

Lessons from the Credit and Liquidity Crunch

Report from the “Lessons from the Credit and Liquidity Crunch” Working Party

June 2009

Abstract:

This paper discusses the credit and liquidity crunch which began in mid-2007 and highlights some impacts on various sectors of the financial markets. These include banks, insurance firms, asset managers and pension funds. By analysing these impacts, lessons are drawn out for how some of the problems experienced could be avoided in the future. We also consider how individual actuaries can contribute to implementing these lessons in their roles.

Authors:

Shajahan Alam
Craig Gillespie
Chris Harvey
Brandon Horwitz (Chair)
Alison Sandy

Please note that the authors are writing in a personal capacity and that the views expressed may not be those of their respective employers.

Report from the “Lessons from the Credit and Liquidity Crunch” Working Party

Contents

1. Introduction - The framework for our analysis	page 3
2. Impact on Banks and lessons learned	page 8
3. Impact on Insurance Firms and lessons learned	page 16
4. Impact on Asset Managers and lessons learned	page 22
5. Impact on Pension Funds and lessons learned	page 30
6. Common lessons learned	page 37
7. How actuaries can help implement these lessons in their roles	page 40
8. Appendix	page 41
8.1. Timeline of selected events during the credit crunch	
8.2. Bibliography and suggested further reading	

1. Introduction

"A sound banker, alas, is not one who foresees danger and avoids it, but one who, when he is ruined, is ruined in a conventional way along with his fellows, so that no one can really blame him." John Maynard Keynes

In this report we have analysed the impact of the credit crunch from the perspective of banks, insurers, asset managers and pension funds. Our focus has been primarily the UK, although we have also included reference to globally important events. We have attempted to draw out the problems at the root of the crisis and suggest ways in which these could be avoided in the future. We have also suggested ways in which the actuarial profession and individual actuaries can contribute to implementing these lessons.

We have not tried to produce a complete history of events nor have we tried to cover all aspects to the crisis in terms of causes or impact. This is not least because the crisis is far from over and therefore more issues are likely to emerge over time.

The framework for our analysis

We have chosen to draw out lessons from the credit and liquidity crunch by analysing its impact upon major financial institutions. To aid this analysis we have drawn out seven broad factors chosen to reflect the key areas which either caused or exacerbated the crisis. These are also areas where we felt there were lessons to be learned and where actuaries could have some influence.

1. Inappropriate leverage
2. Adequacy of disclosures
3. Due diligence
4. Valuations and the pricing of risk
5. Governance/Business models
6. Liquidity
7. Impact of interventions

In the following chapters we then analyse the impact of the credit and liquidity crunch on the following four sectors using these factors as a common framework:

- Banks
- Insurers
- Asset Managers
- Pension Funds

These sectors were chosen either because they are areas where actuaries have some influence or in the case of banks because of its importance in the crisis.

Throughout each section key "lessons learned" are highlighted in boxes such as this.
--

In the remainder of this chapter we have set out some background on each of the 7 factors.

"Capitalism without financial failure is not capitalism at all, but a kind of socialism for the rich"
James Grant, Grant's Interest Rate Observer

1.1. Inappropriate leverage

Leverage is the use of debt often to improve returns in a business or investment for those investors supplying the lowest tier of risk capital. The lines have blurred over the years between different layers of capital, so that both debt and equity can have different levels of risk implicit within them.

Many businesses use leverage to increase the return achieved for their shareholders. In these cases the idea is to borrow money for capital which will generate a higher return than interest required to service the debt.

Clearly therefore leverage increases risk to the shareholders of the business, as debts must be cleared/serviced before the shareholders can receive their share of the profits. The trick is to appropriately balance the amount of debt and equity used to finance a business.

Leverage can be considered to be 'inappropriate' for a number of other reasons. One is where leverage is employed without an appropriate degree of risk management. Another reason is where the use of leverage is not made adequately clear to investors, especially where this is a key driver of a strategy's returns.

In particular, it would be considered inappropriate not to disclose to investors the risks introduced should the ability to employ leverage become constrained (e.g. should supply of funding drying up) or should the cost of that leverage increase (e.g. higher borrowing costs).

Difficulties arise in two main circumstances:

- When the business is unable to service the debt it has – either because the expected revenues/profits did not arise or due to default by those the money has been lent to. In this case the business will need to refinance its obligations to creditors or default.
- A breakdown of investor confidence. If the market believes that the business may not be able to service its debts at some point in the future and thus it is not able to refinance debts as they fall due.

Typically leverage will increase as a bubble emerges. Investors and business leaders grow more confident as the bubble grows and they see profits grow. Their competitors are making a better return for shareholders through greater gearing, the shareholders demand action and a new round of leapfrog begins. This pattern has emerged on many occasions in the past and is likely to occur again.

1.2. Adequacy of disclosures

Most businesses and investment vehicles are required by law to provide some level of disclosure to their debt and equity holders.

If we are going to make appropriate decisions with regard to leverage and decisions to invest or disinvest, then we need appropriate information on the risks and exposures implicit in this investment. This is particularly true when making loans to an individual or company. A loan by its nature has a skewed risk/return trade off with a limited upside and the potential for a total loss of investment.

Many of the issues in the financial crisis have been around the "breakdown of investor confidence" issue. Uncertainty arose as to who was exposed to various risks, how much exposure individuals had, whether the write downs announced were adequate/appropriate and whether positions had been closed out or left to run.

In the absence of adequate information, and with the skewed risk/return profile, investors' only sensible option was to withhold funds from institutions that were likely to be at risk. Unfortunately most of the market was considered at risk at one stage or another.

On the other side of this coin, however, total disclosure also has its problems. Those institutions with the largest risk do not want to signal this fact to the market as it would both damage their ability to raise funds and importantly their ability to close-out the positions which are causing their difficulty.

1.3. Due diligence

It is obvious to most people that you should thoroughly understand any venture before you invest large sums of money and this is often quoted as a central tenet of investment philosophy. There are of course passive investors who will invest while doing little or no research into the assets which they buy. In this case, however, the passive investors are relying on "the market" and regulators to do their research for them and ensure securities are legally sound and appropriately priced.

There are two main elements to consider here:

- The disclosures provided by banks and other companies around their financial viability
- The disclosures provided around investments such as hedge funds and asset backed securities, to allow investors to adequately understand the risks involved

It is perhaps too easy to say that the lesson to be learned here is that you should not invest in an instrument that you do not fully understand.

It is typically only with the benefit hindsight that we learn the full extent of the risks involved in any given investment. Very few investors would say they own investments for which they do not adequately understand the risks. However we have many examples where this turned out to be the case in the hedge fund world. Amaranth¹ and LTCM² are just two well known examples of investments for which it is likely that investors did not have a full understanding of the risks involved, many of them very experienced professional investors.

"There are known knowns. There are things we know that we know. There are known unknowns. That is to say, there are things that we now know we don't know. But there are also unknown unknowns. There are things we do not know we don't know." Donald Rumsfeld

1.4. Valuations and the pricing of risk

This heading covers a number of different areas. There are issues to consider from the perspective of the banks producing new investments and the investors in deciding whether to invest. Investors should clearly be looking to achieve a higher return from higher risk investments.

Risk is often a very difficult thing to price. Even with the benefit of hindsight it can be impossible to know whether the pricing of certain risks was correct. However, we can conclude that there appeared to be too much reliance on historical data when pricing sub-prime mortgage backed securities.

From a shareholders and debt-holders perspective it is important to know whether the assets held by insurers, banks and pension funds are appropriately valued.

Investment managers and bank traders are normally rewarded to some extent on the basis of the returns that they achieve. It is, therefore, important to appropriately value the assets they are holding on their books and understand the level of risk implicit in the returns they have achieved.

¹ **Amaranth Advisors LLC** was a multi-strategy hedge fund managing \$9 billion in assets. In September 2006, it collapsed after losing roughly US\$6 billion in a single week on natural gas futures. It was clear many investors failed to understand the level and concentration of risk which the Amaranth had employed.

² **Long-Term Capital Management (LTCM)** was a U.S. hedge fund which used trading strategies such as fixed income arbitrage, statistical arbitrage, and pairs trading, combined with high leverage. It failed spectacularly in the late 1990s, leading to a massive bailout by major banks and investment houses, which was supervised by the Federal Reserve.

1.5. Governance/Business models

One of the major issues highlighted in the credit crisis has been the lack of controls and the incentives to make short-term gains, which many people believe led to many of the problems in the credit crisis. Gordon Brown, for example, has been quoted as saying the Government wanted to 'reward hard work' not 'excessive risk-taking'.

Clearly many of the credit control functions at various institutions have failed to properly understand and limit the level of risk being taken. This has led to fraud and increased losses.

From the investors perspective questions need to be asked over what new controls need to be put in place to avoid repeating the mistakes made around lack of understanding of investments. What can they do to better understand the risks implicit in new investments? How can they better understand the changes to the legal environment in the US and other countries which generates these new investments? Can they more thoroughly investigate the valuations underlying the collateral backing these investments?

1.6. Liquidity

Liquidity issues played out in two main ways over the credit crisis: challenges faced by banks and other institutions in sourcing liquidity (i.e. funding) and challenges faced by investors in terms of liquidity of various capital markets (i.e. trading conditions).

The two issues are clearly related as the funding problems suffered by many institutions arose not just because of actual or perceived credit/other losses being suffered but also because of their inability to raise funds and roll over credit agreements. In other words, institutions facing short term liquidity needs (e.g. short term borrowing requirements or collateral calls) could not meet these from some of their existing assets given the poor liquidity of capital markets.

The illiquidity in capital markets began in asset-backed securities (ABS) related to US retail sub-prime mortgages, but quickly moved to other ABS. As the credit crunch evolved assets such as Commercial Mortgage Backed Securities (CMBS) and CDOs became increasingly illiquid due to uncertainty regarding their underlying assets.

In parallel, banks in their role as broker/dealers faced growing losses and write-downs which resulted in reductions in their capital and increasing risk aversion. One major consequence of this was banks ceasing or drastically reducing their market making role in various asset classes, especially corporate bonds, where they had previously been willing to trade as principal. For much of the credit crunch the corporate bond market has been extremely illiquid with trading taking place on an agency/'matched-trade' basis.

1.7. Impact of interventions

Government interventions occurred both before and during the credit crisis. It could be argued that previous government interventions were partly to blame for causing the crisis - cheap money policies and legislation which encouraged sub-prime lending fuelled the housing boom. Low interest rates and easy availability of credit encouraged more new homeowners as mortgages appeared cheap relative to the alternative of renting. The low interest rates and government bond yields led investors to search for higher yields, making the Collateralised Mortgage Obligations (CMOs) appear more attractive than would otherwise have been the case.

Interventions from the various governments and central banks evolved during the crisis. Early on the interventions were mostly aimed at ensuring consumers were not harmed – eg increased guarantees on retail deposits. These measures evolved into rescuing banks and then moved to rescuing companies in many other sectors – car makers and financial

providers. This is clearly with the intention of protecting jobs rather than simply ensuring retail customers could trade in confidence with banks (thus preventing “runs”).

The cost of these various interventions has spiralled and, as a result, it is likely that US and other tax payers will be paying higher taxes for many years. Reduced corporate and individual incomes, together with increased unemployment and other benefits are driving government budgets into the red. We are now seeing vastly increased government debt levels.

The cost of not intervening was, however, deemed to be too high. There seemed to be few banks that could weather this financial storm. Without a properly functioning financial system it would be very difficult to have a properly functioning capitalist economy.

“We were very, very close to a system that was totally dysfunctional, and would have not only gummed up the financial markets but gummed up the economy in a way that would take us years and years to repair. It’s not like Pearl Harbour where you could look at what happened with your own eyes and decide you had to do something that day. This is sort of an economic Pearl Harbour we’re going through.”

Warren Buffett

“Now that the crisis has been unleashed a large-scale rescue package is probably indispensable to bring it under control. Rebuilding the depleted balance sheets of the banking system is the right way to go. Not every bank deserves to be saved, but the experts at the Federal Reserve, with proper supervision, can be counted on to make the right judgments”

George Soros

2. Impact on Banks and lessons learned

The banks are at the epicentre of the current financial crisis. It was in the banking sector that the crisis started and the banks who have been the worst affected. It is certainly possible that we would have seen a large proportion of our major banks fail, if not for the intervention of governments. A number of mistakes were made in the build-up to the crisis, all while in search of higher profits.

The key errors of judgement were:

- Failure to adequately control the risks being taken both in absolute terms and through diversification (there was too much concentration on mortgage risk)
- An over-confidence in the continued rise of the housing market
- Too great a reliance on historical data³ and mathematical models
- Inadequate controls on mortgage brokers/salesmen, which ultimately allowed fraud to take place
- Insufficient capital reserves for the level of gearing utilised
- Failure to properly understand the risks posed by the products entered into
- Rewarding staff throughout the business in a manner which encouraged short-term concentrated risk taking

This all happened after a long process of banking deregulation, which started in the late 70's. Governments were happy with the enhanced economic growth that banking deregulation provided and so were disinclined to intervene when the above excesses began to emerge. Banks therefore gradually eroded their capital base in a bid to increase profits and grow into international financial institutions. This was particularly true in the now empty US investment bank sector.

