raising in total, with the Government underwriting £37 billion of that amount. Tier 1 capital ratios will be significantly improved under the plan, in some instances rising by over 3 percentage points. **Table 1** illustrates the impact of the measures announced by banks so far on their capital ratios. The potential Government stakes in banks could turn out to be large. If no existing shareholders were to subscribe for the new equity in HBOS or RBS then the Government would in both cases own almost 60% of their ordinary shares. In that event, one possibility would be the creation of a Bank Reconstruction Fund to manage and ultimately sell these stakes to outside investors. Those institutions issuing preference shares to the Government will not be able to pay a dividend until the preference shares are repaid. Other institutions, such as Barclays, are bolstering their capital by declaring no dividends for this financial year, and raising capital in the market. Longer term, capital is also likely to be augmented from asset disposals.

Barclays has raised €3 billion through the issue of three-year senior bonds guaranteed by the Government under this scheme. The bonds have been given a AAA rating. Bank of Scotland plc (a subsidiary of HBOS) has announced a £20 billion programme of issuance of short-term notes,

commercial paper and certificates of deposit guaranteed by the Government under this scheme. This programme has also been given a AAA rating. Other eligible institutions are in the process of bringing government-guaranteed debt instruments in the near future.

Overall, this support represents the largest UK government intervention in financial markets since the outbreak of the First World War. Then, too, money markets were in danger of seizing up as it was feared that accepting houses who supplied liquidity to the market would be unable to meet their commitments. The then-Chancellor Lloyd George responded by providing, in effect, a state guarantee to cover, for the war's duration, all obligations of the accepting houses. This immediately restored the markets to normal functioning. The Government suffered no appreciable losses under these guarantees.

### International initiatives

The US Government has extended its original proposals under the Emergency Economic Stabilization Act of 2008, with at least US\$250 billion of the US\$700 billion voted under the Act now available to recapitalise US banks. The balance, as originally proposed, is available to purchase distressed assets. The recapitalisation is in the form of preference shares carrying an initial coupon of 5% and rising to 9% if not redeemed in five years' time. The amount of this capital injection has already been announced for some banks. In addition, the Federal Deposit Insurance Corporation increased its deposit insurance from US\$100,000 to US\$250,000, offered for a fee to insure the entire amount of each non-interest bearing account, and offered for another fee of 75 basis points per annum to insure senior liabilities of a bank.

Countries of the euro area, Switzerland and Sweden have also announced their own proposals which, while differing in technical details from country to country, all seek to bolster capital ratios and to provide some guarantees for bank debt instruments. France has made available €41 billion to recapitalise banks, and offered to provide €320 billion of funding on a secured basis. Germany offered €130 billion of capital for its banks, and offered, for a fee, to guarantee directly up to €400 billion of bank debt. **Table 2** gives further details of these and other countries' schemes.

(1) Further details can be found on the HM Treasury website at [www.hm-treasury.gov.uk](http://www.hm-treasury.gov.uk).

(2) Preference shares are part of a company's share capital but rank ahead of equity shares in a winding up of a company. Typically they carry limited voting rights. PIBS are, like most deposit accounts, part of the share capital of a building society. However, unlike deposit accounts they are permanent and can never be redeemed. On the winding up of a building society PIBS would be paid out only after all creditors and depositors have been paid in full.

(3) Further details can be found on the UK Debt Management Office website at [www.dmo.gov.uk](http://www.dmo.gov.uk).

(4) Full details can be found on the Bank's website at [www.bankofengland.co.uk](http://www.bankofengland.co.uk).

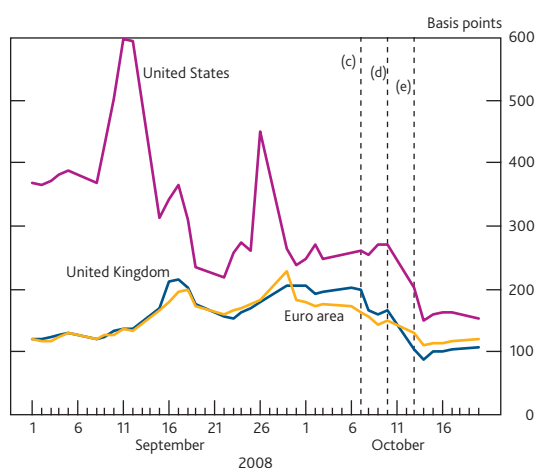
Table 2 Selected government support packages<sup>(a)</sup>

Country	Guarantee of banks' wholesale liabilities <sup>(b)</sup> (billions)	Capital injection (billions)	Purchase of assets (billions)	Other
United Kingdom	£250	£50		£200 <sup>(c)</sup> £149 <sup>(d)</sup>
United States	\$1,400	\$250	\$450 <sup>(e)</sup>	\$198 <sup>(f)</sup>
Euro area <sup>(g)</sup>				
Austria	€85	€15		
Belgium	Pre-Oct. 2009 debt	€4.4 <sup>(h)</sup>	€2.5 <sup>(i)</sup>	
France		€41 <sup>(j)</sup>		€320 <sup>(k)</sup>
Germany	€400	€130 <sup>(l)</sup>		
Greece	€15	€5		
Ireland	Banks' wholesale debt			
Italy	Pre-Dec. 2009 debt	As needed <sup>(m)</sup>		
Netherlands	€200	€46.8 <sup>(n)</sup>		
Portugal	€20			
Spain	€100		€50 <sup>(o)</sup>	
Norway			NRK350	
Sweden	SEK1,500			
Switzerland		CHF6	US\$60 <sup>(p)</sup>	
Canada	Banks' wholesale debt <sup>(q)</sup>		CAD\$25	
Denmark	Banks' wholesale debt			
Iceland	Nationalisation of Glitnir, Landsbanki and Kaupthing			
Australia	Banks' wholesale debt		A\$8	
South Korea	\$100	KRW 1,000	KRW 10,000	
<b>Total (£ billions)<sup>(r)</sup></b>	<b>£2,927</b>	<b>£395</b>	<b>£397</b>	<b>£754</b>

Sources: Press releases.

- (a) Table includes government announcements up to 24 October 2008.  
(b) These guarantees may cover (i) money market borrowing and (ii) term debt.  
(c) Bank of England is making at least £200 billion available under the Special Liquidity Scheme.  
(d) £99 billion Northern Rock and £50 billion Bradford & Bingley.  
(e) The United States has also announced other packages to finance purchases of commercial paper and assets held by money market mutual funds.  
(f) Term Securities Lending Facility, outstanding to date.  
(g) All euro-area bank guarantees cover debt issued until end-2009. Maturity of debt guaranteed ranges from three to five years depending on the country. Details for Spain are known for 2008 only.  
(h) €2 billion Dexia and €2.4 billion Fortis.  
(i) 24% stake in a portfolio of structured products arising from the restructuring of Fortis.  
(j) €1 billion Dexia and €40 billion other.  
(k) France is offering €320 billion of collateralised lending to its banking system.  
(l) €50 billion Hypo and €80 billion other.  
(m) The Italian Ministry of the Economy and Finance has been authorised to subscribe to or guarantee capital raising decided by banks incorporated in Italy.  
(n) €16.8 billion Fortis, €10 billion ING and €20 billion available for other banks.  
(o) Fund established with an initial endowment of €30 billion extendable to €50 billion.  
(p) A special purpose vehicle (SPV) will be set up to purchase up to US\$60 billion of illiquid assets. The Swiss National Bank will loan this SPV US\$54 billion and UBS will provide US\$6 billion. UBS will bear the first US\$6 billion of losses.  
(q) The maximum amount of insurance available to an eligible financial institution will be the greater of 125% of the contractual maturities of wholesale debt instruments for that institution during the six-month period beginning 1 November 2008, or 20% of deposits as of 1 October 2008.  
(r) Bank of England estimates. Guarantees for Australia, Belgium, Canada, Denmark, Ireland and Italy have been estimated on the basis of existing banks' wholesale debt. Totals computed using foreign exchange rates as of 22 October 2008.



Chart 5.1 Indices of bank CDS premia<sup>(a)(b)</sup>

Sources: Thomson Datastream and Bank calculations.

- (a) Data to close of business on 20 October 2008.  
 (b) Five-year senior credit default swaps.  
 (c) Last closing price before UK Government's announcement of financial support package.  
 (d) Last closing price before French, German, Spanish and other European governments announce support packages and UK Government announces scale of equity purchases.  
 (e) Last closing price before US Treasury's announcement that up to US\$250 billion of the Troubled Asset Relief Program is to be used for bank recapitalisation.

Table 5.A Major UK banks' CDS spreads and equity prices<sup>(a)</sup>Credit default swap spreads (basis points)<sup>(b)</sup>

	April 2008 Report	Prior to support package <sup>(c)</sup>	October 2008 Report
Barclays	99	196	101
HBOS	175	264	102
Lloyds TSB	73	146	80
RBS	113	291	103
HSBC	78	98	65
Nationwide	211	292	103

## Equity prices (index: April 2008 Report = 100)

	April 2008 Report	Prior to support package <sup>(c)</sup>	October 2008 Report
Barclays	100	66	55
HBOS	100	19	16
Lloyds TSB	100	54	41
RBS	100	31	29
HSBC	100	107	100

Sources: Thomson Datastream and Bank calculations.

- (a) Data to close of business on 20 October 2008.  
 (b) Five-year senior credit default swaps.  
 (c) Last closing price before UK Government's announcement of financial support package.

## 5 Near-term prospects for the financial system

*Bank credit risks have fallen since the support package was announced...*

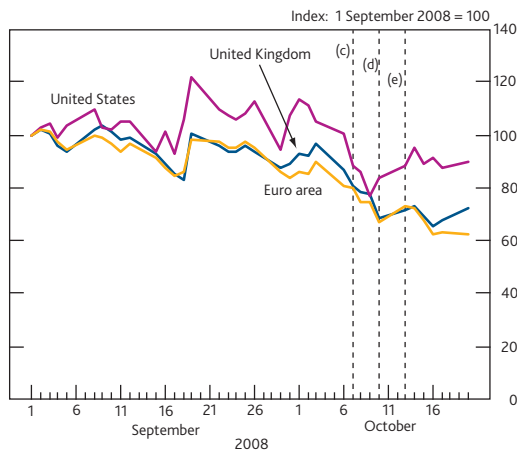
The announcement of the UK package on 8 October and similar measures in the United States, euro area, and other European countries, had an immediate impact on banks' credit default swap (CDS) premia and equity prices. CDS premia declined, as recapitalisation was perceived to have reduced the probability of future defaults (Chart 5.1). They fell by almost 200 basis points for senior CDS for some of the major UK banks, for some banks taking them back to levels seen at the time of the April Report and in some cases significantly lower (Table 5.A). Subordinated CDS premia fell by even more, narrowing the gap between senior and subordinated CDS premia from around 100–250 basis points before the 8 October announcement to 35–45 basis points.<sup>(1)</sup> Falls in CDS premia for most of the major UK banks were roughly constant across CDS contracts of all maturities, suggesting that the banks' prospects have been enhanced both in the near and longer term.

Equity prices of some UK and global banks declined following the announcements (Table 5.A and Chart 5.2). That may have been because existing shareholders feared 'dilution' as a result of new equity issuance. But that concern may prove short-lived if funding costs fall as a result of the measures taken. Based on a calibration fitted to the UK banking system and assuming a £50 billion equity injection, Chart 5.3 looks at the relationship between the return on equity to existing shareholders and the reduction in banks' funding costs. It suggests that, provided the effect of the equity injection is to lower aggregate funding costs by 25 basis points or more, the effect on existing shareholders' return on equity will be positive, providing a boost to share prices in the medium term.

