

1 Shocks to the financial system

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

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

The credit boom has come to an abrupt end.

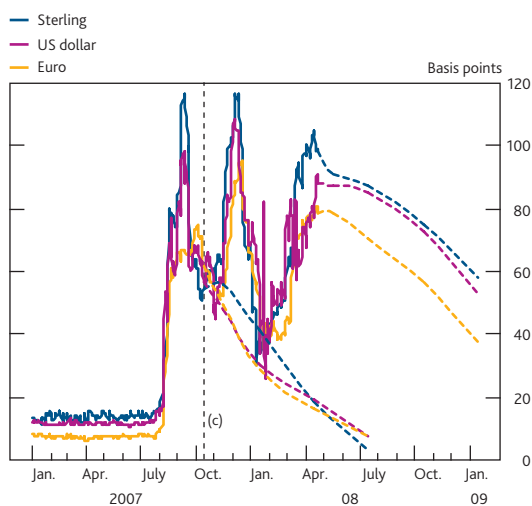
During the summer of 2007, the credit boom came to an end. The October 2007 *Report* explained how rising default rates on US sub-prime mortgages undermined confidence in structured credit products generally, causing sharp falls in financial asset prices and acute funding difficulties for many financial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

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

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

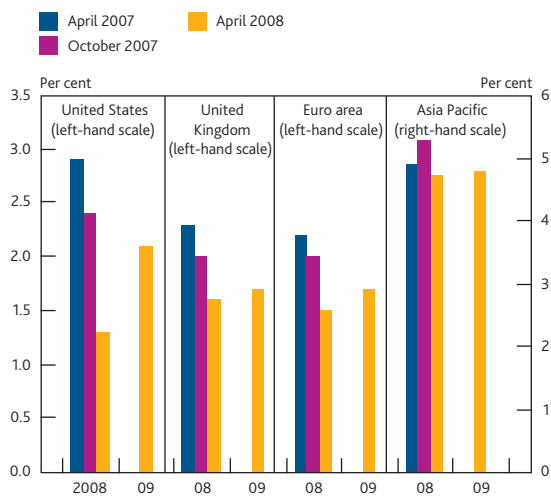
As credit conditions have tightened, forecasts for international growth in 2008 have been cut, particularly for the United States (**Chart 1.2**). In the February 2008 *Inflation Report*, UK GDP growth was expected to fall back markedly in early 2008 before picking up during 2009. At the same time, global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

Chart 1.1 Three-month interbank rates relative to expected policy rates^{(a)(b)}

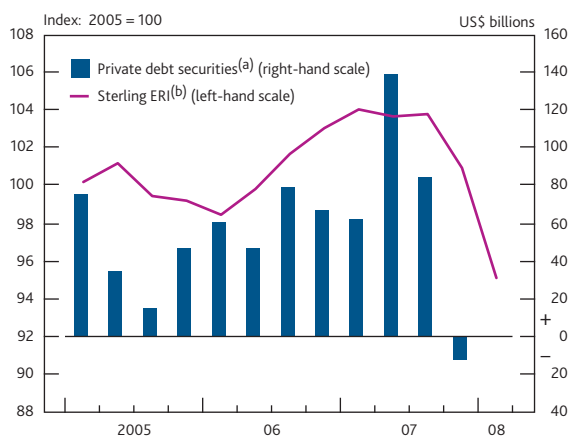


Sources: Bloomberg and Bank calculations.

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

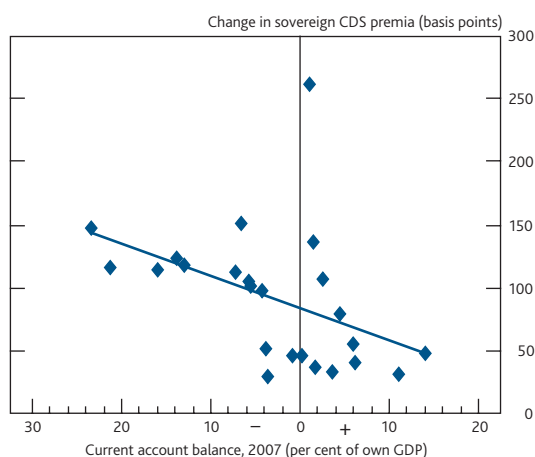
Chart 1.2 International GDP growth forecasts

Source: Consensus Economics Inc.

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

Sources: Bloomberg, ONS and Bank calculations.

