

Among the PRMIA Case Studies, LTCM has some unique characteristics:

- No US taxpayer money was involved in the rescue
- No retail depositor's money was involved or threatened
- No politicians were involved
- No laws were broken and no-one went to prison
- No-one was fined or censured
- No LTCM employee was indicted for fraud
- No internal or regulatory authority audit report ever highlighted any risk, or operational, concerns
- Any losses suffered by LTCM professional investors were minor relative to their wealth
- There was no proven, shareholder, or legal suites for any form of negligence or malfeasance
- And no bankruptcies were declared

Not quite so unique about LTCM, was the hype and sensationalism created in the media by distorted coverage about what was, essentially, an overreaction by many commentators to the usual and known risks involved by anyone investing in high-risk, potentially high-reward strategies in the wholesale markets. But when extremely large numbers are involved, and large potential losses, linked with personalities of international repute, and in a climate of the unknown, it becomes susceptible to easy, and headline-grabbing, reporting.

So why is LTCM included as a PRMIA Case Study?

Because It offers an insight into the professional derivative markets of the 1990s, some of the personalities and institutions involved, those who trade in those markets, some deep insight into the trading strategies and dynamics of those markets, the motives and performance of the US regulators, the rational and irrational behaviour of all concerned; but more importantly – the lessons (which should have been) learned from the entire episode.

### So what happened

The investment partnership Long-Term Capital Management was set up in 1993 by John Meriwether, previously a successful bond trader and then senior manager at the US investment bank, Salomon Brothers. Meriwether recruited to LTCM, from Salomon and elsewhere, an impressive team of experienced traders and specialists in mathematical finance. Much of its trading was with leading banks, and it largely avoided risky 'emerging markets', preferring well-established ones such as those in government bonds of the leading industrial nations. The fund avoided speculation based on hunches. It built carefully researched mathematical models of the markets in which it traded, and invested in a way designed to achieve insulation from market movements, seeking small pricing anomalies from which it could profit. Although it had to borrow large amounts and commit money on a large scale to make an adequate return from these anomalies, LTCM scrupulously measured and controlled the risks it was taking.

The investor's who were attracted to LTCM's business strategy reads like a "Who's Who" of professional and sophisticated investors who knew the risks involved, had committed both equity and loan capital (locked in for perhaps 3 years with various contractual mechanisms to ensure no quick flight of their capital), and, presumably had the approval of the investment committees of their respective institutions. They included: LTCM partners (who invested \$100 million); and other whose investment totalled \$1 billion; Liechtenstein Global Trust; Bank of Italy; Credit Suisse; UBS; Merrill Lynch (employees' deferred payment plan); Donald Marron, chairman, PaineWebber; Sandy

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Weill, co-CEO, Citigroup; McKinsey executives; Bear Stearns executives; Dresdner Bank; Sumitomo Bank; Prudential Life Corp; Bank Julius Baer (for clients); Republic National Bank; St John's University endowment fund; and University of Pittsburgh.

In total \$1.1 billion was raised, and the transparency of their investment was provided by Monthly Net Asset Valuations, Quarterly Balance Sheets, annual financial statements including full disclosure of off balance sheet contractual positions, and periodic presentations to lenders concerning financial condition and portfolio policy.

LTCM were strikingly successful from the start of trading in 1994 when it earned 28% after fees in 10 months. In LTCM's first two full years of operation it produced 43% and 41% return on equity and had amassed an investment capital of \$7.5 billion. The fund was closed to new investors in 1995. In the last quarter of 1997 LTCM returned \$2.7 billion to investors. Such numbers are quite startling, but not especially so, considering the amount of capital involved, its corresponding leverage, and the probably very high nominal principal amount of each trade chasing perhaps no more than a few basis points per trade.