*...and money market pressures have eased somewhat...*

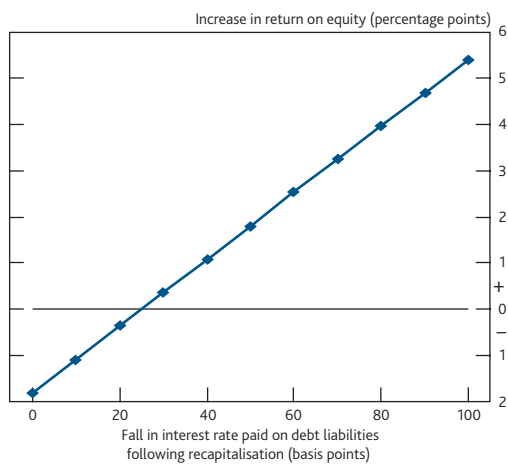
As the perceived probability of default has fallen, there are tentative signs that counterparties have become more willing to lend to banks on an unsecured basis. After the announcement, market contacts reported a little more term funding in interbank markets than at the end of September and early October. As of 20 October, the spread between sterling three-month unsecured lending rates and expected policy rates had initially narrowed from its peak in mid-October, although it has remained at high levels (Chart 5.4). The equivalent US dollar spread fell by more, although from a higher level. US banks are also reported to have become more willing to supply dollars to their European counterparts, with some of the larger US banks recently

(1) Senior CDS provide insurance against default losses on senior debt, while subordinated CDS provide insurance against default losses on subordinated debt.

**Chart 5.2** Indices of bank equity prices<sup>(a)(b)</sup>

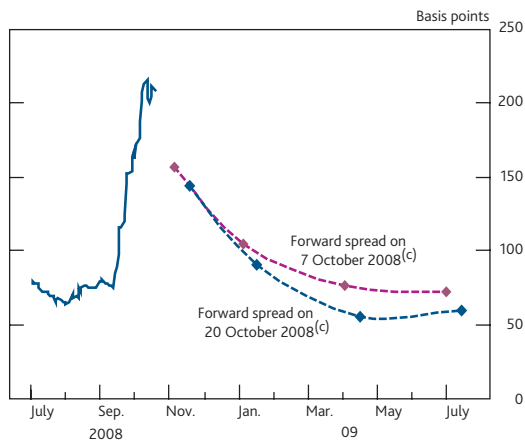
Sources: Thomson Datastream and Bank calculations.

- (a) Data to close of business on 20 October 2008.  
 (b) Rebased to 1 September 2008.  
 (c), (d) and (e) As in Chart 5.1.

**Chart 5.3** Illustrative change in return on bank equity following recapitalisation<sup>(a)</sup>

Source: Bank calculations.

- (a) Assumes an initial capital ratio of 10%, which rises to 12.2% following recapitalisation; a fixed return on assets of 7%; and an initial interest rate on debt liabilities of 6%.

**Chart 5.4** Three-month UK interbank rate relative to expected policy rate<sup>(a)(b)</sup>

Sources: Bloomberg and Bank calculations.

- (a) Spread of sterling three-month Libor to three-month overnight indexed swap (OIS) rate.  
 (b) Data to close of business on 20 October 2008.  
 (c) Dashed lines show implied forward spreads derived from forward rate agreements (FRAs) and OIS with a range of maturities. Reflecting intraday volatility in FRA prices on 20 October, average prices were used to compute forward spreads, rather than closing prices.

extending substantial dollar funding, in some cases at maturities of over one month. The gap between US dollar Libor rates and the rates implicit in currency swap contracts, which had widened sharply, has since returned to normal ranges (Chart 5.5).

Libor-OIS spreads may fall further as banks begin to take advantage of the government-guaranteed new debt issues. A few major UK banks have already issued government-guaranteed debt or announced plans to do so. Furthermore, Lloyds TSB placed £400 million of ten-year bonds without a government guarantee, in the first issue of European financial debt since the failure of Lehman Brothers. Encouragingly, longer-dated forward Libor-OIS spreads are below the costs of issuing government-guaranteed debt, including for sterling. Sterling spreads also indicate a greater fall than expected prior to the recent announcements (Chart 5.4). It seems unlikely that these spreads will return to pre-crisis levels, since these reflected an underappreciation of the risks on banks' balance sheets.

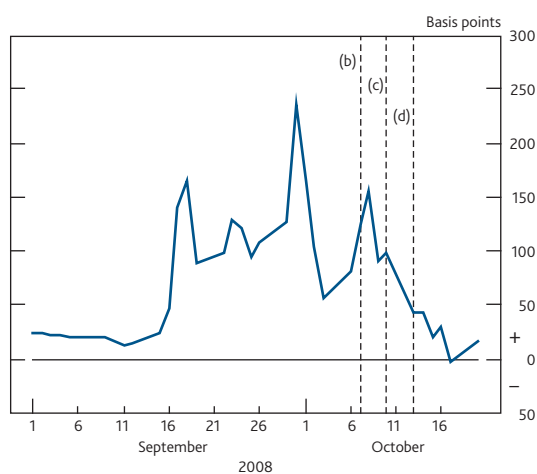
*...though risks remain in other parts of the financial system, including hedge funds, ...*

While these early signs of stabilisation in bank funding conditions are encouraging, risks remain in the broader financial system.

One risk is that leveraged investors, like hedge funds, may be forced to liquidate asset holdings due to tighter credit conditions. For example, haircuts on collateral used to obtain credit from prime brokers have at least doubled for all types of fixed-income securities since the start of the financial crisis and by a factor of at least five for asset-backed securities. Prime brokers are typically not lending at all against ABS CDOs (Table 5.B).

Recently, hedge funds have also experienced additional funding pressures due to redemption requests and a risk is that these could increase. Redemptions tend to increase following a period of weak returns. In 2008 Q3, hedge funds had one of their worst quarters on record, losing a little over 10% on average (Chart 5.6). Bank contacts report that redemption requests have been high in particular from funds of hedge funds (FoHFs) in the light of their own redemption requests. Hedge funds generally operate 'gates' that place an upper limit on aggregate redemptions in any given quarter. A risk for FoHFs is that hedge fund gates prevent them securing the liquidity that they need to meet redemption requests. FoHFs often have liquidity lines with banks on which they could draw in such circumstances. This would transfer the need for liquidity from FoHFs to banks. Hedge fund liquidity needs may help to explain sales of relatively liquid securities such as developed-country and emerging market equities, the prices of which have fallen sharply in September and October.

**Chart 5.5** Spread of three-month US dollar Libor implied by currency swaps over actual rates<sup>(a)</sup>



Sources: Bloomberg and Reuters.

- (a) Data to close of business on 20 October 2008.  
 (b) Last closing price before UK Government announcement of financial support package.  
 (c) Last closing price before German, French, Spanish and other European governments announce support packages and UK Government announces scale of equity purchases.  
 (d) Last closing price before US Treasury announcement that up to US\$250 billion of the Troubled Asset Relief Program is to be used for bank recapitalisation.

**Table 5.B** Typical haircuts applied by prime brokers

Asset	Haircut (per cent)	
	April 2007	August 2008
US Treasury bonds	0.25	3
Investment-grade corporate bonds	0–3	8–12
High-yield corporate bonds	10–15	25–40
Equities	15	20
Investment-grade credit default swaps	1	5
Senior leveraged loans	10–12	15–20
Mezzanine leveraged loans	18–25	35+
Collateralised loan obligations (AAA-rated)	4	10–20
Prime mortgage-backed securities	2–4	10–20
Consumer asset-backed securities (ABS)	3–5	50–60
ABS collateralised debt obligations (AAA-rated)	2–4	n.a.
ABS collateralised debt obligations (AA-rated)	4–7	n.a.
ABS collateralised debt obligations (A-rated)	8–15	n.a.
ABS collateralised debt obligations (BBB-rated)	10–20	n.a.
ABS collateralised debt obligations (Equity)	50	n.a.

Source: International Monetary Fund.

### ...insurance companies, ...

As long-term investors, insurance companies tend to hold a significant proportion of their assets in equities and corporate bonds. The marked decline in the value of these securities in 2008 has generated capital losses for some UK insurance companies, which is reflected in rising CDS spreads and falling equity prices for the sector (**Chart 5.7**).

Unlike banks and hedge funds, however, insurance companies generally do not employ much leverage and have long-term liabilities. So insurance companies seem relatively well placed to avoid liquidity difficulties. Risks could arise, however, if the value of insurance companies' investments were to fall below regulatory capital requirements. This was an issue in the bear market of 2003, but regulatory reforms introduced in 2004 have reduced the likelihood of this risk by using a more risk-based capital requirement with countercyclical resilience testing. A second risk is that credit ratings of insurance companies could be downgraded. Counterparts to any derivatives trades would then increase margin requirements, increasing the liquidity needs of the insurance sector.

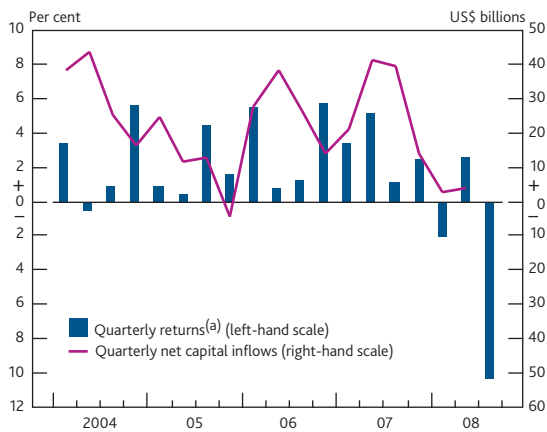
### ...and emerging market economies.

The banking sector and currency crisis in Iceland illustrates the dangers of extreme reliance on external funding. Some banking systems in central and eastern Europe and the Commonwealth of Independent States are also reliant on financing from international wholesale markets and foreign parent banks, although not to the same degree as in Iceland. In some cases, they also have foreign currency reserves that are small relative to potential external financing requirements. Growth in these countries is forecast to slow, in some case quite sharply. Some of these countries will also be adversely affected by recent falls in the prices of oil and other commodities. Reflecting these developments, some sovereign CDS premia have increased markedly since the *April Report* (**Chart 5.8**). As a precaution, some countries, including Hungary and Ukraine, have been in discussions with the International Monetary Fund (IMF) about loans. Iceland has already agreed a US\$2.1 billion loan from the IMF.

As well as the risks to these countries, adverse developments in emerging market economies (EMEs) could put fresh strains on financial systems in developed countries. For example, large banks in developed economies with international operations could be exposed to significant credit losses. In addition, indirect channels may operate through weakening global growth, as demand from the EME regions slows.

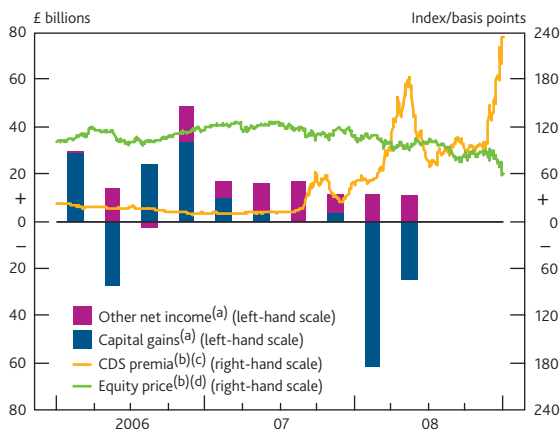
### Structural changes in banks' balance sheets are needed...

Section 1 described the emergence of a customer funding gap for UK banks. This is one diagnostic on the structural factors that have driven increased reliance on wholesale funding, although that reliance varies across institutions. The maturity structure of that wholesale funding also matters and that has

**Chart 5.6** Hedge fund returns and net capital inflows

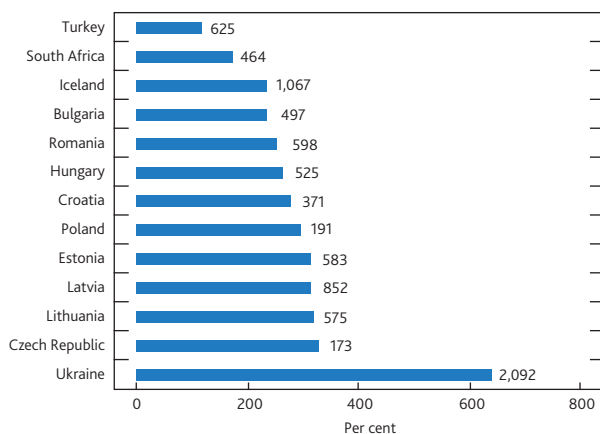
Sources: Bloomberg, CSFB/Tremont, Lipper (a Thomson Reuters Company) and Bank calculations.

