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LONG-TERM CAPITAL MANAGEMENT (A): RISE AND FALL

In 1993, John Meriwether gathered together the smartest group of bond arbitrage experts ever assembled.¹ The group included former professors and Ph.D.s, two of whom were future Nobel Laureates in economics. Some of the group had honed their skills and their computer models under Meriwether's leadership at Salomon Brothers, where their activities had generated a substantial amount of Salomon's profits. Now, they assembled to raise a private hedge fund that would utilize this brainpower, as well as extensive computer databases, to isolate risk, minimize the chance of loss, generate exceptional profits for their investors, and amass huge wealth for themselves. They raised \$1.25 billion in capital from investors and assembled a network of banks ready to provide additional financing at very favorable terms.

From 1994, when they began trading, through mid-1998, they generated astonishing returns. Many of the partners invested their entire net worth in the fund. Some took large personal loans to increase their investments, thus investing much more than their net worth. All had become fabulously wealthy.

Then, over a period of five weeks, the fund, with assets of more than \$100 billion, collapsed. To prevent a potential disaster in world financial markets, the Federal Reserve stepped in at the last moment to bring the leading banks together to engineer a bailout. The partners lost their entire investments, some going deep into personal debt—one partner plunged from a personal net worth of \$500 million to a personal debt of \$24 million in five weeks.

How could things have gone so totally, and tragically, wrong? Was it a case of unprecedented, and totally unpredictable financial events? Were there faults in their computer models? Was it just bad luck? Or was it something more basic?

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Research Associate David Hoyt prepared this case under the supervision of Professor Margaret Neale, Stanford Graduate School of Business, and Professor Thomas Z. Lys, Kellogg Graduate School of Management, Northwestern University as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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JOHN MERIWETHER AND THE SALOMON ARBITRAGE GROUP

John Meriwether joined the investment banking firm of Salomon Brothers in 1974, after studying mathematics at Northwestern, teaching high school mathematics for a year, and then receiving an MBA from the University of Chicago. At the time, Salomon Brothers was a small firm, and Meriwether began in the financing department, trading bonds (6–7).

Bond trading changed dramatically between the mid-1960s and 1970s. Previously, investors had bought bonds to achieve a steady income, and generally held the bonds for long periods. In the early 1970s, the bond trading environment changed. The price of gold was deregulated, oil was embargoed, and the Penn Central Railroad declared bankruptcy. Interest rates, and therefore bond prices, fluctuated more widely than ever before, and there was a new perception of risk.²

New financial products were created based on currencies and interest rates. Bonds and mortgages were cut up and resold. For instance, the interest from a set of bonds might be repackaged and sold separately from the principal. In addition, the widespread use of the computer was changing the nature of trading. It became easy for traders to calculate the relationship between price and yield, speeding the flow of transactions.

In 1977, Salomon formed the Arbitrage Group, led by Meriwether. Previously, the Salomon traders had bought and sold bonds for customers. The Arbitrage Group, however, used Salomon's own capital to buy and sell. Their most common activity was to bet on the change in spreads of two related items, such as a futures contract on a specific bond and the bond itself.³

In the short term, these spreads might widen if investors in riskier bonds got scared and sold. Over time, however, spreads usually converged. In the bond/futures example, as the maturity date of the bond approached, the bond price fluctuated less with interest rate changes (it approached its redemption value), and the cost of the futures contract approached the cost of the bond itself.

Throughout his life, Meriwether had been a student of gambling—"Meriwether was the priest of the *calculated* gamble. He was cautious to a fault; he gave away nothing of himself. His background, his family, his entire past were as much of a blank to colleagues as if, one said, he had 'drawn a line in the sand'" (10). He had a quick mind and a poker face—important attributes for a bond trader.

Bond traders had traditionally operated on gut feel. Looking for an advantage, Meriwether sought traders who would view the markets from a dispassionate, intellectual perspective. In 1983, he recruited Eric Rosenfeld, an MIT-trained Harvard Business School assistant professor and computer freak, who was using quantitative methods to make investments. He then hired Victor Haghani, who had a master's degree in finance from the London School of Economics; Gregory Hawkins, a Ph.D. in financial economics from MIT; William Krasker, a mathematically

² Bonds pay a specified amount of interest, generally each six months, and are redeemed at face value upon expiration. When interest rates fall, investors will pay more for the bond in order to receive the fixed interest payment. Conversely, when the interest rate on a bond rises, the bond price falls.

³ The spread is the difference in interest rates between two bonds, and a measure of relative risk. The spread on a single bond is its yield compared to a 30-year Treasury bond, which is the lowest risk bond.

mindful economist and Ph.D. from MIT and assistant professor at Harvard. Lawrence Hilibrand had two degrees from MIT, and was viewed as “probably the nerdiest, and surely the smartest” (11).

At Salomon, the professors created computer databases of all the past bond prices they could find and their historical price relationships, and modeled how these relationships should behave in the future. Using this model, they looked at current prices and determine if the prices had deviated from their expected relationships. When such deviations occurred, it created an investment opportunity, as the relationships would be expected to return to their historical patterns. If they made a trade and it went wrong in the short term, they redoubled their bet, supremely confident that given enough time the market would behave according to their model.

The professors in the Arbitrage Group were very successful, for two reasons. First, they were smart. They focused on markets they understood, thoroughly analyzed their trades, and had lots of opportunities since there weren't many others making similar trades. Second, Meriwether protected them from the rest of Salomon, where they were hopelessly out of place. They were not, by nature, corporate personalities, and the only reason they could work was that Meriwether isolated them from the need to deal with others or negotiate for resources at Salomon. They became extremely close, working and socializing as a group, and they worshipped Meriwether.

As they became more and more profitable, the group began to take over more and more of Salomon's business, applying their models to bonds and other investment vehicles that had previously been handled by others. They kept their activities extremely secret, even from their Salomon colleagues. Their arrogance and refusal to share information alienated them from the rest of the firm. Their fanatical loyalty to Meriwether fostered a clannishness and us-versus-them mentality.

