

When Genius Failed
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Meriwether

- p.4 The idea of Treasury Bill arbitrage was brought to Salomon Brothers and John Meriwether by J.F. Eckstein & Co. The strategy consists of buying Treasury Bill futures and selling the actual bills, then waiting for the price to converge at some point in the future.
- p.9 John Meriwether formed the Arbitrage Group at Salomon Brothers in 1977 and performed bond arbitrage trades. The field was new so there was relatively little competition. Bond arbitrage consisted of betting that the spread between two securities would either converge or diverge (such as a bond futures contract and the actual underlying bond, or between two different bonds) Occasionally spreads would widen leading to temporary losses, but if there was sufficient capital to stay the course spreads would almost always contract and generate a profit. "...while a losing trade may well turn around eventually (assuming, of course, that it was properly conceived to begin with), the turn could arrive too late to do the trader any good--meaning, of course, that he might go broke in the interim."
- p.11 In 1983 Meriwether begins hiring academic professors that "would treat markets as an intellectual discipline": Eric Rosenfeld, Victor Haghani, Gregory Hawkins, William Krasker, and Lawrence Hilibrand
- p.12 Arbitrage group used computer models to forecast how bonds should behave in the future
- p.13 "Given enough time, given enough capital, the young geniuses from academe felt they could do no wrong..."
- p.20 Paul Moser submits false bids to the US Treasury. John Gutfreund, CEO of Salomon, and Meriwether are forced to resign.

Hedge Fund

- p.26 Meriwether envisions Long-Term Capital Management as a hedge fund focused on profiting from the same bond arbitrage trades that were conducted at Salomon. Profit made from bond spreads was tiny, requiring LTCM to leverage its bets 20x or more in order to make a decent profit.
- p.28 Key traders from the Arbitrage Group at Salomon Brothers begin leaving in 1993
Recruits Robert C. Merton from Harvard
- p.31 Recruits Myron Scholes
- p.32 Merrill Lynch devises "feeders" to solicit funds for LTCM
Funds were channeled to the Long-Term Capital Portfolio (a Cayman Islands partnership) which held assets and executed trades--LTCM ran LTCP
- p.37 David W. Mullins, vice chairman of the US Federal Reserve, joins LTCM in early 1994
LTCM opens for business in February 1994 with 1.25 billion in assets, the largest hedge fund startup to date

On The Run

- p.41 February 1994: Greenspan raises short-term interest rates causing spreads to widen and creates abundant opportunities for LTCM

- p.42 When trying to pay back debt during times of crisis: "You don't sell what you should. You sell what you can."
By leveraging one security investors give up control of the others that they own. Securities that were once unrelated become correlated
"If you aren't in debt, you can't go broke and can't be made to sell, in which case "liquidity" is irrelevant. But a leveraged firm may be forced to sell, lest fast-accumulating losses put it out of business."
- p.45 LTCM refuses to pay "haircut" to lenders (the collateral required to borrow a security)
- p.48 LTCM does business with multiple banks, and takes advantage of each banks particular expertise
- p.52 Various arbitrage trades conducted by LTCM (more than simply bond spreads)
- p.54 LTCMs edge wasn't in the models they were using as those were widely available, but instead was in their ability to read and interpret the models. Additionally, they had far better financing than other funds

