



The Actuarial Profession

making financial sense of the future

Liquidity Risk and the Global Financial Crisis

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Introduction

- Liquidity Risk has traditionally not been a serious issue for actuaries working in UK life insurance. Assets are mostly invested in marketable securities while contracts either gave flexibility as to claim amount or permitted deferral or payment.
- However, the current global financial crisis has highlighted the impact Liquidity Risk has on other financial institutions, and its impact – direct and indirect – on life insurers .
- This presentation aims to:
 - Outline the key components of Liquidity Risk;
 - Review the current global financial crisis and the role Liquidity Risk has played in this; and
 - Highlight some Liquidity Risk lessons for life insurers as a result of the crisis.

What is Liquidity Risk ?

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- The FSA defines Liquidity Risk

“The risk that a firm, although solvent, either does not have available sufficient financial resources to enable it to meet its obligations as they fall due, or can secure such resources only at excessive cost”

- We might split Liquidity Risk into 7 components:
 1. Adverse variances in non-discretionary liability related outflows;
 2. As 1., but relating to discretionary liability related outflows;
 3. Asset related liquidity strains;
 4. Strains arising from corporate outflows (dividends, tax etc.)
 5. Impairments of liquid resources available to meet outflows;
 6. Frictional strains; and
 7. Aggregation of strains.

What is Liquidity Risk ?

- Adverse variances in non-discretionary liability related outflows:
 - Life Insurance – strains arising from non-discretionary policy related payments such as maturities, deaths and annuity payments.
 - Should be reasonably easy to project such cashflows and arrange sufficient liquid resources are in place to meet these.
 - Also includes the ability to roll over maturing debt capital.
- Adverse variances in discretionary liability related outflows:
 - Life Insurance – strains arising from surrenders and other policy related payments where timing is at the discretion of the policyholder.
 - May also arise from policy features such as policy loans.
 - Far more difficult to predict – there is a possibility that a loss of confidence in the insurer could trigger mass surrenders.
 - However life insurers can mitigate this by deferring unit redemptions or varying with-profit payouts (within PRE constraints).
 - Could also arise from any early redemption options of debt holders.

What is Liquidity Risk ?

- Asset related liquidity strains – these may arise from:
 - Margin calls on derivative positions, including any increase in collateral a financial institution may face as a result of its downgrade.
 - Depletion in liquid resources as a result of the completion of property purchase, or possibly as a result of portfolio re-balancing (e.g. buy Gilts with cash but short equity futures rather than selling equities).
 - More generally, possible asset-related outflows could arise from (a) securities underwriting; (b) drawdowns of uncommitted loan facilities (more an issue for banks); and (c) any commitment to buy back an asset sold on.
- Strains arising from corporate outflows:
 - Corporate outflows here relates to outflows such as dividends, tax etc..
 - While large, these should be known well in advance and it should be possible to arrange liquid resources to be in place to meet these.

What is Liquidity Risk ?

- Impairments of liquid resources available to meet outflows:
 - Reduced marketability of listed securities including widening deal spreads and/or lower deal sizes meaning that holdings can only be realised in full at a discount to market price.
 - Inability to realise assets such as property and private equity.
 - Impairment of cash resources e.g. if held in a money market fund that “breaks the buck”.
 - Currency restrictions prevent repatriation of overseas liquid assets.
 - Failure of a lender to honour a “line of credit” – especially if an institution is overly reliant on one particular lender.
 - More generally the inability to raise loans to meet arising needs, or that borrowing can only be made at a penal rate of interest.
 - Repo – higher “haircuts” required may mean the amount that can be raised on the back of assets through Repo markets is reduced.

What is Liquidity Risk ?

- Impairments of liquid resources, continued:
 - Inability to securitise loans and other illiquid assets due to seizure of securitisation markets; or lack of a framework to access such markets.
- Frictional liquidity strains may arise within individual unit linked funds or subsidiaries even if the overall position of the life insurer is favourable. They may also arise in a particular currency of a multinational insurer.
- Aggregation of strains – a key point to note that Liquidity Risks will be strongly correlated with each other and the sum may well be greater than the sum of the parts e.g. a downgrade could trigger higher collateral outflows on derivatives as well as a surge in surrenders, while making it more difficult to borrow. Each on its own may be manageable, but the aggregate effect may not.