(a) CSFB/Tremont aggregate hedge fund index.

**Chart 5.7** UK insurance company net income and financial indicators

Sources: ONS, Thomson Datastream and Bank calculations.

- (a) UK long-term insurance funds. 2008 Q3 not yet available.  
 (b) Data to close of business on 20 October 2008.  
 (c) UK insurance sector five-year senior CDS index spread.  
 (d) Index: 1 January 2006 = 100.

**Chart 5.8** Proportionate changes in selected sovereign credit default swap premia since April Report<sup>(a)(b)</sup>

Sources: Thomson Datastream and Bank calculations.

- (a) Data to close of business on 20 October 2008.  
 (b) Labels on bars show five-year senior CDS spreads on 20 October in basis points.

become progressively shorter in recent months. In combination, these factors have increased the vulnerability of UK banks to rollover risk.

Over the medium term, financial institutions will need to address vulnerabilities in their business models. This will include adjusting funding structures. Interventions from central banks and (more recently) governments have aided this adjustment in funding positions, but are not a permanent solution.

Capital injections should also smooth the adjustment process for banks, allowing balance sheet deleveraging to be orderly, and minimising spillovers to the real economy caused by restrictions of bank credit. But these injections alone may not be sufficient to reduce fully banks' leverage to a lower equilibrium level. For example, even after accounting for recently announced capital raisings which the UK Government will help underwrite, the largest UK banks would need to shed around one sixth of total assets to reduce leverage back to, say, 2003 levels.

*... extending the maturity of wholesale funding and reducing reliance on public sector support...*

The closure of markets such as RMBS and covered bonds to new issuance has made it difficult for banks to lengthen the maturity of their funding. As funding has matured, banks have been unable to replace it with liabilities of similar duration. Facilities established by central banks — such as the Special Liquidity Scheme in the United Kingdom — have been important in helping banks access longer maturity funding. These facilities, and the availability of other operations such as collateral swaps, have expanded by around US\$2 trillion since the start of the crisis (Table 5.C). Over time, banks will need to shift funding models away from dependence on these central bank facilities.

It appears unlikely that banks will be able to rely on securitisation as a source of longer-maturity funding to the same extent as in the past. Market sources suggest banks and their off balance sheet vehicles represented just under half the investor base in ABS markets (Chart 5.9). Banks, along with other key investors such as MMMFs and asset managers, appear to have invested in particular in AAA-rated tranches. Volatility and illiquidity in these securities, along with uncertainty over credit quality, suggest the size and composition of the future investor base is uncertain. Banks may need to offer investors more protection, such as larger equity tranches and greater overcollateralisation, within simpler and more transparent structures. When the market returns, the cost of such funding and hence the cost of finance to end-borrowers is likely to be higher.

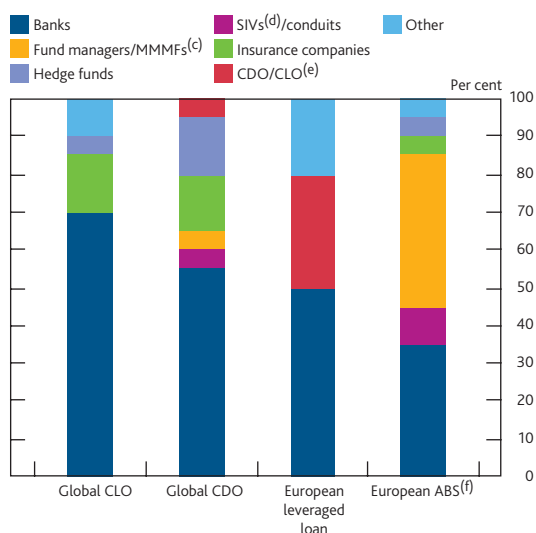
The recent implementation of government guarantees will also help banks to adjust the maturity structure of wholesale

**Table 5.C** Expansion of central banks' balance sheets and availability of government guarantees on banks' wholesale funding

	Pre-crisis <sup>(a)</sup>	Latest <sup>(b)</sup>		Pre-crisis <sup>(a)</sup>	Latest <sup>(b)</sup>
<b>Central bank open market operations</b>			<b>Other new market-wide facilities</b>		
Board of Governors of the Federal Reserve (US\$ billions)	20	343	Board of Governors of the Federal Reserve (US\$ billions) <sup>(g)</sup>	–	257
Repurchase agreements	20	80	ABCP <sup>(h)</sup> Money Market Mutual Fund Facility	–	123
Term Auction Facility	–	263	Primary Dealer Credit Facility	–	134
European Central Bank (€ billions)	438	739	<b>Government guarantees of banks' wholesale liabilities<sup>(i)</sup></b>		
Main refinancing operations <sup>(c)</sup>	288	292	United States (US\$ billions)	–	1,400
Longer-term refinancing operations	150	447	Euro area (€ billions)	–	820 <sup>(j)</sup>
Bank of England (£ billions)	46	104	United Kingdom (£ billions)	–	250
Short-term repurchase agreements	31	0			
Longer-term repurchase agreements	15	104			
<b>Collateral swaps</b>					
Board of Governors of the Federal Reserve Term Securities Lending Facility (US\$ billions)	–	198 <sup>(d)</sup>			
Bank of England Special Liquidity Scheme (£ billions available)	–	200 <sup>(e)</sup>			
<b>US dollar swap lines</b>					
Provided by Board of Governors of the Federal Reserve (US\$ billions)	–	Unlimited			
of which to European Central Bank (US\$ billions)	–	236 <sup>(f)</sup>			
of which to Bank of England (US\$ billions)	–	85 <sup>(f)</sup>			

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

- (a) 22–27 June 2007.  
(b) Latest available at close of business on 20 October 2008.  
(c) Includes fine-tuning operations and marginal lending facility.  
(d) Outstanding amount to date (up to US\$200 billion is available).  
(e) At least this amount available.  
(f) Outstanding amount to date.  
(g) Outstanding amounts to date. The Federal Reserve also announced a new Commercial Paper Funding Facility and Money Market Investor Funding Facility in October 2008. These are not yet operational, so are not reflected in the table.  
(h) Asset-backed commercial paper.  
(i) Covering money market borrowing and term debt.  
(j) All euro-area bank guarantees cover debt issued until end-2009, except Belgium (October 2009) and Spain (details known only for 2008). In addition, Ireland has offered unlimited guarantees.

**Chart 5.9** Estimated pre-crisis investors in credit markets<sup>(a)(b)</sup>

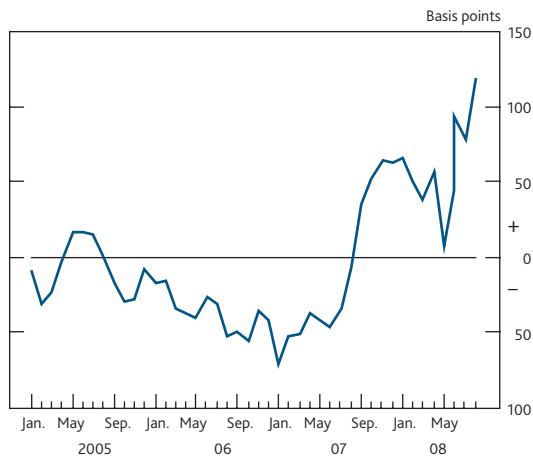
Sources: Citi, JPMorgan Chase &amp; Co., Lehman Brothers, Standard &amp; Poor's and Bank calculations.

- (a) Estimates taken from broker reports covering the period 2004–07.  
(b) Data shown are the average of the data sources available, rounded to the nearest 5%.  
(c) Money market mutual funds.  
(d) Structured investment vehicles.  
(e) Collateralised debt obligation and collateralised loan obligation.  
(f) Asset-backed securities.

funding in the absence of a swift re-opening of ABS markets. Yet while guarantees will also help to reduce reliance on central bank facilities, they merely shift that reliance to another part of the public sector. Taken together, perhaps as much as £5 trillion has implicitly or explicitly been made available by central banks and governments since April 2008 to support wholesale funding (Table 5.C). While temporarily helping lengthen funding maturities, this cannot be a source of funding for banks in the medium term. It will need to be replaced from private sector sources. Given the scale of this intervention, reducing reliance on the official sector as a source of funds is likely to be a significant constraint on banks' activities over the medium term.

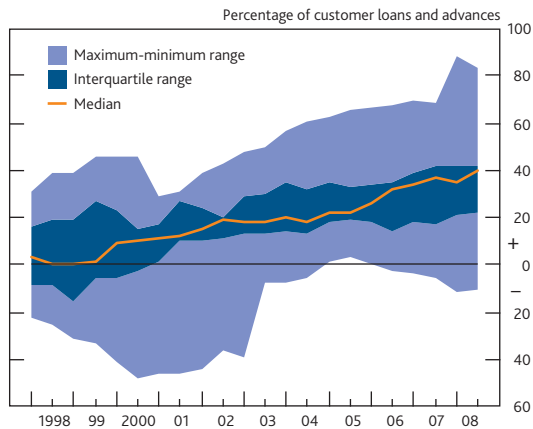
### *...growing the customer deposit base relative to customer lending...*

Over the medium term, banks can reduce vulnerability to rollover risk by financing a greater proportion of customer lending through customer deposits. Such adjustment would result in a narrowing of the customer funding gap. But banks' willingness to raise customer deposits will be constrained by cost. In the United Kingdom, increased competition for customer deposits has pushed up the cost of such funding (Chart 5.10). The ability of banks to raise customer deposits in the United Kingdom will also be constrained by developments in the real economy. Although some larger, more geographically diversified UK banks have recently been able to raise customer deposits overseas, these institutions typically already have customer funding surpluses (Chart 5.11).

**Chart 5.10** Major UK banks' fixed-rate bond spreads<sup>(a)</sup>

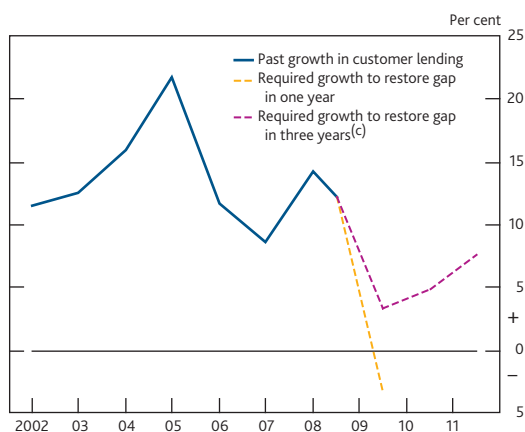
Sources: Bank of England and Bank calculations.

(a) Average spread of one year (or nearest) fixed-rate bonds over equivalent general collateral repo rate.

**Chart 5.11** Major UK banks' customer funding gap<sup>(a)</sup>

Sources: Dealogic, published accounts and Bank calculations.

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

**Chart 5.12** Illustrative adjustment path for customer lending to reduce customer funding gap to 2003 levels<sup>(a)(b)</sup>

Sources: Dealogic, published accounts and Bank calculations.

- (a) Data excludes Nationwide and uses Abbey data rather than Banco Santander.  
 (b) Assumes major UK banks' customer deposit growth is equal to the average annual rate since 2005.  
 (c) Assumes 20% of the required adjustment in customer lending growth occurs in the first year, 30% in the second year, and 50% in the third year.