In 1991, Meriwether was forced to leave Salomon Brothers after a trader in his group was found to have submitted false bids to the U.S. Treasury to get an unauthorized share of a government bond auction. The trader had told Meriwether about the bids, and Meriwether had reported them to his superior, but in the wake of the scandal both the managing partner at Salomon and Meriwether left the firm.

THE FORMATION OF LONG TERM CAPITAL MANAGEMENT

In the early 1990s, the stock market was booming, and Meriwether was looking for ways to resurrect his career. He decided to start a hedge fund that would focus on profiting from changes in the relative values of bonds. Hedge funds were limited partnerships that were exempt from securities law because they had only a few wealthy investors. They had to make very few disclosure filings, could borrow as much as their bankers would lend them, and were free to make any type of investment they chose.

Meriwether started Long Term Capital Management in 1993, with the objective of raising a staggering \$2.5 billion from investors.⁴ Meriwether and his partners would charge fees much

⁴ There were actually two legal entities. One was Long Term Capital Portfolio, which consisted of the invested funds, profits, or losses. It was managed by Long Term Capital Management. The fund paid fees to LTCM, which was owned by the partners. For simplicity, the two entities are treated as one in this case, and called Long Term Capital Management (LTCM), unless otherwise specified.

higher than normal for managing hedge funds—25 percent of the profits, and an annual charge of 2 percent on assets. He felt these fees were required to properly manage the global scale of activity that he envisioned. In addition, investors were required to leave their money in the fund for at least three years, providing LTCM a long-term supply of capital (27). The fund would trade much as the Salomon group had, but with high leverage, borrowing large amounts—20 to 30 times their equity, or more, in order to generate high profits on the thin margins gained for each trade (26). He located the firm in Greenwich, Connecticut, isolating his professors from the hustle and bustle of Wall Street.

As he began to raise money, he also started to recruit his partners and looked to his old team at Salomon. He quickly brought Rosenfeld, Haghani, and Hawkins to join him. Hilibrand joined later in the year. Meriwether also brought in some close friends who were not from Salomon, including James McEntee, who had founded a bond-dealing firm. McEntee did not fit the academic mold of the Salomon traders. He was an Irish American from the Bronx, and a traditional bond trader who relied on his gut rather than the computer (36).

Meriwether also added David Mullins, vice chairman of the U.S. Federal Reserve, and number two in the Fed hierarchy to Alan Greenspan, to his list of partners. However, he needed to find partners who had the cachet needed to raise large amounts of money. Rather than looking for unknown assistant professors, he went to the top of the academic tower, recruiting Robert Merton of Harvard, the leading scholar in finance. He also recruited Myron Scholes, co-developer of the Black-Scholes model for determining the “correct” price of a stock option, who was very highly regarded by Wall Street. Both had previously worked as advisors to Salomon, so knew the Meriwether group. Merton and Scholes were viewed as two of the most brilliant minds in finance.⁵ Scholes was a particularly effective fund-raiser, and by February 1994 the fund started trading operations with \$1.25 billion in capital, raised from wealthy individuals and financial institutions around the world.

ORGANIZATION AND GROUP DYNAMICS

Meriwether was the undisputed leader of LTCM, but he had created a strong group of partners who played an active role in managing the firm. Not all LTCM partners were equal, however. The group was dominated by the former Salomon team—Meriwether, Hilibrand, Rosenfeld, and Haghani. This group received more than half of the partners’ compensation, and also had voting control. Lesser partners, such as Scholes, were constantly trying to improve their compensation and gain more control. They were not able, however, to break into the tight circle that had developed over many years among the former Salomon group (49).

Hilibrand epitomized the firm. He truly believed the models. He was cool, analytical, and supremely confident, and he commanded great respect from his partners (49). He was also devoted to Meriwether. Hilibrand’s closest trading partner was Haghani, who ran the firm’s office in Mayfair, the fashion district of London.

The LTCM partners met on Tuesdays for risk meetings, where they would discuss trading opportunities. An important objective of the meetings was to understand why spreads existed, and to gain insight on how the spreads might change in the future. If the partners understood why a spread might have deviated from historical patterns, or why the historical pattern indicated

⁵ Merton and Scholes shared the Nobel Prize for Economic Science in 1997.

a favorable trading opportunity, the case for making the trades was strengthened. They also held research seminars on Wednesday mornings that were open to partners and associates, and usually held meetings on Thursdays for partners, in which specific trades were discussed.

Only Meriwether, Merton, and Scholes had offices (Merton and Scholes because they didn't trade), but Meriwether spent most of his time on the trading floor with the other partners and associates. The analysts and legal and accounting staffs were in a room in the back of the building, and were generally treated like second-class citizens. Partners did not fraternize with the staff, and treated them formally (51).

In London, Haghani had a closer relationship with his traders than would have been acceptable in Greenwich, frequently inviting them to his home for dinner. He even brought the entire office, including secretaries, together after the firm's first successful month to explain how they had been so profitable — something that could never have happened in the secretive Greenwich office, with its rigid caste system (56).

Operations were shrouded in secrecy, both to the outside world and internally. Senior traders in the Greenwich headquarters didn't know the extent of the firm's activities, and sometimes resorted to calling counterparts in London to learn about the company's trades.

LTCM's employees were well paid, as was generally the case on Wall Street; top staff made more than one million per year. Most invested their bonuses in the fund, because of subtle pressure and also because this was seen as a major perk of working for LTCM (51).