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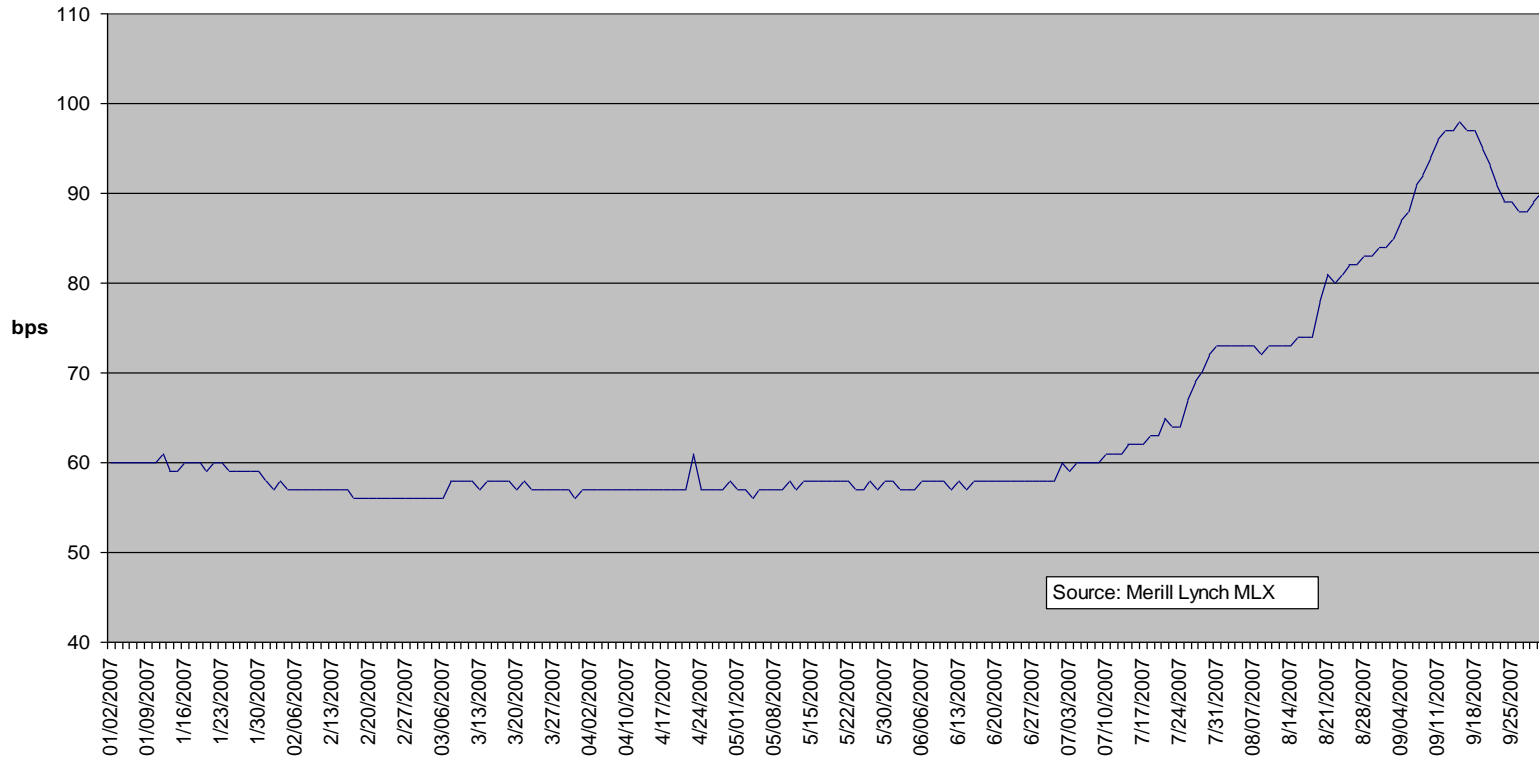
- Liquidity Risk played a significant part in the global financial crisis which started in mid-2007 and has continued to the present time.
- This crisis can be split into a number of stages:
 - The shock to Asset Backed Securities (ABSs) due to US sub-prime mortgage losses and the subsequent breakdown of the ABS securitization and Asset Backed Commercial Paper (ABCP) markets;
 - The loss of confidence in financial institutions in each other, leading to significant liquidity problems for banks;
 - The problems stemming from capital and liquidity in banks leading to a credit crunch and the spread of the crisis to the wider economy;
 - The shock to financial markets as a result of the default of Lehmans, requiring active government intervention in financial institutions; and
 - Following continued deterioration in markets in Q1,2009, a partial recovery to the present time.

Stage One – ABS market shock

- By mid-2007, large losses were emerging on ABSs linked to US sub-prime mortgages, even where these were highly rated.
- This led to a loss of faith in the valuation of ABSs and the ratings given them by credit rating agencies, which in turn led to falling prices and widening spreads on ABSs.

Stage One – ABS market shock

Spreads over Gilts of UK Securitized & Collateralized bonds, January - September 2007



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 - This led to a loss of faith in the valuation of ABSs and the ratings given them by credit rating agencies, which in turn led to falling prices and widening spreads on ABSs.
 - The consequent evaporation of demand for ABSs meant banks which were previously able to raise liquid funds by securitising these as ABSs could no longer do so, leading to funding problems.
 - This loss of faith also caused a seizure of the Asset Backed Commercial Paper (ABCP – short-term loans secured on ABSs) market as investors weren't prepared to lend against ABS collateral.
 - This in turn triggered a crisis for Structured Investment Vehicles (SIVs) which were running a significant liquidity mismatch by investing in ABSs using funds raised on the ABCP market.
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Stage One – ABS market shock

- Where SIVs were sponsored by banks, there were usually able to call on liquidity support from their sponsor, but in other cases, their inability to roll over debt lead to the SIV being liquidated.
- The result of such liquidations was a “fire sale” of ABS assets which drove down prices further.
- To take one example of the impact of such liquidations, in July 2008, Deloitte held an auction of SIV ABS assets, and obtained the following prices (as % face value):
 - Commercial Mortgage Backed Securities (CMBS) – ca.80%
 - Prime Residential Mortgage Backed Securities (RMBS) – ca.50%
 - Other (monoline wrapped) RMBS – ca.40%
 - CDOs backed by ABSs – 20-30%
 - Total of \$1.2bn face value across 8 asset classes – avge.price 44%

Stage One – ABS market shock

- Rising spreads and falling ABS values were matched by falls in other bond classes. This led to mark-to-market losses for bonds held at fair value, damaging bank balance sheets and capital.
- At the same time, increasing market volatility was driving up capital requirements for bank trading books.
- The combination of fair value losses reducing available capital and higher capital requirements led many market makers to reduce stock inventories, reducing deal sizes and widening deal spreads.
- Sizeable holdings could only be realised at significant discounts to market value, reducing the liquidity of listed securities.
- Worse, banks stopped making markets in many ABS and other bonds. The result was considerable uncertainty over the price of assets.

Stage Two – Banking Liquidity Crisis

- As a result of the ABS market collapse, banks were suffering from:
 - Mark-to-market losses on ABS and other bonds;
 - Uncertainty over the prices of securities held;
 - Liquidity strains from having to rescue SIVs they sponsored;
 - Reduced liquidity of such marketable securities as they held; and
 - The inability to raise funds through securitisation or ABCP markets due to the collapse of the ABS market.
- The liquidity strains were particularly onerous for banks which had raised funds on wholesale markets and which had to roll these over. This ultimately led to the run on, and collapse of, Northern Rock.