An alternative is to reduce the gap through slower lending growth. The customer funding gap of major UK banks at end-June 2008 was around £740 billion. As an illustration, if banks aimed to reduce the gap to 2003 levels (when it was around £265 billion) over three years, and growth in customer deposits continued at a rate equal to its trend over the period 2005–07, then customer lending (to both domestic and overseas borrowers) would slow significantly from earlier growth rates (**Chart 5.12**). That would be in line with the slower bank lending observed in other countries following banking crises (**Chart 5.13**). The package of measures announced in the United Kingdom will help smooth this slowing in lending. Without it, banks may have had to close the gap more quickly in response to wholesale funding pressures, potentially causing customer lending to contract. Capital injections in the United Kingdom and elsewhere will also increase banks' capacity to absorb losses on legacy assets. This should reduce the impact of the deterioration in macroeconomic conditions on banks' lending behaviour, enabling bank credit to remain available to households and companies.

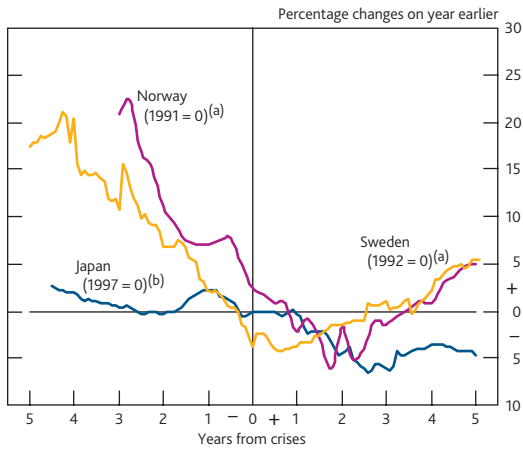
#### *...and holding a larger buffer of liquid assets.*

The recent implementation of changes to the Bank of England's market operations — discussed in Section 4 — will provide banks with liquidity insurance in the event of stress, although this is not designed to replace banks' own liquidity risk management or act as a longer-term source of funding to the banking sector. As part of that risk management, banks hold highly liquid assets as a form of self-insurance against rollover risk. These can be mobilised via repo transactions or outright sales to raise funds during stressed periods. The ongoing turmoil has revealed that, during more benign periods, some banks sought to reduce the opportunity cost of holding liquid assets by substituting traditional liquid assets such as highly rated government bonds with highly rated structured credit products. This has been part of a longer-term decline in banks' holdings of liquid assets in the United Kingdom (**Chart 5.14**), which has been replicated in other countries.<sup>(1)</sup> Liquidity regulation — discussed further in Section 6 — can play an important role in requiring banks to build larger defences against crystallisation of rollover risk.

In summary, banks still need to deal with the legacy of overextended balance sheets. This means reducing leverage further and reducing reliance on short-term wholesale funding. Both are consistent with a period of tighter credit conditions for the real economy, compared to the period prior to the turmoil. Official sector intervention should help smooth this adjustment process, reducing the risk of adverse spillovers to

(1) The evolution of liquid assets and related issues are 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 5.13** Growth in lending to real economy following past financial crises

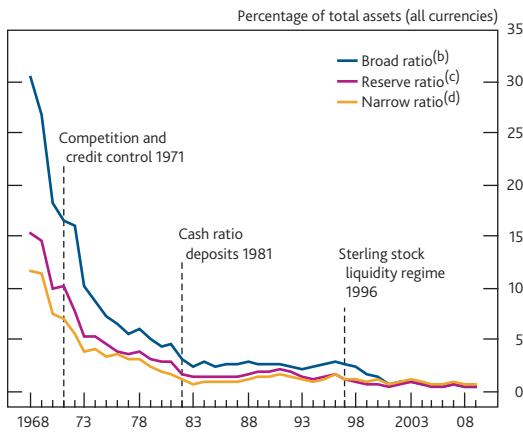


Sources: Central bank financial stability reports and Bank calculations.

- (a) Quarterly data.
- (b) Monthly data.

the real economy. But this intervention will not of itself deliver the required adjustment in balance sheets, since large-scale interventions by the official sector need also to be repaid over the medium term.

**Chart 5.14** Sterling liquid assets relative to total asset holdings of UK banking sector<sup>(a)</sup>



Source: Bank calculations.

- (a) 2008 data are as of end-August 2008.
- (b) Cash + Bank of England balances + money at call + eligible bills + UK gilts.
- (c) Proxied by: Bank of England balances + money at call + eligible bills.
- (d) Cash + Bank of England balances + eligible bills.

## 6 The medium-term agenda

The banking crisis and the unprecedented interventions by national and international authorities will affect both the structure of the financial system and the incentives within it. The full consequences will take time to emerge. But recent events have highlighted the need for a fundamental rethink internationally of the appropriate safeguards against systemic risk.

The long-standing focus on capital and, to a lesser extent, liquidity requirements for particular institutions has not delivered the right outcomes for the system as a whole, resulting in real costs for the wider economy. There needs to be a substantive discussion at a national and international level of the appropriate long-term responses. But some of the changes needed to improve the resilience of the system are already clear. These are discussed in this section, and summarised in **Table 6.A**.

*Macroprudential tools are needed to ensure banks are in a stronger position ahead of the next downturn.*

Recent events have demonstrated the tendency of the financial system to be procyclical, overexpanding in good times and contracting sharply in bad times. Many banks did not build up large enough capital buffers in benign times to ensure that they could maintain market confidence when conditions eventually reversed. As a result, large-scale injections of capital — often underwritten by the authorities — have been required into banks that had previously been considered adequately or well capitalised.

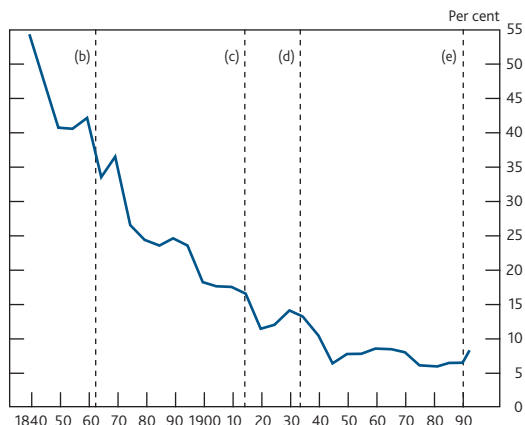
By historical standards, banks have operated with relatively low levels of capital in recent years. For example, long-run evidence shows that capital ratios for US banks have fallen significantly from levels of around 50% in the mid-19th century (**Chart 6.1**). The structure of banking systems, and the safety nets in place to support them, have changed dramatically over the period. While it is difficult to determine the optimum level of capital, recent events suggest that capital levels across the financial system as a whole have fallen too far.

Existing regulatory tools need to be adapted and new ones developed, to ensure that the financial system is better capitalised in advance of the next downturn and to address the build-up of risk through the cycle. A range of specific proposals have already been put forward. A leverage ratio — a minimum ratio of capital to total assets — would impose a constraint on the growth of banks' balance sheets relative to their stock of capital. A system of dynamic provisioning would force banks to build up reserves against future losses in good times, providing a resource which could be drawn on in bad times. These and other proposals are outlined in detail in **Box 6**. In addition, the requirement on banks under Pillar 2 of

**Table 6.A** Key actions to improve resilience

- Macroprudential tools are needed to guard against systemic risk and to ensure banks are in a stronger position ahead of the next downturn.
- Capital levels have been too low and need to rise; and capital needs to be of sufficient quality to deliver higher levels of resilience.
- Liquidity standards have been inadequate and should be strengthened to ensure that firms are sufficiently resilient to a range of shocks.
- The current UK legal framework for depositor protection and dealing with institutions in difficulties needs to be strengthened.
- International arrangements for managing crises at cross-border financial institutions should be developed further.
- Transparency should be improved through more informative disclosure, including the provision of more information on potential future balance sheet volatility, to strengthen market discipline.
- The scope for — and potential benefits of — developing centralised infrastructures for a broad array of over-the-counter instruments should be assessed.

**Chart 6.1** Long-run capital levels for US commercial banks 1840–1993<sup>(a)</sup>



Source: Berger, A, Herring, R and Szegö, G (1995), 'The role of capital in financial institutions', *Journal of Banking and Finance*, pages 393–430.

(a) Equity as a percentage of assets (ratio of aggregate dollar value of bank book equity to aggregate dollar value of bank book assets).

(b) National Banking Act 1863.

(c) Creation of Federal Reserve 1914.

(d) Creation of Federal Deposit Insurance Corporation 1933.

(e) Implementation of Basel risk-based capital requirements 1990.



Basel II to stress test their business for a downturn, which is in the process of being introduced, should also make a useful contribution.

*Inadequate levels of capital reflect underestimation of the risks that banks have been running...*

During this crisis, banks, market participants and the authorities have all underestimated the risks to which many banks and other financial institutions have been exposed.

The Basel II capital rules introduced this year are more sophisticated than the original Basel Accord which was in place throughout the build-up to the current crisis. But some specific shortcomings of Basel II have been revealed by recent events, such as the treatment of trading book assets and the risks relating to off balance sheet exposures, and are now being addressed.

Structural changes, such as the growth in trading books and the wider adoption of mark-to-market accounting, have resulted in greater uncertainty about the net worth of some banks. Recent events have illustrated that banks can now incur losses much faster than they can recapitalise themselves in stressed market conditions. As such, banks may need to hold more capital in normal conditions so as to provide an adequate buffer against market volatility. If capital levels are to increase, this additional capital should be genuinely usable under stress. It must not simply become locked-in as part of a higher *minimum* expected level of capital.

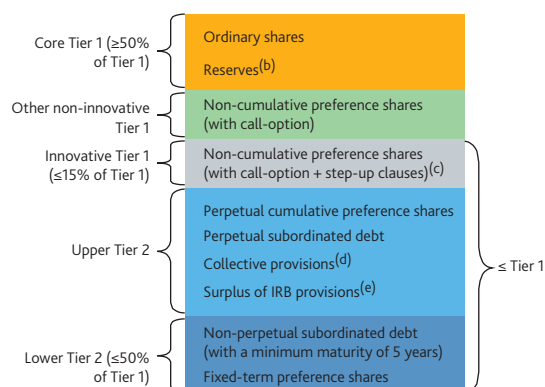
*...including systemic risks.*

Risks arising from system-wide interactions and market dynamics have received too little attention among firms and regulators. Firms' stress testing and contingency planning needs to factor in spillovers of asset sales on market prices and of lending contraction on aggregate credit conditions (as discussed in the October 2007 Report, pages 62–63). Macroeconomic stress tests, such as those required by the FSA, should help to calibrate the buffer necessary to insure against unexpected economic shocks. But it is not clear that firms currently have the capability to assess the potential impact of systemic risk on their balance sheets. They should consider how to adapt their stress-testing techniques and risk management practices in order to do so, and use the results in their capital planning.

*The quality of capital has been overestimated...*

Markets appear to have perceived the level of loss-absorbing capital held by banks as going-concerns to be lower than was previously thought. Supervisory regimes accept a range of hybrid debt-equity instruments in Tier 1, not just shareholders' funds (see Chart 6.2 and the discussion in Box 4 of the April 2008 Report, pages 40–41). But it appears that the market does not consistently treat these as loss-absorbing instruments. Instead, market participants recently have

**Chart 6.2** Key components of Tier 1 and Tier 2 capital and relevant regulatory limits under Pillar 1<sup>(a)</sup>



Source: General Prudential Sourcebook for Banks, Building Societies, Insurers and Investment Firms, FSA.

