LESSONS FROM THE COLLAPSE OF HEDGE FUND, LONG-TERM CAPITAL MANAGEMENT
By David Shirreff

Barings, the Russian meltdown, Metallgesellschaft, Procter & Gamble, LTCM. These are all events in the financial markets which have become marker buoys to show us where we went wrong, in the hope that we won't allow quite the same thing to happen again. The common weakness, in these cases, was the misguided assumption that 'our counterparty and the market it was operating in, were performing within manageable limits.' But once those limits were crossed for whatever reason, disaster was difficult to head off.

The LTCM fiasco is full of lessons about:
1. Model risk
2. Unexpected correlation or the breakdown of historical correlations
3. The need for stress-testing
4. The value of disclosure and transparency
5. The danger of over-generous extension of trading credit
6. The woes of investing in star quality
7. And investing too little in game theory.

The latter because LTCM's partners were playing a game up to hilt.

John Meriwether, who founded Long-Term Capital Partners in 1993, had been head of fixed income trading at Salomon Brothers. Even when forced to leave Salomon in 1991, in the wake of the firm's treasury auction rigging scandal (another marker buoy), Meriwether continued to command huge loyalty from a team of highly cerebral relative-value fixed income traders, and considerable respect from the street. Teamed up with a handful of these traders, two Nobel laureates, Robert Merton and Myron Scholes, and former regulator David Mullins, Meriwether and LTCM had more credibility than the average broker/dealer on Wall Street.

It was a game, in that LTCM was unregulated, free to operate in any market, without capital charges and only light reporting requirements to the US Securities & Exchange Commission (SEC). It traded on its good name with many respectable counterparties as if it was a member of the same club. That meant an ability to put on interest rate swaps at the market rate for no initial margin - an essential part of its strategy. It meant being able to borrow 100% of the value of any top-grade collateral, and with that cash to buy more securities and post them as collateral for further borrowing: in theory it could leverage itself to infinity. In LTCM's first two full years of operation it produced 43% and 41% return on equity and had amassed an investment capital of $7 billion.

Meriwether was renowned as a relative-value trader. Relative value means (in theory) taking little outright market risk, since a long position in one instrument is offset by a short position in a similar instrument or its derivative. It means betting on small price differences which are likely to converge over time as the arbitrage is spotted by the rest of the market and eroded. Trades typical of early LTCM were, for example, to buy Italian government bonds and sell German Bund futures; to buy theoretically underpriced off-the-run US treasury bonds (because they are less liquid) and go short on-the-run (more liquid) treasuries. It played the same arbitrage in the interest-rate swap market, betting that the spread between swap rates and the most liquid treasury bonds would narrow. It played long-dated callable Bunds against Dm swaptions. It was one of the biggest players on the world's futures exchanges, not only in debt but also equity products.

To make 40% return on capital, however, leverage had to be applied. In theory, market risk isn't increased by stepping up volume, provided you stick to liquid instruments and don't get so big that you yourself become the market.

Some of the big macro hedge funds had encountered this problem and reduced their size by giving money back to their investors. When, in the last quarter of 1997 LTCM returned $2.7 billion to investors, it was assumed to be for the same reason: a prudent reduction in its positions relative to the market.

But it seems the positions weren't reduced relative to the capital reduction, so the leverage increased. Moreover, other risks had been added to the equation. LTCM played the credit spread between mortgage-backed securities (including Danish mortgages) or double-A corporate bonds and the government bond markets. Then it ventured into equity trades. It sold equity index options, taking big premium in 1997. It took speculative positions in takeover stocks, according to press reports. One such was Tellabs whose share price fell over 40% when it failed to take over Ciena, says one account. A filing with the SEC for June 30 1998 showed that LTCM had equity stakes in 77 companies, worth $541 million. It also got into emerging markets, including Russia. One report said Russia was "8% of its book" which would come to $10 billion!