Stage Two – Banking Liquidity Crisis

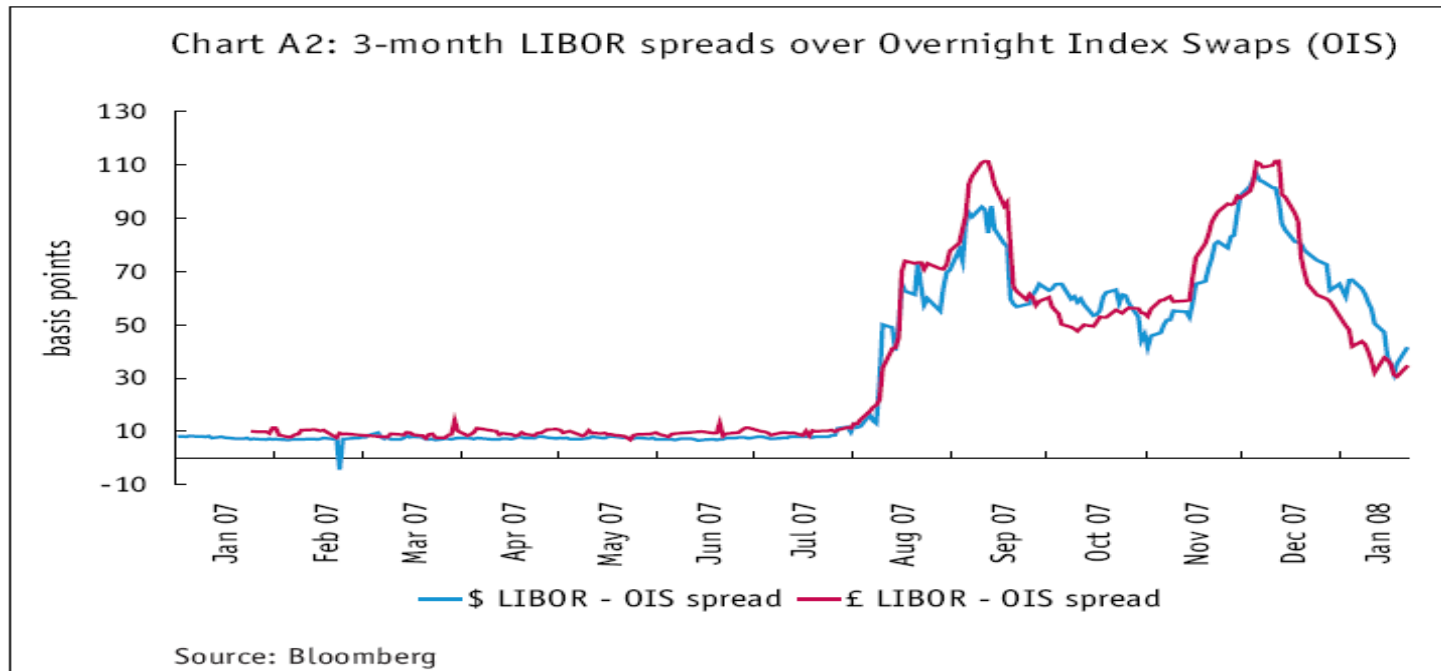


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- The collapse of Northern Rock and the above strains on banks resulted in a loss of confidence in banks themselves, with investors reluctant to lend to banks and banks reluctant to lend to each other.

Stage Two – Banking Liquidity Crisis

- Interbank money markets seized up, causing an unprecedented crisis of liquidity for banks, as can be seen from this graph of 3-month LIBOR vs. overnight rates:

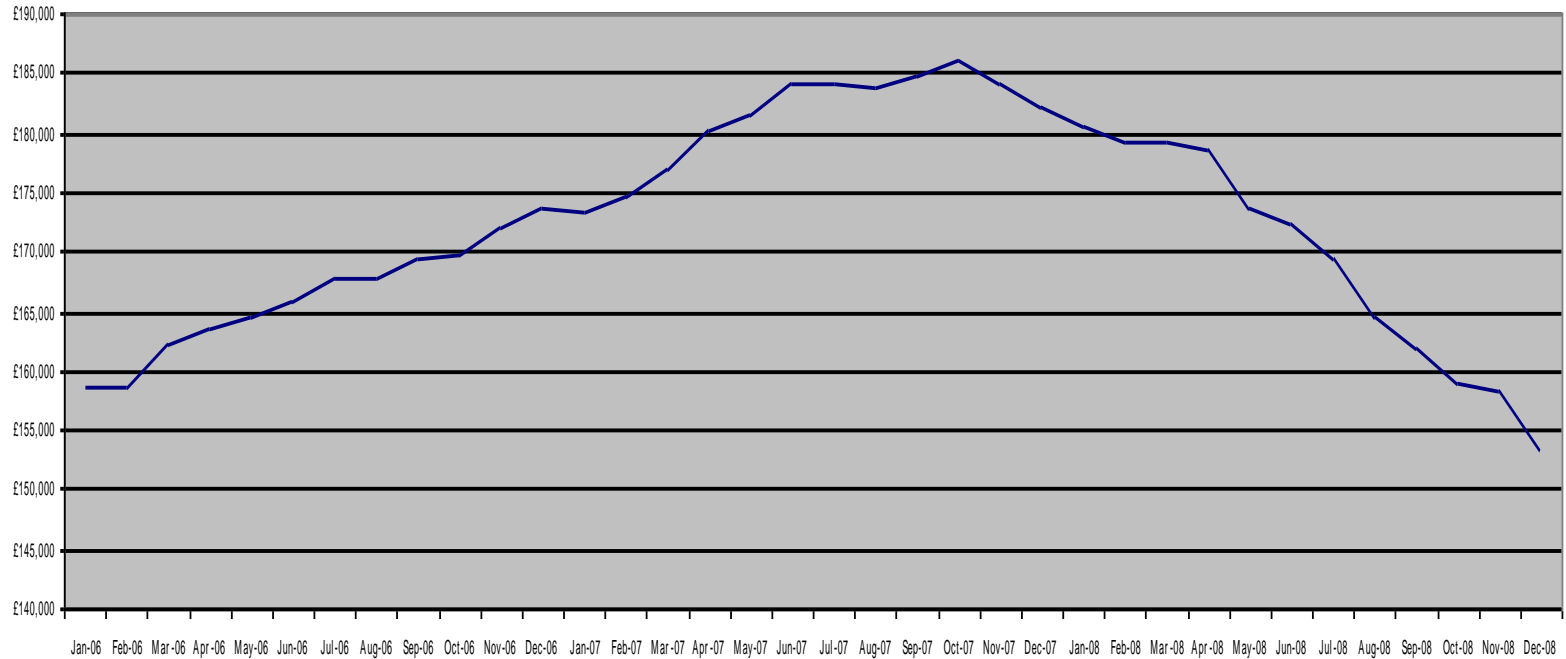


Stage Three – Credit Crunch

- With the help of governments lending liquidity support, a widespread collapse of the banking system was averted, but banks remained weak in terms of liquidity and capital, which had been depleted by mark-to-market losses and increased funding costs.
- As a result they reined in lending, which caused the crisis to spread to the wider economy:
 - Business overdraft facilities were cut forcing them to scale back their business and in some cases go bust, leading to unemployment;
 - The lack of mortgage finance reduced demand for property, reversing the rising market in house prices;

Stage Three – Credit Crunch

Nationwide Average House Price Index January 2006 - December 2008

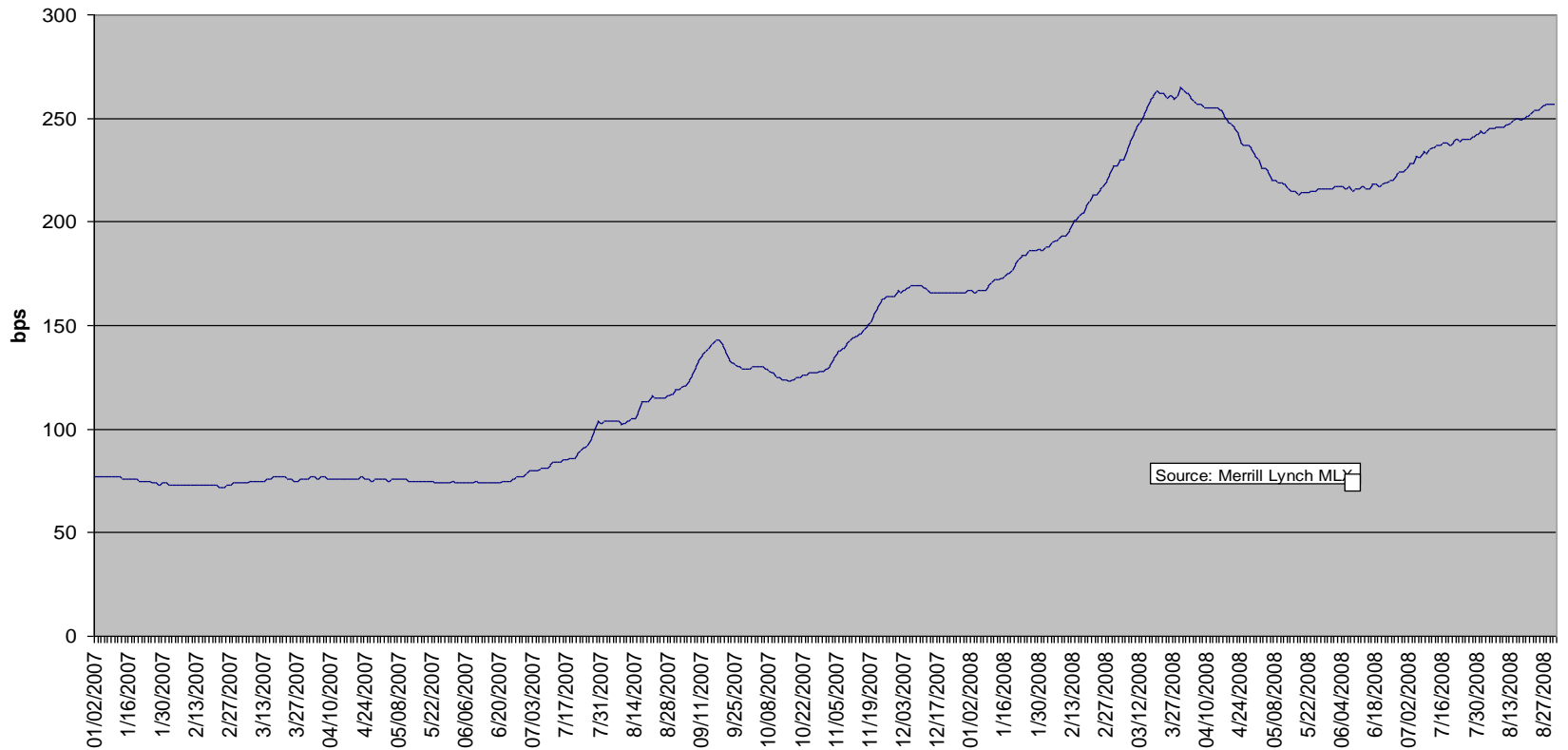


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 - The lack of mortgage finance reduced demand for property, reversing the rising market in house prices; and
 - Rising unemployment, falling house prices and a general lack of credit lead to a collapse of demand in the economy and to recession.
- The fear of bond defaults as a result of the recession drove bond spreads ever higher.