THE RISE AND FALL OF LTCM

The fund began trading in February 1994. It utilized various types of investments, typically betting on changes in the relative yields of bonds. A simple representative example is a pair of trades involving new and recently issued 30-year U.S. Treasury bonds. A six month old 30-year Treasury bond is considered slightly less desirable than a new bond because many of them are kept as long-term investments, leaving fewer available to trade, and making them slightly less liquid. Thus, a bond that has 29 ½ years to mature would typically trade at a slightly lower price (higher yield) than one with 30 years to mature. Within a few months, however, the prices tended to converge, as the bonds were very nearly equivalent, with virtually the same risk. LTCM would buy the cheaper, 29 ½-year bonds, and short sell the 30-year bonds. In a few months, when the prices converged, it would liquidate its positions by selling the older bonds, and buying the newer ones. Each set of trades would earn only a small amount, perhaps one percent of the bond's value.

While this particular combination of trades was relatively simple, it had features in common with most of LTCM's activities. In general, the firm combined a series of trades (in this case, buying one bond and short selling a similar bond), so that it narrowly isolated the risk (in this case, to the difference in yield between the two bonds, regardless of whether the actual prices of the bonds went up or down). The traders bet that this spread would change according to their models—in most cases, that it would converge. Often, it would not converge in the short term, and might actually get larger. In this case, the traders' most common reaction was to double up on their bet, as they had at Salomon.

Earlier in his career, Meriwether had taken advantage of the eventual convergence of yields in another way. In 1979, a securities dealer was on the brink of failure. The dealer had been very successful in trading U.S. Treasury bill futures (buying the futures, and selling the underlying bonds), but in June 1979 the normal pattern was reversed, and prices diverged. The dealer was so confident that they would eventually converge that he made another extremely large trade. However, instead of converging, the gap increased still further, and the trader was hit with large margin calls.⁶ In order to meet the margin calls, he had to sell. Meriwether, then at Salomon, bought his position. Prices continued to diverge, but eventually converged, netting Salomon large profits. Meriwether was promoted to partner the next year.

LTCM relied heavily on borrowing, and did transactions using little, if any, of its own capital. The firm immediately loaned the bonds they purchased to a different Wall Street firm, and used the cash as collateral for the bonds it borrowed for the related short sale. In addition, it generally refused to pay the additional collateral to the firms that is normally required when borrowing bonds for a short sale, which is intended to protect the lender against a rise in the bond price.

Financial institutions extended LTCM large amounts of money, and provided favorable terms largely because they didn't want to get left out of LTCM's activities. LTCM treated these firms poorly, but none wanted their part of the business to go to competitors, and each hoped for profitable business from LTCM sometime in the future. They also hoped to gain valuable information about the worldwide bond markets, as LTCM had strong connections to powerful traders all over the world. In addition, the heads of many of the banks liked Meriwether personally.

Each part of a related transaction was done with a different financial institution, so that no firm knew the extent of LTCM's activity. While each transaction generated only a small profit, LTCM could make many transactions, since each matched pair consumed little, if any, of the firm's capital. In his sales pitches, Myron Scholes explained that they "would be earning a tiny spread on each of thousands of trades, as if...vacuuming up nickels that others couldn't see" (34).

In 1994, its first year of trading, LTCM earned 28 percent, increasing investors accounts by 20 percent after deducting partner fees—a remarkable performance in a year in which the average bond investor had lost money.

In fact, LTCM's timing was very fortunate. Shortly after LTCM began operations, markets went into turmoil after the United States Federal Reserve raised interest rates. Bond prices fell worldwide, and spreads grew well beyond historical norms. Funds that relied on large amounts of debt compared with their underlying equity, such as the one managed by George Soros in the international currency market, lost heavily.⁷ Two factors exacerbated the situation: in a time of uncertainty, all markets behaved similarly in searching for safe investments, and when prices decline, such funds are forced to sell, making the situation even worse. For LTCM in 1994, however, this was a perfect situation. Spreads were large, and the firm had not yet invested its

⁶ When borrowing to buy, a trader must maintain collateral equal to a certain percentage of the loan (the "margin"). This collateral is generally in the form of the purchased financial instrument. If prices fall, however, the value of the collateral may fall below the minimum, and the trader will be forced to either liquidate part of the investment, or make payments to increase the collateral (meet a "margin call").

⁷ Such a capital structure is highly leveraged.

capital. It could invest during the period of worst uncertainty, buying the riskier securities that others were desperate to sell, and betting that calm would eventually return.

In his letter to investors, Meriwether cautioned that investors could not count on such excellent results in the future. An attachment by Merton and Scholes provided a detailed calculation of the odds of a loss occurring. They stated that the fund would lose at least 5 percent of its money 12 percent of the time (i.e., twelve times in every hundred years). The letter also gave precise odds for the fund losing at least 10 and 15 percent. It also provided odds of various results using a range of different assumptions, all calculated to a high degree of precision. It calculated that the fund should lose at least 20 percent of its value one year in fifty, and did not consider the odds of losing more. It also provided precise odds on a monthly basis (61–63).

These calculations were based on an analysis of the typical variance in bond prices. Using its extensive database, LTCM knew how bond prices had fluctuated in the past. This historical knowledge formed the basis of the firm's assessment of future risk—assuming, of course, that the future behaved according to its models based on past bond behavior. LTCM assumed that the market was efficient, so that future prices would fluctuate in a statistically predictable manner around the current price.⁸ LTCM did not allow for uncertainty, nor did it account for the observed fact that returns that greatly varied from the average occurred much more frequently than predicted by a random statistical variation.

In other words, in the real world, markets were not always this well behaved. In moments of panic, such as on “Black Monday” in October 1987, investors do not act with calm rationality, and prices change by vastly greater amounts than could be predicted using the efficient market assumption. Such events occur on a smaller scale more frequently than Black Monday-sized dislocations. During such periods, there is the potential for changes greatly exceeding those predicted under the efficient market (perfect price, rational investor) assumption. Not only did LTCM assume that markets were efficient, it assumed they would become even more efficient in the future. This was the central assumption behind the firm's common trading strategy that depended on spreads to narrow.

LTCM had another successful year in 1995, earning 59 percent (43 percent after partner fees). After its exceptional first two years, the firm had no problem raising another \$1 billion from investors. LTCM now had sixteen partners and a staff of ninety-six, about half of whom were involved in trading.