Some of LTCM's biggest competitors, the investment banks, had been clamouring to buy into the fund. Meriwether applied a formula which brought in new investment, as well as providing him and his partners with a virtual put option on the performance of the fund. During 1997, under this formula [see separate section below, titled UBS Fiasco], UBS put in $800 million in the form of a loan and $266 million in straight equity. Credit Suisse Financial Products put in a $100 million loan and $33 million in equity. Other loans may have been secured in this way, but they haven't been made public. Investors in LTCM were pledged to keep in their money for at least two years.
LTCM entered 1998 with its capital reduced to $4.8 billion.

A New York Sunday Times article says the big trouble for LTCM started on July 17 when Salomon Smith Barney announced it was liquidating its dollar interest arbitrage positions: "For the rest of the that month, the fund dropped about 10% because Salomon Brothers was selling all the things that Long-Term owned." [The article was written by Michael Lewis, former Salomon bond trader and author of Liar's Poker. Lewis visited his former colleagues at LTCM after the crisis and describes some of the trades on the firm's books]

On August 17,1998 Russia declared a moratorium on its rouble debt and domestic dollar debt. Hot money, already jittery because of the Asian crisis, fled into high quality instruments. Top preference was for the most liquid US and G-10 government bonds. Spreads widened even between on- and off-the-run US treasuries.

Most of LTCM's bets had been variations on the same theme, convergence between liquid treasuries and more complex instruments that commanded a credit or liquidity premium. Unfortunately convergence turned into dramatic divergence. LTCM's counterparties, marking their LTCM exposure to market at least once a day, began to call for more collateral to cover the divergence. On one single day, August 21, the LTCM portfolio lost $550 million, writes Lewis. Meriwether and his team, still convinced of the logic behind their trades, believed all they needed was more capital to see them through a distorted market.

Perhaps they were right. But several factors were against LTCM.

1. Who could predict the time-frame within which rates would converge again?
2. Counterparties had lost confidence in themselves and LTCM.
3. Many counterparties had put on the same convergence trades, some of them as disciples of LTCM.
4. Some counterparties saw an opportunity to trade against LTCM's known or imagined positions.

In these circumstances, leverage is not welcome. LTCM was being forced to liquidate to meet margin calls.

On September 2, 1998 Meriwether sent a letter to his investors saying that the fund had lost $2.5 billion or 52% of its value that year, $2.1 billion in August alone. Its capital base had shrunk to $2.3 billion. Meriwether was looking for fresh investment of around $1.5 billion to carry the fund through. He approached those known to have such investible capital, including George Soros, Julian Robertson and Warren Buffett, chairman of Berkshire Hathaway and previously an investor in Salomon Brothers [LTCM incidentally had a $14 million equity stake in Berkshire Hathaway], and Jon Corzine, then co-chairman and co-chief executive officer at Goldman Sachs, an erstwhile classmate at the University of Chicago. Goldman and JP Morgan were also asked to scour the market for capital.

But offers of new capital weren't forthcoming. Perhaps these big players were waiting for the price of an equity stake in LTCM to fall further. Or they were making money just trading against LTCM's positions. Under these circumstances, if true, it was difficult and dangerous for LTCM to show potential buyers more details of its portfolio. Two Merrill executives visited LTCM headquarters on September 9, 1998for a "due diligence meeting", according to a later Financial Times report (on October 30, 1998). They were provided with "general information about the fund's portfolio, its strategies, the losses to date and the intention to reduce risk". But LTCM didn't disclose its trading positions, books or documents of any kind, Merrill is quoted as saying.

The US Federal Reserve system, particularly the New York Fed which is closest to Wall Street, began to hear concerns about LTCM from its constituent banks. In the third week of September, Bear Stearns, which was LTCM's clearing agent, said it wanted another $500 million in collateral to continue clearing LTCM's trades. On Friday September 18, 1998, New York Fed chairman Bill McDonough made "a series of calls to senior Wall Street officials to discuss overall market conditions", he told the House Committee on Banking and Financial Services on October 1. "Everyone I spoke to that day volunteered concern about the serious effect the deteriorating situation of Long-Term could have on world markets."