The investment banks (also known as broker dealers) included some very well known institutions such as Goldman Sachs and Morgan Stanley. They enjoyed light regulation and oversight but in return did not have the same level of federal protection that was afforded to deposit taking institutions. Ultimately they were forced to abandon this status in order to receive government protection. Although Lehman was allowed to go into bankruptcy, the US government discovered that these banks were so firmly entwined within the overall banking system (both inside the US and globally) that they could not afford to allow them all to fail.

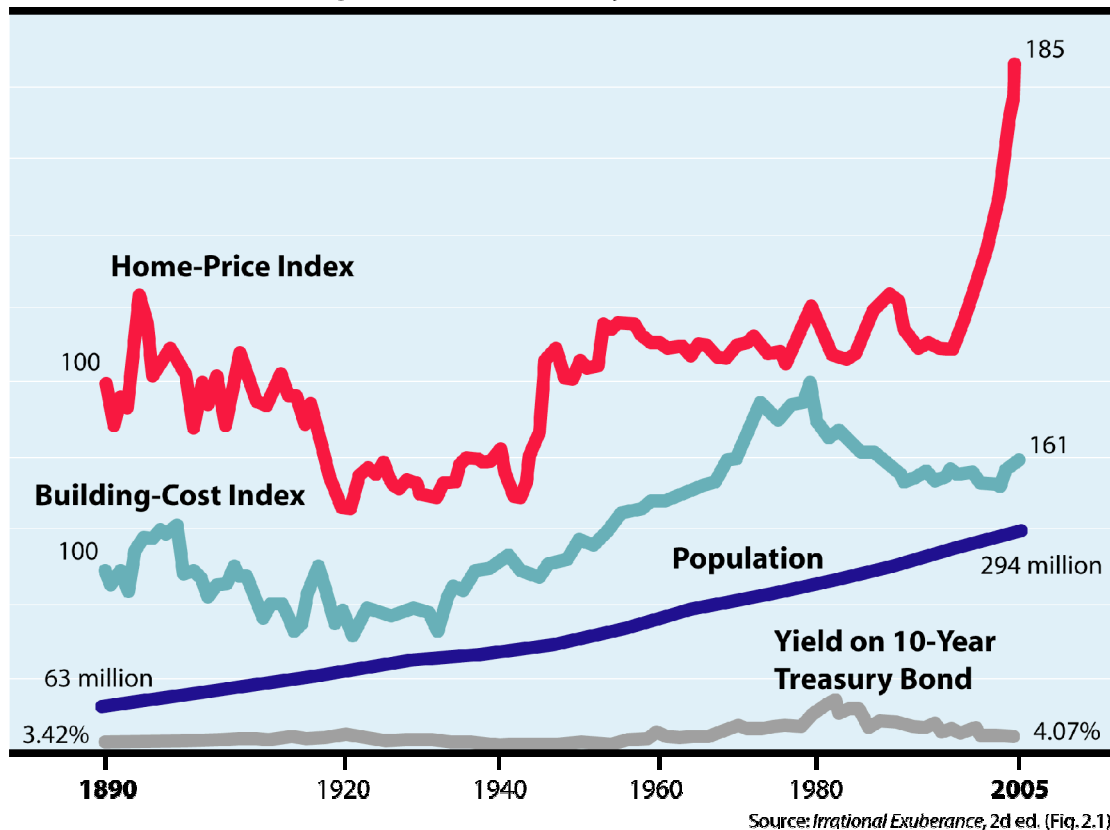
The US Housing bubble – illustrated below – in the early part of this century was the catalyst for the credit crunch.

“At this juncture, the impact on the broader economy and financial markets of the problems in the subprime market seems likely to be contained”

Fed chairman, Ben Bernanke, Congressional testimony, March, 2007

³ For example sub-prime mortgage defaults turned out to be far higher than would have been expected through analysis of historical data. This was due to the way in which these loans were being made (i.e. to people with much worse credit scores than before and with no evidence of ability to pay) and the fact that house prices were at an all time high.

Inflation-adjusted U.S. home prices, Population, Building costs, and Bond yields (1890–2005)



Encouraged by ever increasing house prices, banks went in search of ever more mortgage business; this led to an increase in sub-prime lending. Sub-prime lending involves lending to individuals who have a history of loan delinquency or default, those with a recorded bankruptcy, or those with limited debt experience.

CMOs (collateralised mortgage obligations) backed by sub-prime debt were issued by lenders to increase their ability to lend. This resulted in the spreading of sub-prime debt across the financial system – particularly among investment banks and hedge funds.

2.1. Inappropriate leverage

Banks are institutions built around leverage. The basic business model of a bank is to borrow money from one group of individuals/organisations and lend that money to another group at a higher rate of interest.

For banks the degree of leverage that is allowed is set out in legislation/regulations for their domestic market. Additional guarantees for retail customers are put in place to reduce the issue of investor confidence causing a catastrophic run. These were clearly inadequately communicated and understood in the case of Northern Rock.

Banks are in a competitive market and one of the easiest ways to be more profitable is to increase leverage. Higher profits typically lead to higher share prices. Executives are typically rewarded with shares and share options, therefore higher share price means higher reward for those at the senior roles in the bank. Therefore the executives are incentivised to make maximum use of leverage.

Within the banks the individual traders receive high bonuses only when both they and the bank make large profits. This encourages concentration of bets by traders – you are more likely to receive a large bonus if you make the same bets as everyone else in the bank.

When markets are rising and profits are high traders/executives tend to become overconfident and increase bets further. These are also environments when the risk of fraud increases – as successful traders are given greater leeway to trade outside their limits and bend/break security protocols in order to keep them “happy” and thus making money.

While bubbles are developing shareholders see their share of the profits (e.g. through rising share prices/high dividends). The main cause of shareholder dissatisfaction at this stage is often that their business is not as profitable as peer businesses. In these circumstances shareholders might well be encouraging more risk taking rather than greater control and limitation of risk.

The answers to all these problems would seem to lie in greater regulatory oversight of the risks being taken by the banks and tighter control of leverage they operate. We would suggest that this should be accompanied by a greater degree of shareholder control and responsibility.

2.2. Adequacy of disclosures

If a bank discloses its market exposures on a regular basis it is at risk of other market investors trading against it. For example, if a bank has a short position in an illiquid market it may be possible for another group of investors to buy the security and force-up the price. If the price is driven sufficiently high then the bank may be forced to close out its position at a loss.

In theory retail savers in banks should require adequate disclosure to understand their savings accounts and whether they are being sufficiently rewarded for any risks being taken. In practice, however, most savers will have neither the time nor the tools to analyse the data and make this judgement.

Inadequate disclosure can often, however, lead to fraud and the US housing bull market encouraged exactly this. Mortgages were provided to individuals where it was known that there was no prospect of redemption – as described in the following excerpt from Bloomberg on the New Century Financial bankruptcy:

The company, once the second-biggest U.S. subprime-mortgage lender, engaged in accounting fraud in 2005 and 2006 before filing for bankruptcy in April 2007, according to the 581-page report by court examiner Michael J. Missal unsealed today.

New Century “engaged in a number of significant improper and imprudent practices related to its loan originations, operations, accounting and financial reporting processes,” Missal wrote in the report.

“This is really the embryo of the credit crisis,” Missal said today in a phone interview. “The theme of the report is how easily the loans were originated, how exceptions were made, how they used bad appraisals.”

The answer to the short-selling issues would appear to be that some disclosures should be confidential and made to a central regulator.

The regulator needs to address disclosure needs of retail investors and there should be an adequate compensation scheme to ensure all retail savers are protected.

Clearly there must still be timely public disclosure of financial information in order that shareholders and potential shareholders of banks can make appropriate buy/sell/hold decisions.

The other element of disclosure relates to products being sold by banks to the wholesale market. Some element of the blame for investors' lack of understanding of these products must lie with the disclosures provided by the banks. Many of the banks retained the riskiest parts of these products and made substantial losses, therefore, it is likely that they were unaware of the risks themselves rather than deliberately failing to disclose information.

Going forward, investors need to be more demanding when it comes to information on new and complex financial instruments. Bankers should be more forthcoming with such information. The internal control functions in the banks should also require greater disclosure for their retained investments and protecting those to whom they are selling.

2.3. Due diligence

It is obvious to most people that you should thoroughly understand any venture before you invest large sums of money. The pitch for senior tranches of CMOs was, however, quite compelling:

- The collateral backing them was mortgages (everyone understands what these are);
- They were investments which produced a cash return (i.e. not very volatile);
- They were (usually) tranchised, with another investor (often the issuing bank) holding the first loss tranche,
- They were AAA rated (so you had the comfort that the rating agency had done a lot of due diligence);
- They were also backed by insurance (for an extra layer of protection);
- In spite of this low risk nature the CMOs were still offering returns of LIBOR + 50-100bps.

It is not surprising that this pitch convinced a lot of investors and that they did not have to dig too deeply and, therefore never discovered:

- The mortgages were based on inflated house prices and borrowers with very poor credit scores. In fact, the borrowers credit scores were significantly worse than had been the case historically and they were being allowed to borrow in excess of 100% of the house price.
- Returns were dependant on a continuation of low interest rates and a booming housing market
- The AAA rating was based on a formulaic approach and had little regard to the underlying quality of the individual mortgages. The formula was based on historical default rates based on a period of time when banks were more conservative.
- The insurers were mono-line and therefore unable to cope in the event of a substantial number of defaults.

It was not just external investors who failed to spot the issues mentioned above. Much of the write-downs suffered by banks (at least in the early stages of the crisis) was due to the retained investments.

The high level lesson to be learned here would appear to be that you should not invest in an instrument that you do not fully understand. It is, however, likely that there are very few investors who would have believed that they did not fully understand the CMOs at the time of investment.

Therefore perhaps more specific lessons should be:

- Avoid over reliance on credit ratings and dig deeper to understand what underlies those ratings.
- Consider the applicability of historic data in setting assumptions
- Consider the impact of systematic risk (eg to mono-line insurers)

2.4. Valuations and the pricing of risk

Much of the issue of confidence with Banks came from concerns over whether valuations of assets (in particular CMOs) were appropriate and whether risk was being adequately priced. The complexity of the instruments and the degree of cross-selling compounded this problem. This led to significant write-downs in bank shares and debt. In many cases AA and A rated bank debt was trading at the same level as BBB rated companies in other industries.

The issues clearly started with inadequate understanding/modelling of the risks involved in sub-prime mortgages, but quickly spread across the spectrum of asset-backed securities and into vanilla fixed income. Ultimately the market values of many fixed income instruments seemed to move to a significant discount to what many believed was their fundamental value.

This arose through a vicious circle of banks de-leveraging to cut loss making positions and using less of their balance sheet to make a market in fixed income in general (and ABS in particular). Thus the secondary market in fixed income across the board became much less liquid, making valuation of these assets much more difficult.

The greater use of scenario analysis and more stress testing of the model parameters (including correlations with other risks being carried) may well have prevented some of the problems we now face.

Given the lack of some very important information with regard to exposure to various instruments, it is hard to argue that investors did not act perfectly logically in selling bank shares and debt.

2.5. Governance/Business models

One of the major issues highlighted in the credit crisis has been the lack of controls within banks and the incentives to make short-term gains, which many people believe led to many of the problems in the credit crisis. The largest bonuses could only be achieved if both the individual trader and the bank made large profits. Therefore traders were incentivised to take the same directional bet as all the other traders in the bank, whether or not they thought that would lead to the greatest profit. This led to a lack of diversification in risk taking.

At Prime Ministers questions responding to the Bank bail out David Cameron said "The banks that are most reliant on this scheme are the banks that have taken the greatest risks and in some cases behaved irresponsibly".

Greater incentives are therefore needed to encourage longer term business models and more responsible behaviour. Shareholder action as well as government intervention is important if such a model is to succeed.

Some solutions to this issue would be:

- to pay bonuses in restricted shares and options
- to pay bonuses over longer periods of time
- to reduce the size of bonuses relative to salary
- to have a regulator cap on the absolute size of bonuses

Shareholders need to consider the level of risk the companies they own are taking when they achieve greater returns than their competitors.

All of these solutions have potential problems such as:

- driving talent overseas
- reducing flexibility of business
- disincentivising sales people once they have reached their maximum bonus for the year

The other major governance issue is the decision making process around whether to participate in new transactions. The process must balance speed against thoroughness. Greater speed will mean the bank can be amongst the first to trade and likely achieve the highest margins. Greater thoroughness will mean some opportunities to make higher profit transactions are missed but should result in fewer catastrophic losses.

Clearly many banks in the recent crisis have erred too much on the side of speed in participating in sub-prime mortgage business and failed to spot some of the potential issues described above.

2.6. Liquidity

The credit crisis in its latter stages became a liquidity crisis. The problems suffered by many of the institutions arose not because of the credit losses they were suffering but because they were unable to raise funds and roll over credit agreements.