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

Chart 1.4 Change in sovereign credit default swap premia^(a) versus current account balances for selected emerging market economies^(b)

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

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

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

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

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

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

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

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

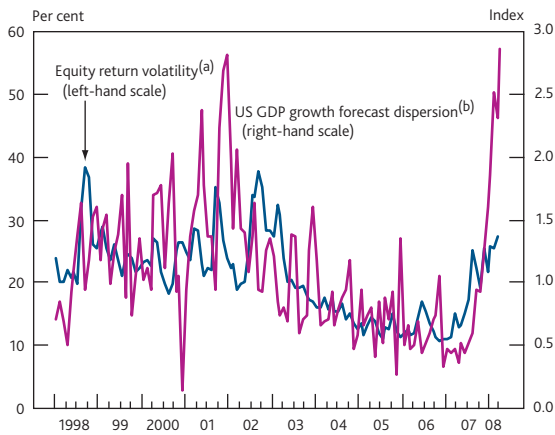
...and resulting in policy interest rates being cut and liquidity provision increased.

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

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

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

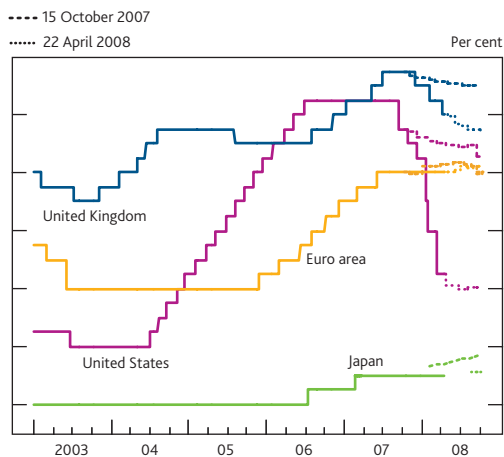
Chart 1.5 US GDP growth forecast dispersion and option-implied equity market volatility



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

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

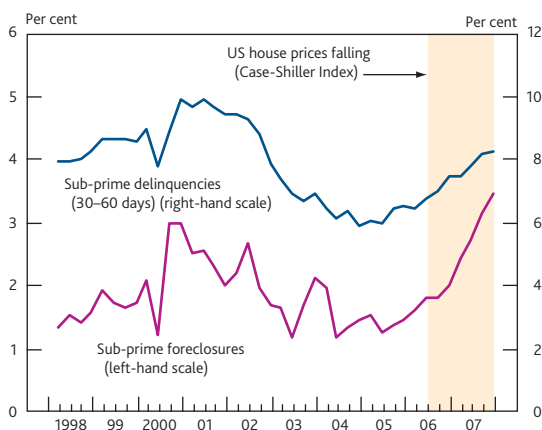
Chart 1.6 Official interest rates^(a)



Sources: Bloomberg, Reuters and Bank calculations.

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

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



Source: Thomson Datastream.

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

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

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

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

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

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

Box 1 Comparison of measures of sub-prime losses

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

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

Whole economy versus financial sector losses

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

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

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

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

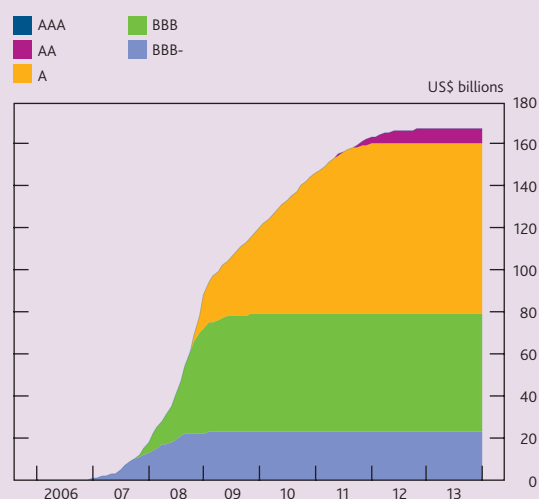
Credit versus mark-to-market losses

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

Credit losses

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

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



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

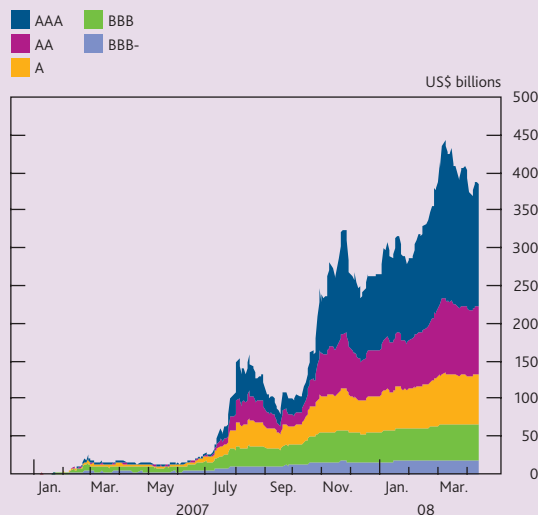
Chart A also shows how the projected losses affect securities of different seniority. The more junior securities, with lower credit ratings, bear the first losses. But losses are projected to rise to levels that would eventually affect AA-rated securities.

