

## Overview: global financial crisis spurs unprecedented policy actions

Financial stability concerns took centre stage once again over the period between end-August and end-November. In the wake of the mid-September failure of Lehman Brothers, global financial markets seized up and entered a new and deeper state of crisis. As money market funds and other investors were forced to write off their Lehman-related investments, counterparty concerns mounted in the context of large-scale redemption-driven asset sales.

The ensuing sell-off affected all but the safest assets and left key parts of the global financial system dysfunctional. With credit and money markets essentially frozen and equity prices plummeting, banks and other financial firms saw their access to funding eroded and their capital base shrink, owing to accumulating mark to market losses. Credit spreads surged to record levels, equity prices saw historic declines and volatilities soared across markets, indicating extreme financial market stress. Government bond yields declined in very volatile conditions, as recession concerns and safe haven flows increasingly outweighed the impact of anticipated increases in fiscal deficits. At the same time, yield curves steepened from the front end, reflecting repeated downward adjustments in policy rates.

Emerging market assets also experienced broad-based price declines, as depressed levels of risk appetite and associated pressures in the industrialised world spilled over into emerging financial markets. With confidence in the continued viability of key parts of the international banking system collapsing, the authorities in several countries embarked on an unprecedented wave of policy initiatives to arrest the plunge in asset prices and contain systemic risks.

Market developments over the period under review went through four more or less distinct stages. Stage one, which led into the Lehman bankruptcy in mid-September, was marked by the takeover of two major US housing finance agencies by the authorities in the United States. Stage two encompassed the immediate implications of the Lehman bankruptcy and the wide-spread crisis of confidence it triggered. Stage three, starting in late September, was characterised by fast-paced and increasingly broad policy actions, as responses to the crisis evolved from case by case reactions to a more international, system-wide approach. In the fourth and final stage, from mid-October, pricing patterns were increasingly dominated by recession fears, while markets continued to struggle with the uncertainties surrounding the large number of newly announced policy initiatives.

## Fannie Mae and Freddie Mac under government control

Financial markets entered September amid growing expectations of a broad-based cyclical deterioration. The prices of financial assets had started to experience downward pressure during the summer as markets adjusted to the outlook of weak earnings, rising defaults and associated financial sector losses. With the hoped-for stabilisation in house prices expected to be still some time off and activity in securitisation markets weighed down by heavy subprime losses (Graph 1, left-hand and centre panels), loss expectations also continued to build for the US government-sponsored housing finance agencies Fannie Mae and Freddie Mac.

Housing markets continue to deteriorate ...

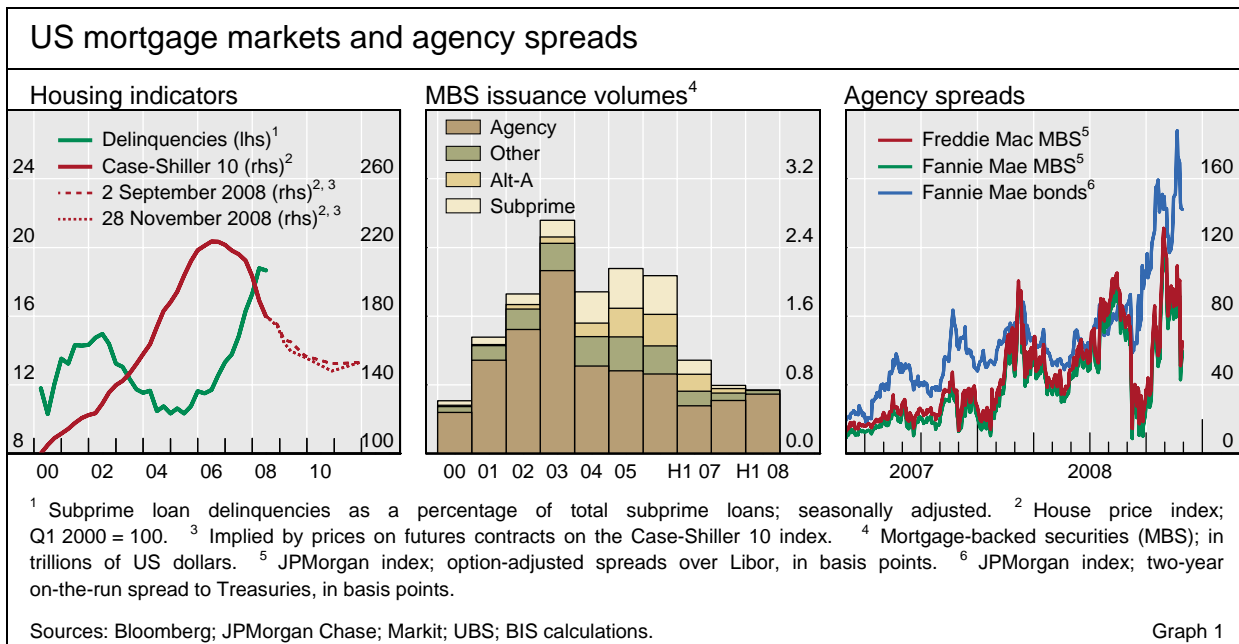
... putting pressure on Fannie and Freddie ...

... which are subsequently taken over by the authorities

In a bid to support the US housing market, which had come to depend on agency securitisation for virtually all remaining mortgage origination activity, the US government formally took control of the two agencies on Sunday 7 September (see Table 1 for a timeline of events). The move had been broadly anticipated and, by essentially making the agencies' formerly implicit guarantees explicit, largely lifted credit risks from both senior and subordinated holders of the agencies' debt. Spreads on agency-sponsored mortgage-backed securities (MBS) and debt instruments (Graph 1, right-hand panel) tightened as a result. In contrast, the remaining value of equity claims was effectively wiped out owing to the government's new senior preferred equity stake, resulting in losses for regional US banks and other holders of the agencies' shares.

The relief provided by these measures proved limited, however. Expectations of further writedowns and losses continued to weigh on other parts of the financial sector. As the macroeconomic outlook darkened, actual announced global losses related to the credit crisis, which had soared to a total of around \$510 billion by the end of August 2008, continued to rise (Graph 2, centre panel). When attention turned away from the US mortgage finance agencies, financial equity prices and credit spreads came under renewed pressure. Weakness in both markets, in turn, added to the problems faced by

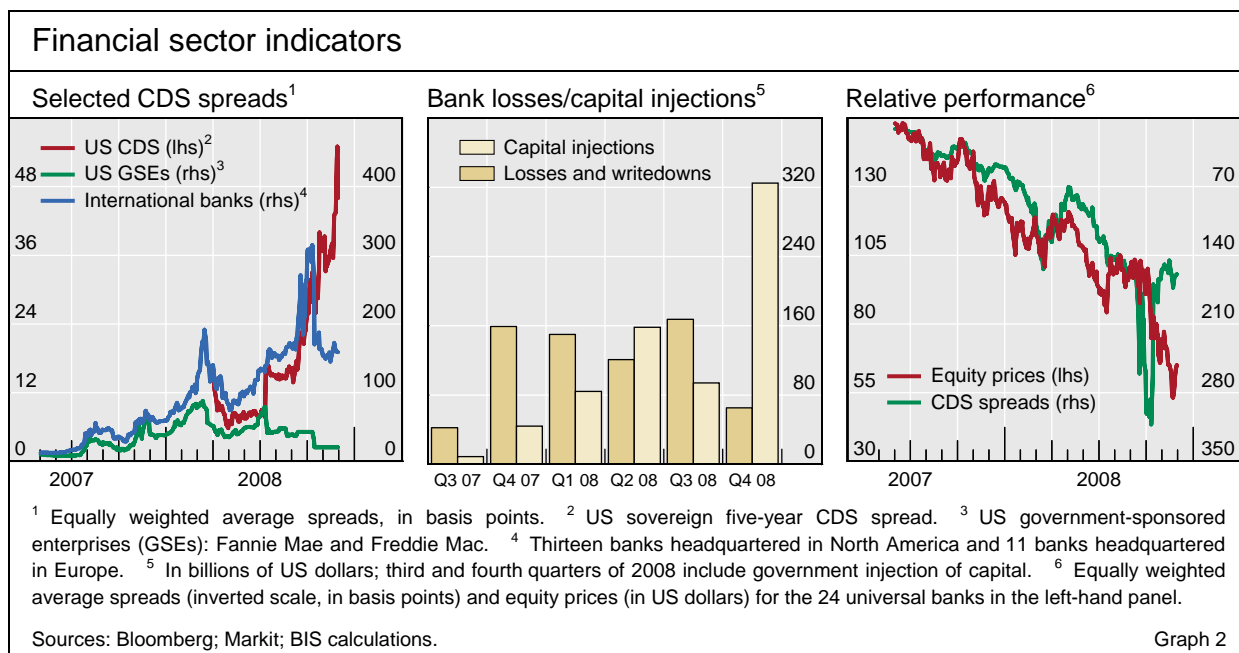
The relief provided by the takeover is short-lived ...



Timeline of key events over the period	
7 September	Two US mortgage finance agencies (Fannie Mae and Freddie Mac) are taken into conservatorship.
15 September	Lehman Brothers Holdings Inc files for Chapter 11 bankruptcy protection.
16 September	Reserve Primary Fund, a US money market fund with more than \$50 billion in assets, "breaks the buck", triggering large volumes of fund redemptions and contagion effects across money and short-term credit markets; the US government steps in to rescue insurance company AIG.
18 September	UK bank HBOS announces its merger with rival Lloyds TSB; new round of coordinated central bank measures address the squeeze in US dollar funding with \$160 billion in new or expanded swap lines; the UK authorities prohibit short selling of financial shares.
19 September	The US Treasury announces a temporary guarantee for money market fund investors; the SEC announces a ban on short sales in financial shares; early details emerge of a \$700 billion US Treasury proposal to remove troubled assets from bank balance sheets (the Troubled Asset Relief Program, TARP).
29 September	UK mortgage lender Bradford & Bingley is nationalised; banking and insurance company Fortis receives a \$16 (€11.2) billion capital injection; German commercial property lender Hypo Real Estate secures a government-facilitated credit line (subsequently raised to \$70 (€50) billion); troubled US bank Wachovia is taken over; the proposed TARP is rejected by the US House of Representatives.
30 September	Financial group Dexia receives a \$9 (€6.4) billion capital injection; the Irish government announces a guarantee safeguarding all deposits, covered bonds and senior and subordinated debt of six Irish banks; other governments follow up with similar initiatives or expand existing guarantee schemes over the following weeks.
3 October	The US Congress approves the revised TARP plan.
7 October	The US Federal Reserve announces the creation of a new Commercial Paper Funding Facility aimed at buying three-month unsecured and asset-backed commercial paper.
8 October	Major central banks undertake a coordinated round of policy rate cuts; the UK authorities announce a comprehensive support package, including capital injections for UK-incorporated banks and guarantees for new short- to medium-term senior unsecured bank debt.
13 October	Major central banks jointly announce measures to improve liquidity in short-term US dollar fund markets, supported by uncapped US dollar swap lines between the Federal Reserve and the other central banks; euro area governments pledge system-wide bank recapitalisations and guarantees for new bank debt.
14 October	The US government announces that up to \$250 billion of previously approved TARP funds are to be used to recapitalise banks; 9 large US banks agree to public recapitalisation.
21 October	The US Federal Reserve announces the creation of a new Money Market Investor Funding Facility, under which it will finance the purchase of short-term debt from money market funds.
28 October	Hungary secures a \$25 billion support package from the IMF and other multilateral institutions aimed at stemming growing capital outflows and related currency pressures.
29 October	To counter the spread of difficulties in obtaining US dollar funding, the US Federal Reserve establishes US dollar swap lines with the monetary authorities in Brazil, Korea, Mexico and Singapore.
12 November	The US Treasury announces that TARP funds previously earmarked for the purchase of troubled assets will be reallocated to supporting consumer credit.
23 November	The US government agrees to protect \$306 billion worth of loans and securities on Citigroup's books and to inject \$20 billion of cash in return for a \$27 billion preferred equity stake
25 November	The US Federal Reserve announces the creation of a \$200 billion facility to extend loans against securitisations backed by consumer and small business loans; under another programme, up to \$500 billion will be used for purchases of bonds and mortgage-backed securities issued by Fannie Mae, Freddie Mac and the Federal Home Loan Banks.