- (a) Limits are expressed in terms of Tier 1 which excludes Tier 1 innovative instruments and also deducts investments in own shares, intangible assets and other specific Tier 1 deductions.  
 (b) Includes non-repayable capital contributions and externally verified interim net profits after prudential filters (eg losses arising from valuation adjustments).  
 (c) A step-up clause allows an increase in the coupon rate beyond a specific date.  
 (d) Provisions that cannot be identified to specific transactions and correspond to portfolios under the standardised approach.  
 (e) The positive difference between the level of provisions and the level of expected losses associated with portfolios under the internal ratings based (IRB) approach.

focused on measures of 'core' Tier 1 capital.<sup>(1)</sup> If banks cannot both withhold payments on these hybrid instruments and be considered a going-concern by markets, they are holding less genuinely loss-absorbing capital than their Tier 1 ratios currently imply. That is one reason why, under the UK recapitalisation scheme, the majority of the capital injected will be provided in the form of common equity. The Basel Committee's current work on the appropriate treatment of different types of capital should provide guidance on appropriate definitions of regulatory capital.

*... with insufficient account taken of systemically important institutions.*

Finally, the standard of resilience for some banks may have been set too low. Higher standards of resilience — not just for capital but also for liquidity — are appropriate for institutions that would impose a greater cost on the financial system as a whole if they were to fail. The Federal Reserve Bank of New York has already indicated that it will put in place more exacting expectations on capital, liquidity and risk management for the largest institutions that play a central role in intermediation and market functioning.<sup>(2)</sup>

*Liquidity standards need to support the necessary adjustments to banks' funding structures.*

Previous Reports have highlighted severe deficiencies in firms' liquidity risk management, including in identifying both on and off balance sheet liquidity risks, conducting sufficiently severe stress tests and maintaining adequate and fully operational contingency funding plans. Supervisors and regulators have stepped up their efforts, domestically and internationally, to ensure that liquidity risk is appropriately managed, given the critical role of liquidity in the banking sector and in the functioning of financial markets.<sup>(3)</sup>

Failures have required extensive intervention by the official sector to ensure that short and medium-term funding is available to banks. As discussed in Section 5, there should be a clear expectation that banks will move away from their current heavy dependence on official sector funding support over the longer term. Tougher liquidity standards should also reduce the financial system's procyclical tendencies — for example, by restricting banks' ability to expand their lending rapidly using potentially volatile sources of funding, such as some types of wholesale funding.

*Legislation will strengthen domestic crisis-handling arrangements...*

Recent events have demonstrated the need for the UK authorities to have more effective tools and systems for

(1) See the discussion of alternative measures of capital in Box 4 of the April 2008 Report, pages 40–41.

(2) Speech by Timothy Geithner, 'Reducing systemic risk in a dynamic financial system', 6 August 2008.

(3) See, for example, the Basel Committee of Banking Supervision (2008), *Principles of sound liquidity risk management and supervision*, September.

## Box 6 Countercyclical measures

The financial system has a tendency to be procyclical, overexpanding in good times and retrenching sharply in bad times, exacerbating the likelihood of financial instability and amplifying undesirable macroeconomic feedbacks. Banks' failure to build up sufficient buffers of capital and liquidity in good times to use in bad times is one aspect of this.

This *Report* discusses initiatives aimed at improving market discipline — such as better disclosure of stress-test results — as a way of mitigating procyclical tendencies. In addition, a variety of changes to regulatory capital requirements have been suggested internationally, to ensure that the financial system is more resilient in advance of a downturn. For example, restrictions on balance sheet growth could be achieved via simple rules linked to either a bank's level of debt or its asset growth. Ensuring banks have buffers to draw on in a crisis could be facilitated by provisioning against future defaults, or by having credible insurance that would provide recapitalisation when necessary. This box discusses examples of each of these in turn.

### Leverage ratio

One possibility is to adopt, in parallel with the Basel II standards, a backstop against capital levels falling too low in good times, such as a leverage ratio: a minimum ratio of capital to total assets. This would impose a relatively simple constraint on the growth of banks' balance sheets relative to their stock of capital. Some authorities — notably in the United States — already use a leverage ratio as an additional tool in their overall assessment of the resilience of their financial institutions. A proposal for a leverage ratio is being considered in Switzerland.

Careful consideration needs to be given to the consequences of the introduction of a leverage ratio. For example, to the extent the required ratio binds, it may provide banks with an incentive to invest in more risky assets. In addition, there is not one clear way to define a leverage ratio, particularly regarding accounting for off balance sheet assets such as lending commitments or potential future exposures on derivatives. If such contingent commitments were to be excluded, banks could circumvent leverage ratio rules through off balance sheet transactions and implicit commitments.

### Dynamic provisioning

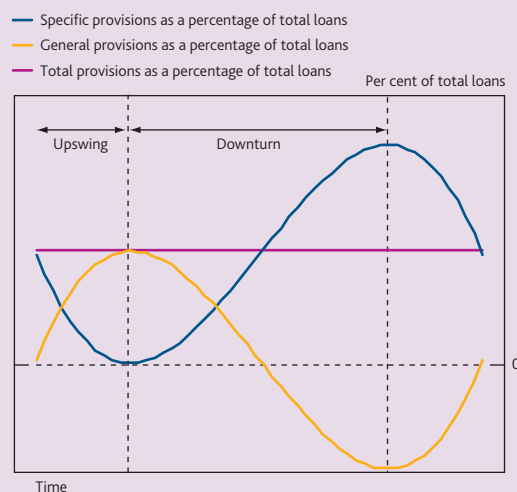
Another rules-based scheme, a form of which is in use in Spain,<sup>(1)</sup> is dynamic provisioning: a rule requiring banks to build up general loss reserves during good times according to a formula calibrated on loan growth and the rate of provisioning and losses experienced over the past. This framework would

be supplementary to current loan-loss recognition and capital requirements. Under current accounting rules, banks are permitted to hold allowances against losses only in respect of assets currently on their balance sheet, and to make impairments, or specific provisions, only on an incurred loss basis. Present accounting requirements therefore largely prohibit banks from building up reserves against future losses that they expect to incur but for which there is currently no or insufficient evidence of actual incurred loss.

Dynamic provisioning would force banks to start to build up reserves against future losses when loans are originated. The effect of such a scheme, if it were properly calibrated, would be that the cumulative stock of these general provisions would rise when actual loan losses are low, providing a resource which could be drawn on in periods when actual losses are high. Banks would have less need to raise new capital in downturns, when the market appetite for new equity may be limited. And since drawdowns on these general provisions would be automatic, the market would view this less negatively than the need for capital raising.

**Chart A** provides a stylised illustration of how such a scheme would work. Specific provisions and impairments fall during upswings and then rise in downturns. General provisions, on the other hand, rise during upswings to build a stock of reserves that can be drawn down in downturns.

**Chart A** Dynamic provisioning



There would be challenges in the practical implementation of such a scheme, notably ensuring consistency with accounting rules. For example, the Bank of Spain was obliged to make changes to its dynamic provisioning rules upon the adoption by the European Union of the international accounting standards issued by the International Accounting Standards Board. As such, a provisioning scheme would have to make clear how regulatory requirements for provisioning differed from general accounting standards that apply to impairments.

A limitation of provisioning is that it typically relates only to average losses, rather than large losses which may occur with a small probability which is the basis for assessing minimum bank capital.<sup>(2)</sup> The scheme could, however, be elaborated to include an element of provision against losses linked to excessive growth of loans, thereby providing protection against the slippage in lending standards that tends to be a feature of prolonged upswings.

### Time-varying capital requirements

Another method to restrain excessive balance sheet growth in good times is to link banks' capital requirements to lending growth. Charles Goodhart and Avinash Persaud have suggested a simple countercyclical rule to achieve this that mechanically links capital requirements to growth in the value of each bank's assets.<sup>(3)</sup> Each bank would be allowed a certain amount of asset growth, related to factors such as the inflation target and the long-run economic growth rate. But banks that grew their assets by more than this allowance would be subject to increased capital requirements.

Further work on calibration would be needed to consider whether such a requirement restrained risk-taking effectively. There are clear drawbacks to such a simple, non risk-based rule; it could potentially penalise banks that grow their balance sheets through less risky assets, relative to their peers. More generally, focusing on specific indicators such as asset growth potentially ignores other important risk drivers, so the proposal would need to run parallel to Basel II. A different option would be to link capital requirements to asset growth in a less mechanical but more risk-based way through the implementation of Pillar 2.

### Capital insurance

An innovative proposal has been put forward by Anil Kashyap, Raghu Rajan (both University of Chicago) and Jeremy Stein (Harvard University).<sup>(4)</sup> Banks could choose between holding higher capital and buying capital insurance which would provide a capital infusion in the event of a systemic event. In essence, banks could buy — or be required by the regulator to purchase — catastrophe insurance. Capital insurance would work through a 'deep-pocket' insurer, such as a pension or sovereign wealth fund, which would place a sum aside in a 'lock box', invested in safe assets such as Treasury bills in return for receipt of premium and interest on the investment. In a payout, the bills would be transferred to the bank, thereby providing recapitalisation.

But this proposal has the potential to create new vulnerabilities, such as an overreliance on 'deep-pocket' insurers and the associated moral hazard. Moreover, it seems unlikely that such a scheme could deal with genuinely systemic events, since this is precisely when many institutions will be drawing on funds at the same time, potentially

exhausting the resources of the insurers. But it nonetheless merits further consideration and has some parallels with bonds which are used to transfer catastrophe (natural disaster) insurance risk from insurers, reinsurers and corporations to investors. Catastrophe bond risk capital outstanding was US\$13.8 billion at the end of 2007. 116 bonds were issued between 1997 and end-2007, comprising primarily of Standard & Poor's BB (or equivalent) rated issues.

### Summary

It is clear that more attention needs to be paid to countercyclical regulatory measures. Dynamic provisioning and *ex-ante* capital rules appear to be useful tools not only to ensure that the system has larger buffers to draw on, but also to restrain the tendency for excessive balance sheet expansion during upswings which exacerbates the severity of subsequent economic downturns. Further analysis of the effectiveness and calibration of the various options is required ahead of their implementation. The Financial Stability Forum has already set such work in train at an international level.

(1) More details on the Spanish approach can be found in Banco de España, *Financial Stability Report* (05/2005), Box III.1; and Jiménez, G and Saurina, J (2006), 'Credit cycles, credit risk, and prudential regulation', *International Journal of Central Banking*, Vol. 2, No. 2, June, pages 65–98.

(2) Under the Internal Ratings Based approach in Basel II, capital against credit risk in the banking book is assessed at a 99.9% level of confidence over a one-year period.

(3) Goodhart, C and Persaud, A (2008), 'A party pooper's guide to financial stability', *Financial Times*, 4 June 2008.

(4) Kashyap, A, Rajan, R and Stein, J (2008), 'Rethinking capital regulation', conference draft for Federal Reserve Bank of Kansas symposium, Jackson Hole, Wyoming, 21–23 August 2008.

**Table 6.B** Elements of the Banking Bill 2008

- Establishes a **special resolution regime (SRR)** to provide the Authorities with tools to deal with banks that encounter, or are likely to encounter, financial difficulties.

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- Establishes a new **bank insolvency procedure**, based on existing liquidation provisions, to provide for the orderly winding up of a failed bank and to facilitate rapid Financial Services Compensation Scheme (FSCS) payments to eligible claimants or a transfer of such accounts to another institution.

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- Establishes a new **bank administration procedure** for use where there has been a partial transfer of business from a failing bank.

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- Includes powers to enable the introduction of pre-funding for the FSCS; allows the FSCS to contribute to costs arising from the use of the SRR; and allows the National Loans Fund to make loans to the FSCS.

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- Gives the Bank of England a statutory role in the oversight of **interbank payment systems**.

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- Replaces existing provisions about **banknotes in Scotland and Northern Ireland**; empowers the Treasury to make regulations about banknotes, including a requirement on note-issuing banks to have backing assets; and permits the Bank of England to make rules about the treatment, holding or issuing of banknotes.

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- Includes provisions relating to the **governance of the Bank of England**, including a new statutory financial stability objective and the establishment of a Financial Stability Committee as a subcommittee of the Bank's Court of Directors.