Another important issue was their high debt. Much of the firm's trading was done using borrowed money. By the end of 1995 it had \$3.6 billion in equity capital, and \$102 billion in assets, a leverage ratio of 28:1.⁹ While capital had tripled in less than two years, the return on total assets (capital plus borrowings), was a more modest 2.45 percent. In addition, LTCM had

⁸ An “efficient market” is one in which trades are performed by rational people with a full knowledge of the relevant facts and thus all prices are correct. Price changes, then, are random and will fluctuate around the mean. This was an essential assumption of Merton and Schole's model.

⁹ Leverage ratio in this case is defined as assets under management divided by equity. This ratio represents the degree to which increases (or decreases) in assets have a greater (leveraged) effect on equity. For instance, at a 30:1 ratio, a 1% increase in assets will result in a 30% increase in equity (and a 1% decrease in assets will decrease equity by 30%).

entered into a large number of derivative transactions that were not on its balance sheets.¹⁰ Taking these transactions into account, the return on LTCM might have been less than 1 percent (78). Thus, the astounding returns that LTCM had generated were almost entirely due to the leveraging effect of making trades using a large amount of borrowed money.

In 1996, following its impressive performance in the previous two years, LTCM increased the relative amount of borrowing compared to equity. By spring, it had \$140 billion in assets under management — two and a half times as big as Fidelity Magellan, the largest mutual fund. The firm's assets were thirty times its equity (80). It controlled more assets than some of the major, well-respected, established Wall Street firms.

LTCM used up to fifty-five banks to finance its operations. The banks were flush with cash after a five-year bull market, and hedge funds were a way to use this capital. The banks were awed by LTCM's performance and the prestige, confidence, and seeming infallibility of its partners. They competed vigorously for LTCM's business. LTCM negotiated every concession it could from the banks, paying minimal fees and extremely small margins on trades. The partners viewed these negotiations as a win-lose situation. Anything conceded to the banks was a loss for them.

LTCM split related trades between different banks, so that no bank could see the full magnitude of the trading activity. From the point of view of any individual bank, it was doing a large number of trades with LTCM, for which it received eagerly sought-after fees. But each bank didn't know that for every trade it did with LTCM, LTCM did a hedging trade with another bank. Nor did any one bank know the total size of LTCM's business with the other banks.

LTCM did make quarterly disclosures of its total assets and liabilities to each bank and the Commodity Futures Trading Corporation (CFTC), and monthly reports to investors. These disclosures were extremely vague in providing information about the nature of LTCM's assets and liabilities, but the banks should have at least known the overall magnitude of the firm's activity. However, they focused only on their own business with LTCM. The fund also reported its derivative totals annually, although these numbers did not convey an accurate picture of current activity due to the firm's rapid growth. Nevertheless, LTCM disclosed derivative bets on \$650 billion of securities at the end of 1995, indicating a substantial exposure. No red flags went up at the CFTC or at any of the banks (80).

By 1996, LTCM had over one hundred employees. The partners had been deferring the 25 percent of investor profits that was part of their fee, leaving it in the fund. By the end of the year, the partners share of the fund had grown from an initial \$150 million investment to \$1.4 billion. During the year they had expanded their international trading, with leveraged trades on Japanese, Italian, French, and German bonds.

The partners were now fabulously wealthy, with far more money than they could spend. But to them money was a scorecard, not just a way to support their lifestyles. Continually increasing their personal wealth was a high priority, although there was tension over the division of partnership shares between the two partnership factions. Scholes developed a plan whereby the partners would pay a bank a fixed amount per year, and the bank would pay the partners

¹⁰ Derivative transactions were contracts that derived their value from some other asset (such as a contract for the right to purchase a certain asset at a specific time in the future for a specific price).

whatever they would have earned on a specified level of investment in the fund. This was a way for the partners to profit even further from the fund's success, and to receive favorable tax treatment (although it exposed them to losses if the fund underperformed). The bank, on the other hand, would have a potentially enormous liability if the fund continued to do well, in exchange for a relatively small return. Clearly, this was a difficult plan to sell to any bank.

After being turned down by several banks, the partners finally were able to sell the deal to Union Bank of Switzerland (UBS), which wanted a closer relationship with LTCM. The deal was done in June 1997, and UBS also made a large investment in the fund. The partners agreed to pay UBS \$289 million, and UBS would pay the partners the amount that an investor of \$800 million would make from the fund over the next seven years. UBS invested \$800 million in the fund as a hedge, and another \$266 million as an investment.¹¹ The agreement with UBS was between the bank and the partners as a group, but the partners needed to divide it up among themselves—deciding how much of the payment and proceeds of the deal to allocate to each partner. This division was contentious, particularly between Hilibrand and Scholes, each of whom wanted as large a position as possible.

Later, LTCM made a similar but smaller deal with another bank. The partners also borrowed \$100 million from a group of banks to increase their personal investment in the fund. Hilibrand personally borrowed an additional \$24 million, another partner borrowed \$15 million, and two others borrowed lesser amounts in order to increase their personal stake in the fund.

The fund earned 57 percent in 1996 (41 percent after the partners' fees), with total profits for the year of \$2.1 billion. LTCM's success did not go unnoticed by the financial community. Money poured into the arbitrage business, and almost every investment bank on Wall Street by the late 1990s was participating. As more people engaged in similar trades, spreads narrowed, reducing the profit potential for each trade. LTCM had to look farther for good trading opportunities, using its standard trading model with different types of financial instruments.