Sources: Bank of England; Federal Reserve Board; Bloomberg; *Financial Times*; *The Wall Street Journal*.

Table 1



the affected institutions in replenishing their capital bases and satisfying their ongoing funding needs (Graph 2, left- and right-hand panels). Strains mounted mainly for market participants primarily dependent on wholesale funding and known to be exposed to troubled assets, including the major standalone investment banks.

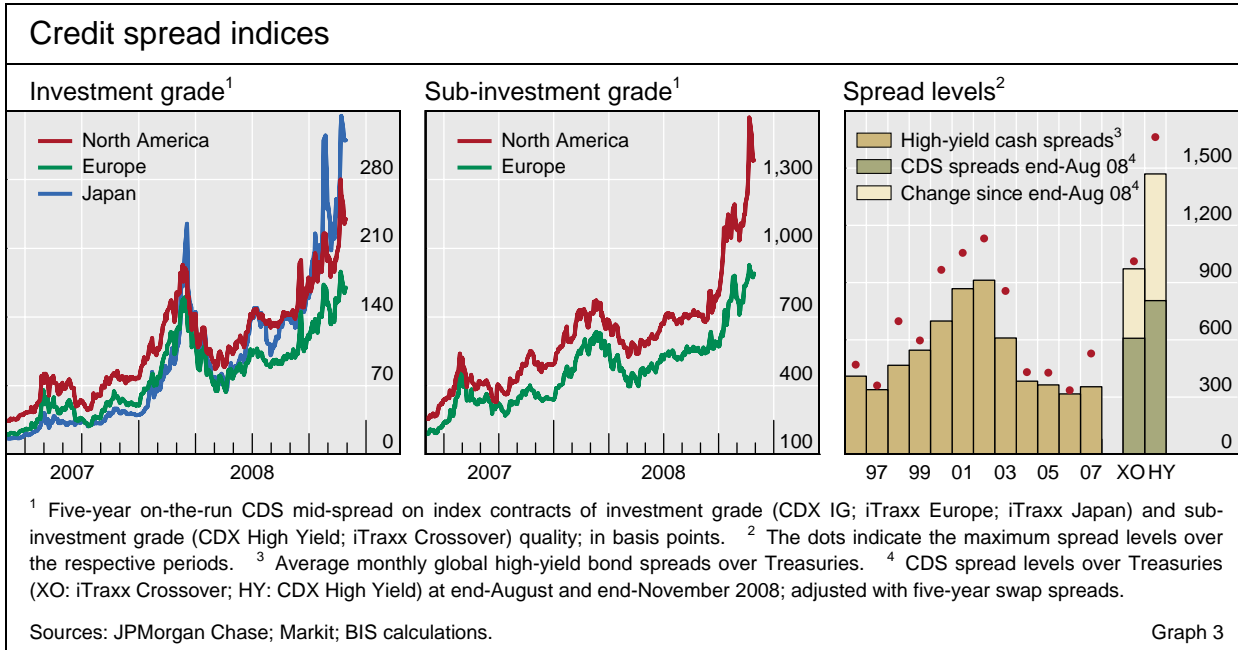
Lehman Brothers, in particular, faced increasing pressures. When, on 9 September, a large Asian investor pulled out of talks about a long-awaited capital injection, the company's already depressed stock price was pushed further down. Weak results for the third quarter of 2008 were released the following day. Despite the simultaneous announcement of plans to spin off major business units in a bid to raise funds, confidence in the ability of Lehman's management to secure urgently needed funding faded quickly. This, in turn, triggered speculation that the authorities would try to arrange a solution over the following weekend.

... with Lehman Brothers facing particular problems

### Lehman Brothers bankruptcy triggers confidence crisis

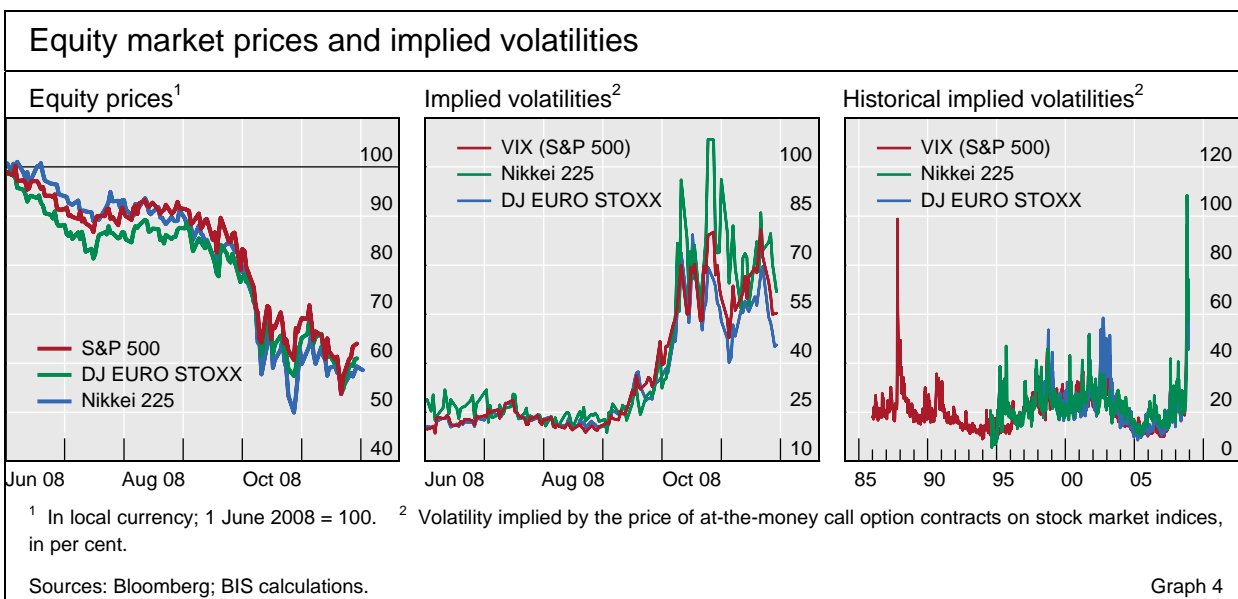
In this environment of tension over the continued viability of Lehman Brothers, financial market developments entered a completely new phase. The spotlight was now being turned on the ability of key financial institutions to maintain solvency in the face of accumulating losses. The trigger for this new and intensified stage of the credit crisis came on Monday 15 September. That day, following failed attempts by the US authorities to broker a takeover by another financial institution over the weekend, Lehman Brothers Holdings Inc filed for bankruptcy protection, one of the biggest credit events in history.

The Lehman failure ...



... causes  
counterparty risks  
to mount ...

The turmoil in financial markets intensified and quickly spread from credit and money markets into the global financial system more broadly (see Box 1 for details on the Lehman bankruptcy and some of its implications). With perceptions of counterparty risk rising, the benchmark US investment grade CDX credit default swap (CDS) index spread jumped by 42 basis points on 15 September alone, and US high-yield spreads rose 118 basis points. Credit spreads in other major markets increased by similar amounts (Graph 3, left-hand and centre panels) and continued to move in tandem with US markets through the remainder of the period. As a result, at their peak, US high-yield CDS spreads reached an all-time high some 500 basis points above the highest comparable cash spreads realised at the height of the telecom bust in September 2002 (Graph 3, right-hand panel). Equity prices fell by some 4% in the United States and Europe on the day of the Lehman bankruptcy, and other stock markets declined by similar amounts (Graph 4, left-hand panel).



## Box 1: Three market implications of the Lehman bankruptcy

*Ingo Fender, Allen Frankel and Jacob Gyntelberg*

Lehman Brothers Holdings Inc (LBHI) filed a petition under Chapter 11 of the US bankruptcy code on 15 September, listing consolidated bank and bond debt of more than \$600 billion; its US broker-dealer subsidiary was acquired by Barclays a few days later. The filing marked the first failure of a major investment bank since the demise of Drexel Burnham Lambert in February 1990. Lehman's problems originated from large-scale losses and writedowns taken on exposures to troubled assets and concerns that future losses would outstrip the company's previous efforts to replenish its capital base (Graph A, centre panel). As such, its failure revived questions about investment banks' highly leveraged balance sheets and associated dependence on wholesale funding that had been raised when Bear Stearns had nearly failed in early 2008. Thus, when confidence in the continued viability of the company collapsed (Graph A, left-hand panel), its access to wholesale markets was cut off, forcing Lehman into bankruptcy.<sup>①</sup>

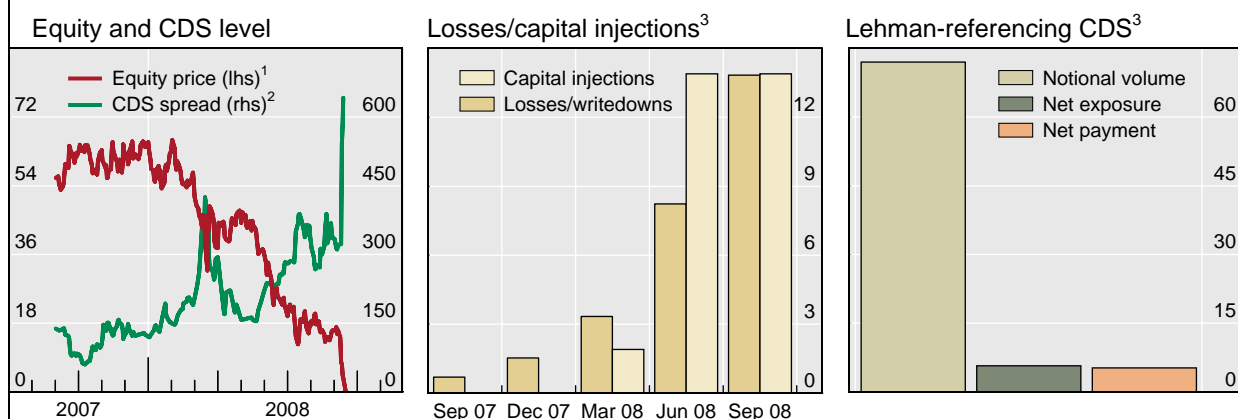
An event of this magnitude obviously raised a multitude of issues, given the company's size and its central position as a dealer and counterparty in a variety of financial markets. This box discusses three particular market implications linked to the failure of Lehman Brothers that had the potential to cause systemic liquidity disturbances: (1) the impact on the CDS market; (2) the liquidation of money market funds due to losses suffered on Lehman debt; and (3) the consequences of the bankruptcy for the company's prime brokerage clients.

### (1) CDS markets

The potential fallout of a Lehman bankruptcy in the \$57.3 trillion CDS market<sup>②</sup> was the one issue that attracted most attention in the days surrounding the company's bankruptcy filings. The concerns arose from Lehman's central role as a major counterparty and reference entity in that market. It was known that its bankruptcy filing would have two immediate effects: it would trigger default clauses in CDS contracts referencing Lehman, and it would terminate the contracts that the firm had entered into as a counterparty. Netting, settlement and replacement of the respective positions were known to raise operational risks. More importantly, however, no hard public information on the volume of CDS contracts referencing Lehman or the net amounts required to settle them was available at the time of the bankruptcy. The absence of such information created great uncertainty about the capacity of already strained money markets to accommodate the anticipated corresponding liquidity needs.