Dear Investors

- p.61 LTCM predicts the odds of the fund losing money
- p.63 THOUGHT: The future can't be predicted. We don't have enough information to calculate the odds in the precise manner that LTCM did.
LTCM acknowledged risk, but banished uncertainty
- p.64 LTCM would increase or decrease leverage in order to increase or decrease volatility of the fund. They attempted to have volatility of the fund match that of the S&P 500.
"To anyone with their theoretical background, volatility and returns were the same thing. Increased volatility mean increased returns."
- p.65 "More specifically, Long-Term was an experiment in managing risk by the numbers. At the center of this experiment was the notion of volatility, which had supplanted leverage, in the partners' minds, as the best proxy for risk."
- p.66 LTCM believed price changes in financial markets were random, and that changes in prices were described by a normal distribution, similar to many other things in nature
THOUGHT: LTCM heavily believed in the Efficient Market Hypothesis
- p.68 Black-Scholes option pricing model relies heavily on volatility, and that volatility is constant
- p.70 Mitchell Kapor, Paul Samuelson and Eugene Fama all considered Merton's model too idealized for the real world
- p.71 Price changes in real markets show more occurrences of extreme events than a normal distribution would predict (Fama's thesis).
Real life markets experience discontinuous price changes as opposed to the theoretical continuous changes that Merton believed in.
- p.72 Markets experience extreme events because not every event is truly random, as required by the normal distribution. Market trends continue out of fear, greed and speculation
- p.75 Most of LTCMs trades were low risk, but that doesn't mean they were risk-free.
"The problem with the math is that it adorned with certitude events that were inherently uncertain."
Concept of modeling Value-At-Risk (VAR)
- p.78 Return of 59% in 1995. However, return on capital was only 2.45% and cash-on-cash return was approximately less than 1%. Almost all of the 59% return was due to leverage
At the end of 1995 LTCM had equity capital of \$3.6 billion, but total assets of \$102 billion. A 28-to-1 leverage ($102/3.6 = 28$).

Tug-Of-War

- p.81 LTCM derivative bets amounted to \$650 billion at the end of 1995
Each bank LTCM did business with knew only it's own exposure to LTCM
- p.82 LTCM was doing business with as many as 55 different banks
exploited banks' hunger for fees, and did business on very advantageous terms
- p.84 LTCM takes advantage of Merrill Lynch, their largest lender
- p.86 LTCM dependent on Bear Stearns for clearing activities
- p.88 LTCM pitches a warrant to Chase that would allow the firm to receive profits on a \$200 million investment in the fund for approximately \$15 million a year. But Chase could not hedge this warrant as LTCM kept their assets and trades secret
- p.92 UBS was eager to grow and took on LTCM as their biggest account in 1996
- p.94 Profits of \$2.1 billion in 1996. More than most major US corporations (McDonald's, Xerox, Disney, Sears, Nike, etc.)
- p.95 Bond arbitrage began seeing huge inflows of money from rival banks and funds. This created tighter spreads and opportunities became more difficult to find.

A Nobel Prize

- p.98 "Wall Street (and academe) had devised many a formula to forecast the market, but none, no matter how esoteric or rigorous, had worked."
LTCM begins investigating equity arbitrage to find new investment opportunities and expand the business. Haghani focuses on paired share trades
- p.100 Hilibrand begins investigating merger arbitrage
- p.102 LTCM was able to avoid Regulation-T, which limits the maximum margin loan to 50% of the total investment, and therefore was able to conduct highly leveraged equity transactions through use of derivatives/swaps
- p.103 David Swensen engineers the first modern swap. IBM wanted to convert debt issued in Swiss francs and German marks into US dollars.
- p.105 In early 1994 the New York Fed began feeling uneasy about the amount of credit that hedge funds could access
Greenspan proposed eliminating margin rules entirely in 1995
By the late 1990s Wall Street was leveraged 25-to-1
- p.106 "Each bank knew the extent of its own exposure to an individual client, in particular to Long-Term. None bothered to think about whether the hedge fund might be similarly exposed to a dozen other banks."
- p.108 UBS becomes the single biggest investor in Long-Term by selling LTCM its warrant
- p.109 LTCM borrows more money from Chase, Fleet Bank and Credit Lyonnais which was plowed back into the fund. Additionally, Credit Lyonnais sets up a program for the partners to borrow against their interest in the fund.
- p.110 LTCM begins making riskier, unhedged bets with Japan's long bond
- p.111 Andrei Shleifer and Robert Vishny publish a paper arguing arbitrage was far riskier than its adherents claimed
July 1997: Thailand experiences defaults and allows its currency to float. Weakness spreads to other Asian countries--"Asian crisis"

- p.113 With close to \$7 billion in capital and limited opportunities, LTCM announces plans to return capital to investors
- p.114 By returning capital to outside investors, the partners were reducing equity capital, but not total assets. This increased their stake in the fund as well as their leverage
- p.116 Merton and Scholes were awarded the Nobel Memorial Prize in October 1997
- p.120 At the end of 1997, LTCM returned \$2.7 billion to investors and leverage increased from 18-to-1 to 28-to-1