Source: The Banking Bill 2008.

dealing with failing banks. This is the main purpose of the Banking Bill laid before Parliament in early October (see **Table 6.B**). The proposals were designed to reduce the likelihood of a bank failing, to lower the impact on the wider financial system in the event of a failure, to ensure effective compensation arrangements for depositors in those circumstances, to strengthen the Bank of England's role in financial stability and oversight of payment systems and to improve co-ordination between the UK authorities.

The special resolution regime (SRR) is central to these proposals (Box 7). This regime would provide powers and tools to be used when voluntary actions by the firm and normal regulatory powers are insufficient to handle a failing bank in an orderly way. The recent severe institutional distress in the United Kingdom — including Northern Rock and Bradford & Bingley — has illustrated the need for a permanent and transparent regime to manage the risks to financial stability, protect public finances and depositors, and ensure the continuity of key banking and payment arrangements.

*...and international crisis management needs also to be strengthened...*

The complexities of cross-border crisis management have long been recognised. But recent events have highlighted weaknesses which increase the need for joint work to improve co-operation between authorities in these cases.

For example, there has been a long-standing recognition of the complications that arise from the resolution of a bank with significant foreign branches or subsidiaries. But this did not prevent poor co-ordination during recent events, such as those surrounding the failure of Lehman Brothers and the handling of distress among the largest Icelandic banks. The sequential announcements by national governments of deposit guarantees and changes to deposit insurance arrangements highlighted other areas where greater international co-ordination would have been desirable. Recent events also demonstrated, however, how effective co-ordinated action can be at times of system-wide stress: for example, the co-ordinated interest rate cuts on 8 October; the provision of dollar liquidity by central banks in September and October (see **Table 3.A**); and the adoption of comprehensive national measures to support banking systems (see Box 5 on pages 31–33).

The Financial Stability Forum (FSF) is developing a practical checklist of issues and actions that need to be considered to manage a distressed cross-border institution and a set of principles for international crisis management, drawing on the experience of the current crisis.<sup>(1)</sup> International work is also

(1) The mandate is set out in the FSF (2008) *Report on Enhancing Market and Institutional Resilience*, April ([www.fsforum.org/publications/r\\_0804.pdf](http://www.fsforum.org/publications/r_0804.pdf)).

under way to develop a better understanding of the different mandates of individual authorities in different countries and the different regimes for crisis management and bank insolvency. In the European Union in particular, there is work to develop firm-specific contingency plans in groups of relevant authorities (known as cross-border stability groups). A better understanding of the complexities of resolving such firms may call for changes in the legal and operational structures of cross-border groups.

*...while ensuring that market discipline is maintained...*

Market discipline did not prevent a build-up in risks. One reason may be that firms lack clear incentives to produce and disclose accurate and comparable information on the risks facing their businesses. Recent surveys of financial statements suggest that disclosures on the use of fair value, on exposures to structured finance and on approaches to risk management have improved.<sup>(1)</sup> But Pillar 3 of Basel II needs to ensure that counterparties and other market participants have the information they need to assess the risks to individual firms' businesses and to the wider financial system. For example, greater disclosure of the potential effects on balance sheets of different outcomes, including the variation or margin of error around those outcomes, would be beneficial. Uncertainty about such effects has been acute during the present crisis and has contributed materially to funding problems.

The consistent and timely disclosure of exposures following international standards is a key step in restoring market confidence in financial institutions. Although fair values have proved difficult to determine in illiquid markets over recent months, that should not mean abandoning the underlying principles. Indeed, events during the crisis have illustrated that market participants are themselves making these fair value adjustments when evaluating the solvency of a firm. It is better if those market judgements are well informed and based on authoritative application of fair value principles to the underlying balance sheet exposures. That is not to say the methods for applying these principles could not be improved. Recent joint guidance from the US Securities and Exchange Commission (SEC) and Financial Accounting Standards Board (FASB) — supported by the International Accounting Standards Board (IASB) — on the valuation of financial instruments when markets are dislocated, is welcome.<sup>(2)</sup>

Other stakeholders in financial institutions also need to play their part. Failings of strategies and risk management within financial firms suggest that shareholder groups have not

(1) For example, PWC (2008), *Accounting for change: transparency in the midst of turmoil*; and Committee of European Banking Supervisors (2008), *CEBS report on banks' transparency on activities and products affected by the recent market turmoil*, June.

(2) IASB (2008), 'IASB staff position on SEC-FASB clarification on fair value accounting', 2 October 2008; and SEC/FASB (2008), 'SEC Office of Chief Accountant and FASB staff, clarifications on fair value accounting', 30 September 2008, 2008-234.

provided as rigorous an oversight role of the financial institutions that they own as they could have done.

*...and market infrastructures develop where necessary.*

Recent market events have also highlighted weaknesses in the post-trade infrastructure for over-the-counter (OTC) products in general, and credit default swaps in particular. Among the actions being discussed to strengthen this infrastructure are the potential benefits of a clearing house or a central counterparty (see Box 2 on pages 21–23). A debate is needed on whether such centralised arrangements are required for a broader array of OTC instruments and if so what form they should take — recognising that the establishment of a sufficiently robust central counterparty may not always be feasible. Even where it is not, standardisation and centralisation of many post-trade functions could bring considerable benefits.

## Box 7

### Banking Bill: overview of the special resolution regime

Until the Banking (Special Provisions) Act (BSPA) was passed in February 2008, the United Kingdom relied on normal corporate insolvency law to wind up failed banks. Such reliance could put financial stability at risk, by undermining the ability of the authorities to take rapid action to resolve a failing bank in the public interest. A number of the resolution provisions in the BSPA expire after one year. So a Banking Bill was laid before Parliament on 7 October,<sup>(1)</sup> which proposes a series of permanent powers and tools be given to the Tripartite Authorities and the Financial Services Compensation Scheme (FSCS) to reduce the potential for, and impact of, future bank failures. A key component of these proposals is the special resolution regime (SRR), which is designed to provide the Tripartite Authorities with a range of tools to deploy flexibly, in order to control the resolution of failing banks in a manner that supports the public interest. The objectives of the SRR — detailed in the bullet points below — set out how it will support the public interest.

Before the Banking Bill is passed, the UK authorities will consult on draft secondary legislation which will set out in more detail the structures and processes that will govern the application of these bank resolution tools, including the safeguards that will apply. This should give greater certainty and confidence to the banking industry and to markets more generally that the SRR is a necessary and proportionate way of resolving failing banks in future.

A key objective of regulation of the financial services industry is to reduce the risk that deposit-taking institutions experience troubles which bring them close to failure. But no regulatory regime can (or indeed should) prevent deposit-taking institutions from failing. It is important, for financial stability, that any such failures are orderly. That is the role of the SRR. The proposals in the Banking Bill include that the SRR applies to banks and building societies that are incorporated in the United Kingdom. The Banking Bill also allows the authorities to extend the SRR powers to credit unions in the United Kingdom, if considered appropriate.

#### Key elements of the SRR

The SRR would be triggered by the FSA, in consultation with the Bank and HM Treasury. The FSA's decision to trigger the SRR would be made upon it determining that the deposit-taking institution had failed (or was likely to fail) to meet its Threshold Conditions, and that it was not reasonably likely that action would be taken to enable the institution to satisfy these Threshold Conditions on an appropriate timescale.<sup>(2)</sup> In consultation with the FSA and HMT, the Bank

would determine which SRR tool was most appropriate for resolving the institution. It is possible that the Bank might choose to deploy a combination of SRR tools at the same time or sequentially. If the Bank's preferred resolution approach required the use of funds for which the Chancellor of the Exchequer is responsible, then that would require the Chancellor's authorisation.

In determining which SRR tool would be most appropriate to resolve a failing deposit-taking institution, the Bank would need to balance the following objectives that are set out in the primary legislation:

- to protect and enhance the stability of the financial systems of the United Kingdom;
- to protect and enhance public confidence in the stability of the banking systems in the United Kingdom;
- to protect depositors;
- to protect public funds; and
- to avoid interfering with property rights in contravention of the European Convention on Human Rights.

Some of the measures that can support the resolution of a bank were available to the Tripartite Authorities even before the BSPA became law — notably public sector guarantees, liquidity support or capital injections. Indeed, all three of these were important elements of the Government's announcement on 8 October regarding financial support to the banking industry. The Banking Bill establishes a SRR that comprises four resolution tools:

- (i) the ability to direct an accelerated transfer of part or all of a bank's business or shares to a private sector purchaser;
- (ii) the ability to direct an accelerated transfer of part or all of a bank's business to a bridge bank;
- (iii) temporary public sector ownership; and
- (iv) a bank insolvency procedure, which imposes a priority on the liquidator to facilitate the payout or transfer of the accounts of depositors insured by the FSCS.

These tools would allow the orderly resolution of a bank that gets into serious difficulties and that is judged not likely to recover. Application of the regime as soon as a regulatory decision has been taken that the bank is failing and not likely to recover, rather than waiting for the bank to fail to make payments, also means that the bank's franchise value can be better preserved. This, in turn, usually means there is more residual value to distribute to creditors (and, ultimately, to shareholders) than if the failed bank were liquidated immediately with a fire-sale of its assets.

Since February 2008, under the wide-ranging powers of the BSPA, the authorities have had the flexibility to implement a



number of different resolution tools, while offering few of the safeguards that are a feature of the Banking Bill. Once the Banking Bill is passed, the range of tools will be more clearly specified, as will be the safeguards, and there will be greater clarity in the processes to ensure that the appropriate tool is chosen in each circumstance. These measures are likely to reduce the probability of needing to use the temporary public sector ownership tool. The remainder of this box explains in more detail these various resolution tools, including some of the main safeguards that the authorities expect to deploy when resolving banks in future.

### Individual SRR tools

#### (i) transfer to private sector purchaser

It is proposed that the Bank of England be given the power to effect the transfer of part or all of a failing bank's business to a willing private sector purchaser either by the transfer of the bank's shares, or of its property, rights and liabilities. The tool would allow for a property transfer of the business of a bank without the protracted court process required under Part 7 of the Financial Services and Markets Act 2000.

#### (ii) transfer to a bridge bank

In addition, it is proposed that the Bank of England be able to transfer part or all of a failing bank's business to a bridge bank. This is a bank controlled and owned by the Bank of England, which is designed to operate for a limited period until it is sold to the private sector. A bridge bank helps to ensure continuity of the banking services for its customers: households and companies would have continuing access to deposit and current accounts and to overdraft and loan facilities. It also creates the time to identify potential private sector purchasers and permit them to undertake due diligence before submitting their bid to acquire ownership of the bank's business. Proceeds from the sale of the bridge bank will accrue back to the creditors and thereafter the shareholders of the failed bank via a Bank Resolution Fund.

The Bank of England may exercise the transfer powers to transfer just part of a failing bank's business to a private sector purchaser or bridge bank. One reason for choosing such a partial transfer might be if a private sector purchaser would be willing to buy only part of a failing bank. A better price might be obtained from the sale of just the higher-quality assets and liabilities. Another advantage of a partial transfer to a bridge bank is that the potential commitment of public funds might be less than in a whole bank transfer.

If there is a partial property transfer to a private sector purchaser or bridge bank, then the Banking Bill proposes a number of safeguards to protect the creditors left in the failing bank. Among other things, these safeguards protect netting and set-off rights; place certain restrictions on the transfer of

assets and liabilities; and require the Treasury to have regard to ensuring that any creditors in the failed bank do not receive less favourable treatment than they would have received if the whole bank had instead entered liquidation. The recent transfers of the deposit books of Bradford & Bingley (to Abbey National), and of Heritable and of Kaupthing Singer & Friedlander's Kaupthing Edge (to ING Direct), underscore the importance of partial transfers as part of the authorities' bank resolution toolkit.

It is likely that after the partial transfer the remainder of the failing bank will be insolvent. In this event, it would enter a special bank administration procedure to allow for the realisation of the failing bank's non-transferred assets. Among other things, the bank administration procedure modifies the normal duties of an insolvency administrator to require it to co-operate with the bridge bank or the private sector purchaser until such time that they can run the purchased business effectively, without the assistance of the failing bank. This may be necessary where the insolvent bank retains some of the systems and contractual arrangements required to run the business that has been transferred.