Eventually LTCM began trading in equities, finding pairs of equities that were related, and placing bets when the relationships deviated from the calculated "correct" difference. The bets it placed were of staggering size; it bought, for instance, \$1.25 billion of Shell and shorted \$1.25 of Royal Dutch when there was a difference in the shares prices of the two companies, though both companies got their income from the same parent, Royal Dutch/Shell. Such large positions are effectively illiquid, which is not a problem unless there is a need to quickly sell.¹²

LTCM also began to participate in merger arbitrage, buying shares of companies that were pending acquisition. In such cases, the stock price of the acquired company is less than the acquisition price due to the possibility of the acquisition falling through or being revalued. This field was dominated by specialists who developed a deep knowledge of the companies involved and the issues related to successful mergers, and could develop reasoned valuations based on the uncertainty of the merger. LTCM had no such knowledge, believing that future stock price fluctuations were random, so it just bought a broad selection of such stocks. LTCM bought in

¹¹ UBS would use the return from their \$800 million investment to pay the partners.

¹² There are few, if any, potential buyers for such a large position at a favorable price. If LTCM tried to sell it quickly, it would drive the price deeply lower. Selling it off without distorting the market would require many smaller trades over a long period. Furthermore, if the market knew that they were trying to unload a large block, others would be likely to sell their positions first, anticipating (and at the same time creating) a price decline.

large quantities, which had the effect of driving down the returns for the industry as a whole, as well as exposing the firm to large potential losses if mergers fell through or were completed at a lower price than originally negotiated.¹³ Such an event occurred in the summer of 1997, when the fund suffered a \$150 million loss when the acquisition of MCI Communications by British Telecommunications was renegotiated at a lower price and MCI's stock price collapsed.

The decision to go into merger arbitrage was made after intense debate. Meriwether allowed all points of view to be expressed, never forcing the issue or taking a firm stand. Scholes and Merton argued that this business was too risky, since LTCM had no expertise in the field, unlike the bond market, which they knew intimately. The two most influential traders, Hilibrand and Haghani, championed the move into merger arbitrage. Rosenfeld sided with them, and the others followed (100–101).

In the first half of 1997, LTCM earned 13 percent before fees, well below its past performance. It was having trouble finding good places to invest its money, which had increased due to profits and the \$1 billion investment from UBS. Overall leverage decreased from 30:1 to 20:1, further evidence of reduced opportunities. Several partners, including Scholes, were growing uncomfortable with the fund's portfolio.

With spreads narrowing in LTCM's traditional markets, there appeared to be fewer attractive opportunities to make use of the fund's large amount of capital. As a result, LTCM planned to return to investors, at the end of 1997, all profits on money invested during 1994, and to return all money (principal and profits) invested after that date. LTCM partners and employees, as well as some large strategic investors, were excluded from this forced return. The investors were angry, believing that the partners were giving themselves preferential treatment at the investors' expense.

McEntee objected to the forced redemption, as he preferred the conservative approach and did not want to reduce the fund's capital. Scholes and Merton were opposed for two reasons. First, they thought that the firm's reputation as a money manager would suffer. Second, since they owned a bigger portion of the management company than they did of the fund, they personally benefited from an increased fund size. Hilibrand and Haghani, however, owned larger shares of the fund and didn't want those shares diluted by outside investors. Hilibrand and Haghani prevailed.

Despite the claim that the payback was due to a decrease in spreads and a reduction in opportunities, the fund didn't actually shrink. The partners maintained their asset positions, so that the net effect was that the same assets were supported by a reduced amount of capital. In other words, the fund's leverage was increased. In addition, since the partners had forced the outsiders to sell, they were increasing their personal leverage in the fund.

In October 1997, Asian currency and stock markets began a precipitous fall, leading to panic selling around the world. Salomon Brothers had made bets before October that the markets would calm down, resulting in losses of \$110 million (118). UBS bet that volatility would decrease, and made other exotic trades that turned into disasters and led to a loss of \$644 million

¹³ LTCM avoided margin requirements for leveraged purchase of equities by entering into derivative contracts that tracked the behavior of stocks, rather than buying the actual shares. By 1997, LTCM had \$1.25 trillion in derivative contracts (104).

during the year (118). LTCM had a better understanding of some of these types of trades, such as those in Japanese convertibles, which helped it avoid large losses, and it actually broke even for October and November.

At the end of the year, three important things happened. First, the fund returned \$2.7 billion to the outside investors, increasing its ratio of assets-to-equity from 18:1 to 28:1, not including derivatives. The fund now had \$4.7 billion in capital, 40 percent of which was owned by the partners. The original investors had received \$1.82 for every dollar of their initial investments. Second, they moved into plush new headquarters in Greenwich. Finally, at the end of December 1997, another foreign crisis loomed, as Standard & Poor's downgraded Russia's debt.

Early in 1998, LTCM began betting heavily, by trading in options, that market fluctuations caused by the uncertainties in Asia and Russia would decrease.¹⁴ The five-year options contracts that LTCM entered into weren't traded on exchanges, so it entered into private contracts with large banks. One aspect of these contracts was that as option prices fluctuated, LTCM had to settle accounts daily, either paying or receiving money. Thus, it was vulnerable to short-term losses if volatility increased, even if in the long term the markets calmed. "The partners believed that, over time, investors would become more rational, more steady, more efficient—more like *they* were—and thus that credit spreads would narrow. 'We've always had that belief,' Rosenfeld noted. The equity vol[atility] trade was an explicit articulation of this doctrine" (126).

The Asian crisis subsided, aided by an International Monetary Fund bailout of South Korea, and things seemed to be under control. LTCM's models predicted that the most it was likely to lose in any single day was \$45 million, and the odds against a run of bad luck that would substantially decrease the fund's capital was vanishingly small.

LTCM's biggest concern was to find new winning investments. It began placing directional bets that financial instruments would move in a specific direction, rather than the more cautious hedged bets on differences between two instruments, in which it was indifferent if the prices went up or down. LTCM increased its equity activity, betting on a decline in the U.S. stock market by shorting options in major corporations. The size of LTCM's transactions was enormous; it took positions that were too large to liquidate quickly.