Peter Fisher, executive vice president at the NY Fed, decided to take a look at the LTCM portfolio. On Sunday September 20, 1998, he and two Fed colleagues, assistant treasury secretary Gary Gensler, and bankers from Goldman and JP Morgan, visited LTCM's offices at Greenwich, Connecticut. They were all surprised by what they saw. It was clear that, although LTCM's major counterparties had closely monitored their bilateral positions, they had no inkling of LTCM's total off balance sheet leverage. LTCM had done swap upon swap with 36 different counterparties. In many cases it had put on a new swap to reverse a position rather than unwind the first swap, which would have required a mark-to-market cash payment in one direction or the other. LTCM's on balance sheet assets totalled around $125 billion, on a capital base of $4 billion, a leverage of about 30 times. But that leverage was increased tenfold by LTCM's off balance sheet business whose notional principal ran to around $1 trillion.

The off balance sheet contracts were mostly nettable under bilateral Isda (International Swaps & Derivatives Association) master agreements. Most of them were also collateralized. Unfortunately the value of the collateral had taken a dive since August 17.

Surely LTCM, with two of the original masters of derivatives and option valuation among its partners, would have put its portfolio through stress tests to match recent market turmoil. But, like many other value-at-risk (Var) modellers on the street, their worst-case scenarios had been outplayed by the horribly correlated behaviour of the market since August 17. Such a flight to quality hadn't been predicted, probably because it was so clearly irrational.

According to LTCM managers their stress tests had involved looking at the 12 biggest deals with each of their top 20 counterparties. That produced a worst-case loss of around $3 billion. But on that Sunday evening it seemed the mark-to-market loss, just on those 240-or-so deals, might reach $5 billion. And that was ignoring all the other trades, some of them in highly speculative and illiquid instruments.

The next day, Monday September 21, 1998, bankers from Merrill, Goldman and JP Morgan continued to review the problem. It was still hoped that a single buyer for the portfolio could be found - the cleanest solution.

According to Lewis's article LTCM's portfolio had its second biggest loss that day, of $500 million. Half of that, says Lewis, was lost on a short position in five-year equity options. Lewis records brokers' opinion that AIG had intervened in thin markets to drive up the option price to profit from LTCM's weakness. At that time, as was learned later, AIG was part of a consortium negotiating to buy LTCM's portfolio. By this time LTCM's capital base had dwindled to a mere $600 million. That evening, UBS, with its particular exposure on a $800 million credit, with $266 million invested as a hedge, sent a team to Greenwich to study the portfolio.

The Fed's Peter Fischer invited those three banks and UBS to breakfast at the Fed headquarters in Liberty Street the following day. The bankers decided to form working groups to study possible market solutions to the problem, given the absence of a single buyer. Proposals included buying LTCM's fixed income positions, and "lifting" the equity positions (which were a mixture of index spread trades and total return swaps, and the takeover bets). During the day a third option emerged as the most promising: seeking recapitalization of the portfolio by a consortium of creditors. But any action had to be taken swiftly. The danger was a single default by LTCM would trigger cross-default clauses in its Isda master agreements precipitating a mass close-out in the over-the-counter derivatives markets. Banks terminating their positions with LTCM would have to rebalance any hedge they might have on the other side. The market would quickly get wind of their need to rebalance and move against them. Mark-to-market values would descend in a vicious spiral. In the case of the French equity index, the CAC 40, LTCM had apparently sold short up to 30% of the volatility of the entire underlying market. The Banque de France was worried that a rapid close-out would severely hit French equities. There was a wider concern that an unknown number of market players had convergence positions similar or identical to those of LTCM. In such a one-way market there could be a panic rush for the door. A meltdown of developed markets on top of the panic in emerging markets seemed a real possibility. LTCM's clearing agent Bear Stearns was threatening to foreclose the next day if it didn't see $500 million more collateral. Until now, LTCM had resisted the temptation to draw on a $900 million standby facility that had been syndicated by Chase Manhattan Bank, because it knew that the action would panic its counterparties. But the situation was now desperate. LTCM asked Chase for $500 million. It received only $470 million since two syndicate members refused to chip in. To take the consortium plan further, the biggest banks, either big creditors to LTCM, or big players in the over-the-counter markets, were asked to a meeting at the Fed that evening. The plan was to get 16 of them to chip in $250 million each to recapitalize LTCM at $4 billion.