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

Mark-to-market losses

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

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



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

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

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

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

Table 1 Estimated loss of market value of US sub-prime mortgage-backed securities based on actual and model-implied prices^{(a)(b)}

US\$ billions

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

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

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

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

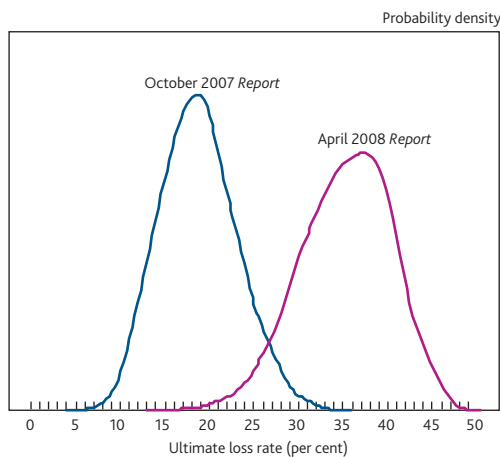
(b) Totals may differ from the sum of their constituents due to rounding.

Conclusion

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

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

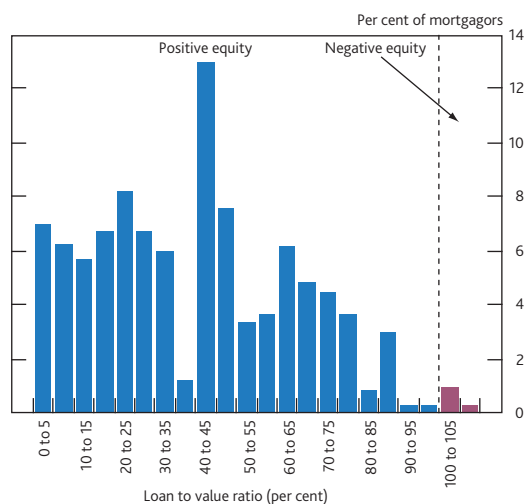
Chart 1.8 Market-implied expectations of ultimate loss rates on US sub-prime mortgages^{(a)(b)}



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

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

Chart 1.9 Distribution of loan to value ratios among mortgagors



Sources: 2007 NMG Research Survey and Bank calculations.

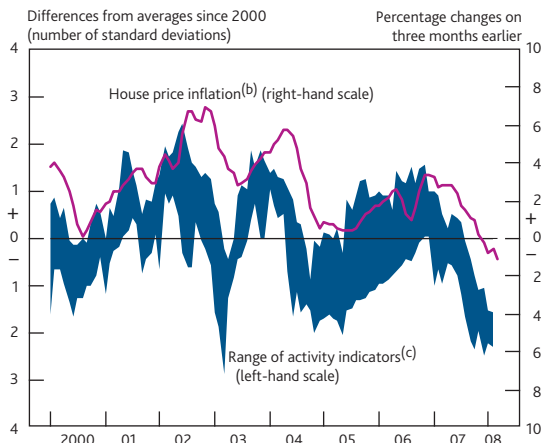
ABX prices are often used to estimate mark-to-market losses on sub-prime securities. These loss estimates have also risen, to around US\$380 billion. These losses have often acted as a benchmark for public commentary on possible bank write-downs. But as Box 1 explains, estimates based on projected credit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

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

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

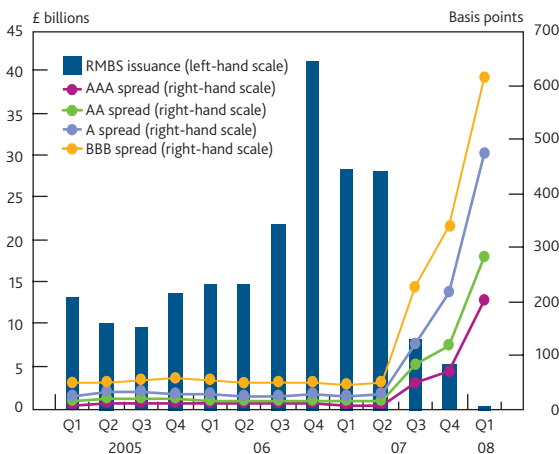
...and possibly the United Kingdom.