Banks were unable to be certain which of their competitors had significant open positions which could potentially push them into insolvency. In addition, one bank falling into bankruptcy could potential push several others over the edge, due to the extent of cross-selling of contracts.

This meant that banks were more cautious when dealing with other banks. They were demanding only the most secure assets be passed as collateral, thus forcing each other to sell illiquid assets, which would at other times be simply passed as collateral. The alternative source of funding came from central banks who also demanded the highest quality collateral, at least initially.

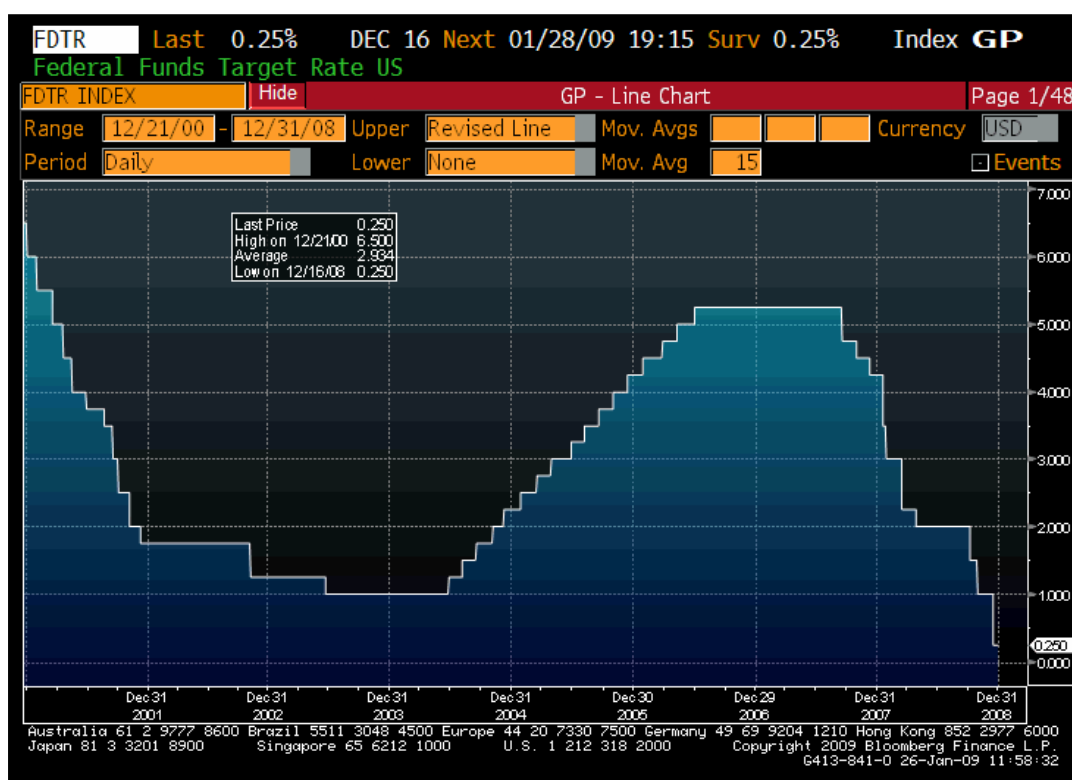
Northern Rock was amongst the first to suffer collapse due to its over-reliance on wholesale funding. Its business model was to aggressively increase its mortgage book and rely on the wholesale market to make up the difference between this and its retail deposit base. Clearly they had not thought through the consequences of a virtual closure of this source of funding. Those banks with a more diversified sourced of funding fared much better through the crisis.

The main solution to the problem has come through central banks accepting lower quality/illiquid collateral. A longer term solution would involve shareholders and/or regulators preventing banks from taking concentrated risks in sources of funding in the future.

2.7. Impact of interventions

Interventions, in respect of banks, from the various governments and central banks evolved during the crisis.

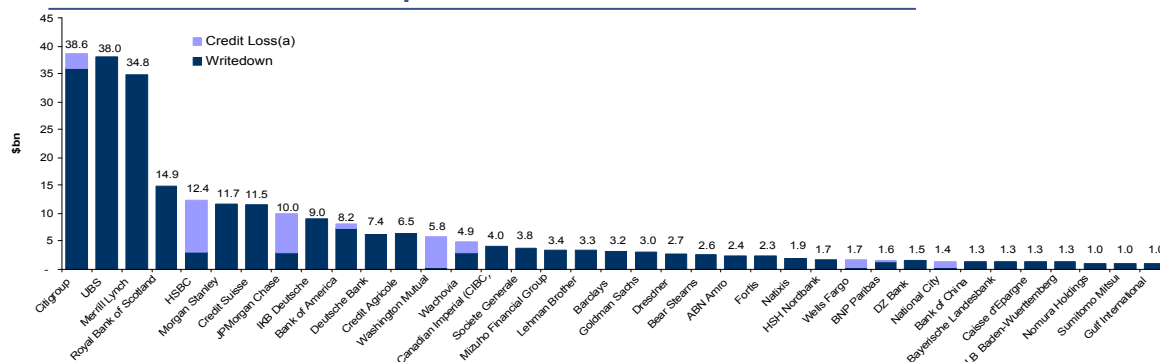
The chart below illustrates the changes in the Fed Funds rate since 2000. The Fed rates initially fell reaching a low point of 1% in 2003, which led the mortgage and housing boom. In 2004, however, the Fed rate began to rise. This began to affect the ability of sub-prime borrowers to make their mortgages payments, particular those whose initial discounted deals also came to an end.



This led to a spiral of foreclosures, falling house prices and more foreclosures. CMOs backed by sub-prime mortgages began to see defaults – particularly the riskier tranches bought by hedge funds and retained by many of the investment banks.

In the following months, banks around the world announced huge right-downs from credit and other related sub-prime losses:

Bank Write Downs – 01 April 2008



As the crisis emerged, early interventions were in the form of extending central bank loan facilities. These proved inadequate due to the message that accepting this support sent out to the market. Northern Rock was brought down by consumer panic following the revelation that it had requested support from the Bank of England.

The next step was to arrange mergers and acquisitions to protect smaller market participants. Bear Sterns was successfully saved through acquisition by J P Morgan. This too, however, was not always possible and the acquisition of Northern Rock by Lloyds Bank fell through when the government felt unable to provide the guarantees required by the acquiring bank.

The next logical step was therefore for the government to take the institution into public ownership. This was required in order to save Northern Rock and AIG. This was not, however, an appropriate long-term solution, as it created inequities and potentially therefore meant consumers got a worse deal on their savings and mortgages.

Government interventions will always produce some adverse consequence and tend to damage competition. Saving failing companies effectively amounts to government protection against the consequences of risk taking. Effectively this encourages greater risk taking and reduced due diligence by those who believe they will be bailed out. Therefore these interventions should be used as a last resort and it is inevitable that some institutions must be allowed to fail. In this case governments were attempting to save the banking system and it was feared that a domino effect could cause widespread bank defaults.

3. Impact on Insurance firms and lessons learned

Introduction

General Insurers tend to invest in short-term simple investment products such as cash and gilts or high rated bonds. The impact of the liquidity and credit crunch has therefore not been felt in the General Insurance sector to (any where near) the degree felt in the Life sector. Some insurers have invested in equities and their solvency positions have significantly deteriorated but this is very much the exception rather than the rule.

As for the impact on the liabilities side, any financial insurance, (e.g. PI, D&O, creditor, Mortgage Indemnity Guarantee (MIG)) is highly likely to take a hit. There tends to be a time lag of around two years before these classes start to suffer, but when they do, the effect can be large with loss ratios three, four (or more) times the average historic loss ratios. Other lines of business such as motor and home insurance are also likely to take a slight hit due to an increase in fraudulent claims and an increased propensity to claim bought about by the recession. However this is a developing issue, rather than the more immediate impacts felt in other sectors.

Of course, there has been much publicity around the financial guarantee insurers (also known as 'monoline' or bond insurers). These firms provide a credit wrap to sub-prime securities including borrowing to provide extra security, essentially making non-marketable illiquid assets up to investment grade quality in return for a premium. These firms have sustained significant losses. However, most insurers have not dabbled in this type of business.

Given the lesser impacts on General Insurers, we therefore focus on Life Insurers in this section, who have very significant exposures to credit risk. The greatest source of this exposure is through investments held in fixed interest securities that have been made to provide cash inflows to match the cash outflows anticipated under policies issued. There are smaller exposures through variable interest securities. Other exposures arise through other business and risk management activities, including their banking and cash deposit arrangements, reinsurance, derivatives exposures and stock lending.

At 31/12/2007 the UK life Insurers had investment exposures where the credit risk fell to the insurer (i.e. excluding assets held in linked funds) as follows:

Type of Investment	£bn
Approved fixed interest securities	117
Other fixed interest securities	132
Variable interest securities	22

Generally UK Life Insurers do not have significant liquidity risks; the nature of their business is such that all contractual premiums are received before a claim arises, and the amount and timing of the claims can be predicted reasonably accurately, or for claims triggered at the option of policyholders the amount of the claim is usually closely related to the amount that can be realised by selling the underlying assets held.

There are some lines of business where liquidity is an issue, but for most firms these are sufficiently minor that any liquidity required can normally be readily provided from other parts of their business. However when asset markets become illiquid life insurers might experience difficulty in setting a fair value on assets as required for financial reporting, and in determining claims amounts, in particular for unit linked and with-profits policies.

As the credit and liquidity crunch has developed it has inevitably had an impact on other assets and markets. Equity markets around the world have fallen sharply. The uncertainty in asset values has precipitated a flight to quality, and the yield on "risk-free" government bonds has fallen sharply. These conditions are particularly challenging for life insurers. Their liabilities are unlikely to have fallen in line with the values of the backing assets. They will have to recognise losses in respect of the fall in the market value of their bond portfolios.

There will be no offset except to the extent that they feel able to take credit for a higher liquidity premium in setting the discount rate for valuing their liabilities.

Whilst the fall in equity values will be absorbed to an extent by lower payouts for with-profits policies, the costs of guarantees on these policies will have increased substantially and in most cases this cost has to be met by the capital of the firm. The guarantees provided on non-profit and with-profits policies (but not unit-linked policies) provide, implicitly or explicitly, a guaranteed minimum level of return on the future premiums and the reserves held. With falling interest rates it might prove increasingly difficult to secure a return sufficient for the guarantees given on amounts to be invested in future. Life insurers will probably experience an increase in the value of their policy liabilities resulting from this fall in interest rates that exceeds the increase in value of the underlying fixed interest assets, even if the duration of these assets is well matched to the duration of their policy liabilities.

3.1. Inappropriate leverage

As a generality this has not been observed as an issue for UK life insurers. There is no evidence of explicit gearing (i.e. purchasing credit risk exposures with borrowed money) nor selling protection via CDS which are not “covered” (i.e. not holding cash or other suitable liquid assets sufficient to cover the payment required to be made to the counterparty in the event that the reference entity is declared to be in default). Whilst investments are held in CDOs and ABSs and similar instruments these are generally in the senior tranches where the gearing is less than 1. Gearing is discouraged by the FSA valuation rules that require assets that are derivatives or quasi-derivatives to be “covered” if they are to be treated as admissible assets so that they can be given a value in the annual return.

An area where some firms have been found to be inappropriately geared is in their handling of cash posted by counterparties as collateral to mitigate counterparty exposures on certain transactions – for example stock lending. The terms of their contracts would normally require this collateral to be returned with interest when the transaction is closed out, so life insurers must look to secure at least the contractual return on the cash collateral to make the transaction profitable. Some firms have anticipated a minimum level of cash collateral from such transactions, and that a proportion of this should be invested in securities with a much longer time horizon than the collateralised transactions, to enhance profits. Following the credit and liquidity crunch they have seen both spreads widening on the securities purchased with the cash collateral and some disruption to the collateralised transactions caused by the ensuing market turmoil. This has caused them to recognise losses on these activities, and added to liquidity pressures.

Insurers have seen their assets in “Other” fixed and variable interest securities suffer significant mark to market losses and seen these markets become very much less liquid. These losses have not been offset by equivalent falls in policy liabilities, except to the extent that firms feel able to use a higher discount rate for valuing policy liabilities, and hence will have caused the capital available to be depleted. In some circumstances it might be possible to claim a higher liquidity premium for lower rated than for higher rated bonds if traditional methods for determining liquidity premium are used. In such cases firms might be able to improve their capital positions by switching from higher rated to lower rated bonds, but with the attendant risks through the greater exposure to credit. Any firm which took this course in the early part of 2008 will probably now be regretting it.

Life insurers holding collateral against counterparty exposures should consider the risks this exposes them to – such as mis-matching and what happens upon default of the counterparty, and should take action to mitigate these risks.

3.2. Adequacy of disclosures

Life insurers would normally be buy side and generally claim to understand the risks in their asset portfolios and not to take on new investments unless and until they understand the risks. There seem to be only isolated cases of life insurers complaining that they were misled or

given insufficient information regarding investments made in bonds, structured credit products or similar investments.