To manage the situation and address the uncertainties involved, the following initiatives were undertaken. First, a special trading session was organised on Sunday 14 September, right before the bankruptcy filing. The objective was to help the main CDS dealers net out counterparty positions involving Lehman and to rebalance their books through the replacement of trades. Second,

### Lehman Brothers: selected indicators



<sup>1</sup> In US dollars. <sup>2</sup> In basis points. <sup>3</sup> In billions of US dollars.

Source: Bloomberg.

Graph A

following established ISDA (International Swaps and Derivatives Association) procedures, an auction among CDS dealers was conducted on 10 October to determine the recovery rate to be used in the cash settlement of CDS contracts referencing Lehman and, thus, the net amounts to be exchanged between parties.<sup>9</sup> Third, the DTCC (Depository Trust and Clearing Corp) made public its count of \$72 billion worth of outstanding CDS contracts referencing Lehman and an estimate of \$6 billion for related net settlement payments. In the end, on 21 October, a total of \$5.2 billion in net payments were made on such contracts (Graph A, right-hand panel). While these relatively modest volumes had no noticeable impact on liquidity conditions at the time of settlement, earlier uncertainties related to these claims are likely to have contributed to volatile conditions in money markets following the bankruptcy filing. Added strains from a potential failure of insurer AIG, in turn, were averted only through a government rescue.

### *(2) Money market funds*

A major source of funding for Lehman was its issuance of commercial paper and other forms of short-dated debt. Money market funds were attracted to these securities by their high credit ratings and yield premiums relative to US government paper. Money market fund investors also felt protected against principal loss because of regulatory restrictions imposed on fund managers and because fund managers had avoided losses in the past.

In the aftermath of the Lehman bankruptcy, 25 money market fund advisers took actions to protect their investors against losses on the company's debt. However, the net asset value of a public money market fund, Reserve Primary, fell below \$1.00 per share. As a result, the fund was to be liquidated and distributions made to investors as cash accumulated either through the maturing of portfolio holdings or their sale.

The fund's liquidation prompted massive redemptions by investors in other US money market funds, especially "prime" funds invested in commercial paper. To stop the run on these funds, the US Treasury instituted a temporary programme of insurance for money market fund investors, which was followed up by Federal Reserve rescue programmes aimed at outright purchases of commercial paper and of short-term debt from money market funds (see Box 2 on recent government initiatives).

### *(3) Prime brokerage activities*

Lehman was managed as a global firm, which involved in particular the centralisation in the United States of its funding activities. Despite the global nature of the firm, separate administration and bankruptcy applications were filed by Lehman outside the United States and by the parent firm in New York. These filings in different jurisdictions made this one of the first truly global bankruptcies of a large and complex financial institution. The complexity of the Lehman operation, and the takeover of its US broker-dealer subsidiary immediately after the holding company's bankruptcy filing, raised questions related to the use of different legal procedures across countries for a collapsed firm that was previously managed and run along global product lines. One manifestation of the resulting issues concerns Lehman's prime brokerage activities.

Lehman provided prime brokerage services to a large number of hedge funds. As part of these prime brokerage relationships, hedge funds placed investment assets with Lehman's broker-dealer units in different jurisdictions. These assets, posted as collateral for funding activities, could then be reused by Lehman to meet its own obligations, a process called re-hypothecation. Given its insolvency, many of Lehman's prime brokerage clients suddenly lost access to (and, potentially, part of their claims on) their collateral assets for the duration of the administration process. They were thus forcibly locked into positions of changing value whose future accessibility would depend on different legal proceedings and contractual arrangements in various jurisdictions. To the extent that this resulted in adjustments to the size and location of hedge funds' activities with their prime brokers, the reallocation of funds across jurisdictions, combined with attempts to reduce leveraged risk exposures, would generate potentially sizeable asset sales and withdrawals from individual prime brokerage accounts. These transactions, in turn, would add to pressures in funding and securities lending markets in the wake of the Lehman bankruptcy.

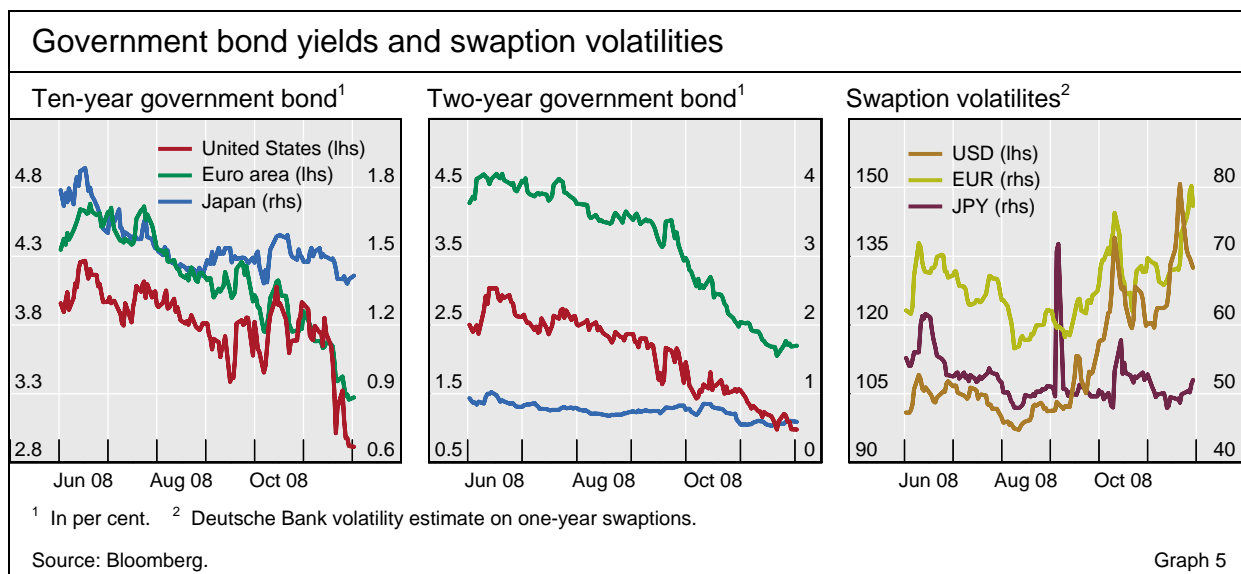
<sup>9</sup> On similar cases of bank run-type effects in financial markets, see C Borio, "Market distress and vanishing liquidity: anatomy and policy options", *BIS Working Papers*, no 158, July 2004. <sup>10</sup> CDS market size is usually measured in notional amounts, while replacement costs are better captured by gross market values (estimated at an overall 5.5% of notional market size in mid-2008). <sup>11</sup> The auction process, defined by ISDA's 2008 Lehman CDS protocol, set the recovery value for Lehman bonds at 8.625%, based on quotes submitted by 14 dealers. As Lehman's bonds had been trading increasingly lower since its bankruptcy filing, the auction price was only slightly lower than bond prices right before the auction, limiting the "gap risk" arising from the auction process.

Longer-term government bond yields also declined (Graph 5, left-hand panel) and foreign exchange carry trades started to be unwound as the developing crisis of confidence resulted in a renewed flight to quality. Volatilities spiked across markets (Graphs 4 and 5, right-hand panels) and climbed even further in the following weeks as investors withdrew from all but the safest assets.

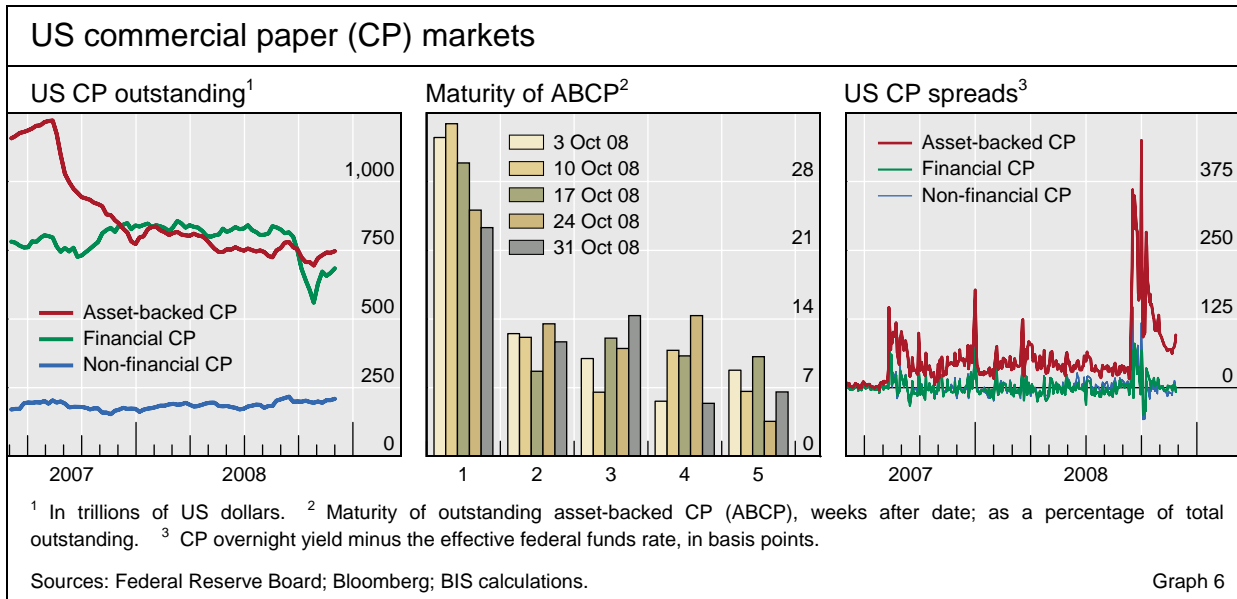
... with pressures spreading quickly across markets

Concerns related to the Lehman bankruptcy initially centred on the firm's role as a broker and key counterparty in the CDS market. In the first half of 2008, unprecedented CDS terminations had reduced outstanding volumes of existing CDS trades by \$17.4 trillion worth of closed-out offsetting positions (see the highlights section on pages 25–35 for more detail on CDS volumes). More specific attempts by key CDS counterparties to adjust their exposures to Lehman were aided by a special trading session on Sunday 14 September, the day before the bankruptcy filing. However, worries about CDS exposures grew further when, late on 15 September, AIG, a large US insurer with substantial CDS positions, had its credit ratings downgraded by all major rating agencies. These downgrades, in turn, were known to trigger sizeable collateral calls by counterparties of AIG's financial products unit and early termination of additional contracts. In response, intraday on 16 September, most major CDS indices rose above their March peaks and receded only on speculation that the insurer would receive some kind of assistance. Government support materialised later that day, when a decision was made to extend an \$85 billion loan under Section 13(3) of the Federal Reserve Act (which allows loans to non-banks under "unusual and exigent circumstances") to avoid the disorderly failure of AIG and its prospective effects on already fragile markets. The loan would later be restructured and supplemented by additional facilities totalling \$27.5 billion, with the US government receiving a stake of up to 79.9% in the company in return.

Initial concerns are centred on the CDS market ...







... but quickly refocus on traditional debt ...

With the immediate concerns about CDS markets alleviated, traditional exposures to Lehman's outstanding debt securities turned out to be of even greater importance. The systemic nature of those exposures became fully apparent the day after the bankruptcy filing. It was then that Reserve Primary, a major US money market mutual fund, wrote off \$785 million worth of short- and medium-term notes issued by Lehman. As a result, Reserve Primary became the first money market mutual fund in 14 years to "break the buck", ie to report less than one dollar's worth of net assets for each dollar invested. This triggered unprecedented volumes of US money market fund redemptions. Between 10 and 24 September alone, investors pulled out \$184 billion, forcing fund managers to liquidate assets into essentially illiquid markets. Short-term credit and money markets froze.