The four core banks met at 7pm and reviewed a term sheet which had been drafted by Merrill Lynch. Then at 8.30 bankers from nine more institutions showed. They represented: Bankers Trust, Barclays, Bear Stearns, Chase, Credit Suisse First Boston, Deutsche Bank, Lehman Brothers, Morgan Stanley, Credit Agricole, Banque Paribas, Salomon Smith Barney, Societe Generale. David Pflug, head of global credit risk at Chase warned that nothing would be gained a) by raking over the mistakes that had got them in this room, and b) by arguing about who had the biggest exposure: they were all in this equally and together.

The delicate question was how to preserve value in the LTCM portfolio, given that banks around the room would be equity investors, and yet, at the same time, they would be seeking to liquidate their own positions with LTCM to maximum advantage. It was clear that John Meriwether and his partners would have to be involved in keeping such a complex portfolio a going concern. But what incentive would they have if they no longer had an interest in the profits? Chase insisted that any bailout would first have to return the $470 million drawn down on the syndicated standby facility. But nothing could be finalized that night since few of the representatives present could pledge $250 million or more of their firm's money.

The meeting resumed at 9.30 the next morning. Goldman Sachs had a surprise: its client, Warren Buffett, was offering to buy the LTCM portfolio for $250 million, and recapitalize it with $3 billion from his Berkshire Hathaway group, $700 million from AIG and $300 million from Goldman. There would be no management role for

Meriwether and his team. None of LTCM's existing liabilities would be picked up, yet all current financing had to stay in place. Meriwether had until 12.30 to decide.
By 1pm it was clear that Meriwether had rejected the offer, either because he didn't like it, or, according to his lawyers, because he couldn't do so without consulting his investors, which would have taken him over the deadline.

The bankers were somewhat flabbergasted by Goldman's dual role. Despite frequent requests for information about other possible bidders, Goldman had dropped no hint at previous meetings that there was something in the pipeline. Now the banks were back to the consortium solution. Since there were only 13 banks, not 16, they'd have to put in more than $250 million each. Bear Stearns offered nothing, feeling that it had enough risk as LTCM's clearing agent. [Their special relationship may have been the source of some acrimony: LTCM had an $18 million equity stake in Bear Stearns, matched by investments in LTCM of $10 million each by Bear Stearns principals James Cayne and Warren Spector]. Lehman Brothers also declined to participate . In the end 11 banks put in $300 million each, Societe Generale $125 million, and Credit Agricole and Paribas $100 million each, reaching a total fresh equity of $3.625 billion. Meriwether and his team would retain a stake of 10% in the company. They would run the portfolio under the scrutiny of an oversight committee representing the new shareholding consortium.

The message to the market was that there would be no fire-sale of assets. The LTCM portfolio would be managed as a going concern.

In the first two weeks after the bail-out, LTCM continued to lose value, particularly on its dollar/yen trades, according to press reports which put the loss at $200 million to $300 million. There were more attempts to sell the portfolio to a single buyer. According to press reports the new LTCM shareholders had further talks with Buffett, and with Saudi prince Alwaleed bin talal bin Abdelaziz. But there was no sale. By mid-December, 1998 the fund was reporting a profit of $400 million, net of fees to LTCM partners and staff.