Bank Of Volatility

- p.123 LTCM begins executing more equity volatility trades in early 1998
"Now and then, the market might be more volatile, but it will always revert to form--or so the mathematicians in Greenwich believed. It was guided by the unseen law of large numbers, which assured the world of a normal distribution of brown cows and spotted cows and quiet trading days and market crashes. For Long-Term's professors, with their supreme faith in markets, this was written in stone. It flowed from their Mertonian view of markets as efficient machines that spit out new prices with all the random logic of heat molecules dispersing through a cloud."
- p.125 Shorting volatility requires shorting options contracts, an illiquid trade that LTCM performed with major banks
- p.126 Long-Term had to settle their bets against options on a daily basis
- p.127 "Indeed, the figures implied that it would take a so-called ten-sigma event--that is, a statistical freak occurring one in every ten to the twenty-fourth power times--for the firm to lose all of its capital within one year."
- p.128 Long-Term begins to trade more exotic securities such as Russian bonds and Danish mortgages. They begin to abandon hedging strategies and opt for directional bets instead
- p.131 April 1998: The high point for Long-Term, with \$134 billion in assets
- p.134 May 1998: many firms began cutting back by liquidating their positions. This caused spreads to widen and volatility to rise. The ensuing flight to safety caused Treasury yields to drop and LTCM took its largest monthly loss of -6.7%
- p.136 LTCM loses 10% in June, its second straight month of losses
- p.137 Salomon Brothers exits US arbitrage citing a disappearing opportunity to profit from arbitrage
- p.138 July 1998: LTCM scales back assets to \$128 billion, but leverage rises to 31 times
- p.141 August 1998: Russian financial crisis-oil, its primary commodity was down 33%, budget was over-tapped, government imposed controls on ruble, banking system froze, Moscow stock market down 75% for the year
- p.142 LTCM goes long on Russia

The Fall

- p.144 Monday August 17, 1998: Russia declares a debt moratorium
Investors begin fleeing emerging markets and most risky investments while buying Treasuries. This pushes bond spreads higher causing LTCM to lose more money
- p.148 Long-Term begins looking for fresh capital to cushion losses and allow time for spreads to converge (met with Buffett, Soros, JP Morgan, etc.)

- p.151 "Despite the ballyhooed growth in derivatives, there was no liquidity in credit markets. There never is when everyone wants out at the same time. That is what the models had missed. When losses mount, leveraged investors such as Long-Term are forced to sell, lest their losses overwhelm them."
- p.154 LTCM, the management company, faces a cash flow problem, owing several banks a combined \$165 million
- p.155 Keeping the banks in the dark begins to work against Long-Term, since the banks couldn't see the whole picture, that most of Long-Term's bets were hedged, they demanded more margin than otherwise "Long-Term was having to plead for leniency to the very banks that it had offended."
- p.156 "This is a timeless irony: when you need money most, the most likely sources of it are likely to be hurting as well."
- p.159 August 1998: worst month on record for credit spreads
LTCM lost \$1.9 billion or 45% of its capital, with \$125 billion in assets

The Human Factor

- p.161 Meriwether letter to investors regarding losses during August 1998
Concise explanation of how bets on bond spreads in early 1998 caused LTCM to lose 52% YTD
- p.162 Leverage at 55-to-1 at the end of August
- p.164 Bear Stearns puts LTCM on notice regarding clearing activities
- p.167 LTCM continues to look for new investors and fresh capital
- p.172 Goldman Sachs (John Corzine) offers to rescue LTCM by funding \$1 billion of new capital as well as a promise to raise an additional \$1 billion in exchange for half of the partners management company
- p.173 "The mathematicians had not foreseen this. Random markets, they had thought, would lead to standard distributions--to a normal pattern of black sheep and white sheep, heads and tails, and jacks and deuces, not to staggering losses in every trade, day after day after day."
- p.174 Wall Street banks trade against LTCM causing the firm to lose even more money
- p.179 Danger of bankruptcy for LTCM--defaulting on any of its seven thousand derivative contracts would automatically trigger a default on the others, which covered some \$1.4 trillion in notional value
- p.180 Day-by-day losses in mid-September
- p.182 Buffett expresses interest in purchasing LTCM's portfolio of assets, but wants nothing to do with the firm's partnership or management