The partners still conducted their weekly risk meetings, but the nature of the meetings changed. They no longer thoroughly researched and analyzed trades. They had heated debates, but the outcomes were always the same. Scholes objected to the large size of some of the fund's positions, and the partners had already experienced difficulty in exiting some of their large trades. However, as a long time devil's advocate, and after his persistent struggles over compensation, Scholes had little influence over Hildibrand and Haghani.

McEntee, Merton, and Mullins also protested, but never threatened to quit. Hilibrand and Haghani's positions always carried the day, but they weren't listening to their partners. Meriwether and Rosenfeld played a passive role with respect to the two top traders. The junior

¹⁴ They shorted options (selling borrowed options) on the S&P 100 stock index, as well as similar indexes on the major international exchanges. When markets are volatile, option prices rise, as nervous investors look for insurance. At the time, option premiums were about 20%, compared to the historical average of 15%. In times of panic, investors might become desperate for insurance, driving option prices even higher (the opposite direction from LTCM's bet).

partners realized that the firm was dominated by Hilibrand and Haghani, and that it was moving away from its previous cautious approach. Frustrated by their lack of influence, the junior partners lost interest in fighting battles that they felt incapable of winning. “Totally dominated by the two senior traders, Long-Term had become a lopsided firm; it was a partnership only in name” (129).

During the spring, the major banks and securities firms began to reduce their investments in risky, relatively illiquid bonds, in part due to ongoing concern for the fragile Asian economy. These were the types of bonds that LTCM had been accumulating. Bond arbitrage spreads began to widen, causing arbitrageurs to lose money, which in turn caused more selling. As prices decreased, leverage ratios increased above the maximum allowed, forcing additional selling by the institutions. Asian markets were weak, and capital was fleeing Russia. Yields on U.S. Treasury bonds fell as investors sought safety. This caused the spreads between Treasuries and other types of bonds to increase, which went against LTCM’s bet on convergence. In May, the fund lost 6.7 percent of its value.

James McEntee, who relied on his gut rather than on the computer models, was worried. All over Wall Street, traders were talking about a “flight to quality,” moving money into U.S. Treasury bonds. He pleaded with his partners to lower their level of risk, but was ignored. Wall Street buzz might impress McEntee, but the professors, isolated in Greenwich, relied on their models and their belief in a rational market.

LTCM was still selling Treasuries as hedges for their purchases of riskier bonds (betting that rates would converge). The “flight to quality” was worldwide. In every market, traders sold risky securities and put money into safer instruments. In every market, LTCM owned the riskier bonds. And in every market, LTCM was losing money.

In June, the fund lost 10 percent, its worst month ever. It was now down 14 percent for the first half of the year. In the wake of the June losses, the partners retested their models, then informed the key banks that June was an expected statistical fluctuation. They continued to recruit new staff, reaching a peak of 190 people.

In July, Salomon Brothers announced it was leaving the bond arbitrage business, and began to liquidate its positions. Salomon was the second biggest player in bond arbitrage (behind LTCM), and had positions similar to LTCM’s. As Salomon began to sell its long positions, and buy to cover its short positions, it drove spreads wider and wider—exactly the opposite of LTCM’s bets. A junior trader expressed concern to Rosenfeld, who dismissed his fears. Other players would fill the void.

The partners did cut back on some of their assets, in light of their decreasing capital, but the reductions were small. Their assets-to-equity ratio increased to 31:1, but their models told them that the most they were likely to lose in a single day had decreased from \$45 million to \$34 million, based on their data-base of past volatility.

In Russia, fear over a possible devaluation caused yields on short-term bonds to soar to 120 percent. Led by Hilibrand and Haghani, LTCM bet that the country wouldn’t let its currency fail, and that it would not default on its outstanding debt. While LTCM knew that a default was possible, its computer forecasts of the consequences, based on past experience, were reassuring.

In August, Russia's markets collapsed. The banking system froze due to the absence of reliable, solvent banks. Short-term interest rates skyrocketed. The government, however, insisted that the ruble would not be devalued, and the Communist-dominated Duma rejected reform measures suggested by the IMF and went on vacation.

Worldwide, investors sought safety, pulling money out of Russia and Asia, and pouring it into U.S. Treasuries. This drove Treasury yields down, and spreads up. In addition, Salomon was continuing to liquidate its bond arbitrage positions.

The LTCM partners, seeing the enormous spreads, felt that they must narrow in the future, and got more heavily into Russian bonds. "Neither the Nobel Prize nor all the degrees mattered now; the professors were rolling the dice. According to one trader at Long-Term, the fund went 'outright long in Russia—right at the end.' Said another, miserably, 'It was so against our way'" (142).

In mid-August, despite the year's losses, the fund still had \$3.6 billion in capital, of which 40 percent was owned by the partners.

On Monday, August 17, Russia declared a debt moratorium, using rubles to pay its workers rather than foreign bondholders. Unlike past defaults, neither the IMF nor any other world body came to the rescue. "In every market, investors wanted only the *safest* bond. In the United States, it had to be the 30-year Treasury; in Germany, the 10-year Bund. All over the world, people were buying safer (lower-yielding) bonds and selling riskier (higher-yielding) ones, pushing the spreads between such bond pairs even wider. Minute by minute, Long-Term was losing millions"(145). Emotion was driving the markets.

Spreads increased dramatically, much more than predicted by LTCM's models. However, the surges were not unprecedented. It had happened in 1987, and also in 1992—but the models didn't go back that far. From LTCM's point of view, it was a once-in-a-lifetime, "impossible" event, despite the fact that this was the third such event in ten years.

In addition to the global finance crisis driving losses in LTCM's bond trading activities, LTCM suffered another major setback in merger arbitrage. It had taken a major position in Ciena Corporation, which was planning to merge with Tellabs, Inc. LTCM continued to hold the stock even when the price came to within \$0.25 per share of the acquisition price. On August 21, the merger was postponed, and Ciena's stock fell nearly by half. LTCM lost \$150 million. The Ciena loss, combined with LTCM's other activity that day, resulted in a total one-day loss of \$553 million, or 15 percent of its capital. Its models had calculated that it was unlikely to lose more than \$35 million in any single day (146–47).