No clear lessons here, but life insurers should continue to be vigilant when considering new investment opportunities – whether in new classes or with new providers.

3.3. Due diligence

There is a mixed picture. Large firms generally have good processes for analysing credit risks and hence a good understanding of those risks they take on. Some smaller firms might outsource fund management to a third party and exercise oversight of the fund manager's compliance with the investment mandate in force. In these cases it is not always clear that the firm has a clear understanding of the credit risks it has taken on, nor that the investment mandate clearly defines to the fund manager the firm's appetite for credit risk. However, most life insurers admit to having underestimated the severity of the credit and liquidity crunch and its impacts on other markets.

Life insurers should not place over-reliance on credit ratings. This is particularly the case when considering less transparent investments, such as ABS or hedge funds, where firms should perform their own due diligence looking through to the underlying assets.

3.4. Valuations and the pricing of risk

Life insurers are buy-to-hold investors. This statement should be interpreted in the sense that because their policy liabilities are (generally) illiquid life insurers are unlikely to be forced sellers of dated securities; they can and do trade such securities with a view to improving the return on their portfolios. Assets are required to be mark-to-market (or mark-to-model if the asset is not quoted – in practice assets held are normally quoted and mark-to-model is rarely used).

Life insurers have limited exposure to structured credit products such as ABS and CDOs. A survey carried out in early 2008 to obtain information on the industry exposure to these instruments as at 31/12/2007 estimated the total exposures to these instruments to have an aggregate market value of £33bn compared to their total exposure to fixed interest assets of £249bn. (These figures exclude holdings in unit linked funds.)

There is some scope for life insurers to write down the value of their liabilities to reflect falls in the market values of fixed interest assets (using a liquidity premium described below). However where markets are illiquid with very wide bid/offer spreads and/or no meaningful prices available, life insurers experience difficulties in setting prices for their unit-linked funds and sometimes in determining appropriate payout values (or final bonus rates) for with-profits policies.

There are also valuation risks relating to liquidity premiums. Firms value their policy liabilities by discounting the net cash outflows expected. The discount rate used for this purpose must not exceed the (prospective) yield on backing assets adjusted for the risk that the expected income might not be received. For bonds and similar fixed interest assets the risk adjustment deducted from the prospective yield has traditionally been an allowance for credit default risk calculated in a conservative manner. The balance of the credit spread is termed liquidity premium, and firms are able to discount policy liabilities, where backed by bonds at a discount rate that exceeds the risk-free rate by this amount.

Whilst the allowance for defaults has been estimated conservatively on an historical basis there is no certainty that the allowance will be sufficient prospectively, nor that the spread does not cover other risks for which an adjustment should be made. Moreover, if spreads widen it would usually be expected that at least some part of the spread widening would be due to an increased risk of default. There would normally be a valuation strain in the event of

spread widening because the market value of the assets would reduce by more than the value of the policy liabilities.

This valuation process has various implications. Firms might be able to use a higher discount rate for valuing policy liabilities where the underlying assets are bonds by switching from high quality to lower quality (i.e. from AAA rated bonds to BBB rated bonds). This is because the liquidity premium calculated on such a switch will normally increase but the (market) value of the assets will be unaltered (except to the extent of any dealing costs incurred). Conversely a firm wishing to protect its asset values (e.g. by switching from bonds to gilts, or buying CDS protection) if it feared a credit bubble was developing might suffer a valuation strain. We question whether the valuation rules should be amended to promote, or at least not discourage, different behaviours.

Life insurers should carefully consider their allowances for default risk and liquidity premium within the discount rate.

Regulators should consider the appropriateness of valuation rules that can (although not necessarily intentionally) prevent insurers from taking action to protect their capital position.

3.5. Governance/Business models

There has been some sharpening of governance (investment mandates/senior management oversight) in response to losses on market values, and to FSA probing. It seems likely that Boards become increasingly aware of the reputational risks they face as the capital positions of their firms deteriorate, and take actions accordingly. They want to ensure that should markets deteriorate to the extent that their firm fails they will be seen to have done everything that could reasonably be expected of them to protect all of the stakeholders in their business.

Considering the magnitude of the widening in credit spreads and the falls in equity markets seen over the last 18 months it seems that so far UK life insurers have weathered this storm surprisingly well compared to the market turbulence of 2000 to 2003. Perhaps lessons have been learned and that the Individual Capital Assessment (ICA) regime now embedded in the FSA rulebook for insurers (and which built on the realistic balance sheet valuations developed in response to the market events of 2000 to 2003) has made UK life insurers put much more focus on the risks in their businesses and to develop contingency plans for taking actions to mitigate crystallising risks. Life insurers have significantly expanded and developed their risk management functions in recent years.

However it is unlikely that life insurers have better-resourced risk management functions than banks. Is it just an illusion that they have been more effective in allowing life insurers to avoid most of the damage suffered by banks? It is suspected that the answer is largely yes. It is likely that insurers have a much more diverse exposure to different risks than banks. Whilst credit risk and equity market risk are important risks for them they also have significant exposures to longevity, mortality and morbidity risks and other risks that are not highly correlated to credit and market risks. They might also have more scope for taking management actions to mitigate risks, and have developed and documented such actions to be taken in certain contingencies under the ICA process. It will be interesting to discover both the extent to which these contingent actions were actually taken, and how effective they proved to be.

Some initial evidence suggests that some firms have been reluctant to implement their management actions when it comes to the crunch. Some insurers have also found that the management actions that they thought would alleviate their problems do not have the desired effect. This would tend to suggest that firms should invest more time and effort in stress and scenario testing including "what if" scenarios that extend to the use of management actions and quantify the impacts of those actions.

Life insurers should reflect upon their use of management actions during market turbulence and consider how effective these have been. They should consider in more detail the management actions that they are willing to take, the time/situations when they should implement them and the quantified impact. They should also consider how these management actions would perform in a range of economic scenarios.

Life insurers should also ensure that they have appropriate procedures in place for monitoring their exposures to the various sources of risk, monitoring their capital and solvency positions, and keeping their senior management and Boards apprised of the situations. They may wish to develop “real time” monitoring tools to assist their monitoring of their capital positions.

3.6. Liquidity

In general liquidity has not been a major issue for life insurers, at least in respect of their non-linked business. Some insurers have indicated they see buying opportunities at current market levels but have found purchases difficult to make because of illiquidity in the market. However there is no indication of any pressures to invest positive cash flows. Life insurers seem content to use these cash flows to rebuild or increase their liquidity. They can also gain exposures to credit markets via derivatives. Where there are negative cash flows these have been modest to date and able to be met from liquid assets held. They are potentially buy-to-hold investors and generally will not be forced sellers to meet cash flow requirements.

For linked business the backing assets are held (mainly) in ring-fenced internal linked funds that operate in a similar way to unit trusts. Additional units are created in a particular fund when premiums are paid on a policy linked to that fund (and funded out of the premiums) or when the policyholder elects to switch his investment under the policy into the fund. Units are realised to pay claims and expenses, or when the policyholder elects to switch his investment under the policy out of the fund. The buy/sell decisions are effectively made by policyholders. However liquidity pressures are generally less than for unit trusts because it is usually possible for the insurer to hold excess units to back other parts of its business if it is judged that the assets should not be sold (for example if they cannot be sold at a reasonable price). This alleviates liquidity pressures in the short term but might add to difficulties in pricing.

A recent example of liquidity issues arising occurred in 2008 when some insurers invoked policy conditions that allowed them to defer realisations from linked property funds. It is common for property funds to allow the managers to defer realisations by up to 12 months in certain circumstances. This allows some breathing space to sell assets in an orderly way. However if the market does not improve and sales cannot be made in the deferral period the liquidity problem might not be resolved, it might be merely deferred.

Liquidity has been an area where life insurers have typically been under less pressure. However, it is worth them reflecting on their ability to respond to cash flow requirements, e.g. in the event of a run on a unit-linked fund, or in the event of the failure of a counterparty.

3.7. Impact of interventions

There has been no direct UK government intervention in the capitalisation or day to day operation of life insurers to date, however the US Government intervened to rescue AIG. However, life insurers will have been impacted by the interventions to recapitalise major banks and to increase liquidity in the financial systems.

Life insurers have invested in the ordinary shares of major banks and will have suffered significant mark-to-market write downs on these investments. Whilst they might feel that the share price has suffered because of the terms of the government support it is likely that share prices in the banking sector, and perhaps generally, would have experienced greater falls had a major UK bank been allowed to fail.

Life insurers also have credit exposures to the banking sector through investment in banks' corporate bonds, and through their banking arrangements. Again the value of these assets will have been supported by the interventions taken.

Finally life insurers will have benefited from the liquidity pumped into the economy which will have been helpful both to enable their business operations (i.e. premium collections and claim payments) to continue to function normally, and has reduced the risk of policyholders needing to raise liquidity by cashing in their insurance policies because other sources of liquidity are no longer available to them. It remains to be seen how the government's purchase of gilts and corporate bonds in the secondary markets will affect life insurers, but this should (eventually) have a positive impact on market values.

Those intervening in the markets with one purpose (in this case easing the banking crisis) should consider the knock on impacts on other sectors of the other financial services industry.
--

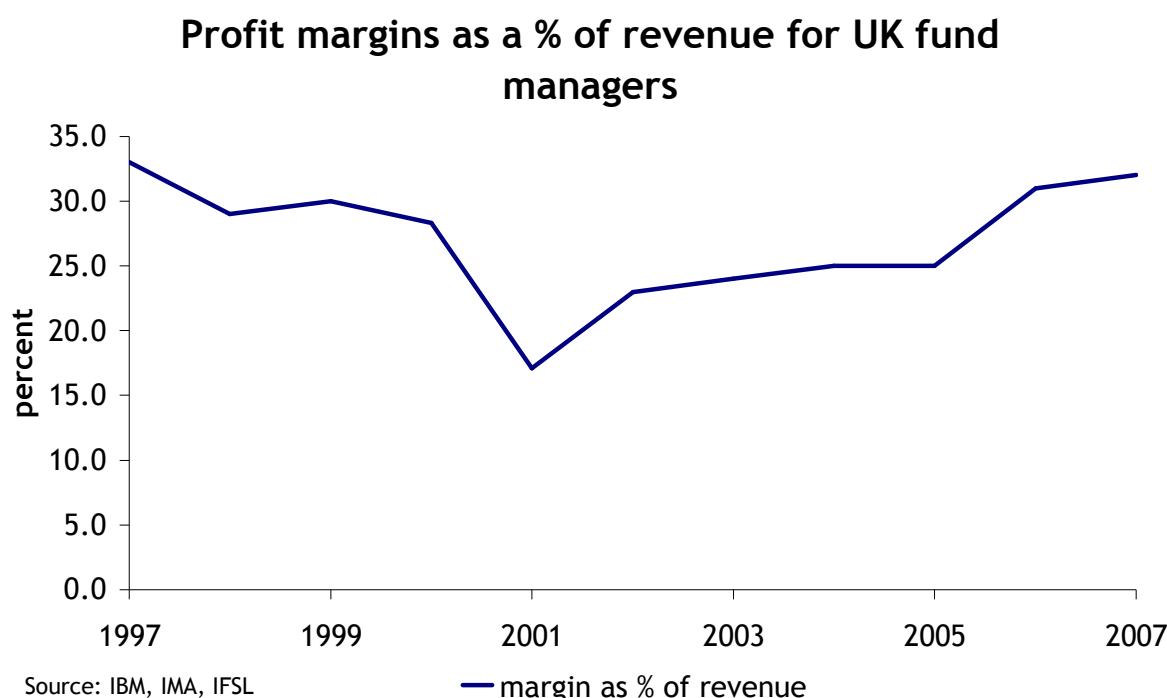
4. Impact on Asset Managers and lessons learned

Introduction

A key impact of the credit crunch on asset managers has been widespread falls in Assets Under Management (AUM) mainly as a result of price reductions across most asset classes (compounded in some cases by withdrawals of funds from riskier asset classes). While there have been a number of high-profile hedge fund liquidations in response to high volume redemption requests and/or poor performance, in aggregate the UK asset management industry appears to have been relatively robust over this challenging period.

One key reason for this is the fact that this c. £3.4tr industry⁴ is dominated by institutional investor assets (c. 76%) with only about 24% in retail assets (c. £770bn in collective investment schemes). Furthermore, compared with continental Europe and elsewhere, the net outflows from retail funds into banking products has been relatively muted. There has, however, been significant retail funds movement across asset classes, contrasted with the relatively more static institutional approach to asset allocation (based on longer term investment horizons).

The asset management business model essentially relies on ad valorem fees from AUM managed on an agency basis. Given recent falls across most asset classes, it is likely that a key impact on the sector will be reduced revenues and profit margins (as has been the case in past downturns – see chart below). This agency model and the resultant segregation of client assets is a key reason for the lessons discussed below being mainly focused on operational or conduct issues rather than prudential or balance sheet issues (as in the banking/insurance sections of this paper).