But it all started to go sour in the summer of 1998 because of unusually adverse market conditions. There were, perhaps, five contributory factors, some of which were extreme events, which led to the Federal Reserve Bank of New York orchestrating an orderly rescue of LTCM:

1. Russia's devaluation of the rouble and partial default on its rouble-denominated debt. The Russian default was just such an extreme event, though one that no one had anticipated: the surprise was not that Russia was in economic trouble, but that it defaulted on debts denominated in roubles, rather than simply printing more money, and also that it temporarily blocked some foreign exchange transactions by Russian banks. LTCM itself had only a minor direct exposure to events in Russia, but the precise form of Russia's actions caused significant losses to Western banks. An investment fund called High Risk Opportunities failed, and (quite unfounded) rumors began to circulate that Lehman Brothers, an established investment bank, was also about to do so. Suddenly, market unease turned into self-feeding fear. A 'flight to quality' took place, as a host of institutions sought to liquidate investments that were seen as difficult to sell, and potentially higher risk, replacing them with lower risk, more liquid alternatives. Because LTCM's 'convergence arbitrage' generally involved holding the former, and short selling the latter, the result was a substantial market movement against the fund.
2. Another, perhaps anecdotal, factor was the simple fact that it took place in August, when many European and US traders, and managers, were on holiday and markets tended to be thinner and less liquid than usual.
3. LTCM was by no means the only market participant involved in convergence arbitrage: many of the world's leading banks, notably Wall Street investment banks who were also LTCM investors, had broadly similar large positions.
4. The majority of these banks employed value-at-risk models not just as LTCM did (to gauge the overall risks faced by the fund), but also as a management tool. By allocating value-at-risk limits to individual traders and trading desks, big institutions prevent the accumulation of over-risky positions while giving traders flexibility within those limits. However, if adverse market movements take positions up to or beyond the limits, the traders involved have no alternative but to try to cut their losses and sell, even if it is an extremely disadvantageous time to do so. In August 1998, widespread efforts to liquidate broadly similar positions in roughly the same set of markets seem to have intensified the adverse movements that were the initial problem. Crucially, they also led to greatly enhanced correlations between what

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historically had been only loosely related markets, across which risk had seemed to be reduced by diversification.

5. LTCM's position, however, was constructed so robustly that, though they caused major losses, these problems were not fatal. In September 1998, though, a social process of a different kind got underway - in effect a run on a bank. LTCM's difficulties became public. On 2 September Meriwether sent a private fax to the company's investors, describing its financial situation and seeking to raise further capital to exploit what he described (quite reasonably) as attractive arbitrage opportunities. The fax was posted almost immediately on the Internet and was read as evidence of desperation. The nervousness of the markets crystallized as fear of LTCM's failure. Almost no one could be persuaded to buy, at any reasonable price, an asset that LTCM was known or believed to hold, because of the concern that the markets were about to be saturated by a fire sale of the fund's positions. In its attempt to raise additional capital, LTCM had shown its positions to outsiders, which may have caused leaks on what was held. In addition, LTCM's counterparties - the banks and other institutions that had taken the other side of its trades - tried to protect themselves as much as possible against LTCM's failure by a mechanism that seems to have sealed the fund's fate. As good business practice, LTCM had constructed its trades so that solid collateral, typically government bonds, moved backwards and forwards between it and its counterparties as market prices moved in favour of one or the other. Under normal circumstances, when prices were unequivocal (rational), it was an eminently sensible way of controlling risk. But in the fear-chilled, illiquid markets of September 1998 (irrational), prices lost their character as clear facts. As was their contractual right, LTCM's counterparties marked against it: that is, they chose prices that were unfavourable to LTCM, seeking to minimize the consequences for their balance-sheets of a LTCM's failure by getting hold of as much of the firm's collateral as possible. Fearing the failure, they made it inevitable by draining the firm of its remaining capital.

### Timeline of Rescue

Each US Federal Reserve System Bank has a remit to monitor all the financial institutions within in its geographical preserve, and likewise, each financial institution has an obligation to disclose to its' local Fed Bank any untoward circumstances. In **early September, 1998**, David Mullins, on behalf of the management of LTCM, informed the New York Fed chairman Bill McDonough about the situation at LTCM.

On **mid September 18, 1998**, McDonough made "a series of calls to senior Wall Street officials to discuss overall market conditions, 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. It was now clear that, although LTCM's major counterparties had individually closely monitored their bilateral positions, they now had sight of LTCM's overall total off balance sheet leverage. The off balance sheet contracts were mostly nettable under bilateral ISDA master agreements, and most of them were also collateralized, but unfortunately the value of the collateral had also taken a dive since mid-August. However, from LTCM's perspective these swaps were marked-to-market on daily basis so if more collateral was needed it had to be made available on a daily basis.