... and spillovers into the money ...

... and CP markets

Commercial paper (CP) markets, in which money market funds are traditionally the largest investor group, were among the first to suffer from the ensuing wave of redemptions and reallocations. In contrast to similar spillovers during the onset of the credit crisis in the summer of 2007, both asset-backed and non-asset backed CP markets were hit hard (Graph 6, left-hand panel). Unsecured financial paper suffered the largest outflows, adding pressure to already strained markets for bank funding. Durations shortened and borrowing rates shot up. Outstanding CP volumes in the United States plummeted by more than \$325 billion from a total of about \$1.76 trillion on 10 September (Graph 6, centre and right-hand panel). Volumes would start to recover only in late October, following the announcement and subsequent initiation by the Federal Reserve of a new facility to buy both unsecured and asset-backed CP.

Money markets freeze ...

Confronted with soaring demand for liquid funds in the wake of the contraction in the money market mutual fund sector, global interbank markets seized up, curbing banks' access to short-term funding. Money markets had already been strained for over a year and had failed to recover even with massive central bank liquidity injections. But conditions abruptly deteriorated even further as of mid-September, when the Lehman bankruptcy caused a

## Box 2: Government-led bank rescue initiatives

*Dietrich Domanski and Srichander Ramaswamy*

Government initiatives to strengthen bank balance sheets have evolved from a case by case approach to system-wide intervention. Until September, governments injected capital into individual institutions to avoid their failure and facilitate mergers. This strategy essentially rested on the premise that massive support through liquidity operations by central banks would at some point encourage other banks to lend to each other. As this could not prevent the rapid erosion of market confidence, governments in virtually all advanced economies announced more comprehensive initiatives to stabilise banking systems in late September and early October.

The government initiatives tackled the crisis of confidence on two fronts: one set of measures aimed at ensuring bank funding through explicit government guarantees on retail deposits and other bank liabilities; another set aimed at reducing bank leverage through government purchases of distressed assets or capital injections (see the table).

The announcement of government programmes had a strong signalling effect. Bank CDS spreads fell and funding market conditions stabilised. However, programmes are being modified as the crisis evolves, and details still need to be spelled out in many cases. As a consequence, the impact of government measures on competition and incentives in the financial industry remains uncertain, and whether these measures are sufficient to restart financial intermediation in the broader economy is yet to be seen.

### *Elements of government programmes announced in September and October*

*Expansion of retail deposit insurance.* Guaranteeing retail bank deposits has been widely used to ensure continued access to deposit funding. The amounts covered by the deposit guarantee schemes have varied substantially across countries, with some extending a blanket guarantee of retail deposits.

*Guarantee of wholesale liabilities.* To address the drying-up of the wholesale funding market, many governments have announced state guarantees on bank wholesale debt. The range of liabilities covered and fee structures vary widely across countries, with some charging a flat fee and others linking fees to bank CDS spreads.

*Capital injections.* Direct capital injections have been the main mechanism used to directly support balance sheets. Cross-country differences in instruments and conditions of capital injections have also been considerable. For instance, dividend payments on government preferred shares ranges from 5 to 12.5%. Moreover, some countries impose restrictions on executive compensation and/or dividend payments to common shareholders.

*Asset purchases.* While removing distressed assets from bank balance sheets is part of several programmes, it has not yet been used on a substantive scale. One issue is determining the price at which the government purchases distressed assets. A substantial support to bank balance sheets may require a purchase price close to par – which may effectively amount to a covert recapitalisation. Moreover, the range of eligible assets might have to cover all distressed credit instruments to have a strong and immediate impact on market confidence. This would require large programmes.

### *Side effects of government intervention*

*Impact on broader credit markets.* Government guarantees affect the relative price of credit. An extension of the pool of government-guaranteed debt may, other things equal, increase the relative cost of borrowing for debt instruments that are close substitutes for bank debt. For instance, the increase in the spreads of GSE debt in early October could be attributable to this effect. Moreover, the combination of different government actions may complicate assessing and pricing the relative credit risk of various forms of bank liabilities. With capital injections, governments typically take junior positions in the capital structure of banks. This may be interpreted as an implicit state guarantee on all existing liabilities. While the stabilisation benefits of government guarantees are likely to outweigh the costs associated with such market distortions in the near term, a clear exit strategy appears important to limit adverse effects on credit markets in the medium term.

*Cross-border issues.* While rescue plans follow common principles, national differences in their concrete design and practical implementation are considerable. Differences in the scope and price of government guarantee schemes for new debt issuance may put banks in different jurisdictions at a disadvantage in wholesale funding markets as funding costs will become a function of the specific insurance fee structure and of the solvency of the country that provides the guarantee of bank liabilities. In the extreme case, sovereign risk may be used as a proxy to assess the credit risk of bank debt. Another issue concerns retail deposits in foreign-owned banks, for in many cases there is little clarity about how foreign depositors would be treated in the event of bank failure. The instrument choice and terms for capital injection may also affect competitive positions in global markets. One aspect is differences in the effective cost of capital provided by governments. Another is that the terms of capital injections, and the associated conditions, may affect access to private equity capital.

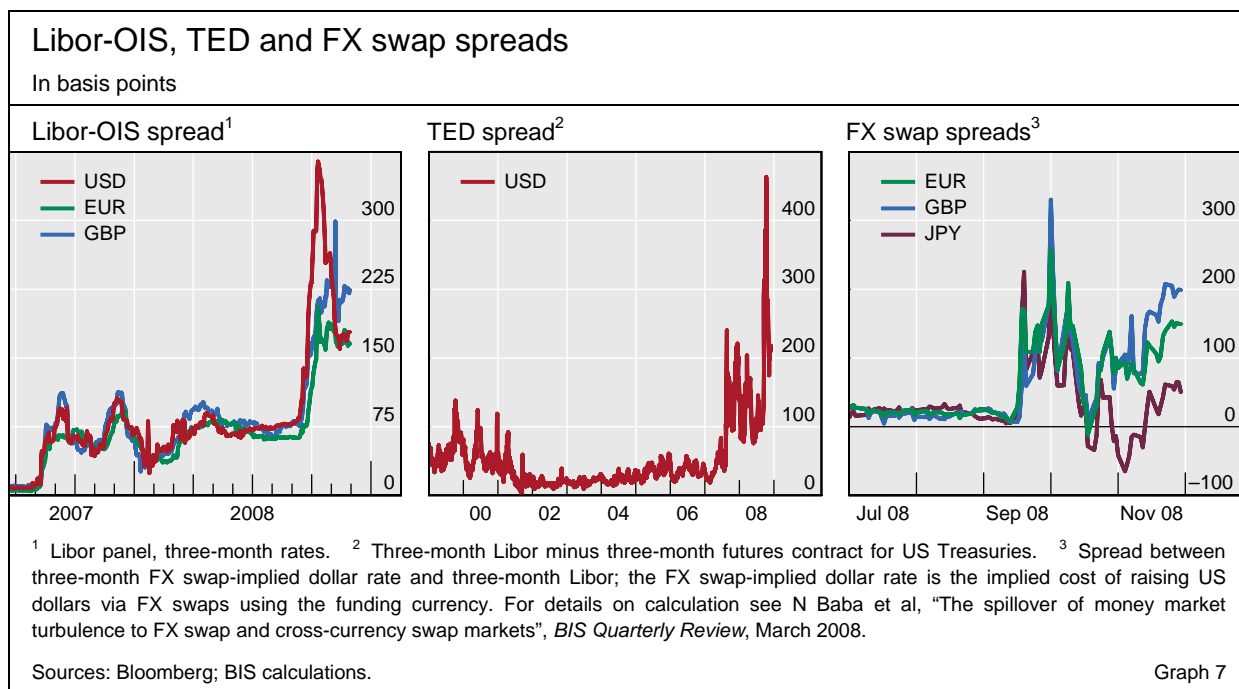
### Elements of banking system rescue plans in developed economies<sup>1</sup>

Country	Expansion of retail deposit insurance	Guarantee of wholesale liabilities <sup>2</sup>		Capital injections <sup>3</sup>	Asset purchases
		New debt	Existing debt		
Australia	✓	✓	✓		✓
Austria	✓	✓		✓	
Belgium	✓	✓			
Canada		✓			✓
Denmark	✓	✓	✓		
Finland	✓				
France		✓		✓	
Germany	✓	✓		✓	✓
Greece	✓	✓		✓	
Ireland	✓	✓	✓		
Italy		✓		✓	
Netherlands	✓	✓		✓	
New Zealand	✓				
Norway					✓
Portugal	✓	✓			
Spain	✓	✓		✓	✓
Sweden	✓	✓		✓	
Switzerland				✓	✓
United Kingdom	✓	✓		✓	
United States	✓	✓		✓	✓

<sup>1</sup> As of mid-November 2008. <sup>2</sup> Includes bond issuance, interbank lending and other wholesale liabilities. Coverage of the guarantee on these items varies across countries. <sup>3</sup> Refers to announced programmes only (excluding standalone actions).

Source: BIS.

complete collapse of confidence in the financial health of money market counterparties. With banks hoarding liquidity, interbank rates soared to historical highs. Spreads between US dollar Libor and corresponding overnight index swap (OIS) rates, which reflect a combination of counterparty credit risk and liquidity factors, rose from near 80 basis points in early September to 232 basis points at the end of the month. Treasury-eurodollar (TED) spreads reacted similarly (Graph 7, left-hand and centre panels). While movements in other markets, such as those for euro and sterling funds, were somewhat less violent, they still showed clear signs of a major disruption (Graph 7, left-hand panel). At the same time, rising financial sector credit spreads and the surging



global demand for US dollar funds also manifested themselves in related markets: the market for foreign exchange swaps saw historically high spreads for various key industrialised country and emerging market currencies vis-à-vis the US dollar (Graph 7, right-hand panel).

Amid largely dysfunctional wholesale funding markets, policymakers stepped up the pace and scope of their initiatives. On 18 September, in a sign of growing pressures, UK bank HBOS was forced into a government-brokered merger with one of its competitors. On the same day, in an effort to take pressure off the financial sector, the UK Financial Services Authority suspended the short selling of financial stocks. This move was emulated the following day by the authorities in the United States. Major central banks, in turn, reacted with a new round of coordinated measures to address the squeeze in US dollar short-term funding. Notably, they signed new or significantly enlarged currency swap facilities worth \$180 billion (see Boxes 2 and 3 for details on government-led bank rescue initiatives and measures taken to alleviate foreign currency liquidity shortages, and Box 4 on the impact of these initiatives on central bank balance sheets). These actions were followed on 19 September by the US Treasury's announcement of a temporary guarantee for money market fund investors, aimed at arresting the escalating run on the US money market mutual fund sector. Redemptions slowed in response, with total assets gradually rising back to their levels before the Lehman failure, reaching \$3.6 trillion by early November.

... forcing a first round of policy measures

While markets reacted with signs of relief, the pressure on banks and other financial sector firms failed to recede. The policy measures taken hitherto, and early details of a \$700 billion US proposal to take troubled assets off the books of financial institutions, helped credit spreads retreat temporarily from the highs reached immediately after the Lehman bankruptcy. Equity markets also recovered, aided in part by the new ban on short sales. The S&P 500 rebounded by 4% on 19 September, with several high-profile banking

stocks rising even more sharply, and European stock markets gained more than 8% on the same day. Similarly, there were signs of growing expectations that observed dislocations in funding markets would not persist: forward US dollar markets slowly started to point to a notable decline in three-month Libor-OIS spreads over the coming months. Even so, on Sunday 21 September, reflecting the continuing funding squeeze and associated concerns about counterparty risk, investment banks Goldman Sachs and Morgan Stanley obtained permission from the US authorities to convert themselves into bank holding companies. The move was aimed at halting ongoing transfers of counterparty positions and client funds to third parties, with CDS spreads for both credits tightening sharply as a result.