In early February, 1999 there were press reports of divisions between banks in the bailout consortium, some wishing to get their money out by the end of the year, others happy to "stay for the ride" of at least three years. There was also a dispute about how much Chase was charging for a funding facility to LTCM. Within six months there were reports that Meriwether and some of his team wanted to buy out the banks, with a little help from their friend Jon Corzine, who was due to leave Goldman Sachs after its flotation in May, 1999.

By June 30, 1999 the fund was up 14.1%, net of fees, from last September. Meriwether's plan approved by the consortium, was apparently to redeem the fund, now valued at around $4.7 billion, and to start another fund concentrating on buyouts and mortgages. On July 6, 1999, LTCM repaid $300 million to its original investors who had a residual stake in the fund of around 9%. It also paid out $1 billion to the 14 consortium members. It seemed Meriwether was bouncing back.

Post mortem

The LTCM fiasco naturally inspired a hunt for scapegoats:

1. First in line were Meriwether and his crew of market professors.
2. Second were the banks which conspired to give LTCM far more credit, in aggregate, than they'd give a medium-size developing country. Particularly distasteful was the combination of credit exposure by the institutions themselves, and personal investment exposure by the individuals who ran them.

Merrill Lynch protested that a $22 million investment on behalf of its employees was not sinister. LTCM was one of four investment vehicles which employees could opt to have their deferred payments invested in. Nevertheless, that rather cosy relationship may have made it more difficult for credit officers to ask tough questions of LTCM. There were accusations of "croney capitalism" as Wall Street firms undertook to bail out, with shareholders' money, a firm in which their officers had invested, or were thought to have invested, part of their personal wealth.

3. Third in line was the US Federal Reserve system. Although no public money was spent - apart from hosting the odd breakfast - there was the implication that the Fed was standing behind the banks, ready to provide liquidity until the markets became less jittery and more rational. Wouldn't this simply encourage other hedge funds and lenders to hedge funds to be as reckless in future?
4. Fourth culprit was poor information. Scant disclosure of its activities and exposures, by LTCM, as with many hedge funds, was a major factor in allowing it to put on such leverage. There was also no mechanism whereby counterparties could learn how far LTCM was exposed to other counterparties.
5. Fifth was sloppy market practice, such as allowing a non-bank counterparty to write swaps and pledge collateral for no initial margin as if it were part of a peer-group top-tier banks.

1. *LTCM's risk management*.

Despite the presence of Nobel laureates closely identified with option theory it seems LTCM relied too much on theoretical market-risk models and not enough on stress-testing, gap risk and liquidity risk. There was an assumption that the portfolio was sufficiently diversified across world markets to produce low correlation. But in most markets LTCM was replicating basically the same credit spread trade. In August and September 1998 credit spreads widened in practically every market at the same time.

LTCM risk managers kidded themselves that the resultant net position of LTCM's derivatives transactions bore no relations to the billions of dollars of notional underlying instruments. Each of those instruments and its derivative has a market price which can shift independently, each is subject to liquidity risk.

LTCM sources apparently complain that the market started trading against its known positions. That seems like special pleading. Meriwether et al must have been in the markets long enough to know they are merciless, and to have been just as merciless themselves. "All they that take the sword shall perish with the sword." [Matthew, xxvi, 52]

2. *Risk management by LTCM counterparties*

Practically the whole street had a blind spot when it came to LTCM. They forgot the useful discipline of charging non-bank counterparties initial margin on swap and repo transactions. Collectively they were responsible for allowing LTCM to build up layer upon layer of swap and repo positions.

They believed that the first-class collateral they held was sufficient to mitigate their loss if LTCM disappeared. It may have been over time, but their margin calls to top up deteriorating positions simply pushed LTCM further towards the brink. Their credit assessment of LTCM didn't include a global view of its leverage and its relationship with other counterparties.

A working group on highly leveraged institutions set up by the Basle Committee on Banking Supervision reported its findings in January, 1999 drawing many lessons from the LTCM case. It criticized the banks for building up such exposures to such an opaque institution. They had placed a "heavy reliance on collateralization of direct mark-to-market exposures" the report said. "This in turn made it possible for banks to compromise other critical elements of effective credit risk management, including upfront due diligence, exposure measurement methodologies, the limit setting process, and ongoing monitoring of counterparty exposure, especially concentrations and leverage."