4.1. Inappropriate Leverage

Leverage, as defined in the introduction, can be considered to be 'inappropriate' for a number of reasons. One is where leverage is employed without an appropriate degree of risk management. Another reason is where the use of leverage is not made adequately clear to

⁴ Investment Management Association (IMA): 6th Asset Management in the UK Survey (August 2008)

investors, especially where this is a key driver of a strategy's returns (rather than, say, a manager's stock-picking skill). In particular, it could be considered inappropriate not to disclose to investors the risks introduced should the manager's ability to employ leverage become constrained (e.g. should supply of funding drying up) or should the cost of that leverage increase (e.g. higher borrowing costs). Both of these risks crystallised during the credit crunch, with significant impact on asset managers whose strategies relied on leverage.

The most common asset managers employing explicit leverage are hedge fund and private equity managers. Certain hedge funds strategies rely more heavily on leverage than others. For example, leverage is a key ingredient required to magnify the small returns which statistical arbitrage or fixed income relative value strategies aim to take advantage of. Many other hedge fund strategies made increasing use of leverage over the 'boom' years of 2000-2007 driven by factors such as: (i) ease of availability (i.e. prime brokers offering liberal amounts of leverage) and (ii) low cost (i.e. the general low cost of borrowing discussed elsewhere in this paper).

The relatively low yields available from credit (i.e. corporate bonds) will have also tempted fixed income based strategies to employ leverage to magnify these to produce higher returns. The growth in securitisation and increasing supply of highly rated asset backed securities (ABS) will have helped facilitate (i) and (ii). For example, the perceived high quality of the highly rated ABS meant that banks/prime brokers were willing to accept them as collateral for leverage to hedge funds. Interestingly, this helped fuel a market in this selfsame ABS which increased the level of funding available for lending by banks/prime brokers.

However, as the credit crunch progressed the circumstances supporting (i) and (ii) quickly evaporated with prime brokers quickly withdrawing availability of credit and increasing the cost of leverage (both in terms of required interest rates and higher collateral requirements). This was caused by banks facing difficulties in raising funds (as wholesale money markets and longer term capital markets froze up and the conduit/SIV model broke down). Banks also became more concerned about the quality of the ABS collateral being provided and therefore demanded much higher levels of collateralisation and accepted a much narrower range of securities.

While this action by individual banks/prime brokers could be seen as a sensible reaction and good risk management, it had unintended consequences for hedge funds. Faced with demands to post more and higher quality collateral, some hedge funds were forced to sell some of their lower quality ABS. When they were unable to do so, they were forced to sell higher quality ABS, thereby helping transfer the issues which originated in sub-prime mortgage related ABS into other forms of ABS. This is likely to have contributed to a cycle of factors depressing ABS prices which precipitated the difficulties of a number of fixed income hedge funds.

Leverage issues also affected non-fixed income hedge funds, such as quant equity hedge funds which suffered major losses in summer 2007 when large equity falls were magnified by high use of leverage.

The private equity (PE) business, especially the leveraged buy-out (LBO) model, tends to use leverage as an important component of capital at acquisition stage as well as to fund exit/payment of dividends to investors. The 'boom' years of 2000 to 2007 saw unprecedented growth of LBO deals with 'mega' deals raising billions in loans generally syndicated across investment banks for onward sale. The credit crunch and resulting reduced availability and increased costs of leverage has meant that many PE deals have become uneconomic from the outset and capital invested is locked up as traditional exit mechanisms using further borrowing or IPOs are less easily available.

It is also worth noting the role played by 'implicit' leverage created through the use of OTC derivatives. An increasing number of asset managers are using OTC derivatives as part of portfolios and while these instruments can be useful for portfolio efficiency, they introduce risks which need to be appropriately managed.

The lessons of these events include the simple fact that while leverage in investment portfolios magnifies gains, it does likewise for losses. The switch from gains to losses can be rapid and unpredictable, so leverage use must be coupled with strong risk management.

Another key lesson is an awareness of the risks of being tempted to employ *significantly* more leverage in a low risk, low cost, low volatility environment on the assumption that this environment will continue. History has demonstrated that this tactic can lead to substantial losses when the market environment changes or a significant market correction occurs.

To some extent the relatively poor performance of many hedge funds over 2008 will have exploded the myth of being able to deliver 'absolute return' in any market conditions and being uncorrelated with mainstream asset classes. While this doesn't mean that talented managers do not exist, it may have revealed some managers as having relied more on leverage and positive momentum than true 'alpha-generating' skill.

4.2. Adequacy of disclosures

In the context of asset managers, disclosures can refer to either the communications between managers and investors or to the communications related to investments which managers buy from broker/dealers on behalf of these investors.

Focusing on the communications between managers and investors, the rapid redemptions from various asset classes over the credit crunch suggests that some disclosures to investors may not have been sufficiently useful. This hypothesis rests on an interpretation which ascribes some of the rapid redemptions by investors to a failure to understand the risks inherent in the relevant investments and the fact that these are long-term in nature.

This can be best illustrated with three examples from various points during the credit crunch. Q3 2007 saw rapid outflows from Enhanced Money Market Funds (EMMF) across continental Europe. While some of these outflows were due to concerns about exposure to sub-prime mortgage related assets within fund, others may have been less discriminate as some investors took fright and exited a range of EMMF style funds. Q4 2007 saw rapid outflows from property funds in the UK. This was based on fears relating to falling UK and global property markets and the volume of withdrawals resulted in a number of unit-linked property funds being suspended for a period. Finally, Q4 2008 saw outflows from emerging market equity funds. This may have reflected the ending of the belief in the 'de-coupling' of emerging market equities from developed market equities and resulted in a number of funds briefly being suspended.

While this investor behaviour can be argued to have been a rational response to falling and volatile values, these three types of fund would not typically be considered low-risk, low volatility in nature. In other words, they would generally be considered to be long term (or at best medium term) investments in nature and to form part of a balanced diversified portfolio.

Without performing a rigorous analysis of the nature of the disclosures which accompanied these and other funds, it is impossible to draw a strong conclusion that the rapid redemptions experienced are predominantly attributable to insufficiently useful disclosures. Furthermore, given that the majority of fund sales in the UK are intermediated by IFAs, a proper analysis of the nature of the advice given would also be required to draw this conclusion.

However, it seems reasonable to draw out a lesson that investment fund communications could in some cases have incorporated more useful disclosures about the risks inherent in products.

Turning now to the communications related to investments which managers buy and sell on behalf of the investors. There is a stronger case for suspecting that there were shortcomings in the disclosures/documentation related to certain types of ABS. A number of asset

managers complained that they were unable to obtain the relevant memoranda describing the full details of these securities. In some cases these memoranda were only available to current investors understandably making performing due diligence in advance of investing challenging.

There are other cases where documentation relating to a particular ABS were available, but where data relating to the underlying portfolio of assets/mortgages was limited or only available at a very high aggregate level. This will have limited the level of analysis which asset managers were able to perform as well as potentially creating informational asymmetries where some parties to transactions have more information. While many asset managers will have shied away from transactions where they could not obtain sufficient information, some others may have purchased securities without adequate knowledge and suffered losses or become forced sellers when the true risk emerged.

The fairly simple lesson learned is that investors should demand a level of disclosure which meets their needs or avoid investing. A number of initiatives have developed to address these issues and various codes of conduct and information sharing facilities have subsequently developed.

4.3. Due diligence

Some asset managers may have been surprised by losses emerging from previously highly rated ABS in their portfolios. The question which arises is whether some of these losses could potentially have been avoided if these managers had used more robust due diligence processes.

Some firms had insufficient expertise of their own to do due diligence and were overly reliant on third party products/services (such as credit rating agency views). Some losses may have been generated through panic sales of assets once investors realised the underlying risk (or that they were unequipped to understand particular investments).

The lessons learned include a relatively simple golden rule: “if you don’t understand it, don’t buy it”. This can be extended to lessons such as not purchasing assets unless the manager is equipped to perform an appropriate level of due diligence which may include being able to perform a fundamental analysis of the underlying risk (and not relying overly on third parties like credit rating agencies). The limitations of credit ratings has also been amply demonstrated with the potential rate of change of these ratings being a key factor to consider if these are being used as part of investment decision-making. It is important to also understand how an asset could behave under different market conditions (a missing piece of information for many ABS which had not existed for a whole credit cycle).

The losses faced by many investors impacted by the Madoff scandal demonstrates another potential failure to perform adequate due diligence. While this is an ongoing investigation and the precise details remain unclear, it appears that investors may have taken too much on trust and failed to satisfy themselves of certain important details. Admittedly this issue appears to be related to fraud, rather than investment risk, but it is a timely reminder of an ever-present risk which is being seen to have crystallised in these turbulent market conditions.

As Warren Buffet said in his 2001 Chairman’s letter to Berkshire Hathaway investors:

“You only find out who is swimming naked when the tide goes out”...

4.4. Valuations and the pricing of risk

Some asset managers faced issues in valuing assets impacted by the credit crunch. In fixed income markets issues began in sub-prime mortgage backed securities, it quickly spread to broader asset-backed securities (ABS) and even vanilla fixed income markets. One reason

for this transmission was the relatively illiquidity of the more complex assets forcing investors to sell the relatively more liquid vanilla assets (as discussed in 4.1 above). Other asset classes also faced valuation difficulties including the perennially difficult-to-value 'bricks & mortar' property market.

These valuation challenges had a very practical impact on asset managers where the Net Asset Value of funds needs to be set frequently (often daily) to set the level at which investors enter/exit the fund. Some firms employed model based or Fair Value Pricing measures to address the issue and to balance the needs of exiting and remaining investors. When non-independent prices are used to price funds, asset managers use various governance arrangements to ensure that adequate checks and balances are in place to manage conflicts of interest between different stakeholders (i.e. exiting vs. remaining investors).

Constant Net Asset Value (CNAV) money market funds (CMMF) faced particular issues around the volatility in the value of money market instruments, especially Asset Backed Commercial Paper (ABCP). Some ABCP was associated with SIVs or conduits which may have had sub-prime mortgage related exposure. These CMMF are permitted to carry certain assets on an amortised cost basis - i.e. not at market-to-market (MTM) value – so long as the MTM value is not greater than a small margin (generally 0.5%) away. Issues in the money markets in general and ABCP in particular saw some CMMF in the USA 'break-the-buck' (i.e. experiencing a capital loss). While some of this may have been driven by MTM losses which were not crystallised (i.e. reflective of a frozen secondary market in CP), some funds experienced losses from exposure to CP of entities which went into default.

Another example of a valuation issue emerged in valuing the iBoxx UK corporate bond index in late 2008. Issues arose from the index rules permitting contributing brokers to post stale prices, resulting in the resulting index (and constituent) pricing not be reflective of actual transacted market prices. While this issue was subsequently resolved, it highlighted the importance of asset managers monitoring the prices which they receive for assets and ensuring that fund NAVs are calculated appropriately to prevent treating exiting/remaining investors inequitably.

Lessons learned include the fact that it could not be assumed that valuations for all assets would be available throughout the credit crunch. With many markets freezing up, notably money market and ABS, it became very difficult to find robust prices. It is imperative under these circumstances for firms to be aware of the risks involved in using non-independent prices and to have in place appropriate governance arrangements to manage these.

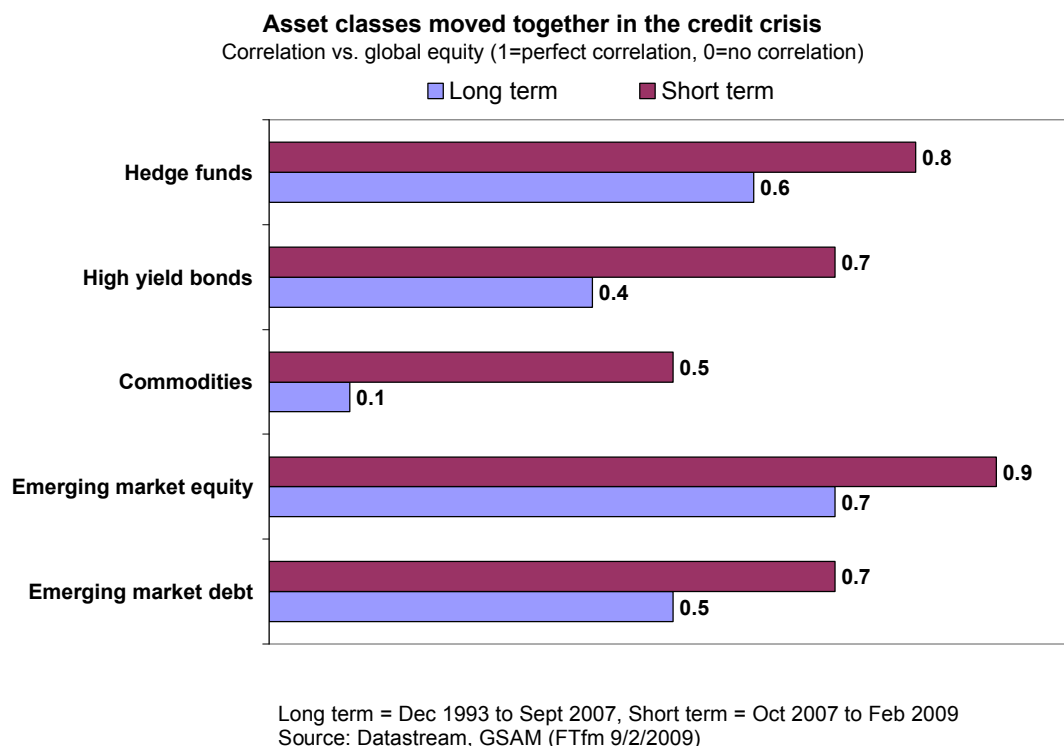
Correlations across asset classes/strategies increased rapidly. For example, emerging markets reflected issues in developed markets and hedge funds suffered losses correlated with equity/credit markets.