Two days later the partners met and were joined by their general counsel, who would attend all future partner meetings in case things continued to deteriorate. Meriwether had each partner report on his area of expertise. The traders all reported that there were no buyers for their trades, despite the fact that the trades seemed sound. In this environment, LTCM couldn't get out of its large positions without moving the markets further in unfavorable directions. "The partners had assumed that other arbitrageurs would recognize the values that they saw; their failure to step forward mystified them. Now, like generals who overcommit to a distant war, they found the

road out blocked”(148). The partners decided to try to raise more money as a cushion, confident that spreads would eventually converge.

To make matters worse, LTCM’s losses in capital had made its leverage (assets-to-equity) even higher. The only way to reduce the leverage was to sell assets. But investors wanted only the least risky bonds, which LTCM didn’t own. LTCM did, however, have about \$5 billion in merger arbitrage investments. Most of these seemed like good assets, but if any of the mergers had gone bad, like MCI or Ciena, LTCM stood to lose heavily.

The partners called Warren Buffet, who had invested in Salomon Brothers to help that firm through earlier problems. He liked large deals, and had done risk arbitrage before. The prices seemed attractive. Buffet heard them out, but declined. He hadn’t been involved in merger arbitrage recently, and wasn’t current in this field. They also approached other wealthy investors.

The partners looked for other potential buyers, such as Michael Dell of Dell Computers, George Soros, and the Ziff brothers, highly successful publishers. They approached other fund operators. Some sent teams to evaluate the LTCM portfolio, but the partners found no takers. They couldn’t reduce their positions in the current market environment. “This was what the models had missed. When losses mount, leveraged investors such as Long-Term are *forced* to sell. When a firm has to sell in a market without buyers, prices run to the extremes beyond [those calculated based on random variability]. To take just one example, yields on News Corporation bonds, which had recently been trading at 110 points over Treasurys, bizarrely soared to 180 over, even though the company’s prospects had not changed one iota. In the long run, such a spread might seem absurd. But long-term thinking is a luxury not always available to the highly leveraged; they might not survive that long” (151).

Banks were not particularly interested in helping LTCM in light of the professors’ earlier secrecy and arrogance. In their search for money to shore up their situation, Meriwether called Vinny Mattone, an old friend who had retired from Bear Stearns. As Lowenstein related:

Mattone ... was everything that [Meriwether’s] elegant professors were not. He wore a gold chain and a pinky ring, and he showed up at Long-Term in a black silk shirt, open at the chest. He looked as if he weighed three hundred pounds. Unlike J. M.’s strangely wooden partners, Mattone saw markets as exquisitely human institutions—inherently volatile, ever-fallible.

“Where are you?” Mattone asked bluntly.

“We’re down by half,” Meriwether said.

“You’re finished,” Mattone replied, as if this conclusion needed no explanation.

For the first time, Meriwether sounded worried. “What are you talking about? We have two billion. We have half—we have Soros.”¹⁵

¹⁵ Soros had made an offer to invest, with contingencies that included finding additional new capital. The contingencies were never met, and the offer died.

Mattone smiled sadly. “When you’re down by half, people figure you can go down all the way. They’re going to push the market against you. They’re not going to roll [refinance] your trades. You’re *finished*.” (156–57)

Later, Meriwether told McEntee, who had previously warned him about the mood of the markets, “You were right ... I should have listened to you” (157).

As the situation got worse, the partners got closer and closer together. They continued to work long hours, trying to contain the situation and raise new money. The staff, however, was still kept in the dark, as they had been throughout the firm’s life. Partners held meetings in a conference room with the blinds drawn for secrecy. After the meetings, they wouldn’t tell staff members what was going on, despite pleas for information. Hilibrand would pass by as though he hadn’t heard staffers’ questions (157). Despite the deteriorating situation, the partners’ secrecy, and their own uncertain future, the employees continued to work tirelessly.

As August ended, the fund’s crisis deepened. The partners were trying to sell off their assets into a bond market in which nobody wanted to buy. While the economy as a whole was sound, Wall Street had panicked, and the bond market had effectively closed, the victim of excessive optimism and leverage. The computer models had not addressed this type of situation. The odds against such an event, according to the models, were such that “they were unlikely to occur even once over the entire life of the Universe and even over numerous repetitions of the Universe” (159).

In early September, Meriwether wrote his investors about the fund’s losses. While acknowledging the enormous magnitude of the decrease in capital, he was guardedly optimistic about the future. The letter implied that the fund’s problems had been due to the behavior of the markets, and investors’ “flight to liquidity” (162). There was no indication that the traders had made mistakes, for instance, in not reducing assets in late 1997, when there had been few attractive opportunities. Haghani even wanted to buy Salomon’s portfolio, to get it off the market and stop Salomon’s selling. But his was too much, even for his most optimistic partners, as the firm wasn’t in a position to buy anything with its rapidly shrinking capital (163).

The partners remained optimistic that the markets would turn in their favor. However, they didn’t. Their positions continued to deteriorate. As they had looked for capital, they had been forced to reveal information about the firm’s portfolio. Other firms feared that LTCM would have to liquidate its massive positions, further depressing prices. The other firms sold first, to protect themselves. The effect was to drive prices even further against LTCM

The markets were not behaving in a random manner. “They had programmed the market for a cold predictability that it had never had; they had forgotten the predatory, acquisitive, and overwhelmingly protective instincts that govern real-life traders. They had forgotten the human factor” (173).

As the situation deteriorated, the division between the partners who had come from Salomon (the inner circle), and the other partners grew. The lesser partners were unhappy with the domineering style, the secrecy, and the lack of trust, as well as the trading results of the inner circle.