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

Chart 1.10 UK residential property market^(a)

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

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

Chart 1.11 UK prime residential mortgage-backed security issuance and spreads^(a)

Sources: Dealogic, Lehman Brothers and Bank calculations.

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

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

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

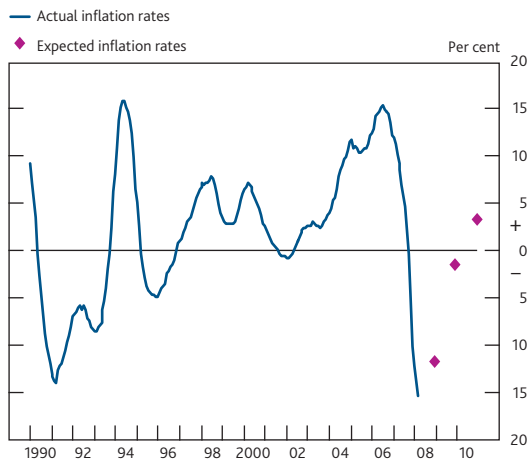
Highly indebted households, adverse credit borrowers and buy-to-let investors are particularly vulnerable...

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

...as is the commercial property sector.

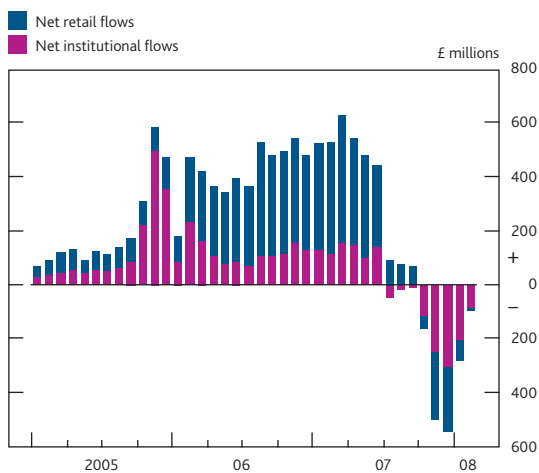
By March 2008, commercial property prices had fallen 16% from their June 2007 peak. Derivatives contracts suggest prices are expected to keep falling for the next couple of years (Chart 1.12). Taken at face value, these contracts imply a peak to trough fall of about 20%–25% although, as with the US ABX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

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

Chart 1.12 UK commercial property capital values^(a)

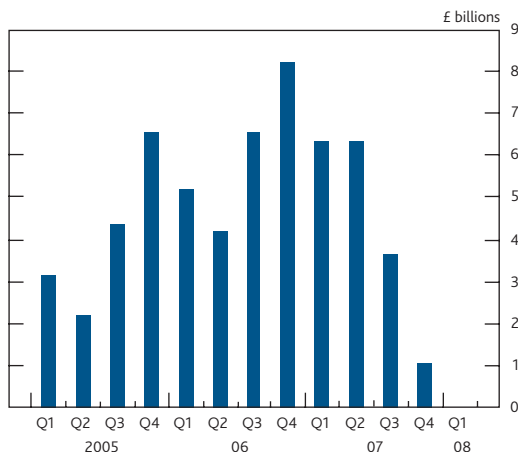
Sources: Fenics, IPD, Thomson Datastream and Bank calculations.

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

Chart 1.13 UK property funds net inflows^(a)

Source: Investment Management Association.

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

Chart 1.14 UK commercial mortgage-backed securities issuance

Source: Dealogic.

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

The UK corporate sector is generally robust...

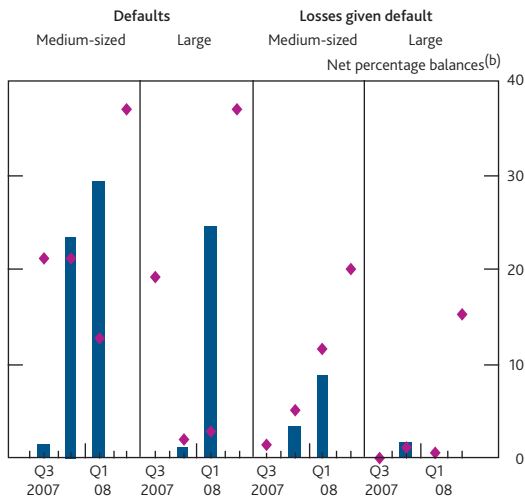
For the UK corporate sector as a whole, default rates remain near record low levels. As described in previous *Reports*, the majority of the UK corporate sector has moderate leverage and healthy buffers of liquidity. And UK companies took advantage of the abundant credit availability of recent years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