This increase in correlations proved a timely reminder of the dangers of asset allocation decisions being made on short performance histories for individual funds or asset classes. Many of the ABS which underperformed significantly over the credit crunch were facing their first real test across a whole business/credit cycle. It also reminded asset managers and investors that short-term correlations can vary significantly across cycles and risk management and decision-making needs to similarly be dynamic.

A main lesson learned is a reminder of the importance of stress testing and scenario analysis when performing any sort of financial modelling. Asset Allocation and other models which assumed lack of correlation or used input parameters based on the relatively benign 2000-2007 period (from a credit point of view) will have been shown to have lacked credibility in these turbulent times.

"In one way, I'm sympathetic to the institutional reluctance to face the music. I'd give a lot to mark my weight to 'model' rather than to 'market' ..."

Warren Buffett, Fortune, 8/16/07 (On the financial institution practice of valuing subprime assets on the basis of a computer model rather than the free market price.)



4.5. Governance/Business models

Many firms will have taken steps to enhance governance arrangements to reflect increased risks in various business areas (e.g. due diligence/valuation as described above) as well as to address risks such as liquidity (increased redemptions) as discussed below. Compared with banks which have seen sweeping changes in chief executives and business strategies, the changes at asset managers are more focused on managing business-as-usual operating risks (many of which are heightened in this challenging times).

One key area which has been highlighted as potentially needing attention at firms is the management of counterparty risk. During 2008 counterparty risk crystallised in variety of ways. Some firms incurred costs arising from replacing OTC derivative positions with bankrupt counterparties, in part due to having demanded insufficient collateral or rebalancing collateral too infrequently. Firms engaging in stock-lending allowed cash collateral received to be invested in money market instruments which carried more risk than had been expected. Some of these money market instruments experienced losses, while others became highly illiquid, reducing their efficacy in offsetting counterparty risk. Hedge funds which posted assets as collateral in funding transactions also experienced difficulties in reclaiming these when counterparties had engaged in rehypothecation and subsequently went bankrupt.

The key lesson learned from these and similar examples is that counterparty risk needs to be monitored and managed closely, especially as potential losses are borne by the end investor rather than the asset manager (although they could be subject to litigation by disgruntled clients).

Over the credit crunch the pressure of increased redemptions coupled with continued challenges in the financial and economic environment resulted in the wind-down or consolidation of some funds. Most notably the hedge fund sector in particular is likely to experience the greatest level of attrition both in terms of the number of firms in operation and in terms of AUM as the standalone boutique business model comes under pressure. The

likely reduced appetite (and capital available) from banks to run large prime brokerage businesses is likely to contribute to this attrition.

As described in Section 1 this reduction in the population on hedge funds may prove useful in helping this sector weed out less robust strategies and business models. The fact that hedge funds have started needing to accept lower fees in order to hold on to funds may also signal a change in the '2 and 20' fee model which may presage further convergence with the mainstream asset management world.

Over the credit crunch a number of private equity firms have experimented with ventures away from their core business model. In part this may have been driven by the search for new sources of revenue for them/returns for clients, but large cash piles with limited opportunities for investment is also likely to have played a big part.

A clear lesson is the danger of moving into a new area which is outside your core expertise. This is a useful lesson for the many traditional managers moving into offering hedge funds, potentially where this is outside of their core competencies.

4.6. Liquidity

Asset managers faced liquidity issues from a number of angles over the credit crunch. The two primary causes of issues were sudden illiquidity in the underlying investments in portfolios and unprecedented high volume investor demand for redemptions from funds. In some cases these two phenomena occurred at the same time posing significant challenges to asset managers.

One common theme is a mismatch between liquidity terms provided to investors and the liquidity of underlying assets. This was most obvious in property funds as noted in (Section 4.2 above) and resulted in some property funds (mainly unit-linked ones investing in bricks and mortar) having to defer redemptions.

This was an example of an asset class which is inherently illiquid and where managers arguably should be very aware of the need to manage liquidity to meet investor demand and where attention needs to be focused going forward.

In other asset classes, such as highly rated ABS such as Commercial Mortgage Backed Securities (CMBS) or Retail Mortgage Backed Securities (RMBS), what had been a relatively liquid market became extremely illiquid because of fears about exposure to Sub-prime mortgages. This illiquidity was compounded by investment banks who had previously made a market in these securities withdrawing from taking principal positions (due to funding/balance sheet constraints) and only being willing to trade on an agency basis. These issues spread to other parts of the ABS market including the Asset Backed Commercial Paper (ABCP) market and the corporate bond market.

While the sudden freeze up in ABS markets could have been argued to be difficult to predict and risk manage, many of these instruments are complex and potentially illiquid by nature. A key lesson learned is that investment strategies need to build this into risk management processes and appropriate and useful disclosures should be made to potential investors, as discussed in Section 4.2.

It is worth noting that recently there has been coverage of some corporate bond funds facing the risk of high volume redemptions in the event of a wave of corporate defaults motivating investors to exit en mass. The OTC nature of the corporate bond market means that similar issues to those which affected ABS markets could materialise.

Some hedge funds were forced to liquidate in response to high volume redemption demands and others suffered losses from forced selling of often illiquid assets to meet investor demand.

In some cases the high volume redemptions followed investor disappointment at poor hedge funds returns as discussed in Section 4.1. Many hedge funds invoked measures to limit redemptions including 'gates' limiting the amount investors could withdraw or using "side pockets" to distribute holdings in specie to avoid having to crystallise losses. Some better performing hedge funds who remained open suffered relatively higher redemptions due to Fund-of-Funds seeking liquidity wherever they could find it.

Some hedge fund managers negotiated accepting lower fees (or forgoing performance fees) in order to be able to hold on to assets. This is a specific example of the bigger issue of investors that choose to remain in funds being exposed to the risk that better quality and more liquid assets are sold to fund withdrawals, potentially leaving them with concentrations of investment risk which may be outside their original mandate or expectations.

Key lessons learned here include the need for firms to model likely client demand as well as considering stresses around this to prepare for the unexpected. The conflicts of interest between exiting and remaining investors mean that managers need to be alive to the need to treat these different sets of investors equitably.

4.7. Impact of interventions

Higher guarantees of bank accounts and support for banks coupled with increased risk aversion among retail investors have driven some savings flows away from asset management investments into bank accounts. While this has been more pronounced in Europe (where investment management distribution is through banking groups), the UK funds market has seen relatively fewer outflows. There is no clear picture at this stage as to how government interventions such as higher bank guarantees will affect the investment funds market, nor whether such low interest rates may encourage more investments in funds to seek a higher return for savings.

5. Impact on Pension Funds and lessons learned

Introduction

Defined Benefit Pension funds are institutions with long-term liabilities, they invest assets to meet these liabilities and take investment risks with the aim of reducing overall financing costs – these costs are typically met by a combination of contributions from pension fund beneficiaries and sponsors. Ultimately however, the sponsor bears the risk of making up any shortfall between assets and liabilities.

Notwithstanding the Pension Protection Fund (PPF), there are primarily two pillars of security for pension fund members' benefits – the fund's assets (and the related investment strategy) and sponsor covenant. These pillars of security are linked, and both have been impacted by the credit crisis and subsequent onset of recession.

Fiduciary responsibility for taking investment decisions lie with trustees of pension funds, however their interaction with the markets is through intermediaries – whether in-house advisers and asset managers or outsourced as in the majority of cases. It is therefore the norm for trustees (with advice) to set overall objectives and delegate much of the day to day asset management responsibilities to professional money managers. This means that Trustee bodies are in practice (at least) once removed from interaction with the financial and capital markets, and some of the comments made regarding asset managers (in the previous section) indirectly relate to pension funds.

Our discussion centres on defined benefit pension funds, however Defined Contribution (DC) pension funds – where the risk of any shortfall in target benefits is borne by the individual – continue to grow in significance. Individuals can either make their own choices regarding investments or (more typically) go into a default option, in both cases the investment universe is set by Trustees. The present crisis will clearly have reduced the market values of current DC funds, and the greatest immediate impact will be on those members retiring in the near term. The discussion below can be adapted to DC funds, and Trustees and other stakeholders can benefit from adapting the lessons learned in designing and managing the choices available to members. Distinctly however, individual members can benefit from the lessons learned – and this highlights the need for ensuring better informed decision making by individuals. From the Government's perspective the industry shift towards DC funds and the Government's position as ultimate risk bearer (to provide a minimum level of income in retirement) makes this an important area for policy makers. We now limit our discussion to DB funds.

We begin with a brief review of the main themes influencing the management of pension fund investment portfolios in recent times. We then consider the impact of the credit crunch on pension schemes, and drawn out some lessons under our 7 headings.

The main themes

Going into the credit and liquidity crunch, there were a number of themes affecting pension funds:

- *High equity exposures in pursuit of higher returns*; Schemes typically invested over 80 % of their assets in equities, although this has been drifting down to c. 65% since the mid 90's. The inherent volatility of equities has been reflected in the volatility in pension scheme funding levels.
- *Pension scheme risks featured higher up the corporate agenda*; the move to fair value accounting has resulted in volatility in scheme funding levels feeding through to sponsor balance sheets.
- *Generally lower levels of return* expected from asset classes; risk premia trended downwards in what was a benign era
- *People generally living longer* coupled with uncertainty around future improvements in longevity

As a result, going into the crisis pension funds were typically underfunded, and with pension fund risks and costs visibly high, a significant number of funds were being closed either to new entrants or even new accrual. This trend means shorter timescales to make up deficits, the focus for both trustees and sponsors is therefore on risk reduction and/or taking risks in more rewarding ways.

The industry responded to the situation, and adapting some of the ideas and innovations in financial markets, products and strategies emerged to mitigate, de-compose and deploy risks. Just as in wider financial markets, pension fund risks were being sliced and diced ready to be transferred to those with the appetite to bear them. In this new era of financial technology, a pension fund's liabilities were simply a collateralised debt obligation (CDO) issued by the sponsor, held by the Trustees, and collateralised with the assets of the pension fund!

This new environment with all its complexity meant that the plain sailing days of the 80's and 90's – when the only questions seemed to be what should the equity/bond split be and how long should the contribution holiday last – were over. Importantly there was a commensurate increase in the time and expertise required to navigate pension fund investment decision making. This increased “governance” requirement was another theme of recent times. Among the things trustees now needed to contend with were:

- Liability Driven Investing (using new investment tools to accurately match liabilities, while also pursuing returns – thus de-coupling the risk-return trade-off)
- Investing in alternative asset classes - diversification (to increase the ‘efficiency’ of the asset portfolio)
- A myriad of risk transfer solutions – buy-out, buy-in, longevity swaps, enhanced transfers etc

Just when there was a feeling of being out at sea, came the storm!

5.1. Inappropriate leverage

A low return environment, cheap debt and investors (including pension funds) looking for return inevitably encourages leverage. Although pension funds do not borrow to invest assets or explicitly leverage their investments, in this environment leverage was difficult to avoid, for example:

- Public equity holdings - debt to equity ratios increased considerably, with some financials leveraged (especially if off-balance sheet activities were allowed for – see section on banks)
- Private equity holdings - cheap debt, available on favourable terms from deal hungry investors encouraged ‘financial engineering’ in pursuit of returns.
- Hedge funds – many ‘skilled’ managers leveraged their skill and/or asset class exposures

Swap based LDI strategies involved leveraged exposure to inflation and interest rate risks. These strategies can be thought of as buying long dated inflation-linked assets funded by borrowing. The borrowing was in effect through issuing floating rate bonds. This introduced a number of risks:

- Swap contracts involve bi-lateral credit risk. The majority of this risk is mitigated through collateralisation, indeed it is the norm to collateralise exposures daily. Details of the collateralisation process and the rights and obligations of each party if a default event occurs is set out in a legal contract which the parties negotiate prior to entering the contracts (the framework for which was already developed for the over-the-counter derivatives market by ISDA). However if a counterparty did go bust there would still be replacement costs that may not be recoverable. The Lehman brothers default of September 2008 provided a live example of counterparty default risk. The

experience showed that the ISDA framework was robust (at least in the scenario where only one bank defaults). However, the episode highlighted the importance of managing and diversifying counterparty exposures.