#### (iii) temporary public ownership

The temporary public ownership power would allow the Treasury to transfer the shares of a failing bank to a nominee of the Treasury. It is envisaged that this tool would be used in cases where significant amounts of public sector funds are required to stabilise the failing bank or where long-term restructuring of the bank is necessary. Enactment of the BSPA allowed the Tripartite Authorities to adopt this tool when resolving Northern Rock.

#### (iv) bank insolvency procedure

In some circumstances, closure of a bank may be the right policy option. Therefore, the authorities are working with the banking and payments industries to speed up the FSCS payout procedures to insured depositors. To deliver this, the Banking Bill also proposes a new insolvency procedure for banks: the bank insolvency procedure (BIP). The BIP is based on existing liquidation procedures, with the main alteration being that the liquidator's primary objective would be to assist the FSCS either in paying compensation speedily to protected depositors or in transferring accounts to another bank or building society.

### Conclusion

To date, the BSPA has been used on four occasions, demonstrating the importance of having legislation to deal with banks outside the normal insolvency procedure. The BSPA powers have been used in a number of different ways: Northern Rock was put into temporary public ownership; Bradford & Bingley saw a transfer of its deposit book and

branches to Abbey National, but with the remainder of the business being placed in temporary public ownership; while the resolution of Heritable and Kaupthing Singer & Friedlander involved a transfer of elements of their deposit books to ING with the remainder of the businesses being placed into administration. These examples, combined with lessons from abroad, demonstrate the importance of the authorities having the flexibility to adapt their approach to resolution to reflect the circumstances of the particular bank and the market conditions at the time. The Banking Bill introduces a number

of resolution options to give the authorities the flexibility to meet the objectives of the regime. In addition to the Bill and secondary legislation, a forthcoming Code of Practice will explain the processes around the implementation of the tools, to ensure that the most appropriate ones are used in a timely way and subject to appropriate safeguards.

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(1) Available at <http://services.parliament.uk/bills/2007-08/banking.html>.

(2) The Threshold Conditions are set out in Schedule 6 to the Financial Services and Markets Act 2000.

## Conclusion

The period since the previous *Report* has been associated with exceptional financial instability. While the roots of this turbulence were established during the credit boom, weaknesses in banks' balance sheets were amplified by rising macroeconomic and counterparty risk. That led to a freezing of funding markets, failures of financial firms and a widespread perception that banking systems, in the United Kingdom and globally, were undercapitalised.

The system-wide measures put in place by the authorities in the United Kingdom and internationally aim to tackle these structural balance sheet weaknesses at source and in size. Nonetheless, the very scale of government and central bank interventions during the present crisis will pose difficult transitional issues for banks as they seek to repair their balance sheets over the medium term. And, looking further ahead, the events of the past year or so clearly highlight the need for a fundamental overhaul of the regulatory safeguards used to mitigate systemic risk within the financial system.

## Annex

### Timeline of crisis events

This timeline details key events since Spring 2007.

Date	Event
5 Mar. 07	HSBC announces one portfolio of purchased sub-prime mortgages evidenced much higher delinquency than had been built into the pricing of these products.
22 June 07	Bear Stearns pledges a collateralised loan to one of its hedge funds but does not support another.
30 July 07	IKB announces that profit will be 'significantly' lower than forecast as a result of sub-prime mortgage exposures.
9 Aug. 07	BNP Paribas suspends calculation of asset values of three money market funds exposed to sub-prime and halts redemptions. AXA had earlier announced support for its funds.
9 Aug. 07	European Central Bank (ECB) injects €95 billion overnight to improve liquidity. Injections by other central banks.
17 Aug. 07	Sachsen LB receives bailout from German savings bank association.
17 Aug. 07	Federal Reserve approves temporary 50 basis points reduction in the discount window borrowing rate, extends term financing, and notes it will 'accept a broad range of collateral'.
10 Sep. 07	Victoria Mortgage Funding is the first UK mortgage company to fail.
13 Sep. 07	Bank of England announces that it will widen the range on banks' reserves targets within which they are remunerated at Bank Rate.
14 Sep. 07	Bank of England announces it has provided a liquidity support facility to Northern Rock.
17 Sep. 07	Following a retail deposit run, the Chancellor announces a government guarantee for Northern Rock's existing deposits.
19 Sep. 07	Bank of England announces plan to undertake a series of three-month auctions against a broader range of collateral (including mortgage collateral).
Oct. 07	Citi, Merrill Lynch and UBS report significant write-downs.
8 Nov. 07	Moody's announces it will re-estimate capital adequacy ratios of US monoline insurers/ financial guarantors.
20 Nov. 07	Freddie Mac announces 2007 Q3 losses and says it is considering cutting dividends and raising new capital.
10 Dec. 07	UBS announces measures to address capital concerns following further write-downs.
12 Dec. 07	Joint Bank of England, Federal Reserve, ECB, Swiss National Bank (SNB) and Bank of Canada announcement of measures designed to address pressures in short-term funding markets. Actions taken by the Federal Reserve include the establishment of a temporary Term Auction Facility (TAF).
20 Dec. 07	Bear Stearns announces expected 2007 Q4 write-downs.
11 Jan. 08	Bank of America confirms purchase of Countrywide.
Jan. 08	Announcements of significant 2007 Q4 losses, by Citi and Merrill Lynch, among others.
15 Jan. 08	Citi announces it is to raise US\$14.5 billion in new capital.
24 Jan. 08	Société Générale reveals trading losses resulting from fraudulent trading by a single trader.
11 Feb. 08	American International Group (AIG) announces its auditors have found a 'material weakness' in its internal controls over the valuation of the AIGFP super senior credit default swap portfolio.
17 Feb. 08	UK Government announces temporary nationalisation of Northern Rock.
19 Feb. 08	Credit Suisse announces they have identified mismarkings and pricing errors by a small number of traders.
11 Mar. 08	Federal Reserve announces the introduction of a Term Securities Lending Facility and Bank of England announces it will maintain its expanded three-month long-term repo against a wider range of high-quality collateral.
14 Mar. 08	JPMorgan Chase & Co. announces that it has agreed, in conjunction with the Federal Reserve Bank of New York, to provide secured funding to Bear Stearns for an initial period of up to 28 days.
16 Mar. 08	JPMorgan Chase & Co. agrees to purchase Bear Stearns. Federal Reserve provides US\$30 billion non-recourse funding.
16 Mar. 08	Federal Reserve announces establishment of Primary Dealer Credit Facility.
21 Apr. 08	Bank of England launches its Special Liquidity Scheme (SLS) to allow banks to swap temporarily their high-quality mortgage-backed and other securities for UK Treasury bills.
22 Apr. 08	RBS announces £12 billion rights issue.
29 Apr. 08	HBOS announces £4 billion rights issue.

Date	Event	Date	Event
2 May 08	Co-ordinated announcement from the Federal Reserve, ECB and SNB regarding further liquidity measures.	19 Sep. 08	US Treasury announces temporary guarantee program for the US money market mutual funds (MMMFs). The Federal Reserve Board announces it will extend non-recourse loans to banks to finance purchases of asset-backed commercial paper from MMMFs.
14 May 08	Bradford & Bingley proposes £300 million rights issue.	19 Sep. 08	SEC prohibits short-selling in financial companies. Bans follow from a number of European regulators.
2 June 08	Bradford & Bingley discloses that private equity firm TPG Capital is to obtain a 23% stake.	20 Sep. 08	US Treasury announces draft proposals to purchase up to US\$700 billion of 'troubled assets' (Troubled Asset Relief Program).
9 June 08	RBS confirms that 5% of shares offered were left with underwriters.	21 Sep. 08	The Federal Reserve approves transformation of Goldman Sachs and Morgan Stanley into bank holding companies.
16 June 08	Lehman Brothers confirms a net loss of US\$2.8 billion in Q2.	23 Sep. 08	Announcement that Berkshire Hathaway is to invest US\$5 billion in Goldman Sachs.
18 June 08	Morgan Stanley reports losses from mortgage proprietary trading and bad loans.	24 Sep. 08	Bradford & Bingley announces the renegotiation of their mortgage forward sale agreement with GMAC-RFC.
25 June 08	Barclays announces plans to raise £4.5 billion in a share issue.	25 Sep. 08	JPMorgan Chase & Co. buys the deposits, assets and certain liabilities of Washington Mutual bank.
11 July 08	Closure of US mortgage lender IndyMac.	29 Sep. 08	Bradford & Bingley is nationalised by UK Government. Abbey buys its branches and retail deposit book.
13 July 08	US Treasury announces a rescue plan for Fannie Mae and Freddie Mac.	29 Sep. 08	Icelandic Government buys stake in Glitnir Bank.
15 July 08	US Securities and Exchange Commission (SEC) issues an emergency order to enhance investor protection against 'naked short-selling'.	29 Sep. 08	Belgian, Dutch and Luxembourg governments announce they will invest €11.2 billion in Fortis.
30 July 08	Federal Reserve announces the introduction of an 84-day Term Auction Facility in addition to its existing 28-day loans. The ECB and SNB announce they will provide 84-day US dollar liquidity in addition to their existing operations with a maturity of 28 days.	29 Sep. 08	Federal Reserve increases swap lines to foreign central banks.
7 Sep. 08	Fannie Mae and Freddie Mac taken into conservatorship.	29 Sep. 08	Announcement of Citi's intention to acquire the banking operations of Wachovia in a transaction facilitated by the Federal Deposit Insurance Corporation (FDIC), protecting all depositors (under the systemic risk exception of the FDIC Improvement Act of 1991).
15 Sep. 08	Lehman Brothers files for bankruptcy. Bank of America announces purchase of Merrill Lynch.	30 Sep. 08	Dexia receives equity capital injection from Belgian, French and Luxembourg governments and from existing shareholders.
16 Sep. 08	US Government provides emergency loan to AIG of US\$85 billion in exchange for a 79.9% stake and right to veto dividend payments.	30 Sep. 08	Irish Government announces deposit guarantee. Other governments follow with extensions to deposit guarantees.
17 Sep. 08	Bank of England extends drawdown period for SLS.	3 Oct. 08	US House of Representatives passes US\$700 billion government plan to rescue the US financial sector (having voted against an earlier version of the plan on 29 September 2008).
18 Sep. 08	Lloyds TSB/HBOS merger announced.	3 Oct. 08	FSA raises the limit of the deposit guarantee to £50,000 (with effect from 7 October 2008).
18 Sep. 08	Announcement of co-ordinated central bank measures to address continued elevated pressures in US dollar short-term funding markets. Bank of England concludes a reciprocal swap agreement with the Federal Reserve.		
18 Sep. 08	FSA announces regulations prohibiting short-selling of financial shares.		

Date	Event
3 Oct. 08	Wells Fargo and Wachovia agree to merge in a transaction requiring no financial assistance from the FDIC.
3 Oct. 08	Dutch Government acquires Fortis Bank Nederland (Holding) N.V.
6 Oct. 08	German authorities announce package to save Hypo Real Estate.
6 Oct. 08	BNP Paribas announces it has agreed to take control of Fortis' operations in Belgium and Luxembourg as well as the international banking franchises.
7 Oct. 08	The Icelandic Government takes control of Glitner and Landsbanki, which owns Icesave.
7 Oct. 08	Federal Reserve announces the creation of the Commercial Paper Funding Facility.
8 Oct. 08	The Chancellor announces that the retail deposit business of Heritable and the Kaupthing Edge deposit business of Kaupthing Singer & Friedlander has been transferred to ING Direct. The remainder of the two businesses were put into administration.
8 Oct. 08	UK support package announced — including provision of capital to UK incorporated banks, guarantee for new short to medium-term senior unsecured debt issuance and the extension and widening of the SLS.
8 Oct. 08	Co-ordinated interest rate cuts of 50 basis points (including the Bank of England, the Federal Reserve and ECB).
13 Oct. 08	Further details of the UK support package released.
13 Oct. 08	Members of the euro zone announce measures to provide their banks with capital funding. Further co-ordinated action to provide US dollar liquidity.
14 Oct. 08	US Government announces Capital Purchase Program of up to US\$250 billion.
16 Oct. 08	Bank of England releases consultative paper on planned developments to its market operations.
19 Oct. 08	Dutch Government injects €10 billion into ING.
21 Oct. 08	Federal Reserve Board announces the creation of the Money Market Investor Funding Facility.