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

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

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

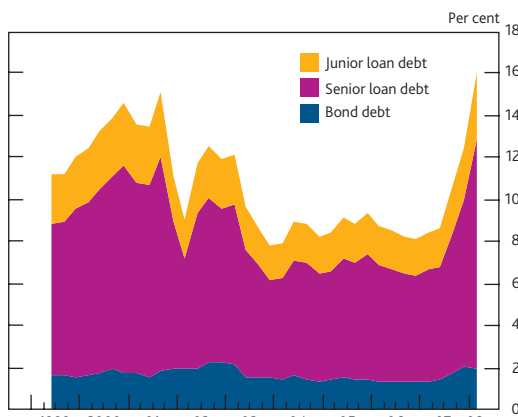
Chart 1.15 Survey of PNFC default rates and losses^(a)



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

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

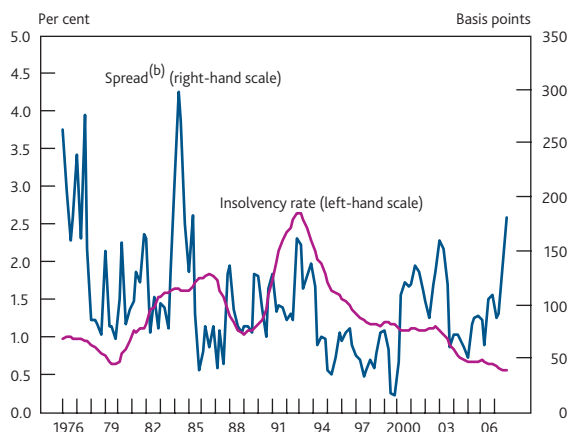
Chart 1.16 Annual debt-servicing cost for a hypothetical leveraged buyout^(a)



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

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

Chart 1.17 UK investment-grade corporate bond spreads and insolvency rate^(a)



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

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

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

...reflecting problems in structured credit markets.

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

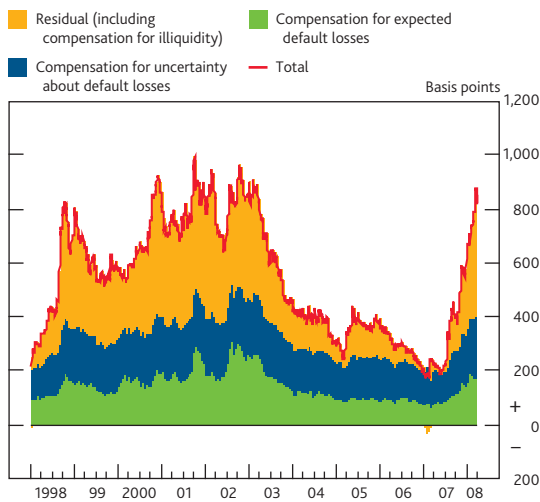
The senior tranches of structured securities were typically held by banks and risk-averse investors, such as insurance companies with ratings-based mandates. They were also held by structured investment vehicles (SIVs) and off balance sheet conduits, which were funded through the issuance of short-term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

Significant market losses on AAA securities...

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

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

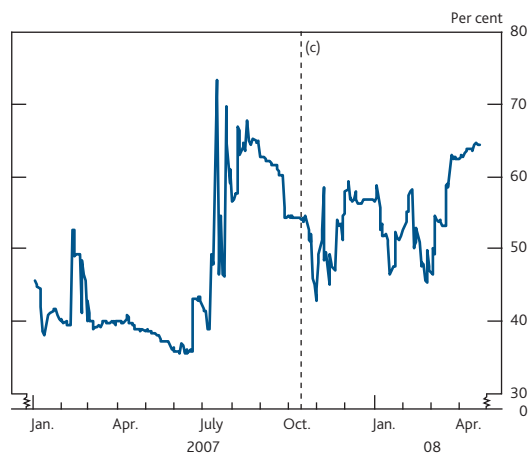
Chart 1.18 Decomposition of sterling high-yield corporate bond spreads^{(a)(b)}



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

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

Chart 1.19 Comovement between AAA-rated US structured financial instruments^{(a)(b)}



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

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

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

...have made them highly illiquid...