### Policy responses to a global confidence crisis

Decisive action is taken ...

At this point, mounting financial sector problems forced the authorities in an increasing number of countries to take decisive action in support of key financial institutions. On 25 September, the US authorities took over Washington Mutual, the largest US thrift institution, and sold its banking assets to a larger rival. In European countries as well, a variety of measures were taken in quick succession to counter threats to the stability of individual institutions within national banking systems. Following negotiations over the weekend, the United Kingdom moved on Monday 29 September to nationalise mortgage lender Bradford & Bingley, while banking and insurance company Fortis received a capital injection from the Belgian, Dutch and Luxembourg governments. Fortis eventually had its Dutch activities nationalised and most of its remaining assets bought by one of its French peers. Also on 29 September, German commercial property lender Hypo Real Estate secured a government-facilitated credit line provided by a consortium of financial sector institutions.

... though the stalling of a comprehensive package shakes markets

Despite such dramatic actions aimed at individual institutions, financial markets were by now focused on the need for comprehensive approaches. Later on 29 September, the US House of Representatives voted to reject the first version of the Treasury's proposed \$700 billion rescue plan for the US financial industry (it was passed into law in revised form at the end of the week). The response to the rejection by the House was immediately visible in US equity markets, which suffered steep declines in a matter of minutes and continued to sell off during the day. The S&P 500 fell 8.8%, led again by financial shares; other indices also declined, though by smaller percentage amounts (Graph 4, left-hand panel).

Individual bank rescues ...

Losses deepened during the following days as further bad news on financial sector health prompted an even sharper weakening of investor confidence. A capital injection by the Belgian, French and Luxembourg governments for financial group Dexia was announced on 30 September. This was followed by initiatives in Ireland and, in response, other countries granting new or raising existing guarantees for bank deposits and similar claims.

### Box 3: Central bank measures to alleviate foreign currency funding shortages

*Corrinne Ho and François-Louis Michaud*

What had been mainly a US dollar liquidity problem for European banks turned into a broader phenomenon in September 2008. The seizing-up of money markets in the second half of September and early October rendered it exceptionally difficult to obtain US dollar funding in both uncollateralised and collateralised markets. Banks in emerging markets, which had until then been relatively little affected by the strains in the dollar money markets, also became embroiled in funding shortages. Moreover, these shortages were no longer in US dollars only. Some financial institutions with foreign currency liabilities in euros and Swiss francs also faced similar funding difficulties.

The spreading of foreign currency shortages has led to a variety of central bank responses. There are three main ways for a central bank to provide foreign currency funding to its counterparties. It can mobilise its existing foreign exchange reserves; it can use foreign exchange borrowed from the market; and it can use foreign funds borrowed from another central bank, including the central bank of issue.<sup>①</sup> All three options have precedents, but in the current financial crisis, the first and the last have been more widely used.<sup>②</sup> In particular, borrowing from another central bank under swap or collateralised lending arrangements may be preferred when there are insufficient foreign reserves in the needed currency, when there is unwillingness to dip into existing foreign reserves, or when there is concern that selling less liquid foreign reserve assets might reinforce negative market dynamics. Moreover, as illustrated by recent events, the desire to demonstrate a cooperative approach to the problem is also a strong reason for engaging in inter-central bank arrangements instead of – or in addition to – using one's own foreign reserves.

#### *Inter-central bank swap lines and collateralised lending*

The use of inter-central bank swap lines – most notably those with the Federal Reserve – has received much attention.<sup>③</sup> This is not only because the crisis originated in the dollar market, but also because the swap lines expanded considerably in both scale and scope over the past year (see the table). Between December 2007 and mid-September 2008, only the ECB and the Swiss National Bank (SNB) used swap lines with the Federal Reserve to deliver US dollar funds to their counterparties, complementing the Federal Reserve's Term Auction Facility. These two transatlantic swap lines had been increased in size over time to support larger dollar operations. With the intensification and spread of US dollar shortages in mid-September, swap lines with the Federal Reserve grew in number (from two to 14 by late October), time zone and geographical coverage (from one continent to five), and size. In particular, the maximum limits for the SNB, ECB, Bank of England and Bank of Japan were lifted in mid-October to allow them to conduct full-allotment US dollar operations at fixed rates. The range of US dollar distribution operations on offer at partner central banks also broadened from mainly longer-term (one- and three-month) offers to include one-week and, for a period, overnight<sup>④</sup> offers as well, and from mainly repos and collateralised loans to include FX swaps.

There are also arrangements in euros and Swiss francs, albeit on a more regional basis. In May 2008, the central banks of Sweden, Norway and Denmark announced an agreement to swap euros for Icelandic krónur with the Central Bank of Iceland. In October 2008, the ECB and the SNB entered into a swap arrangement to facilitate the distribution of Swiss franc funding in the euro area, particularly to smaller banks that did not have direct access to SNB market operations. In the same month, the ECB established a swap line with the National Bank of Denmark to support the latter's efforts to improve liquidity in euro short-term markets and agreed to provide euros to Magyar Nemzeti Bank of Hungary via a repo agreement. In November, the SNB and the ECB concluded Swiss franc- and euro-supplying agreements, respectively, with the National Bank of Poland.

A number of these arrangements, though publicly announced, have not been drawn upon. This suggests that these arrangements signal precaution and the availability of a backstop, rather than an immediate need for actual external financial support.

#### *Drawing on existing foreign reserves*

Central banks have also deployed their existing foreign reserves to alleviate foreign currency shortages. Since the onset of the more acute phase of the financial turmoil in mid-September 2008, most major emerging market central banks have conducted *outright sales* of foreign reserves to

help meet the local market's demand for foreign currency funding, as well as to relieve pressure on the exchange rate.<sup>①</sup> In addition, some central banks have sought to offer foreign reserves to counterparties under *repurchase agreements* (eg Brazil, the Philippines). A complementary method is to conduct foreign currency-providing *FX swap transactions* with counterparties. For central banks that have long counted FX swaps among their normal money market operations (eg Australia), this method constitutes only an extension of purpose of an existing tool and does not require a new tool. Some central banks have announced modifications (eg widening of counterparty eligibility, extension of term) to their existing FX swap facilities to make the distribution of foreign currency more efficient and flexible (eg Korea, Indonesia). Others have set up new swap facilities (eg Brazil, Chile, Poland) or announced their readiness to conduct swaps with counterparties as needed (eg Hong Kong SAR). Moreover, some central banks also stand ready to be on both sides of FX swap transactions (eg Hungary), helping to ameliorate counterparty credit concerns.

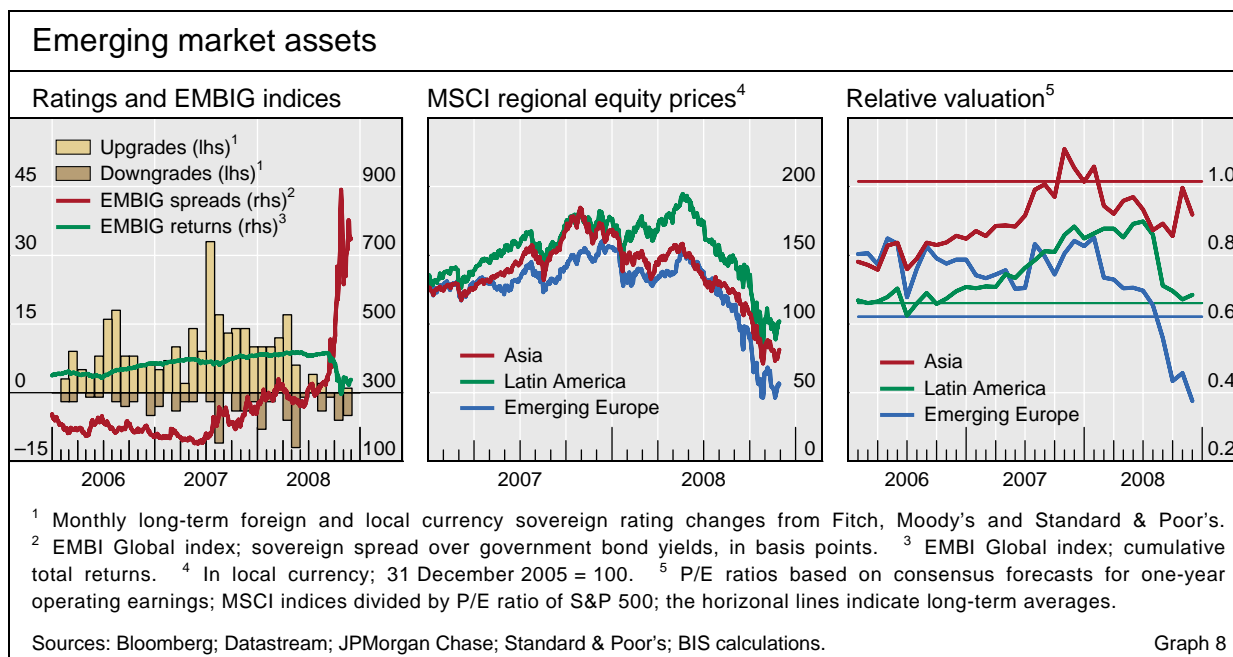
<sup>①</sup> In some cases, such borrowing may be done in conjunction with other official financial assistance, such as that from the IMF. <sup>②</sup> Apart from injecting foreign exchange, a central bank can also use other measures, such as changing the reserve requirement framework, to improve the availability of foreign currency funds in the financial system. <sup>③</sup> Swap lines are by no means a novel policy option, though historically they have been used to support foreign exchange market interventions rather than to alleviate foreign currency funding difficulties. <sup>④</sup> The daily overnight dollar auctions offered by the ECB, the SNB and the Bank of England between mid-September and mid-November 2008 (mid-October for the ECB) aimed specifically at alleviating dollar shortages early in the European trading day. <sup>⑤</sup> With the usual dollar funding channels (borrowing and FX swap market) impaired, many firms reportedly turned to the spot market to purchase dollars, resulting in sharp depreciations of the local currencies.

### Announced inter-central bank arrangements<sup>1</sup>

Partners	First announced	Max amount	Drawn	Supported operations <sup>2</sup>
Federal Reserve providing USD:				
Swiss National Bank	12 Dec 07	–	Yes	1M, 3M, 1W
European Central bank	12 Dec 07	–	Yes	1M, 3M, 1W; and FX swaps
Bank of England	18 Sep 08	–	Yes	1M, 3M, 1W
Bank of Japan	18 Sep 08	–	Yes	1M, 3M
Bank of Canada	18 Sep 08	\$30 bn		–
Reserve Bank of Australia	24 Sep 08	\$30 bn	Yes	1M, 3M
Sveriges Riksbank	24 Sep 08	\$30 bn	Yes	1M, 3M
National Bank of Denmark	24 Sep 08	\$15 bn	Yes	1M, 3M
Central Bank of Norway	24 Sep 08	\$15 bn	Yes	1M, 3M
Reserve Bank of New Zealand	28 Oct 08	\$15 bn		–
Central Bank of Brazil	29 Oct 08	\$30 bn		–
Bank of Mexico	29 Oct 08	\$30 bn		–
Bank of Korea	29 Oct 08	\$30 bn		–
Monetary Authority of Singapore	29 Oct 08	\$30 bn		–
Swiss National Bank providing CHF:				
European Central Bank	15 Oct 08	–	Yes	FX swaps; 1W, 3M
National Bank of Poland	07 Nov 08	–	Yes	FX swaps; 1W, 3M
ECB providing EUR:				
Magyar Nemzeti Bank	16 Oct 08	€5 bn <sup>3</sup>	–	O/N FX swap <sup>4</sup>
National Bank of Denmark	27 Oct 08	€12 bn	Yes	1M, 3M <sup>5</sup>
National Bank of Poland	21 Nov 08	€10 bn <sup>3</sup>	–	–
Nordic central banks providing EUR:				
Central Bank of Iceland	16 May 08	€1.5 bn	Yes	–

<sup>1</sup> Information as of 21 November 2008; refer to swap lines, unless otherwise indicated; – indicates not specified. <sup>2</sup> Refer to operations for distributing foreign currency to counterparties (not the inter-central bank transactions). Central banks may have other foreign currency-supplying facilities that draw on existing foreign reserves. Repo or collateralised loans, unless otherwise indicated. 1M = one-month; 3M = three-month; 1W = one-week; O/N = overnight. <sup>3</sup> Based on repo agreement. <sup>4</sup> A standing facility was announced but its usage is confidential. <sup>5</sup> A three-month auction is planned for 10 December 2008.