Stage Three – Credit Crunch

UK Investment Grade Corporate Bond spread over Gilts, January 2007 - August 2008



Stage Three – Credit Crunch

- As well as the impact of the recession on bonds and equities, new business and persistency, the credit crunch also exacerbated the smaller scale liquidity crisis life insurers faced with property funds.
- Having experienced significant inflows into open-ended unit-linked property funds up to 2007, by the end of that year a reversal of investor sentiment lead to a surge of surrenders and switches out of these funds causing most to move to a bid basis and some offices to invoke unit deferral provisions.
- Unit deferral provisions to a large extent mitigated the liquidity strains of these surrenders, albeit with some reputational impact.
- However the process of liquidating fund assets was complicated by the credit crunch as it was more difficult for potential buyers to borrow funds to buy property.

Stage Four – Lehmans

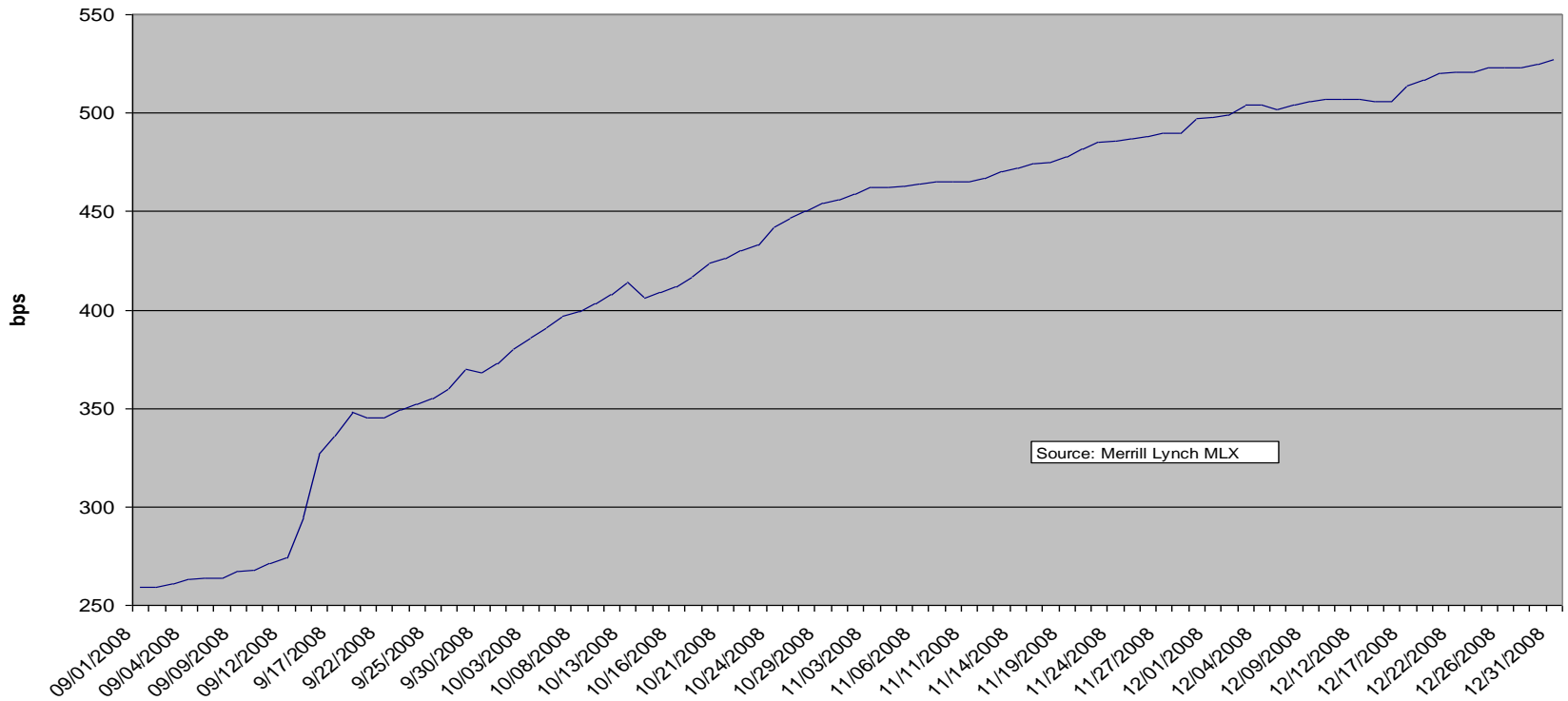
- Throughout 2008, the banking system struggled to cope with a shortage of capital and liquidity.
 - Investment banks were particularly affected:
 - They incurred significant losses on trading books from the collapse of the ABS market and falls in other assets as the recession took hold.
 - This often gave rise to margin calls on derivatives positions, which was exacerbated by downgrades of the banks themselves.
 - Their liquidity position was more precarious than retail banks as they were more reliant on short-term wholesale fund and rolling this over.
 - In February 2008, Bear Sterns had to be rescued by JP Morgan and the US Government due to difficulties it faced in rolling over loans.
 - However to avoid moral hazard, such support was not forthcoming for Lehmans, which was made bankrupt on 15 September 2008 due to a combination of ABS losses and difficulties in rolling over loans.
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Stage Four – Lehmans

- The bankruptcy of Lehmans caused severe market disruption:
 - Bond spreads widening significantly;