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The next day, **Monday 21<sup>st</sup> September**, 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.

By this time LTCM's capital base had dwindled to a mere \$1,000 million. That evening, **Monday 21<sup>st</sup> September**, UBS sent a team to Greenwich to study the portfolio. On **Tuesday 22<sup>nd</sup> September**, the Fed's Peter Fischer invited those three banks, and UBS, to breakfast at the Fed headquarters 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 some "takeover" positions). 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. 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.

There is also the market mechanics of unwinding these positions in a bankruptcy situation. For example, if LTCM had a trade long the 29 year bond and short the 30 year bond - that had very little risk. They had used leverage to bring that risk more into line with normal market risk. At inception, each side of the trade had been done with a different counterparty, for two reasons.

1. First, for proprietary reasons LTCM probably did not want their counterparties to see the exact trade for fear that that might copy it; and
2. Second, LTCM received better financing terms when they separated the legs of their trades.

But if in the event that LTCM filed for bankruptcy, these trades would no longer be paired together as the counterparties looked to unwind them quickly. To illustrate, if JP Morgan was financing the LTCM long position in the 29 year bond via a repo, then J P Morgan had lent LTCM cash against holding the 29 year bond as a collateral. In bankruptcy J P Morgan would look to sell out their collateral as quickly as possible and if there was a shortfall they would send LTCM a bill. On the short side LTCM might have borrowed the 30 year bond from Citibank and posted cash as collateral. In bankruptcy, Citibank would buy back the bond quickly in the open market. The paired trade had very little risk, but in bankruptcy each side had enormous risk. In this sense LTCM acted almost as a clearinghouse so that when it was a going concern there would be a small amount of risk, but – in bankruptcy - each of the individual legs of the trades could have a substantial amount of risk.

A meltdown in developed markets on top of the panic in emerging markets seemed a real possibility. In addition, LTCM's clearing agent Bear Stearns was threatening to foreclose the following day if it didn't receive an additional \$500 million in 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 that evening. The plan was to get 16 of them to chip in \$250 million each to recapitalize LTCM at \$4 billion.

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The four core banks met at 7pm **Monday 21<sup>st</sup> September** 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 meeting resumed at 9.30 on **Wednesday 23<sup>rd</sup> September**. 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. The conditions included a) there would be no management role for Meriwether and his team; b) none of LTCM's existing liabilities would be picked up; and c) all current financing had to stay in place. Meriwether had until 12.30 that day to decide. By 1pm it was clear that Meriwether and LTCM could not accept the offer for various reasons, which included a) he couldn't do so without consulting his investors, which would have taken him over the deadline; and b) more importantly to keep the current financing in place including term maturities and no haircuts etc would require the dealers, and other counterparties and debt holders, to agree. LTCM had 15,000 outstanding trades and each one was a credit counterparty trade (like a repo or a swap). Each one would need the approval of the other counterparty to transfer it to the Buffet group. Of course every counterparty would have preferred to have had Buffet on the other side as opposed to an about-to-be-bankrupt hedge fund but LTCM had 1 hour to obtain all these approvals and many of the counterparties (in Japan) were already closed for the day.

So it didn't happen. (Anecdotally, in a Buffett biography, he does discuss his version of what happened, and discloses that he would have liked the transaction to have gone through.)

But more importantly, 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. On **September 23**, a consortium of 14 leading investment and commercial banks agreed in principle to invest \$3.625 billion in the fund. The investment was consummated on **September 28**. The consortium investment consisted entirely of private sector capital.

### The aftermath...

By mid-December, 1998 the fund was reporting a profit of \$400 million, net of fees to LTCM partners and staff. By June 30, 1999 the fund was up 14.1%, net of fees, from the previous September. Meriwether's plan, approved by the consortium, was to redeem the fund, then 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.