Source: Central banks.



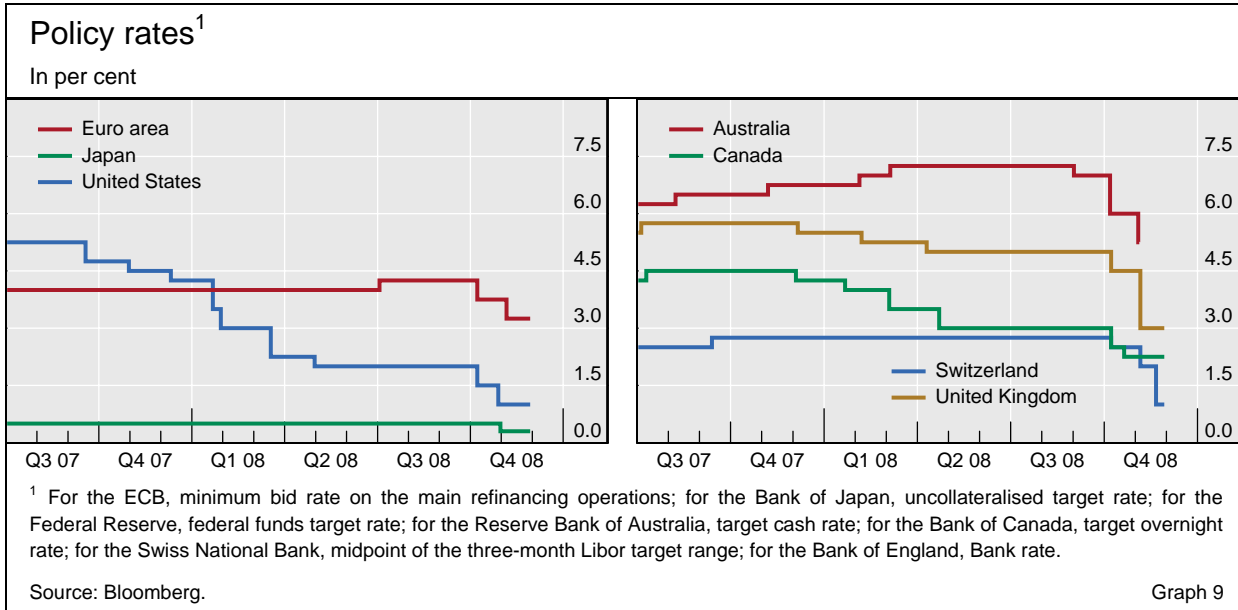
In the United Kingdom, the authorities announced comprehensive measures to recapitalise UK banks, to provide short-term liquidity and to ensure the availability of sufficient medium-term funding for the banking system through guarantees for new unsecured senior bank debt. Yet, despite the increased pace of government intervention, financial market turmoil continued, with credit and stock markets suffering losses on a broad scale into October. The universal scope of the sell-off was particularly apparent from broader global equity indices, which experienced record losses in late September and early October. While the S&P 500 dropped about 25% between 22 September and 10 October, the MSCI World index plummeted more than 28% over the same period. Emerging market equities declined by similar amounts, losing 24% in local currency terms (Graph 8, centre panel); selling pressures were most intense for countries with large current account deficits and relatively high private sector reliance on foreign currency borrowing. Money markets also continued to show signs of extreme dislocation, with Libor-OIS spreads setting new records on a daily basis (Graph 7, left-hand panel).

... stronger deposit guarantees ...

At this point, uncoordinated policy actions by national authorities no longer appeared to be sufficient. On 8 October, the first coordinated international policy response aimed at arresting the deepening crisis of confidence came in the form of an unprecedented round of 50 basis point policy rate cuts by six major central banks, including the Bank of England, the ECB and the Federal Reserve (Graph 9). Futures-based indicators showed that the move was immediately reflected in monetary policy expectations, particularly in Europe (Graph 10).

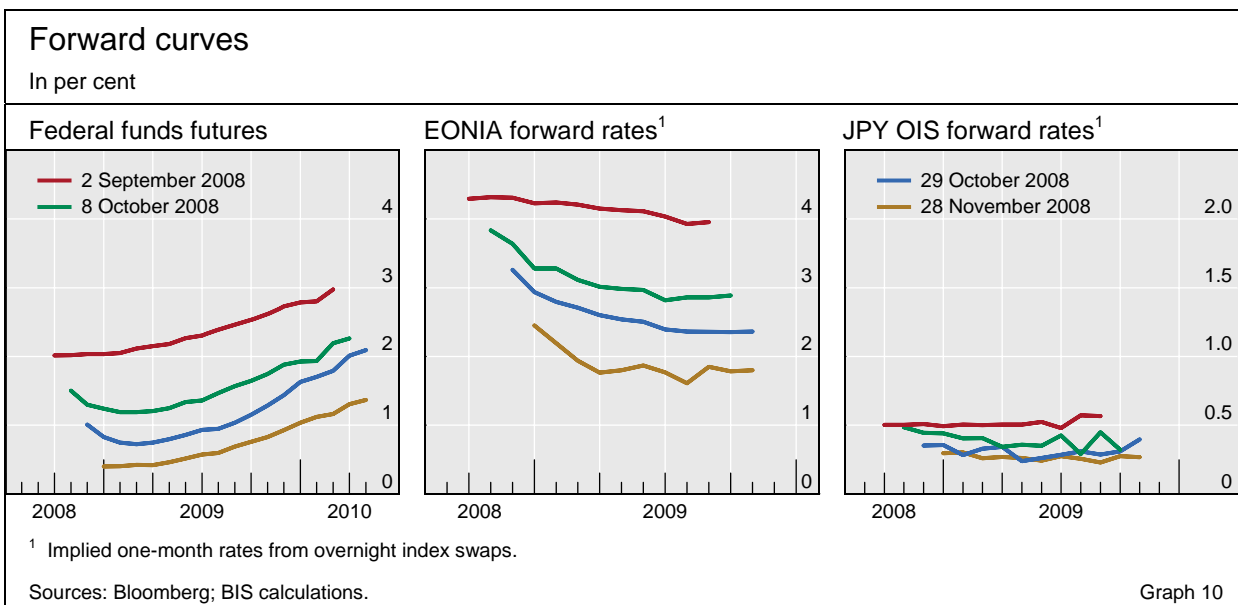
... globally coordinated rate cuts ...





... and system-wide bank recapitalisations ...

Efforts towards implementing more system-wide, coordinated policy measures continued in the following days. One example was the joint announcement on 13 October by the Federal Reserve, the ECB, the Bank of England and the Swiss National Bank that they would supply US dollar funding at maturities of seven, 24 and 84 days at fixed rates for full allotment to further ease tensions in the money market. Simultaneously, existing swap lines between the Federal Reserve and the other major central banks were increased to accommodate whatever quantity of US dollar funding would be demanded. On the same day, the euro area member countries made unprecedented coordinated announcements of guarantees and equity injections aimed at restarting interbank lending and at replenishing banks' capital positions. This was followed by notice from the US Treasury on 14 October that it would use \$250 billion of the previously legislated rescue package to recapitalise major banks.



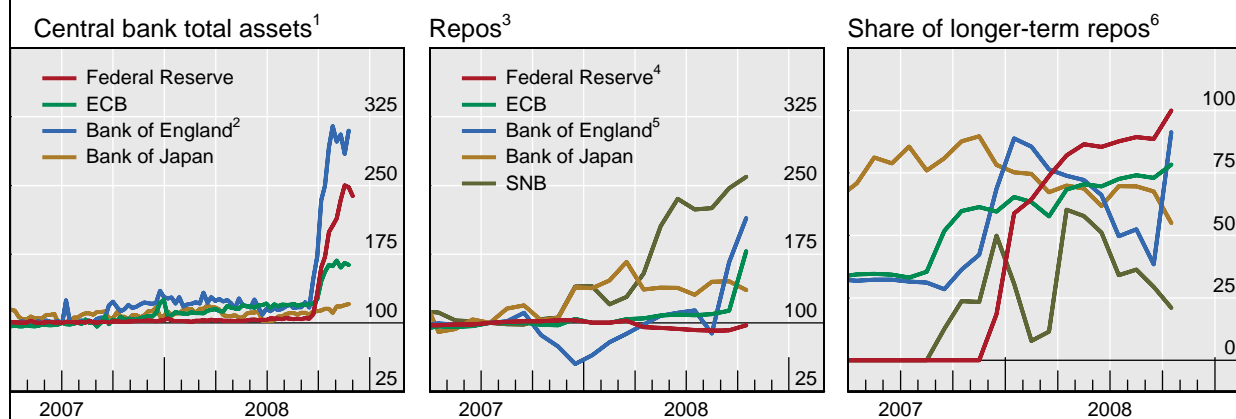
## Box 4: Central bank balance sheets

*François-Louis Michaud and Gert Schnabel*

Central banks in major advanced economies have taken a wide range of actions to address the tensions in the interbank and money markets since August 2007. As a result the size, composition and risk profile of their balance sheets have changed substantially. Major central banks have provided more term funding to a wider range of institutions and against wider collateral than in the past. In some cases, they stepped in to provide direct lending to distressed institutions and took other exceptional measures to improve funding conditions in credit markets. This box outlines how these actions have affected central bank balance sheets.

During the initial stages of the turmoil, until mid-September 2008, central bank measures did not lead to a significant expansion of the size of their balance sheets. However, there was a major shift in the composition of their assets, as central banks conducted, in general, more frequent and longer-term liquidity-providing operations than in the past (Graph A). In some cases, they also broadened the range of eligible collateral.

### Central bank assets and open market operations



<sup>1</sup> End-Q2 2007 = 100; weekly data. <sup>2</sup> Adjusted by BIS for estimates of items in the course of settlement related to unlimited dollar operations. <sup>3</sup> Repurchase agreements (and term auction credit (TAF) for the Fed) including foreign currency auctions; amounts outstanding; monthly averages, June 2007 = 100. <sup>4</sup> Sum of the amount outstanding of repurchase agreements, TAF and US Treasury securities held in the Fed's portfolio. <sup>5</sup> Decline from August to December offsets supply of reserves to the market via lending to Northern Rock (NR). The subsequent increase offsets the drain of reserves brought about as mainly the UK government, but also NR, repaid borrowing from the Bank of England. <sup>6</sup> Outstanding repos (and TAF for the Fed) including foreign currency auctions of 28 days and beyond as percentage of total outstanding repos (and TAF for the Fed); monthly averages.