Stage Four – Lehmans

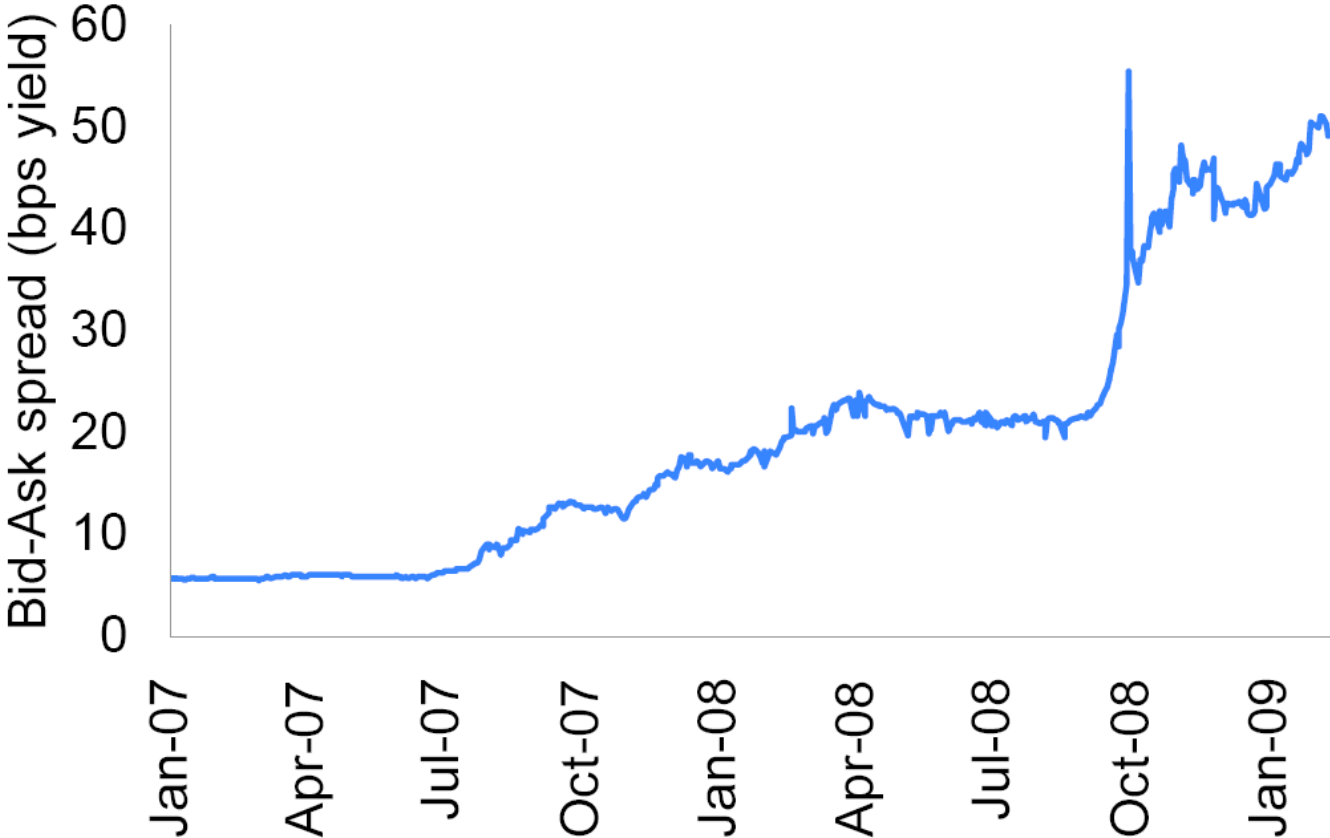
UK Investment Grade Corporate Bond spread over Gilts, September 2008 - December 2008



Stage Four – Lehmans

- The bankruptcy of Lehmans caused severe market disruption:
 - Bond spreads widening significantly;
 - Equity markets crashed, with the FTSE100 falling by ca.15% from 15 September to 31 December 2008;
 - Option prices soared – on 24 October, VIX reached an intraday high of 89.5 as institutions had to replace options written by Lehmans;
- Money market funds “broke the buck” due to losses on Lehman deposits. This caused a run on these funds and a seizure of commercial paper markets. This threatened a general liquidity crisis as companies rely on these markets for short-term funding. This was only averted when the US government intervened to guarantee money market funds for a fee.
- The disruption also caused dealing spreads, which had been rising steadily since mid-2007, to spike upwards markedly.

iBoxx £ corporates bid/offer spread (yield)



Stage Four – Lehmans

- Lehman's role as counterparty to other banks caused many to doubt these banks themselves. This led to another bank liquidity crisis.
- By 6/7th October HBOS and RBS were on the verge of collapse as they could not find funding. To quote Mervyn King:

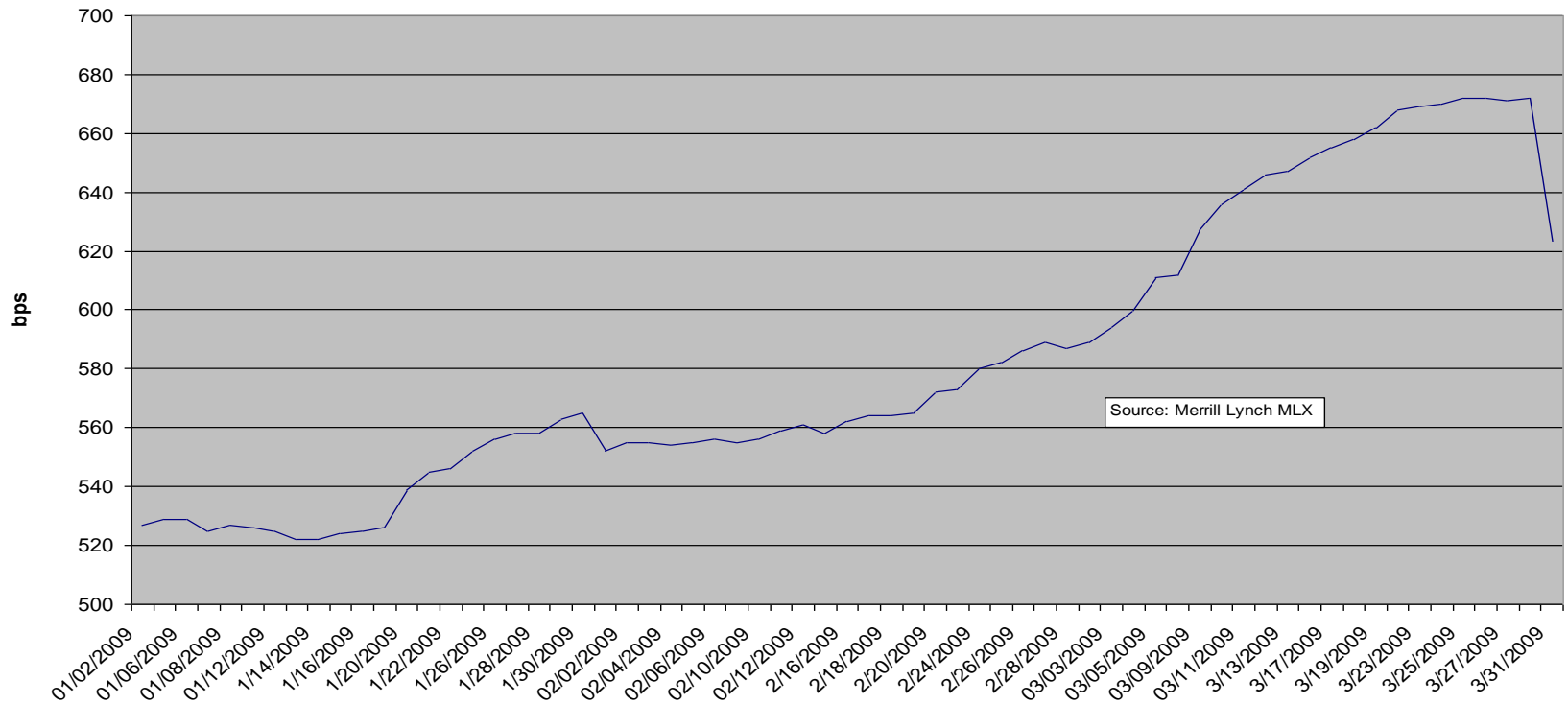
"Two of our major banks which had had difficulty in obtaining funding could raise money only for one week then only for one day, and then on that Monday and Tuesday it was not possible even for those two banks really to be confident they could get to the end of the day,"
- To avert the possible collapse of the banking system, governments intervened to prop up the key banks with the UK government injecting £37bn of capital into RBS and LTSB/HBOS.
- However Icelandic banks systematically failed and this led to losses on deposits with those banks.

Stage Five – Recovery (?)

- Market volatility continued in Q1,2009 with Corporate Bond spreads continuing to rise

Stage Five – Recovery (?)