The partners continued to look for money as their capital deteriorated. The banks, exposed to potentially large losses by LTCM's demise, began to talk with each other. Meriwether informed the Federal Reserve of the problem, as LTCM's situation had the potential to seriously damage international financial markets. If the fund failed, the parties on the other side of each of LTCM's transactions would have to liquidate their positions. These positions were so large that the consequences of such a sell-off were potentially catastrophic. The problem wasn't only the more than \$100 billion in assets. There was also about \$1 trillion in derivative exposure.

The Fed did not have authority over hedge funds, as it did over banks, but LTCM was in desperate straits, and the world's financial markets were threatened. LTCM needed help to minimize the damage. The Fed was able to call banks together so that the banks could find a solution to the problem.

After the Fed's staff met with LTCM and reviewed its portfolio, they then arranged for the banks to go over the portfolio in confidence. The plan was that the banks would then bid on LTCM's portfolio. The problem was that "if any *one* bank acquired it, it would be in the same position as Long-Term—the whole Street would be shooting at it. So all the banks would have to be in" (190). The banks realized that the only way out was to work together.

Meriwether still felt that LTCM's trades were sound as long as the partners could get past the immediate crisis. But everyone was taking advantage of their vulnerable position (193). As the bankers evaluated the continually deteriorating portfolio, they arrived at valuations that were little more than zero.

"Haghani seemed wounded by their minimal valuations. 'Thank you for coming,' he told a Merrill banker with an air of rebuke, 'but we don't think you're right. You ought to be investing *with* us.' He was like a drowning man trying to dictate terms to a rescuer on shore; in his heart of hearts, he was unsinkable." (197)

The bankers broke up into several groups to study different approaches to solving the problem. One group, led by Herbert Allison of Merrill Lynch, studied the idea of a consortium. Allison outlined a solution, which would require the support of most of the Wall Street banks. It called for sixteen banks to invest \$250 million each. There were additional important issues to be addressed—was the new cash a loan or equity, and what should they do with the LTCM partners? They were not inclined to help the partners.

"They had taken all they wanted to from the gang in Greenwich. For four years, the partners had held themselves aloof, picking off the best trades from each of the banks and not even trying to hide their smug superiority. Now the partners had the look of false prophets. The bankers felt taken—they had been so credulous. Several said the partners should be fired...Meriwether sounded mortified to hear...the anger directed at him." (199)

At the same time, Warren Buffett was evaluating the possibility of buying the portfolio and putting together a consortium of Goldman Sachs, AIG, and Berkshire Hathaway. During the bankers' meetings, Meriwether received a fax with their offer—\$250 million. If accepted, the group would immediately invest another \$3.75 billion, \$3 billion of which would come from Berkshire. There was a deadline of less than one hour to decide on the offer. If they took the

offer, the partners would be wiped out. They would also be fired. There were some detailed problems with the offer, and Buffett was unexplainably unavailable. Then the offer was withdrawn ten minutes before it expired. (203–204)

EPILOGUE

After difficult negotiations, the banks rescued the fund. The bank negotiations are described in the (B) case.

The partners, who had forcibly cashed out their outside investors months before, were left to withstand the collapse virtually on their own. They lost \$1.9 billion in personal funds. Hilibrand, who had been worth about \$500 million, was now broke, with a personal debt of \$24 million for the money he had borrowed to invest in LTCM.

Most of the partners lost everything they had invested in the fund but retained a degree of wealth, as most had some resources outside the fund and in their wives' names. They had not been lavish spenders, and perhaps were hurt as much by the perception that they were irresponsible speculators as by their financial losses.

Merton was upset by the taint on his academic prestige. “Though tacitly conceding that the models had failed, he insisted that the solution was to design ever-more elaborate and sophisticated models. The notion that relying on *any* formulaic model posed inescapable risks eluded him” (220).

The day after the bailout, the Fed cut interest rates. This didn't stop the slide, however, and in the first two weeks after the bailout, the fund lost another \$750 million in capital. However, by October and another interest rate cut, markets stabilized and the portfolio turned around. The fund had lost \$5 billion between April and October, but the storm had now passed. The partners now were forced to steadily liquidate the fund. The Oversight Committee did not want new trades. The fund was effectively liquidated by early 2000.

In the wake of the LTCM disaster, several of the bankers who had stepped in eventually lost their jobs. However, in the end, LTCM repaid all its debts in full. Most of the outside investors came out ahead, largely due to the forced return of their capital at the end of 1997.

Although the fund with the highest IQs ever assembled had collapsed, during LTCM's lifetime the ordinary stock market investor had more than doubled his money (225).

The partners never acknowledged their contribution to the fall: they continually blamed “the irrationality and veniality of *other* traders...and portrayed LTCM as the victim of outside events” (228).

In November 1999, Meriwether, Hilibrand, Haghani, Rosenfeld, and other LTCM partners formed JWM Partners. This fund announced that it would limit its assets-to-equity to 15:1, and use a “risk control system” to ensure that it could withstand extreme events. In December, the fund raised \$250 million and began operations.

QUESTIONS

1. What businesses were LTCM in and what were their core competencies?
2. How did Meriwether, who had the reputation for taking 'calculated gambles' - who was 'cautious to a fault,' become the principal and architect of the organization that came close to bringing down the world financial markets?
3. How did the relationships among the partners influence decision making? What about other members of the team? How were investment decisions made within the partnership? Was this a true 'partnership' or were there firsts-among-equals?
4. How did the structure of the organization affect information gathering and subsequent decision making?
5. How did Meriwether choose his partners? Was their physical location a factor in the process that was to unfold?
6. What was Meriwether's role in the firm's ongoing decision making? How did this role help or hinder their decision making and implementation? What additional roles, if any, should he have played?
7. Did LTCM propensity towards risk change as the situation become more volatile? How do the models discussed in class predict LTCM's behavior?
8. Is there anything that can be learned from this financial fiasco? What processes or structures might be put into place that could reduce the likelihood that similar problems would emerge in Meriwether's new organization?