Source: Central banks.

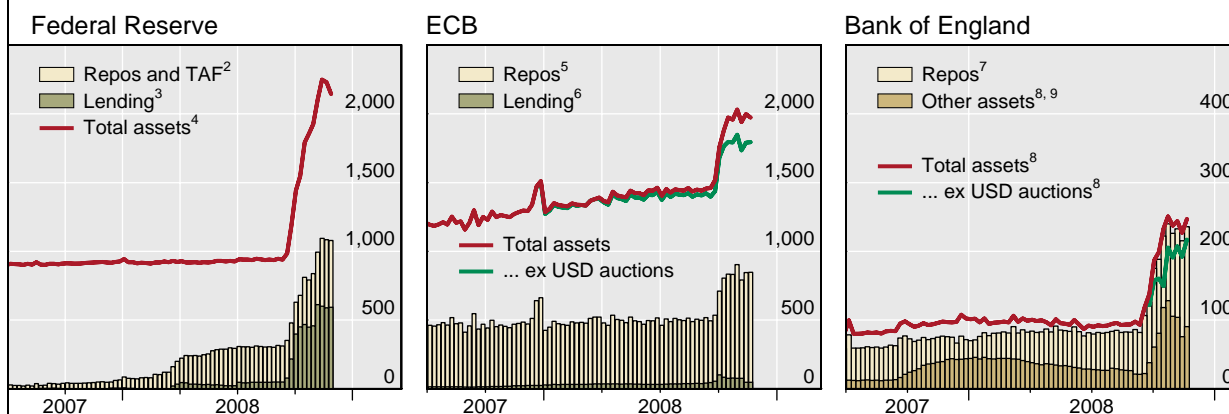
Graph A

In the United States, the Federal Reserve (Fed) lengthened the maturity of its refinancing operations. Their size also increased, but this was offset by the shrinking of its portfolio of Treasury securities. In addition, an increasing share of the latter was lent to primary dealers against a wide range of less liquid securities to help liquefy their balance sheets via the Fed's Term Securities Lending Facility (with no net impact on bank reserves or on the size of the central bank balance sheet). Similarly, the Bank of England (BoE) allowed banks to swap less liquid securities against more liquid ones under its Special Liquidity Scheme. The BoE, European Central Bank (ECB) and Swiss National Bank (SNB) substituted longer-term open market operations (OMOs) for shorter-term operations. While the ECB and SNB established swap lines with the Fed to distribute dollar liquidity to European banks, the amounts involved were relatively limited, and there was little or no use of central bank standing lending facilities.

After the failure of Lehman Brothers, the balance sheets of several major central banks expanded sharply, reflecting their growing intermediation role in money markets. The assets of the Fed and the BoE more than doubled in a matter of weeks, while those of the ECB and the SNB increased by more than 30%. In the Fed's case, this reflected direct lending to banks and dealers through existing and new lending facilities, including those providing indirect lending to money market funds and purchasing commercial paper through special purpose vehicles, and drawings by foreign central banks on dollar swap lines. In Europe, there was also some increase, albeit less marked, in the use of central banks' standing facilities. Most of the growth of central banks' balance

sheets reflected higher net amounts of domestic and dollar liquidity-providing OMOs, representing mostly term funding (Graph B). More auctions were also conducted at a fixed rate with full allotment. The maximum amount of dollar swap lines and related dollar liquidity-providing transactions was significantly increased (and subsequently made unlimited). The US dollar swap lines of the Fed with the ECB, BoE and SNB were increased by more than \$300 billion between end-August and end-September; US dollar lending of these central banks increased by about half that amount over the same period.

### Central bank open market operations and lending<sup>1</sup>



<sup>1</sup> In billions of national currency units. <sup>2</sup> Repurchase agreements and term auction credit (TAF). <sup>3</sup> Primary discount credit, primary dealer credit facility, Maiden Lane (Bear Stearns), AIG, commercial paper and money market mutual fund support measures. <sup>4</sup> Total factors supplying reserve funds. <sup>5</sup> Main refinancing, long-term refinancing and fine-tuning operations in euros. <sup>6</sup> Marginal lending and other claims in euros on euro area credit institutions. <sup>7</sup> Short and long-term reverse sterling repos. <sup>8</sup> Adjusted by BIS for estimates of items in the course of settlement related to unlimited dollar operations. <sup>9</sup> Includes US dollar lending and lending to UK deposit protection.

Source: Central banks.

Graph B

The corresponding growth of central bank liabilities took various forms. There was often a rise in bank reserve balances with the central bank. The ECB saw a sharp increase in the use of its deposit facility. In addition, several central banks took steps to manage their liabilities more flexibly. In the United States, the Treasury issued supplementary bills and held the proceeds at the Fed (nearly \$500 billion). Importantly, the Fed began to pay interest on bank reserves – currently at the average (lowest) FOMC target rate during the reserve maintenance period for required (excess) reserves – making it easier to expand its balance sheet at positive interest rates. The BoE and ECB narrowed the corridor between the rates of their lending and deposit facilities from 200 to 50 and 100 basis points, respectively. The ECB also announced that it might raise one-week fixed-term deposits. Several central banks started to issue their own bills (the BoE, Riksbank and SNB).

State guarantees for bank debt may slow the growth and increase in riskiness of central bank sheets. To the extent that government-guaranteed facilities help to stabilise markets, they can make private liquidity providers less reluctant to lend to banks. This would allow central banks to gradually scale back their role in bank funding. And as central banks start accepting government-guaranteed debt as collateral, the risk profile of their balance sheets may also improve.

The greatly increased level of central bank intermediation is often viewed as a temporary substitute for impaired private financial intermediation. However, interbank lending has not resumed, and money markets remain dysfunctional despite increased central bank intermediation and state guarantees. This may of course reflect banks' continued balance sheet and capital constraints. An additional factor may be the differences in state guarantees across countries and their gradual implementation. Banks' funding liquidity management may also be evolving, and banks may wish to rely less on wholesale funding markets. Finally, increased central bank intermediation may in some cases weaken banks' incentives to resume their intermediation function. For instance, borrowing from the central bank at close to the policy rate with no counterparty risk may arguably reduce banks' incentives to raise funds from market sources. And narrow spreads between central bank target rates and the rates paid on excess balances also discourage banks from lending to other banks. It is unclear how much, and for how long, central banks may need to expand their balance sheets.

With the flurry of unprecedented policy initiatives taken across countries up to mid-October increasingly adding up to a joint approach, market prices finally responded. As potentially large amounts of financial institutions' senior liabilities had effectively become quasi-government debt, financial sector spreads rallied back from the peaks reached earlier during the period (Graph 2, left-hand panel). The recovery in financial credit initially helped to drag broader credit spread indices lower (Graph 3, left-hand and centre panels). However, markets remained under strain from ongoing portfolio liquidations by leveraged investors suffering from margin calls and redemptions.

... prevent complete collapse of confidence

Signs of gradually easing pressures were also evident in other markets. The three-month US dollar Libor-OIS spread peaked at 364 basis points on 10 October and maintained a steady downward trend into November, with spreads reaching around 170 basis points. Similar pricing patterns were seen in euro and sterling Libor-OIS spreads, suggesting that interbank markets were finally beginning to stabilise (Graph 7, left-hand panel). In the meantime, major equity markets were showing at least temporary signs of relief (Graph 4, left-hand and centre panels), with the Dow Jones Industrial Average rising 11% on 13 October alone, its largest one-day percentage increase since 1933. Other equity indices also rallied back from their previous lows, as did emerging market equities and bonds (Graph 8, left-hand and centre panels).

Signs of relief prove temporary

At the same time, unintended side effects of recent policy initiatives were starting to show up in markets such as those for US agency securities. After an initial decline, spreads on agency debt and MBS soared even beyond the peaks experienced prior to the government takeover of Fannie Mae and Freddie Mac in early September (Graph 1, right-hand panel). Given newly announced FDIC guarantees for eligible unsecured bank debt issued before 30 June 2009, investors had started to anticipate a potentially sizeable new asset class of AAA-rated bank debt that would compete directly with agency paper. Uncertainties about the exact nature of the government guarantee for the agencies' longer-maturity debt and ongoing investment fund redemption sales put further upward pressure on agency spreads. Similar side effects were evident in collateralised lending markets, especially those for repurchase agreements (see the special feature by P Hördahl and M King on pages 37–53 for a discussion).

The scope and magnitude of the bank rescue packages also meant that significant risks had been transferred onto government balance sheets. This was particularly apparent in the market for CDS referencing sovereigns involved either in large individual bank rescues or in broad-based support packages for the financial sector, including the United States. While such CDS were thinly traded prior to the announced rescue packages, spreads widened suddenly on increased demand for credit protection, while corresponding financial sector spreads tightened (Graph 2, left-hand panel).

## Recession fears take centre stage

By mid-October, accumulating evidence from macroeconomic data releases was starting to overshadow the immediate effects of government initiatives

Recession fears ...

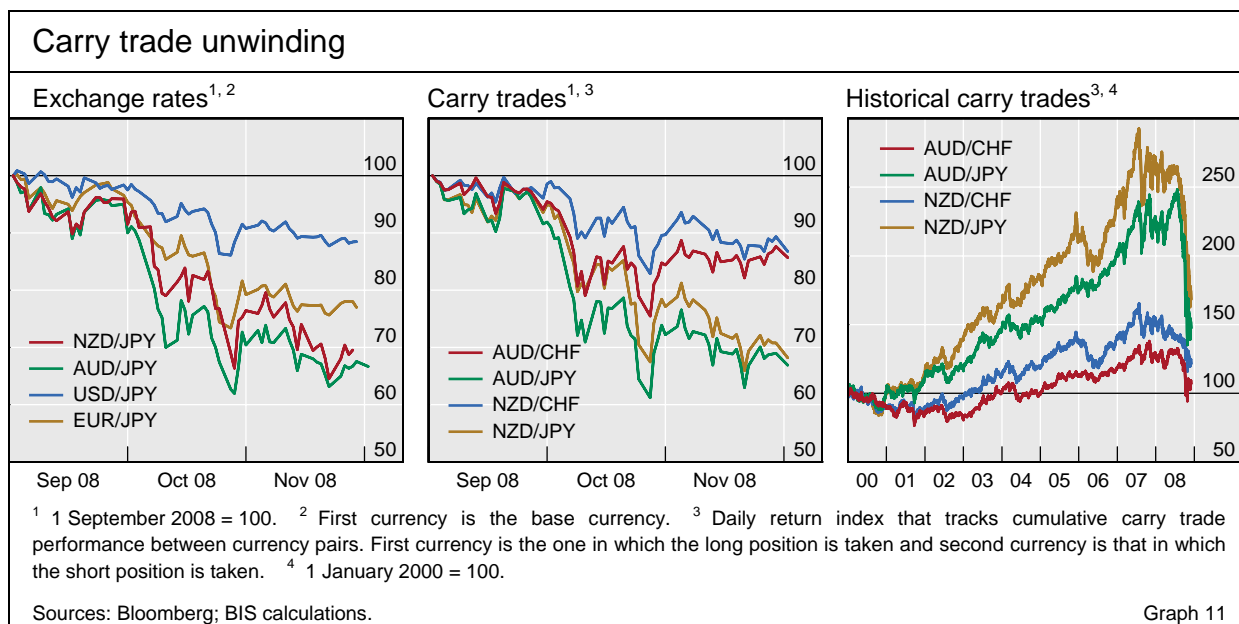
... fed by negative macroeconomic news ...