UK Investment Grade Corporate Bond spread over Gilts,
January 2009 - March 2009

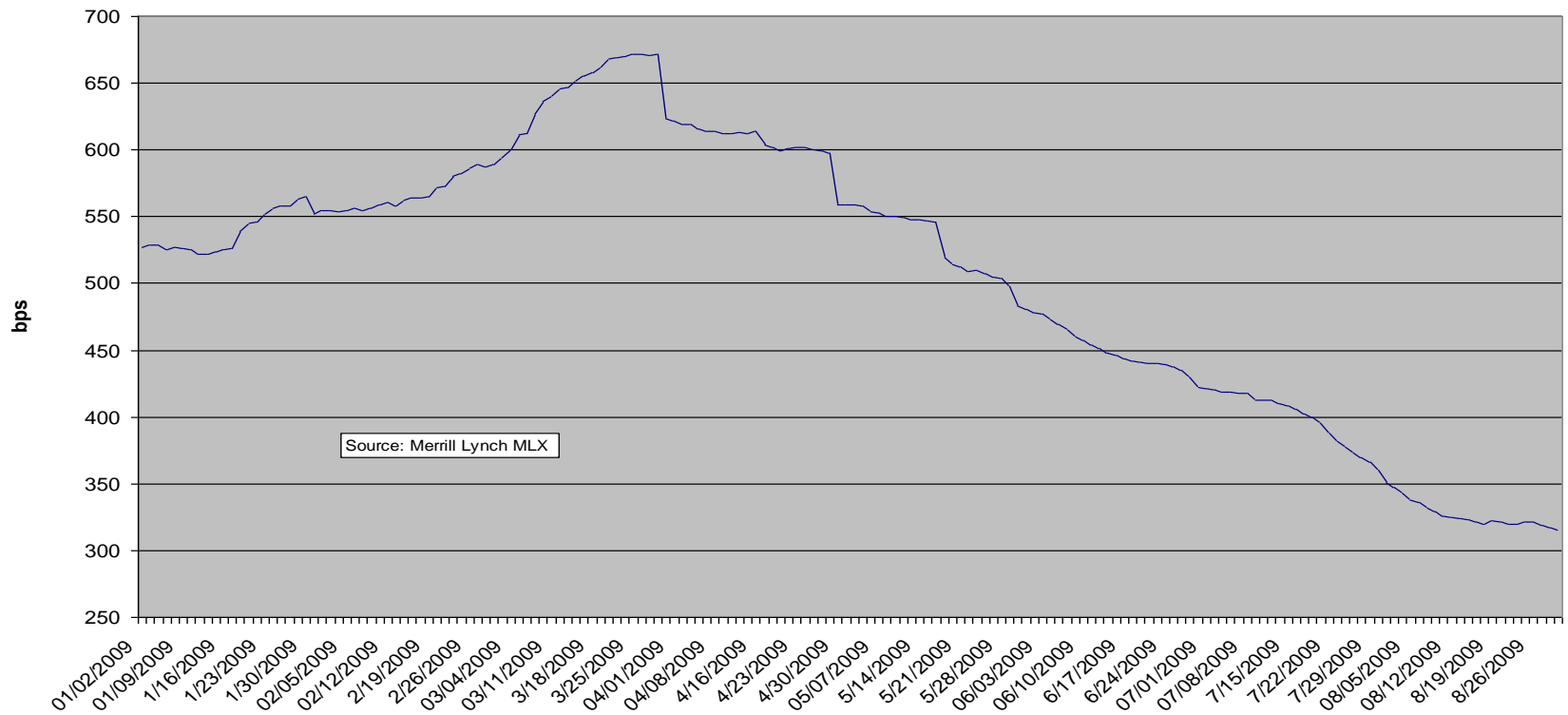


Stage Five – Recovery (?)

- Market volatility continued in Q1,2009 with Corporate Bond spreads continuing to rise, and equity markets falling, with the FTSE100 falling 11.5% over the quarter.
- In part these may have been due to the continued impact of Lehmans as well as economies going into recession.
- However hedge funds withdrawals may have played a part. By some accounts \$150bn+ was withdrawn from hedge funds in December after the Madoff fraud came to light, and continued sales to meet outflows, exacerbated by hedge fund gearing, may have driven down prices.
- Since Q1, there has been a recovery in markets.

Stage Five – Recovery (?)

UK Investment Grade Corporate Bond spread over Gilts, January 2009 - August 2009



Stage Five – Recovery (?)

- However banks remain weak and the risk remains of one or more facing a loss of confidence and resulting funding crisis like RBS and HBOS, triggering further market disruption.
- Meanwhile economies are in recession and this will have an impact on Corporate Bond defaults as well as equities.
- The recovery is in part due to the unprecedented fiscal and monetary stimulus added to limit the impact of the credit crunch, but at some stage interest rates will go up and the large rises in public debt from fiscal stimulus and bank rescues will have to be tacked.
- The global financial crisis may be far from over....

What Liquidity Risk lessons can Life Insurers learn from the Global Financial Crisis ?

Liquidity Risk learning points

- The crisis has acted as a reminder for what the market price of an asset is: the price at which equilibrium is reached between buyers and sellers for a marginal transaction in that asset.
- This market price may have little to do with intrinsic value – “firesale” prices of debt securities (e.g. 50% of nominal for prime RMBSs) had little relation to likely long-term default experience.
- It is also a price for a marginal transaction – the price obtained for significant transactions may be significantly lower:
 - In modelling management actions, do life insurers allow for any discount that may apply on a sizeable sale of say equities ?
 - What systems and controls do life insurers have to monitor marketability of assets and deal sizes ?

Liquidity Risk learning points

- It is also worth noting the widening of dealing spreads during the crisis:
 - Do life insurers allow for any widening of spreads in assessing capital and modelling risk ?
 - Policyholders are exposed to moves between bid and offer unit pricing bases - how well is this risk explained in literature ? This risk could be significant where dealing spreads are large, as seen during the crisis.
 - Recent dealing spreads and the resulting differences between bid and offer bases highlight the need for robust unit pricing processes to minimise the operational risk of pricing on the wrong basis.
- The reduced marketability of formerly liquid assets highlight the need for deferral clauses in all unit funds, not just property.
 - In particular would note problems faced by some emerging markets funds when the countries they invested in imposed exchange controls.

Liquidity Risk learning points

- The crisis highlighted the liquidity strains that can arise from margin calls on liquidity positions.
 - Life insurers should ensure they have sufficient liquidity to meet such calls in stress conditions (including market rises for short positions).
 - Ideally life insurers would avoid clauses generating increased collateral calls on their downgrade, but at least should allow for the liquidity strains such “downgrade triggers” could generate.
- It has also highlighted the risks associated with cash holdings:
 - The near insolvency of HBOS/RBS showed the risk of loss with even short term deposits.
 - Money market funds may “break the buck” or have to impose restrictions on redemptions.

As well as the solvency strains associated with such impairments, there is the added liquidity strains from the reduction in liquid assets which these holdings represent.

Liquidity Risk learning points

- Even where a life insurer is not directly exposed to Liquidity Risk, other institutions exposure to this can have an impact – as seen by the impact of SIV liquidations on ABS spreads.
 - How well do life insurers understand the risk profile of other investors in a particular asset ? and the risk these investors may have to liquidate holdings in a “firesale” ?
 - At a minimum the decision to invest in new asset classes should consider the profile of other investors in this class.
 - Do life insurer’s modelling of risks adequately allow for the impact of such “firesales” ?
- Finally, the crisis has highlighted how crucial Liquidity Risk is for many financial institutions, who should seek a premium for investing in illiquid assets. There is an economic rationale for the illiquidity premium (even if life insurers may not need it).

Further reading

- Liquidity Risk papers of note:
 - CRO Forum paper on Liquidity Risk Management Best Practice - http://www.croforum.org/publications/20081029_resource/File.ecr?fd=true&dn=croforumbbrmpliquidityriskmanagement_oct08
 - Basel Committee on Banking Supervision's "Principles for Sound Liquidity Risk Management and Supervision" paper - <http://www.bis.org/publ/bcbs138.pdf?noframes=1>
 - Liquidity Working Party Paper "How valuable is Liquidity ?" - http://www.actuaries.org.uk/_data/assets/pdf_file/0013/140044/Stanworth_text.pdf
- The Profession has a wealth of material on Liquidity Risk on its ERM CPD Technical Links website – see http://www.actuaries.org.uk/practice_areas/erm/cpd_technical_needs/liquidity_risk_resources