The working group also noted that banks' "covenants with LTCM did not require the posting of, or increase in, initial margin as the risk profile of the counterparty changed, for instance as leverage increased". (For full reports, see "Sound Practices for Banks' Interactions with Highly Leveraged Institutions," and "Banks' Interactions with Highly Leveraged Institutions".) Another report in June, 1999 by the Counterparty Risk Management Policy Group, a group of 12 leading investment banks, suggested many ways in which information-sharing and transparency could be improved. It noted the importance of measuring liquidity risk, and improving market conventions and market practices, such as charging initial margin.

3. Supervision

Supervisors themselves showed a certain blinkered view when it came to banks' and securities firms' relationships with hedge funds, and a huge fund like LTCM in particular. The US Securities & Exchange Commission (SEC) appears to assess the risk run by individual broker dealers, without having enough regard for what is happening in the sector as a whole, or in the firms' unregulated subsidiaries. In testimony to the House Committee on Banking and Financial Services on October 1, 1998, Richard Lindsey, director of the SEC's market regulation division recalled the following: "When the commission learned of LTCM's financial difficulties in August, the commission staff and the New York Stock Exchange surveyed major broker-dealers known to have credit exposure to one or more large hedge funds. The results of our initial survey indicated that no individual broker-dealer had exposure to LTCM that jeopardized its required regulatory capital or its financial stability.

"As the situation at LTCM continued to deteriorate, we learned that although significant amounts of credit were extended to LTCM by US securities firms, this lending was on a secured basis, with collateral collected and marked-to-the-market daily. Thus, broker-dealers' lending to LTCM was done in a manner that was consistent with the firms' normal lending activity. The collateral collected from LTCM consisted primarily of highly liquid asseets, such as US treasury securities or G-7 country sovereign debt. Any shortfalls in collateral were met by margin calls to

LTCM. As of the date of the rescue plan, it appears that LTCM had met all of its margin calls by US securities firms. Moreover, our review of the risk assessment information submitted to the commission suggests that any exposure to LTCM existed outside the US broker-dealer, either in the holding company or its unregistered affiliates."

The sad truth revealed by this testimony is that the SEC and the NYSE were concerned only with the risk ratios of their registered firms and were ignorant and unconcerned, as were the firms themselves, about the market's aggregate exposure to LTCM.

Bank of England experts note the absence of any covenant between LTCM and its counterparties that would have obliged LTCM to disclose its overall gearing. UK banks have long been in the habit of demanding covenants from non-bank counterparties concerning their overall gearing, the Bank of England says.

3.*Was there moral hazard?*
The simple answer is yes, since the bailout of LTCM gave comfort that the Fed will come in and broker a solution, even if it doesn't commit funds. The Fed's intervention also arguably tempted Meriwether not to accept the offer from Buffett, AIG and Goldman. The offer, heavily conditional though it was, shows that the LTCM portfolio had a perceived market value. A price might have been reached in negotiations between Buffett and Meriwether. Meriwether's argument [and the Fed's] is that Buffett's deadline of 1230 didn't give Meriwether time to consult with LTCM's investors: he was legally unable to accept the offer.

It is possible to argue that a market solution was found. Fourteen banks put up their own money, regarding it as a medium-term investment from which they expected to make a profit. From a value-preservation point of view it was an enlightened solution, even if it did seem to reward those whose recklessness had created the problem.

Federal Reserve chairman Alan Greenspan defended the Fed's action at the October 1 hearing in the House Committee on Banking and Financial Services as follows: "This agreement [by the rescuing banks] was not a government bailout, in that Federal Reserve funds were neither provided nor ever even suggested. Agreements were not forced upon unwilling market participants. Credits and counterparties calculated that LTCM and, accordingly, their claims, would be worth more over time if the liquidation of LTCM's portfolio was orderly as opposed to being subject to a fire sale. And with markets currently volatile and investors skittish, putting a special premium on the timely resoluton of LTCM's problems seemed entirely appropriate as a matter of public policy."