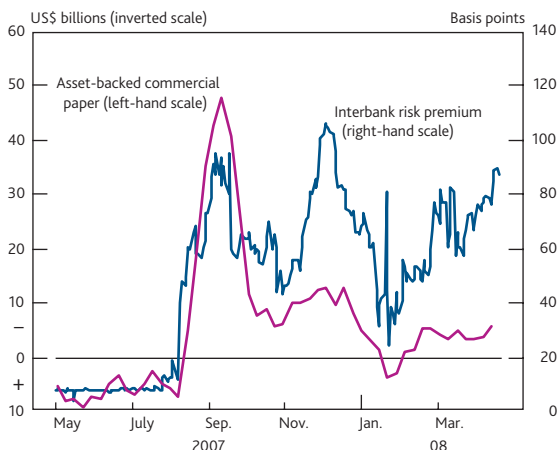
Against this backdrop, it appears to be senior tranche investors who have been the most affected by the developments of the past nine months. **Chart 1.21** provides support for this hypothesis by showing that, based on model estimates, AAA tranches are out of line with the pricing of other tranches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

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

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

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

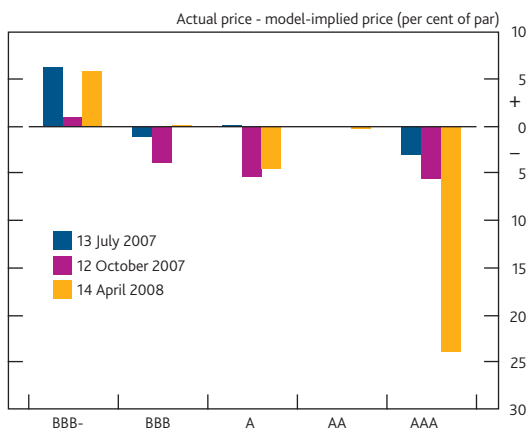
Chart 1.20 US interbank risk premium and declines in US asset-backed commercial paper^{(a)(b)}



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

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

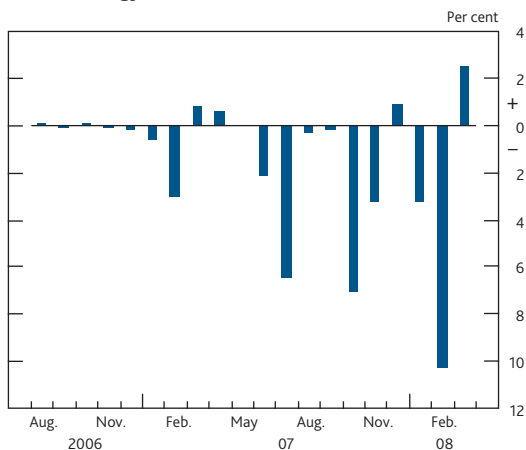
Chart 1.21 Anomalies in the prices of the ABX sub-prime index (2007 H1 vintage)^{(a)(b)}



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

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

Chart 1.22 Monthly returns on a hypothetical hedge fund strategy^(a)



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

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

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

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

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

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

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

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

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

Table 1.A Mortgage-related collateralised debt obligations event-of-default (EOD) notices^{(a)(b)(c)}

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

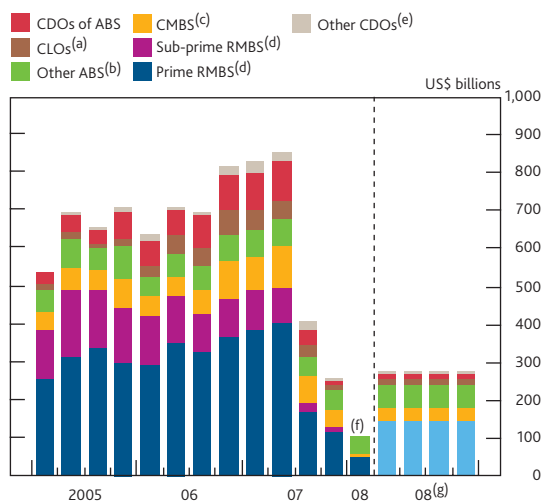
Source: Standard and Poor's.

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

(b) As of 17 March 2008.

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

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



Sources: Dealogic and Sifma.

(a) Collateralised loan obligations.

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

(c) Commercial mortgage-backed securities.

(d) Residential mortgage-backed securities.

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

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

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

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

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

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