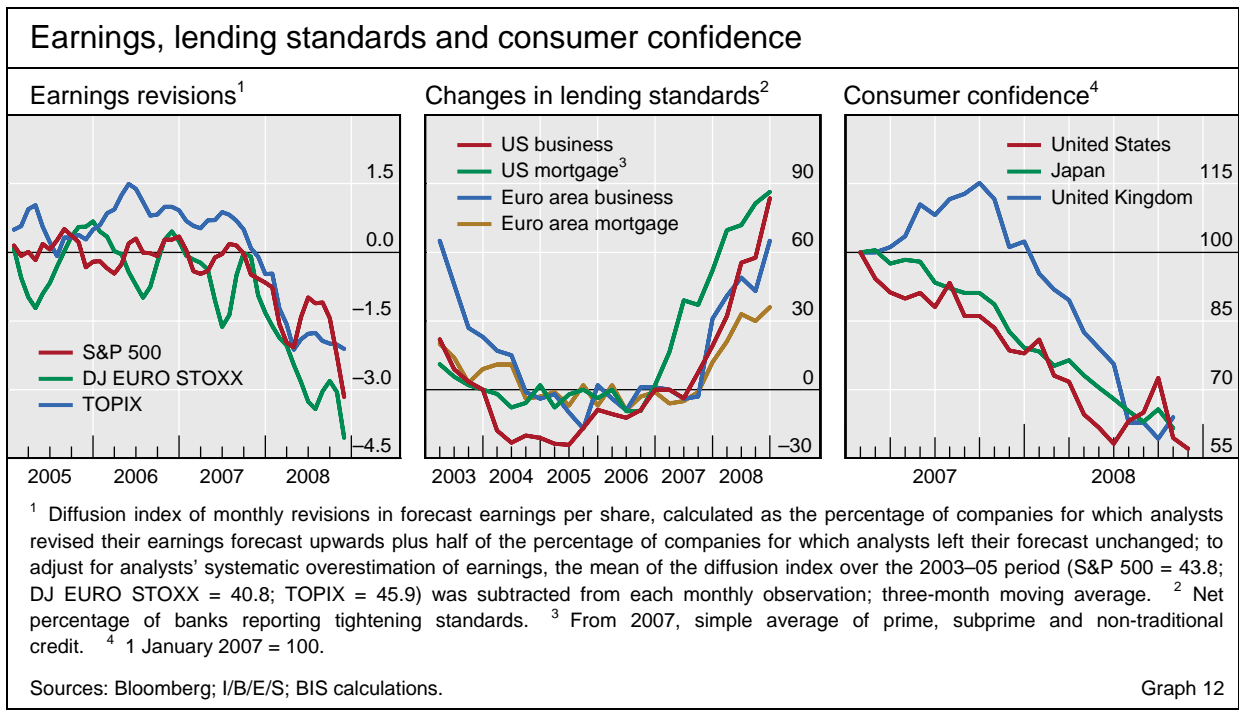
across markets. Reports on economic activity confirmed that numerous major economies had officially moved into recession or were about to do so. Thus, while the combined efforts of central banks and governments appeared to have successfully arrested the global crisis of confidence, gains across most asset classes turned out to be short-lived. The main exception was short-term funding markets, where conditions continued to gradually recover, with US money market fund assets stabilising and Libor-OIS spreads declining, though still at levels higher than those before the credit crisis.

... drive credit spreads up ...

Credit markets quickly refocused on expectations of an approaching global recession and the associated increase in default-related losses. Contracting bond issuance and depressed bank lending were consistent with growing concerns about the lack of availability of credit for households and non-financial companies. Following weak macroeconomic data releases for the United States on 16 October, credit spreads resumed their earlier upward drift. To be sure, the widening of credit spreads at times reflected policy uncertainty in addition to recession fears. The mid-November announcement that TARP funds previously meant for the purchase of troubled assets were being reallocated in support of the consumer finance sector – where lending activity had increasingly been impaired by collapsing securitisation volumes – pushed CDS spreads to new highs, reflecting expectations that the anticipated asset purchases would not materialise (Graph 3, centre and right-hand panels). Signs of recovering credit spreads emerged only in late November, following the announcement of a support package for Citigroup and of measures aimed at supporting the markets for asset-backed securities and US agency debt. Stresses remained, however, as suggested by the continued widening of spreads in troubled sectors, such as commercial real estate.

At the same time, the unwinding of currency carry trades, which had begun after the Lehman event, gained new momentum in the wake of elevated market volatilities and the investor retreat from risky assets (Graph 11, left-hand and centre panels). Lower-yielding currencies appreciated and carry





trade returns turned strongly negative, eroding some six years' worth of accumulated gains (Graph 11, right-hand panel).

Equity markets also reflected the fact that recession fears came into focus in late October and November: declines in global equity markets over the quarter exceeded those during any of the crises since the 1930s. Major indices fell sharply on almost universally negative earnings-related news, tightening lending standards and rapid declines in consumer confidence (Graph 12). By end-November, despite additional monetary easing by several central banks and a late-month recovery, global stock markets had fallen by some 35% from their end-August levels. As a result, price/earnings ratios for many major indices were down to levels not seen for at least a decade.

... and equity markets down

The prices of emerging market assets continued to adjust to a combination of collapsing exports, more limited private sector access to funding and rapidly declining commodity prices. Signs of indiscriminate asset disposals emerged in mid-October, as plummeting risk appetite and concerns about the availability of trade finance increasingly translated into large-scale redemption flows out of emerging market assets. Pressures came to a head in the week of 21 October, when speculation that the authorities in Argentina might nationalise the public pension system caused concerns about political risk to soar. This occurred despite efforts by emerging market central banks to enhance their domestic and foreign currency lending operations and the announcement of full or partial guarantees of bank deposits in several economies.

As investors retrench ...

... and concerns about political risk soar ...

Emerging market sentiment temporarily recovered in late October and early November, but was weighed down by recession fears during the remainder of the period. Reaching their highest levels since 2002, EMBIG spreads widened to a peak near 891 basis points on 24 October, before tightening by about 276 basis points into early November. Emerging equity

... emerging markets assets sell off

markets also extended their previous declines, reaching new lows on 27 October. Conditions stabilised only after the announcement of a \$25 billion support package for Hungary on 28 October and news of dollar swap lines between the Federal Reserve and the monetary authorities in Brazil, Korea, Mexico and Singapore the next day (Graph 8, left-hand and centre panels). By end-November, emerging credit and equity markets had recovered somewhat from their late October levels, mirroring the performance of their industrialised country counterparts. Nevertheless, reflecting the heavy losses experienced since August, price/earnings multiples in emerging market economies generally adjusted more sharply than those in the United States and other major markets, with relative valuations across countries broadly back in line with historical discounts relative to the industrialised world (Graph 8, right-hand panel).

Bond yields  
decline ...

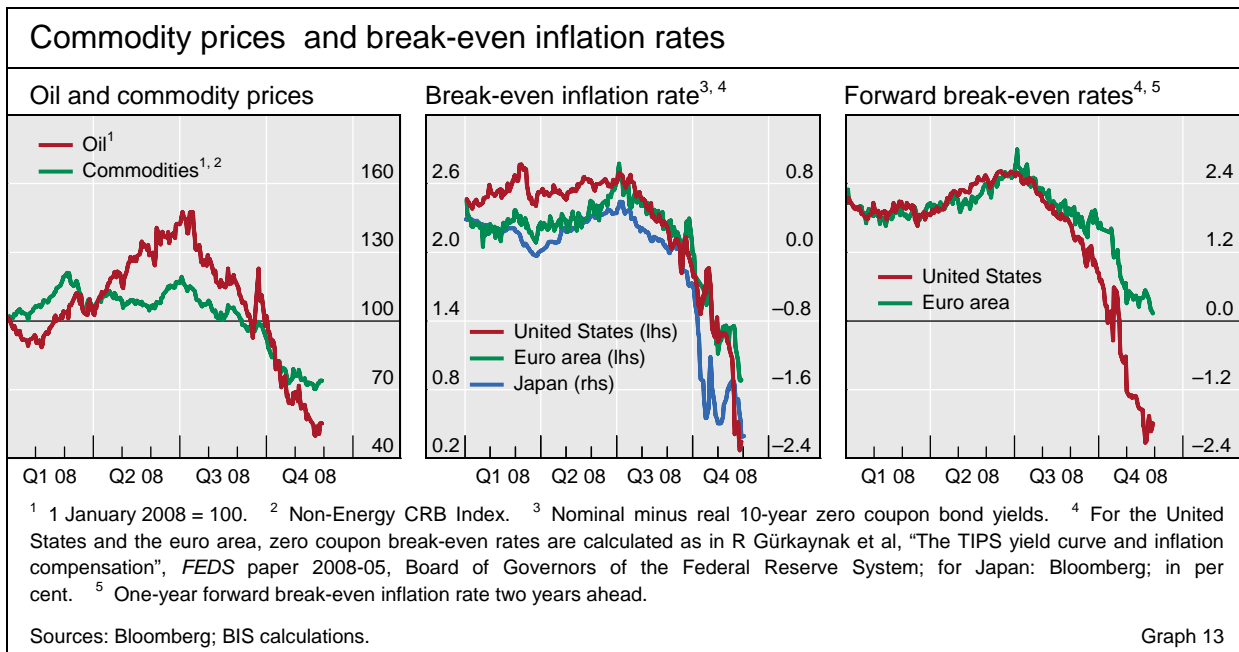
At the same time, recession fears put shorter-term yields squarely on a downward trajectory. The lowering of policy rates as well as a flight to safety pushed two-year yields dramatically lower in both the United States and the euro area, to 0.96% and 2.1%, respectively, by end-November. Likewise, expectations about the path of near-term policy rates were also revised downwards. As a result, federal funds futures prices signalled expectations of low and broadly steady policy rates in the United States for much of 2009, consistent with depressed to negative growth over the coming quarters (Graph 10, left-hand panel). In the euro area, EONIA swap prices pointed to a further lowering of policy rates by the ECB over the next 12 months (Graph 10, centre panel), reflecting in part the greater leeway for additional rate adjustments compared to the United States. In Japan, the policy rate was adjusted downwards by 20 basis points on 31 October, reaching a level of 30 basis points for the first time since March 2001. Japanese forward rates, in turn, suggested expectations of unchanged policy rates for most of 2009.

... on lower policy  
rates ...

... expectations of  
lower inflation ...

In this environment, break-even inflation rates derived from the yields of nominal and inflation-indexed bonds fell significantly across all maturities. The declines were particularly pronounced in the United States, where the 10-year break-even rate dropped by 1.9 percentage points between end-August and end-November, although substantial declines were seen in the euro area and Japan as well (Graph 13, centre panel). Even sharper drops took place at the short end of the maturity spectrum, with, for example, US implied one-year forward break-even rates two years ahead plunging by 3.5 percentage points during this period to reach levels deep inside negative territory (Graph 13, right-hand panel). With break-even inflation rates typically seen as indicators of investors' inflation expectations, the observed declines appeared to be in line with perceptions of rapidly easing price pressures amid accumulating signs of a broad-based global slowdown. Moreover, the declines that took place at the short end of the break-even curve largely reflected developments in both oil and commodity prices, which declined by over 50% and 30%, respectively, between end-August and end-November (Graph 13, left-hand panel).

... falling commodity  
prices ...



Nevertheless, another important factor behind the sharp drops in break-even rates is likely to have been rising liquidity premia and sell-side pressures from leveraged investors unwinding their positions. Consistent with this, much of the decline in US break-even rates that took place in September and October was due to real bond yields rising faster than nominal yields, suggesting that more technical factors may have played a significant role in driving the dynamics of break-even rates during this period. However, by early November, real yields had stabilised while nominal yields again fell as recession fears and concerns about the health of the financial sector intensified, leading to renewed downward pressure on break-even rates.

... as well as  
recession fears