### Post mortem

The LTCM event naturally inspired a hunt for scapegoats, someone to blame:

1. First in line were the risk management practices of LTCM. Perversely it was those very same risk management practices which first highlighted and quantified the problem, and allowed the measured and controlled liquidation of the portfolio to happen.
2. Second were the banks which had given LTCM far more credit, in aggregate, than they'd give a medium-size developing country. Particularly distasteful to some was the combination of credit exposure by the institutions themselves, and the personal investment exposure by the individuals who ran them. That rather cosy relationship may have made it more difficult for senior credit officers to ask tough questions of LTCM. So there were accusations of "conflicts

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of interest" as Wall Street firms undertook to rescue, 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 were the regulators - US Federal Reserve system, and the SEC. Although no public money was spent - apart from hosting the odd breakfast - there was the veiled implication that the Fed was standing behind the banks, ready to provide liquidity until the markets became less jittery and more rational. 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) appeared 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". 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.

However, the reality is that the FED facilitated an "expedient pre-packaged bankruptcy", where the major creditors made an emergency equity infusion in order to provide for an orderly liquidation. The FED was able to do this due to their authority, and the lack of complete information that was available to each of the individual creditors.

4. Fourth culprit was poor LTCM information. Scant public and industry-wide disclosure of its activities and exposures, in allowing it to put on such leverage. There was also no mechanism (and there still isn't a mechanism) whereby counterparties could have learnt how far they were (and are) exposed to other counterparties.
5. Fifth was extremely bad credit analysis, such as allowing a non-bank counterparty – however well esteemed by the "Street" - to write swaps and pledge collateral for no initial margin as if it were part of a peer group of top-tier banks with the highest credit rating. 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.
6. Sixth was the US regulatory oversight of hedge fund activities. LTCM was required to, and did, file all its' required periodic returns to all regulatory and tax authorities; so why didn't any "authority" spot these inherent risks to the financial system? No answers have been forthcoming from any federal source on this point. However in mitigation, it can be asserted that this event in the financial markets erupted so quickly, and amid other market and world turmoil, that the Federal Reserve acted wisely and expediently in co-ordinating LTCM's recapitalization among a peer group of investors – all in the space of less than 2 weeks.

## Lessons Learnt

### 1. Stress Testing of Liquidity Risk.

Despite the \$900 million Standby Letter of Credit, and over a \$1 billion in working capital, LTCM still required a rescue. No matter how extreme they may appear, worst-case scenarios do, and will, happen. Hedging the “tail” of a VaR may seem like an expensive capital raising insurance but could also limit potential losses in adverse market conditions. But also bear in mind that there will always be events, or compound or correlated events, which will not be anticipated. And no stress testing model (economic, proprietary, accounting or regulatory) is a complete descriptor of the complex reality. There will always be missing elements from any prior analysis, and thus as part of risk management design one must have procedures in place to deal with managing crises (defined as events not anticipated in any fashion beforehand), which cannot be known in advance.

(LTCM did to the extent it had a team of senior management who had dealt with crises of the past (1987 Crash; S&L crisis), nevertheless it was not able to prevent the events described in this Case Study)

### 2. Market Risk.

When markets become illiquid, for whatever reason, bid / offer spreads will diverge dramatically, and self-interest and self-preservation will drive market prices. As in liquidity risk, worst-case scenarios do, and will, happen.

### 3. Credit Risk.

There is no substitute for good, and enforceable, credit policies. Any deviations must require approval and sign-off at the highest level

### 4. Governance Risk

The responsibility for good governance starts at home, and cannot be abrogated to regulatory bodies.

### 5. Operational Risk

- i) Always guard against the event of any private, internal documents and memorandum becoming public. In the domain of the uninitiated, they can be taken out of context and cause material, reputational, and financial, damage
- ii) Seemingly small mistakes (e.g. the design and feasibility of the Buffett offer) leading to major problems (imagine if the Buffett deal had gone through, there would probably have been only a very small story about LTCM)

### 6. Reputational Risk.

The market's perception, including that all your customers and counterparties, of your risk appetite and profile, must be assiduously managed. Processes and processes must be in place (and stress tested) and capital allocated, to protect shareholder, stakeholder, and investor capital in the event of adverse publicity.

This Case Study has been written by J Downing, from material extracted from, and provided by: “Lessons From the Collapse of Hedge Fund, Long Term Capital Management” By David Shirreff; IFCI Risk Institute, [www.ifri.ch](http://www.ifri.ch); Fear in the Markets - Donald MacKenzie in London Review of Books, April 13, 2000, <http://www.lrb.co.uk/v22/n08/print/mack01.html>; Eric Rosenfeld, Zvi Bodie, and R. C. Merton