The true test of moral hazard is whether the Fed would be expected to intervene in the same way next time. Greenspan pointed to a unique set of circumstances which made an LTCM solution particularly pressing. It seems questionable whether the Fed would act as broker for another fund bailout unless there were also such wide systemic uncertainties.

4. *Was there truly a systemic risk?*

Since there was no global meltdown it is difficult to prove that there was a real danger of such a thing last September. But if the officers at the US Federal Reserve had waited to see what happened no-one would have thanked them after the event. In the judgment of this writer, the world financial system owes a lot to the prompt action of Greenspan, McDonough, Fisher and others at the Fed for their willingness to meet the problem fair and square. One shudders to think what the Bank of England (FSA) might have done, given its "constructive ambiguity" during the Barings crisis.

But the counter-argument is also valid. Those Wall Street firms, once they knew the size of the problem, had only one sensible course of action, to bankroll a co-ordinated rescue. They had the resources to prevent a meltdown and it took only a night and a day to pool them. Mutual self-interest concentrates the mind wonderfully. It seems that in the developed world, since the early 1990s, financial firms have built up enough capital to meet most disasters the world can throw at them. Their mistakes in emerging markets were costly both for them and for the countries concerned, but they haven't threatened the life of the world financial system. It seems the mechanisms for restructuring and acquisition are so swift that the demise of a financial firm simply means it will be stripped of the trash and carved up. In a down-cycle, however, the outcome could be very different. Moreover, the social costs of this financial overreach, followed by cannibalism, could be considerable.
Systemic, no; ripe for concerted private and public intervention, yes.

On September 29, 1999, six days after the LTCM bailout, US Federal Reserve chairman Alan Greenspan cut Fed fund rates by 25 basis points to 5.25%. On October 15, 1999 he cut them by another quarter. His critics associate these cuts directly with the bail-out of LTCM: it was an extra dose of medicine to make sure the recovery worked. Some sources attribute the cut to rumours that another hedge fund was in trouble.

The more generous view is that, if the financial markets were in disarray, we ain't seen nothing yet. Bruce Jacobs, who has followed the systemic implications of the 1929, 1987 and subsequent mini-crashes, fearful of the dangers of globally traded derivatives, writes in a new book: "Had LTC not been bailed out, the immediate liquidation of its highly leveraged bond, equity, and derivatives positions may have had effects, particularly on the bond market, rivaling the effects on the equity market of the forced liquidations of insured stocks in 1987 and margined stocks in 1929. Given the links between LTC and investment and commercial banks, and between its positions in different asset markets and different countries' markets, the systemic risk much talked about in connection with the growth of derivatives markets may have become a reality." [Capital ideas and market realities, Blackwell, 1999, page 293]

Corrective response

The Basle Committee on Banking Supervision's report on highly leveraged institutions (HLIs) in January 1999 suggests that supervisors demand higher capital charges for exposure to highly leveraged institutions where there is no limit to overall leverage: "Possibly all exposures to all counterparties not covered by covenants on leverage should carry a higher weight." It further considers the possibility of extending a credit register for bank loans in the context of HLIs. "The register would entail collecting, in a centralized place, information on the exposures of international financial intermediaries to single counterparties that have the potential to create systemic risk (ie major HLIs). Exposures would cover both on and off-balance-sheet positions. Counterparties, supervisors and central banks could then obtain information about the overall indebtedness of the single counterparty."