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## 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 April 2008 *Report*.

### Regular publications

#### Markets and operations article, *Bank of England Quarterly Bulletin*, 2008 Q3.

This article reviews recent developments in sterling financial markets since the 2008 Q2 *Quarterly Bulletin* up to the beginning of September 2008. It also reviews the Bank's official operations during this period.

[www.bankofengland.co.uk/publications/quarterlybulletin/qb0803.pdf](http://www.bankofengland.co.uk/publications/quarterlybulletin/qb0803.pdf)

### Speeches

#### The credit crisis: lessons from a protracted 'peacetime'.

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

[www.bankofengland.co.uk/publications/speeches/2008/speech348.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech348.pdf)

A key message from Paul Tucker's remarks was that the stresses and risks that were currently affecting the financial system had been built up during a protracted 'peacetime'. The financial community and the authorities should not lose sight of that when 'peacetime' was eventually regained. As part of this the authorities should take an interest in the regimes which govern and drive changes in the structure and behaviour of the financial system. And policies should be developed to contain or head off the risk of systemic problems in the first place. The crisis had exposed issues with elements of the armoury available to the authorities. First, the conjunctural environment had tested what had been a creeping orthodoxy that monetary policy could effectively cushion the economy from the bursting of asset price bubbles. Second, the stigmatisation of central bank premium-rate standing facilities had disturbed part of what he described as a '*de facto*' Social Contract between the banking system and the authorities. Innovation and permanent reforms in the area of liquidity insurance would be needed to redress that. Finally, policymakers needed to consider ways in which the international and domestic credit cycle could in future be tamed, whether by macro or micro tools.

#### Banking and the Bank of England.

Mervyn King, Governor, June 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech347.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech347.pdf)

In this speech, the Governor discussed methods that could be used to establish a stronger framework for financial stability. He discussed the relationship between the Bank of England and the banks, noting that in this relationship the two sets of interests would not always coincide, with the use of the Bank's balance sheet being one area where clashes might occur. The Governor observed the need to develop a strong framework for financial stability. Such a framework included a special resolution regime for failing banks, changes to deposit insurance and an improved regime for the regulation of bank liquidity. He highlighted three key features that would be central to the success of the special resolution regime. First, responsibility for winding down a failing bank should be delegated to a resolution authority. Second, the circumstances in which the regime would be triggered should be spelt out as clearly as possible. Finally, a clear framework of accountability should be established to give confidence that decisions relevant to the resolution regime would be exercised in line with the objectives set out in legislation. He welcomed domestic and international initiatives to develop liquidity regulation. The Bank intended to learn from the experience of the special liquidity scheme and so put in place a liquidity facility that worked well in all seasons — both 'normal' and 'stressed'.

#### A tale of two cycles.

John Gieve, Deputy Governor, June 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech350.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech350.pdf)

In this speech, John Gieve discussed the challenge faced by the Monetary Policy Committee (MPC) from the tale of two cycles: the downswing of the financial cycle and the upswing in the commodity cycle. He argued that, although the banking cycle is not a new phenomenon, the scale and speed of the downswing in the past year has been exceptional. However, at the same time, the emerging and developing countries had contributed to strong world growth and driven the upswing in oil and commodity prices. He noted that balancing the downside risk to demand associated with tighter credit conditions against the inflationary pressures emanating from the rest of the world was the greatest challenge the MPC has had to face, but concluded that the monetary policy framework and independence of the Bank was designed for difficult times as well as plain sailing.

### Financial innovation: what have we learnt?

Nigel Jenkinson, Executive Director for Financial Stability, Adrian Penalver and Nicholas Vause, July 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech351.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech351.pdf)

In this paper, Nigel Jenkinson, Adrian Penalver and Nicholas Vause discussed what has been learned since the start of the financial crisis about the limitations of innovative financial instruments. Financial engineering can help decompose, transfer and pool risks to match the risk appetite of lenders and improve the options available for households and companies to manage risk. But the paper argued that market frictions and imperfections can limit the effectiveness of financial innovation. Information is lost when there are chains of parties involved in credit creation. The ability to sell on or pool credit risk can reduce incentives to screen and monitor borrowers. Products with tailored risk profiles can be difficult to sell. The paper argued that these frictions have become more apparent since the onset of the credit crisis. The paper concluded that removing these frictions, for example through better credit screening, will be costly. Innovative financial instruments will also require a higher liquidity premium. Recognising these costs, though, will strengthen the resilience of the financial system and underpin the durability of the benefits of financial innovation.

### The financial cycle and the UK economy.

John Gieve, Deputy Governor, July 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech353.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech353.pdf)

In this speech, John Gieve discussed the financial cycle and the UK economy. He argued that the US sub-prime market provided only the initial spark and fed a fire fuelled by much broader weaknesses in the financial sector. He outlined a number of factors in modern credit markets that have tended to amplify the financial cycle, including a growing reliance on credit ratings, a greater proportion of balance sheets coming under mark-to-market accounting, asymmetric remuneration structures that reward risk-taking, and regulatory incentives. He concluded that the Bank was assessing proposals to make the regulatory system more countercyclical and was discussing the best approach with the Financial Services Authority and international colleagues at the Financial Stability Forum.

### The credit crunch and the UK economy.

John Gieve, Deputy Governor, September 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech358.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech358.pdf)

In this speech, John Gieve discussed how the credit crunch was affecting the wider UK economy. He noted that like other central banks, the Bank of England had adapted its money market operations to provide the liquidity the banking system as a whole should require. First, the Bank of England had allowed banks to increase their reserve balances held at the Bank, increasing the size of overall provision of central bank money. Second, within that larger total, the Bank had shifted the balance towards longer-term lending as the terms of market finance had shortened. Third, the Bank had widened the collateral accepted for longer-term repos. And in April, the Bank had introduced a special scheme to provide banks with up to three years' finance for legacy assets which had become illiquid. He explained why the risk of inflation expectations drifting upwards had been such a central concern of the MPC over the past year. He highlighted the importance of not underestimating the deflationary consequences of the credit crisis and that the news on that front remained worrying. He noted that although the Bank would continue to work for the return of calmer financial markets, this work should not be relied upon to deliver a quick reversal of the macroeconomic slowdown. On the contrary, the risk at the moment was that the slowdown in the real economy could be amplified through a contraction in banks' balance sheets. He concluded by noting the need for longer-term measures to prevent such financial imbalances from building up again in the next upswing and commended the countercyclical 'dynamic provisioning' approach to capital that has been developed in Spain.

### The Governor's speech to the CBI, Institute of Directors, Leeds Chamber of Commerce and Yorkshire Forward at the Royal Armouries, Leeds.

Mervyn King, Governor, October 2008.

[www.bankofengland.co.uk/publications/speeches/2008/speech362.pdf](http://www.bankofengland.co.uk/publications/speeches/2008/speech362.pdf)

In this speech, the Governor explained how the industrialised world had been engulfed by financial turmoil and why the radical action taken by the UK authorities to recapitalise the banking system had been needed to ensure its survival. He noted that the scale of central bank liquidity support had been unprecedented but was not, and never could be, the solution to the banking crisis which reflected deeper structural problems in the banking sector. Risks built up during benign times, from securitised mortgage lending, particularly US sub-prime mortgages, from banks' own mortgage exposures and from their funding through short-term wholesale

borrowing had been exposed by rising defaults and falling house prices, with the effects amplified by very high levels of borrowing relative to capital. The value of banks' assets had fallen with liabilities unchanged. And as uncertainty about the value of banks' assets had risen, markets had sent a clear message to banks around the world that they did not have enough capital. As that view spread, confidence in the system had been eroded. The recapitalisation plan was having a major impact in the restoration of market confidence in banks. But it would take time before the recapitalisation led to a resumption of more normal levels of lending and there might still be problems in other parts of the financial system and the emerging market economies. Attention had moved to the outlook for the UK and world economies, which had deteriorated quickly. It seemed likely that the UK economy was entering a recession. There were implications for fiscal policy, as well as monetary policy, from the crisis, though it should be possible for the Government to reduce its stake in the banking system, for example by selling units in a Bank Reconstruction Fund, and repay the additional debt issued. But a fall in capital inflows to the United Kingdom would, unless replaced by other forms of external finance, lead to adjustments in the trade deficit and exchange rate that would be larger and faster in the short term than otherwise, implying weaker domestic spending in the short run.

## Working papers

### Dealing with country diversity: challenges for the IMF credit union model.

Gregor Irwin, Adrian Penalver, Chris Salmon and Ashley Taylor, May 2008.

[www.bankofengland.co.uk/publications/workingpapers/wp349.pdf](http://www.bankofengland.co.uk/publications/workingpapers/wp349.pdf)

### An agent-based model of payment systems.

Marco Galbiati and Kimmo Soramäki, August 2008.

[www.bankofengland.co.uk/publications/workingpapers/wp352.pdf](http://www.bankofengland.co.uk/publications/workingpapers/wp352.pdf)

# 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.  
**CLO** – collateralised loan obligation.  
**CP** – commercial paper.  
**GDP** – gross domestic product.  
**Libor** – London interbank offered rate.  
**PIBS** – permanent interest bearing shares.  
**RMBS** – residential mortgage-backed security.  
**SIV** – structured investment vehicle.  
**SPV** – special purpose vehicle.

## Abbreviations

**AIG** – American International Group.  
**BIP** – bank insolvency procedure.  
**BIS** – Bank for International Settlements.  
**BSPA** – Banking (Special Provisions) Act.  
**BTL** – buy to let.  
**CCP** – central counterparty.  
**CRMFG** – Counterparty Risk Management Policy Group.  
**ECB** – European Central Bank.  
**EME** – emerging market economy.  
**EU** – European Union.  
**FASB** – Financial Accounting Standards Board.  
**FoHFs** – funds of hedge funds.  
**FRA** – forward rate agreement.  
**FSA** – Financial Services Authority.  
**FSCS** – Financial Services Compensation Scheme.  
**FSF** – Financial Stability Forum.  
**GAAP** – generally accepted accounting principles.  
**GSE** – government-sponsored enterprise.  
**HMT** – Her Majesty's Treasury.  
**IASB** – International Accounting Standards Board.

**IFRS** – International Financial Reporting Standard.  
**IMF** – International Monetary Fund.  
**IPD** – Investment Property Databank.  
**IRB** – internal ratings based.  
**ISDA** – International Swaps and Derivatives Association.  
**LCFI** – large complex financial institution.  
**LCH** – London Clearing House.  
**LGD** – loss given default.  
**LTI** – loan to income.  
**LTRO** – longer-term refinancing operation.  
**LTV** – loan to value.  
**MMMF** – money market mutual funds.  
**MoU** – Memorandum of Understanding.  
**MSCI** – Morgan Stanley Capital International Inc.  
**MTM** – mark to market.  
**NFC** – non-financial corporates.  
**OIS** – overnight indexed swap.  
**ONS** – Office for National Statistics.  
**OTC** – over the counter.  
**PDCF** – Primary Dealer Credit Facility.  
**SEC** – Securities and Exchange Commission.  
**SLS** – Special Liquidity Scheme.  
**SNB** – Swiss National Bank.  
**SRR** – special resolution regime.  
**S&P** – Standard & Poor's.  
**TAF** – Term Auction Facility.  
**TSLF** – Term Securities Lending Facility.

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