At The Fed

- p.186 Peter Fisher, who ran the Fed's trading desk, visits LTCM to review their books
- p.188 During times of crisis, correlations go to one. Long-Term's portfolio of assets were all going bad at the same time
- p.190 JP Morgan sees two potential scenarios
 - 1) Allow LTCM to fail, each bank would have to seize collateral for itself and face losses of approximately \$500 million to \$700 million each
 - 2) Purchase large chunks of the portfolio, but be left in the same situation as LTCM, with the other banks shooting at it
 As a result, all the major banks would have to be in on a deal
- p.191 Banks continue trading against LTCM as the fund was vulnerable
"...hungry traders were finishing the job of killing Long-Term that the crisis in Russia had begun."

Monday September 21, 1998: LTCMs equity capital drops below \$1 billion with more than \$100 billion in assets--omitting derivatives its leverage was greater than 100-to-1

- p.192 Buffett's strategy: buy the portfolio and show it is in strong hands, allow prices to recover, then sell
- p.194 Fisher and McDonough not concerned about losses to LTCM or other banks. Main concern was that if LTCM failed the ensuing liquidation would pose a systemic risk by harming the entire financial system
- p.195 Impending financial crisis was not visible to regular Americans and US economy was still quite vibrant
- p.198 Herb Allison of Merrill Lynch devised a plan that called for 16 banks to invest \$250 million each (\$4 billion total)
Banks disagree on many of the details
- p.202 Buffett, Goldman Sachs, and AIG make a bid for Long-Term of \$250 million
- p.204 Buffett deal falls through
- p.207 Consortium of banks agree to a deal: \$3.65 billion for 90% of the fund's equity, with existing investors retaining 10% of the equity
- p.208 No public money was involved in the deal
UBS writes off its entire investment in LTCM, losing approximately \$700 million

Epilogue

- p.219 LTCM partners lost a total of \$1.9 billion
- p.221 Bailout was signed on Monday September 28, 1998
In mid-October many of the banks that bailed out LTCM lose money on similar investments and in similar amounts to LTCM
- p.222 "Familiarity had bred the desire to imitate; that was the true price of the banks' "exposure""
- p.224 Because of the rescue, Long-Term was able to meet every margin call and repay all of its debts
Most of LTCM's investors were saved by the return of capital in 1997 and came out on top
- p.225 After fees, each dollar invested in LTCM grew to \$2.85 (end of April), but shrank to only \$0.23 after the collapse
- p.226 Most of the partners were able to resume normal working life with other firms after the bailout
- p.227 Some of the partners begin to visit investors to plant seeds for a new fund
Partners denied that leverage or the size of the portfolio contributed to the collapse, or even that the basic strategy was flawed
- p.229 "People caught in such financial cataclysms typically feel singularly unlucky, but financial history is replete with examples of "fat tails"--unusual and extreme price swings that, based on a reading of previous prices, would have seemed implausible
Greenspan admits that when the Fed helped organize the rescue of LTCM it was concurrently encouraging future risk takers and created a degree of moral hazard
- p.230 Involvement of the Federal Reserve was limited and no government money was used in funding the bailout
- p.233 During bad times correlations go to one
"The Long-Term episode proved that eggs in separate baskets can break simultaneously."
- p.234 Losses in two biggest trades
 - 1) Swaps: \$1.6 billion
 - 2) Equity Volatility: \$1.3 billionLTCM got too big in these markets and distorted the very markets on whose efficiency it relied. They became too illiquid and too leveraged

"The professors overlooked the fact that people, traders included, are not always reasonable."

p.235 "The belief that tomorrow's risks can be inferred from yesterday's prices and volatilities prevails at virtually every investment bank and trading desk. This was Long-Term's basic mistake, and its stunning losses betrayed the flaw at the very heart--the very brain--of modern finance."

Returns

p.61 1994: 28% Before Fees, 20% After Fees

p.77 1995: 59% Before Fees, 43% After Fees

p.94 1996: 57% Before Fees, 41% After Fees

p.120 1997: 25% Before Fees, 17% After Fees

p.131 1998: \$1 invested grew to \$4.11 Before Fees, \$2.85 After Fees at the end of April

p.225 \$1 invested shrunk to \$0.23 after the collapse