The losers

Among the investors who lost their capital in LTCM (according to press reports) were:

- LTCM partners - $1.1 billion ($1.5 billion at the beginning of 1998, offset by their $400 million stake in the rescued fund)
- Liechtenstein Global Trust - $30 million
- Bank of Italy - $100 million
- Credit Suisse - $55 million
- UBS - $690 million
- Merrill Lynch (employees' deferred payment) - $22 million
- Donald Marron, chairman, PaineWebber - $10 million
- Sandy Weill, co-ceo, Citigroup - $10 million
- McKinsey executives - $10 million
- Bear Stearns executives - $20 million
- Dresdner Bank - $145 million
- Sumitomo Bank - $100 million
- Prudential Life Corp - $5.43 million

There were no reported numbers for the following organisations:
- Bank Julius Baer (for clients)
- Republic National Bank
- St Johns University endowment fund
- University of Pittsburgh

UBS fiasco

The biggest single loser in the LTCM debacle was UBS, which was forced to write off Sfr950 million ($682 million) of its exposure. The UBS involvement with LTCM pre-dated the merger of Union Bank of Switzerland and Swiss Bank Corporation in December 1998. Various heads rolled, including that of chairman Mathis Cabiallavetta (formerly chief executive of Union Bank of Switzerland), Werner Bonadurer, chief operating officer, Felix Fischer, chief risk officer, and Andy Siciliano, head of fixed income (who had been with SBC).

UBS's deal with LTCM was a variation on other attempts to turn hedge funds into a securitized asset class with a protected downside. However in this case UBS was protecting the downside and LTCM was taking a good deal of the upside. The sweetener for UBS was a structure that looked more like an option than a loan, turning any income into a capital gain, and an opportunity to invest directly in LTCM.

For a premium of $300 million UBS sold LTCM a seven-year European call option on 1 million of LTCM's own shares, valued then at $800 million. To hedge the *position - the only way it could be done - UBS bought \$800 million worth of LTCM shares. UBS also invested \$300 million (most of the \$266 million premium income) directly in LTCM. Such an investment had to be held for a minimum of three years. This transaction was completed in three tranches in June, August and October 1997. The deal was calculated so that the \$300 million premium was equivalent to a coupon of Libor plus 50 basis points over the seven years.*

Assuming that LTCM performed well the deal provided UBS with steady, tax-efficient, return plus a share in the upside, through its \$266 million stake. But if ever its hedge looked like falling below the \$800 million strike price it was looking at a loss. The only way to hedge it would have been to sell LTCM shares. But there were various impediments to this. UBS could not just dump the shares. It was obliged to convert any shares it sold into a loan at par value, maturing in 2004. Shares in hedge funds aren't liquid, and LTCM's were no exception. It was impossible to mark them regularly to market. LTCM reported to shareholders only monthly. If UBS did sell LTCM shares in a falling market, and then LTCM's performance picked up again, there was no guarantee it could rehedge its position. No one was making a market in LTCM shares.

Theoretically there was a volatility cap on the arrangement: if the fund's volatility exceeded a certain level a cash sum would be reckoned in UBS's favour, payable at the end of year seven. But it is not clear how that would have left UBS market-neutral.

In the climate of mid-1997 it is understandable how UBS risk managers might have overlooked the horrible implications of a worst-case LTCM scenario. LTCM had a fantastic reputation for big-number but low-risk arbitrage. (There is a parallel in the reputation that Nick Leeson enjoyed at Barings before March 1995).

But it is clear now that UBS risk managers never faced the possibility of a collapse of LTCM which would have left them with \$766 million exposure (\$800 million hedge, \$266 million investment, less \$300 million option premium). That is, they didn't wake up to it, apparently, until around April 1998, in a post-merger review, when it was too late to do much about it.

Credit Suisse Financial Products, which did a similar deal for \$100 million, set that as the maximum it was prepared to lose.

An interesting aspect of the UBS deal is to consider it from LTCM's point of view. LTCM secured \$800 million new investment capital at Libor plus 50 basis points. It had a call on all returns above that level. UBS's obligation, to convert any shares it wanted to sell into a loan, provided LTCM with a synthetic seven-year put on its own performance. Was this an added incentive to roll the dice? It was a cheap gambling stake.

ends