- Leverage is involved. Although most pension funds did not explicitly leverage their swap exposures, ensuring that initially capital was available in some form to back the borrowing (by for example restricting swap exposure to the fund's bond assets), however there is always the risk that this implicit leverage becomes explicit.
- Operational and liquidity risks were introduced i.e. the possibility that capital would not be available in the right amounts and at the right times due to market conditions and/or operational issues.
- For pension funds, the contracts typically involved borrowing at LIBOR, the credit crisis showed that the risks associated with earning LIBOR were not insignificant (especially given the exposures introduced into pension fund portfolios in some instances.) These issues have been discussed in the previous section.

The lessons learned under this heading are basically a reminder that leverage can be dangerous, it can focus the minds of those taking on leverage (say, to run companies efficiently) and magnify returns but the severity and speed of loss when it does occur can be devastating.

For this reason, for pension funds it will be important to monitor leverage levels of underlying investments, ensure asset managers who employ leverage do not do so excessively and are operationally equipped to manage the risks. The same applies where pension funds employ implicit leverage (eg through swap arrangements)

5.2. Adequacy of disclosures

Pension funds invest assets with asset management firms regulated by the FSA and are classified as Professional clients under the FSA's Handbook. Levels of disclosure are governed by rules and principles in line with this classification. As professional investors there is an expectation that the pension fund (with appropriate advice) is able to satisfy itself that disclosure is sufficient for a commitment to be made. On the whole there does not seem to be any widespread indication that disclosures were felt to be insufficient when entering into investments – on the basis that there is a lack of clients seeking legal redress – thus far.

As clients and ultimate shareholders, pension funds do however expect fund managers to ensure they are engaged with underlying investments, and are happy with the levels of disclosure provided by management to shareholders. Lord Myners recently described institutional shareholders as 'absentee landlords', which seems to indicate that there may be some room for improvement. However, I would suggest there is doubt that better corporate governance would have prevented the crisis - as it pre-supposes a significant group of people that were not themselves 'under the influence'.

Another area where disclosure is important is in ensuring appropriate disclosure is sought to enable monitoring of portfolio exposures at a sufficiently granular level. Many pension funds would have been unaware of the level of exposure to sub-prime mortgage debt in their portfolios. Pension funds weren't big direct buyers of such debt, securitised products (MBS, CDO's etc) were generally deemed to be in the hard to understand category and by and large, pension funds avoided putting these in strategic benchmarks or bond portfolio benchmarks. However some bond portfolio managers had discretion to hold sub-prime debt and other securitisations, as did cash portfolio managers (especially those with 'cash plus' performance targets). The latter being held by many pension funds who put in place swap based LDI strategies. In-direct exposure, through equity and bond benchmarks with significant exposure to the players in sub-prime debt issuance and other securitisations was of course unavoidable.

For pension funds the lessons learned are to seek greater engagement with underlying investments; monitor portfolio exposures at a sufficiently granular level and seek to understand those exposures and the risks implied. Both of these areas require clear communication between pension funds and asset managers, by developing clear guidelines and requiring appropriate reporting.

5.3. Due diligence

As far as understanding individual investments, again pension funds delegate the due diligence role largely to fund managers. In traditional portfolios this has been a well trodden path. However as pension schemes move into alternative asset classes and more complex investment structures the need for due diligence and gaining an adequate understanding of what is bought becomes ever more important. The Madoff fiasco also highlighted the need for due diligence.

However, the unexpected holdings in fund portfolios referred to under the previous heading and the remedy proposed of providing detailed guidelines means that trustees will need to carry out their own due diligence on the asset managers they employ.

Trustees may need to carry out due diligence to be satisfied that their asset managers are able (and continue to be able) to follow any guidelines set thus ensuring that they better understand what they buy.

5.4. Valuation and the pricing of risk

The use of models to aid pension fund investment decisions has grown significantly since the mid 1990's. Stochastic models have been developed to reflect the uncertainty of outcomes. However, the crisis has shown that models that rely heavily on recent history to simulate the future are prone to reflect (and help perpetuate) current systemic biases. Thus risk levels appeared to be low.

Also the measures of risk used did not tell the whole story, for example VaR95 (widely used by pension funds) is the minimum loss for a 1 in 20 event. Hardly a black swan!

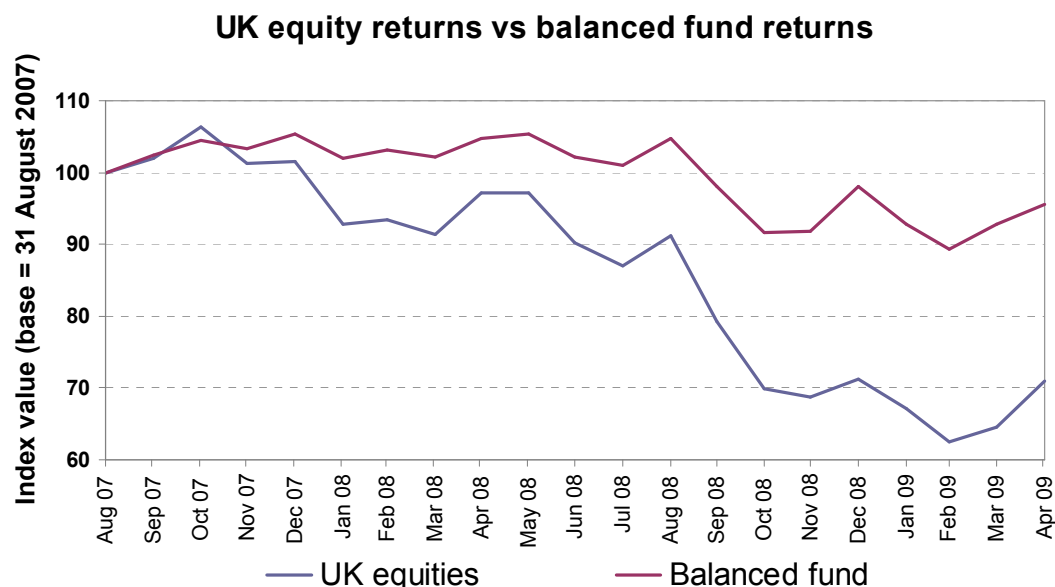
Luckily, although 'sophisticated' tools exist and are used extensively, in practice risk management and investment decision making for the typical pension fund is not purely model driven. The crisis served as a reminder that models should be used carefully, their limitations should be acknowledged at outset and that scenario modelling is important.

It is worth considering the theme of diversity, where models were typically used to support a basic argument. Historically, pension funds predominantly held UK equity assets, however since the mid 90's there has been a move to diversify away from UK equities. The first step was to increase overseas equities in favour of UK equities, and more recently a move into 'alternative' asset classes (hedge funds, private equity, commodities, and so on).

This is all based on the familiar idea of not putting all your eggs in one basket. This basic idea in modelling terms translates to investing in assets that are uncorrelated, and similarly diversity translates to diversification. For those needing a model to back up common sense, they could focus on these concepts. During the crisis asset class correlations went up (as most prices moved south in unison.) Many newspaper articles proclaimed that diversity had failed. We must ask ourselves whether common sense has indeed failed, or is this just an example of our inability to capture reality in our models? Should we abandon diversity or should we abandon our models? Surely the lesson is that there are limitations to both and there will be scenarios when things don't work. We should simply update our expectations.

Having said this, the chart below compares a UK equity portfolio versus a more balanced portfolio and the performance since August 2007. As not all asset classes performed equally

badly, diversity may not have delivered the silver bullet that some seemed to expect (from the models), but volatility has indeed dampened.



Over the past decade or so, pension fund asset and liability valuations moved away from the traditional actuarial approach of smoothing results and towards market consistency. This was an acknowledgement of the virtues of financial economics and in line with the move to the fair value principle in accounting and regulatory disclosures. However, in times of crisis market values can move quite far from what would be perceived as fair value, the same can be true in boom time. A strict adherence to the fair value concept serves to exacerbate matters in these scenarios. To alleviate this, many experts have called for a 'contra-cyclical' approach to regulatory capital requirements. Is this actuarial smoothing by another name?

The lessons learned here are not new, however we are reminded that an over-reliance on models is dangerous, and an understanding of the limitations of a model should accompany its use. This highlights the value of judgement developed through experience as an input into decision making.

In true scientific fashion, we should use recent experience to update our models to better describe/explain the past. Importantly, these models should produce forecasts that allow for the common observation that the past may not be a good guide to the future.

5.5. Governance/Business models

Driven by the increasing complexity of pension fund investment choices, governance had become a key agenda item for trustees, even before the credit crisis. Added to the complexity of investment choices, trustees are increasingly expected to interact with the fund sponsors in more sophisticated fashion.

The credit crisis again served to highlight other areas that will need to be addressed through better governance. An important factor in bringing about the crisis has been the skewed incentives of the different stakeholders. Conflicts of interests of some sort are inevitable, however understanding these and re-configuring business models to ensure incentives are as aligned as possible will require a focus of resource and expertise. For example, as investors trustees will need to:

- increasing scrutiny of agents who act on behalf of trustees
- understand underlying investments and engage with these appropriately
- monitoring their investment portfolios versus clear objectives

- be better equipped to understand and interact with other stakeholders

There is currently a governance gap in the pension fund industry. One emerging approach to filling this gap is to employ advisers differently – for example by delegating greater fiduciary responsibilities. This undoubtedly decreases the gap, but trustees must think through the implications of this in terms of incentives and design future relationships that best suit the needs of the individual fund.

The main lesson learned is that understanding the incentives of the various stakeholders is important, and to succeed (or at the least avoid systematic or sporadic losses arising from misaligned incentives) trustees will need to understand and monitor the landscape. This will require a high level of governance.

5.6. Liquidity

Pension funds have long dated and illiquid liabilities, which means they are able to invest in assets of this nature. However, this is tempered by mark to market considerations and the fact that dwindling numbers of active member's contributing to funds increases the requirement to liquidate investments to pay current pensioners.

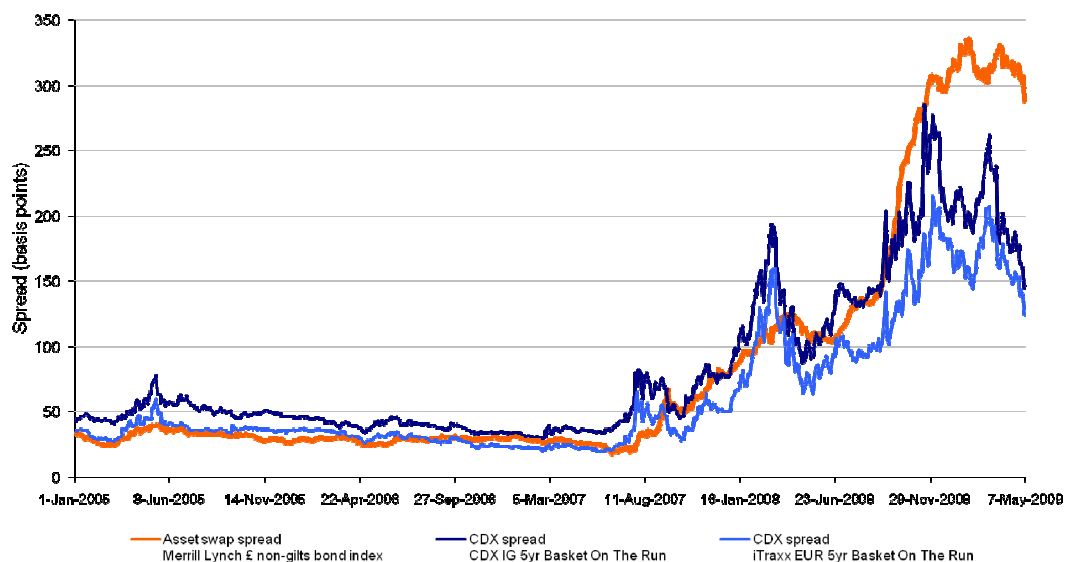
LDI strategies have on the whole not posed any additional problems from a liquidity perspective. This is because the cashflow requirements of a fund are not fundamentally changed by LDI strategies (rather the aim is to change the risks associated with the valuation of these cashflows). Also the cashflows under swap contracts are not typically going to be exchanged until years into the future. Mark-to-market positions on cash portfolios backing the swap obligations may not look healthy due to the current high premium for liquidity, but the argument goes that if default is avoided then there will be no material loss. However, if these cash funds had to be liquidated, the situation would have proved problematic.

Most pension funds remain cashflow positive and are not forced to sell assets to pay current pensioners. As longer term investors they have not been greatly affected by liquidity concerns. The problems they have faced are more to do with illiquidity issues hampering their ability to switch investments in order to take advantage of investment opportunities or cut losses by exiting investments. For example:

- Redeeming hedge fund investments
- Implementing investment switches without incurring prohibitive trading costs are difficult eg high spreads on corp bonds, securitised bonds or even 'cash' funds meant buying/selling is difficult and a major consideration when changing asset allocation (either strategically or tactically)

As natural providers of liquidity, the deleveraging and capital scarce environment precipitated by the crisis has provided funds with opportunities. The premium paid for liquidity remains high and as a result the price paid for physical assets is much lower than that paid for synthetic assets. One prime example is the corporate bond market versus the credit default swap market.

Chart of physical corporate bonds spreads vs CDS



Pension funds are well placed to take advantage of such opportunities – but the investment and operational risks need to be understood. All of which requires governance.

Again the crisis has served to forewarn pension funds. In this case that liquidity may not be available at times when it is needed.

5.7. Impact of intervention

Direct government action in capital markets and influence through legislative and regulatory intervention has been a dominant theme during the crisis, and will clearly continue to be. The main consequence is that a greater role will be played by government at least in the medium term. This is evidenced by government ownership of banks and the implementation of policies such as quantitative easing.

Pension funds as investors will need to factor in the implications of government intervention and also the heightened regulatory risks when thinking through investment policy.

There is no specific lesson here apart from the unthinkable can happen!

6. Significant lessons learned

We summarise the over-arching lessons learned below.

6.1. Inappropriate leverage

The lessons learned under this heading are basically a reminder that leverage can be dangerous. While it can focus the minds of those taking on leverage (say, to run companies efficiently) and magnify returns, the severity and speed of loss when it does occur can be devastating. As this switch from gains to losses can be rapid and unpredictable, leverage use must be coupled with strong risk management. Another key lesson is an awareness of the risks of being tempted to employ *significantly* more leverage in a low risk, low cost, low volatility environment on the assumption that this environment will continue. History has demonstrated that this tactic can lead to substantial losses when the market environment changes or a significant market correction occurs.

Those active in the financial services industry need to be aware of the role of implicit leverage in a strategy (e.g. stock lending) that might appear to offer “money for nothing”, and the risks which this introduces. Those responsible need to be actively managing these risks and disclosing them to stakeholders from the outset.

For this reason, for pension funds it is important to monitor leverage levels of underlying investments, ensuring that asset managers who employ leverage do not do so excessively and are operationally equipped to manage the risks. The same applies where pension funds employ implicit leverage (e.g. through swap or other derivative arrangements).

It seems that there is a need for greater regulatory oversight of the risks being taken by financial companies and tighter control of leverage they operate. We would suggest that this should be accompanied by a greater degree of shareholder control and responsibility.

6.2. Adequacy of disclosures

It is not apparent whether disclosures were inadequate, or whether there was just a lack of understanding of the available disclosures. If the level of information that is available is considered inadequate by investors then they should demand more detail or not invest. Firms should also seek greater day-to-day engagement with their investments, monitor their asset exposures at a sufficiently granular level and seek to understand those exposures and the risks implied. It is likely that financial services firms will have to provide much more private information directly to their regulators so that the regulator is properly armed to regulate.

6.3. Due diligence

This links in to the points made above. Put simply, investors need sufficient information in order to decide whether to make an investment, and should not invest unless they fully understand what they are investing in. Firms should not overly rely upon the information that they are provided by interested third parties, be they credit rating agencies, investment banks or otherwise, and instead should ensure that due diligence is performed on all the available information. Firms should consider the applicability of historic data in setting assumptions and also consider the impact of systematic risk (e.g. to mono-line insurers). Those taking on the risk of an investment are the ones that need to be satisfied with the quality of their investment.

6.4. Valuations and the pricing of risk

A key lesson learned across the financial industry is that valuations for all assets may not be available in extreme market conditions. With many markets freezing up, notably corporate bonds and ABS, it became very difficult to find robust prices. It is imperative under these

circumstances for firms to be aware of the risks involved in using non-independent prices and to have in place appropriate governance arrangements to manage these.

However, we are also reminded that an over-reliance on models is dangerous, and an understanding of the limitations of a model should accompany its use, in particular where it has significantly underestimated losses. This highlights the value of judgement developed through experience as an input into decision making. In true scientific fashion, we should use recent experience to update our models to better describe/explain the past. Importantly, these models should produce forecasts that allow for the common observation that the past may not be a good guide to the future.

Firms across the financial industry should also make greater use of scenario analysis and to perform more stress testing of the model parameters (including correlations with other risks being carried) in order to avoid similar problems in the future.

6.5. Governance/Business models

The main lesson learned is that understanding the incentives of the various stakeholders is important, and to succeed (or at the least avoid systematic or sporadic losses arising from misaligned incentives) it is necessary to understand and monitor the landscape. This will require a high level of governance, and may also include reviews of remuneration policies in order to ensure that employees are not incentivised to take on undue levels of risk or seek short term gains.

It is important to be aware of the danger of moving into a new area which is outside core expertise. This is a useful lesson for the many traditional asset managers moving into offering hedge funds and equally hedge fund managers moving into offering retail funds, potentially where this is outside of their core competencies.

Financial institutions (including pension funds) should ensure that they have appropriate procedures in place for monitoring their exposures to the various sources of risk, monitoring their capital/solvency positions, and keeping their senior management, Boards and other key stakeholders apprised of the situation. They may wish to develop “real time” monitoring tools to assist the monitoring of their capital/solvency positions.

Those in the financial industry should reflect upon their use of management actions during market turbulence and consider how effective these have been. They should consider in more detail the management actions that they are willing to take, the time/situations when they should implement them and the quantified impact. They should also consider how these management actions would perform in a range of scenarios (i.e. perform robust stress and scenario testing).

6.6. Liquidity

A key lesson learned regarding managing firms’ (and especially banks’) liquidity needs in a crisis is the importance of central banks accepting lower quality/illiquid collateral. A longer term lesson for shareholders and regulators is to aim to prevent banks (or other financial institutions) from taking concentrated risks in sources of funding in the future.

Even life insurers, for whom liquidity has typically been less of a concern, should reflect on their ability to respond to cash flow requirements, e.g. in the event of a run on a unit-linked fund, or in the event of the failure of a counterparty.

While the sudden freeze up in ABS markets could have been argued to be difficult to predict and risk manage, many of these instruments are complex and potentially illiquid by nature. A key lesson learned is that investment strategies need to build this into risk management processes and appropriate and useful disclosures should be made to potential investors.

It is worth noting that recently there has been coverage of some corporate bond funds facing the risk of high volume redemptions in the event of a wave of corporate defaults motivating investors to exit en masse. The OTC nature of the corporate bond market means that similar issues to those which affected ABS markets could materialise.

Key lessons learned here include the need for firms to model likely client demand as well as considering stresses around this to prepare for the unexpected. The conflicts of interest between exiting and remaining investors mean that managers need to be alive to the need to treat these different sets of investors equitably.

6.7. Impact of interventions

Government interventions will always produce some adverse consequence and damage competition. Saving failing companies effectively amounts to government protection against the consequences of risk taking. Effectively this encourages greater risk taking and reduced due diligence by those who believe they will be bailed out. Therefore these interventions should be used as a last resort and it is inevitable that some institutions must be allowed to fail. In this case governments were attempting to save the banking system and it was feared that a domino effect could cause widespread bank defaults. However in future thought should be given to the consequences of the actions, and whether the actions will achieve their intentions.

7. How actuaries can help going forward

Actuaries operate in most sectors across the financial industry, working in a range of roles at all levels of businesses. Acting in these roles, actuaries may have the opportunity to influence the design of products, the distribution/marketing, pricing and valuation of these products and the management of the overall business. They are therefore ideally placed to assist in ensuring that the lessons outlined above are learned and implemented going forward.

Actuaries are able to consider the impacts on both assets and liabilities – they are perhaps unique in this skill set – however this doesn't mean we always get it right! Actuaries can also use our unique position to influence other stakeholders (e.g. government and regulators).

7.1. Risk aversion, prudence and fiduciary concerns

Actuaries are (in the main) naturally risk averse, and often suspicious of investments that sound “too good to be true”. They are trained to consider risks from a number of angles. They can therefore use their professional scepticism and training to input to investment and ALM committees, and to influence product development and marketing specialists.

Actuaries are trained to consider the interests of all stakeholders. There are specific actuarial roles that have an inherent responsibility to protect customers (such as the With Profits Actuary). There is also a suggestion from the Actuarial Profession that Chief Risk Officers in Banks need many of the skills of actuaries. Actuaries need to understand the roles and responsibilities of each of the stakeholders and the interplay of incentives, and must be vigilant to how these incentives change over time (after all a poor understanding of incentives by some stakeholders is at the heart of the credit crunch!). Actuaries should consider different scenarios and the impacts of these on both the financial provider and the beneficiary; this helps to equip our clients to be effective and optimise their outcomes.

7.2. Technical skill set

Using their technical knowledge of investment and the needs of different investors, actuaries can influence products at the design phase. This could include helping ensure that products are robustly developed and stress tested before being sold. They could help ensure that issues such as potential investor demand for liquidity are appropriately modelled and built into the investment strategy and that when leverage is employed that it is used appropriately and adequately risk managed. Actuaries can also ensure that appropriate due diligence processes are in place commensurate with the complexity of the assets to be included in investment portfolios.

Actuaries can also use their technical skills to design investment and risk solutions that use the latest financial technology and ensure unintended risks are minimised. They should also further develop risk frameworks and design appropriate monitoring and mitigation capabilities.

7.3. Management skills and professionalism

Actuaries are professionally qualified and also have a responsibility to stay educated and aware of developments in their specialist areas (through the CPD scheme). Actuaries should use professional behaviour and high ethical standards to influence business practices. This could include helping ensure that products sold are robust and perform in line with the descriptions represented to clients. For example, actuaries could try to ensure that products are marketed in a responsible fashion highlighting both benefits and potential upside alongside risks and potential downside. For example, products sold as ‘all-weather’ or ‘low-risk’ have underperformed over the credit crunch, and others sold on the basis of delivering ‘absolute returns’ or ‘low correlation to mainstream asset classes’ have failed to deliver on their promises.

For those directly advising clients, actuaries can enhance the clients' governance capabilities, either by helping them understand and make decisions or by providing decision making capabilities directly if that is desired.

8. Appendix

8.1. Credit Crunch Timeline

(from Turner Review, pg 27 http://www.fsa.gov.uk/pubs/other/turner_review.pdf)

BOX 1B: STAGES OF THE CRISIS: 2006 – 2009	
2006 – Summer 2007 Localised credit concerns	Rising defaults in US subprime and Alt-A loans. Falling prices of lower credit tiers of some credit securities. Expectations of property prices fall.
Summer – Autumn 2007 Initial crack in confidence and collapse of liquidity	Failure of 2 large hedge funds. Spreads in inter-bank funding and other credit products rise sharply. RMBS funding and inter-bank funding for second tier banks dries up. Northern Rock faces retail run.
Autumn 2007 – early Summer 2008 Accumulation of losses and continuation of liquidity strains	Severe mark-to-market losses in trading books. Collapse of commercial paper markets: SIVs brought back on balance sheet. Funding strains in the secured financing market. Worries about liquidity of major institutions Government assisted rescue of Bear Stearns.
Summer 2008 Intensification of losses and liquidity strains	Mark-to-market losses and liquidity strains continue to escalate. Housing market problems recognised as widespread in UK, US and other countries, as house prices fall and supply of credit dries up. Fannie Mae and Freddie Mac increasingly reliant on US government support. Funding problems of UK mortgage banks intensify.
September 2008 Massive loss of confidence	Bankruptcy of Lehmans breaks confidence that major institutions are too big to fail. Credit downgrade of AIG triggers rising collateral calls, requiring government rescue. Mix of credit problems, wholesale deposit runs and incipient retail deposit runs lead to collapse of Washington Mutual, Bradford & Bingley, and Icelandic banks. Almost total seizure of interbank money markets; major banks significantly reliant on central bank support.
October 2008 Government recapitalisation, funding guarantees and central bank support	Exceptional government measures to prevent collapse of major banks; explicit commitments that systemically important banks will not be allowed to fail.
November 2008 → Feedback loops between banking system and economy. Further government measures to offset feedback loop risk.	Impaired bank ability to extend credit to real economy produces major globally synchronised economic downturn. Recession threatens further credit losses which might further impair bank capital. Tail risk insurance – Asset Protection Scheme.

8.2. Bibliography and suggested further reading

- **The Turner Review:** A regulatory response to the global banking crisis
(http://www.fsa.gov.uk/pubs/other/turner_review.pdf)
- **The financial crisis and the future of financial regulation** - speech by Adair Turner, Chairman, FSA to The Economist's Inaugural City Lecture 21 January 2009
(http://www.fsa.gov.uk/pages/Library/Communication/Speeches/2009/0121_at.shtml)
- **Observations on Risk Management Practices during the Recent Market Turbulence** - Senior Supervisors Group report
http://www.newyorkfed.org/newsevents/news/banking/2008/SSG_Risk_Mgt_doc_final.pdf
- **Manias, Panics and Crashes: A History of Financial Crises** - by Charles P. Kindleberger
- **The Black Swan: The Impact of the Highly Improbable** - by Nassim Nicholas Taleb