

Forensic Finance

Reading: Stephen A. Ross, “Forensic Finance: Enron and Others”

Forensic finance

- Stephen A. Ross (MIT), one of the giants of modern financial economic theory
- President of American Finance Association
- Leading “financial engineer”
- Practitioner
 - Portfolio management
 - Consultant (forensic pathologist)



Financial engineering

- *Selections from Wikipedia: Financial engineering* is a multidisciplinary field relating to the creation of new financial instruments and strategies, typically exotic *options* and specialized *interest rate derivatives*. The field applies engineering methodologies to problems in finance, and employs financial theory and applied mathematics, as well as computation and the practice of programming; see computational finance.
- Financial engineering is also the *process of creating new securities* or processes, and *designing new financial instruments*, especially derivative securities. More importantly financial engineering is the process of employing mathematical, finance and computer modeling skills to make pricing, hedging, trading and portfolio management decisions. Utilizing various derivative securities and other methods, financial engineering aims to precisely control the financial risk that an entity takes on. Methods can be employed to *take on unlimited risks under certain events*, or completely *eliminate other risks* by utilizing combinations of derivative and other securities.
- Financial engineering can be applied to many different types of *currencies* and pricing options. These include *equity*, *fixed income such as bonds*, *commodities* such as oil or gold, as well as *derivatives*, *swaps*, *futures*, *forwards*, *options*, and *embedded options*. With financial engineering comes many risks. Risks are divided into *market risk* and *credit risk*. Market risks can be managed using risk identification, risk measurements, and risk management. Credit risks can be managed using credit modeling and credit pricing.

Financial pathology/forensic finance

- *From Ross:* Learn from financial institutions that have died, with the “hope of developing a cure or preventing it from happening in the future”
- *From wikipedia:* **Forensic science** (often shortened to **forensics**) is the application of a broad spectrum of sciences to answer questions of interest to a legal system. This may be in relation to a crime or a civil action.

Unusual opportunity right now

- Numerous suits against Citibank, in connection with investment practices and disclosure timing in 2007 (class action suits, Norgesbank suit)
- Failure of Lehman brothers and report of bankruptcy examiner
- Suits by one company against another: Barclays and Bank of America suing Bear Stearns Asset Management
- Suits by public authorities (attornies general) against various banks
- Disclosure suits by news organizations against Fed (and perhaps Treasury)
- Maybe: Wikileaks release of huge amount of Bank of America data

Examples in Ross

- Metalgeseellschaft and Oil trading
- Hedge Funds in 1998, particularly Long-Term Capital Management (book on reading list)
- ENRON and investments via special purpose vehicles (SPV)

Ross's principles for forensic finance

1. A blind allegiance to a particular theory or strategy is a central feature of all financial debacles.
2. Bad things happen that were not anticipated by the theory
3. Financial markets are efficient in the sense that prices reflect up to date information. The markets are populated with astute traders whose business is processing information and profiting from it. Liquid markets are too efficient for naïve and simple strategies to give sure profits
4. Big dollars attract big attention. It is very costly to move a big position particularly when everyone is watching you, and it is impossible to be nimble. Elephants can waltz but they cannot tap dance.
5. In times of distress, liquid debts always beat illiquid assets. Simply put, in a crisis only cash is liquid
6. Complexity creates opacity and this makes a business vulnerable; the more opaque and complex a business is, the more difficult it is to finance. Complexity makes controlling risk all the more difficult.
7. Agency costs: the cost to the firm of managing the misalignment of employee and shareholder interests (stresses in MG)
8. Leverage is risky and big leverage is dangerous (stresses in LTCM)

Case 1:

- Oil traders sold long-term contracts with delivery commitments of up to 10 years and with embedded options for buyers.
- They hedged these contracts by buying short duration futures, requiring (i) a posting of margin; and (ii) continuing rollover
- Not a perfect hedge: that would have been long duration contracts plus options, but a hedge against changes in oil prices that were “permanent”. Hence, a “model” that most oil price movements were permanent.
- Perhaps these traders were advised by financial engineers
- MG was a very large player in the marketplace
- Prices moved against them (near term oil prices fell, while longer-term futures did not (at least as much)) and major losses were encountered, nearly bankrupting the company.

More reading

- *Academic review*: Wallenberg, Mark, “Hedging Oil Price Risk: Lessons from Metallgesellschaft”, <http://www.finance.uni-frankfurt.de/wp/395.pdf>
- Practitioner review: Kropel, Ed, 2001 “Re-examining the MG Affair and its implications for oil traders,” Oil and Gas Journal, used as case by professional risk manager’s association www.prmia.org/pdf/Case_Studies/MGRM.pdf

Case 2: LTCM

- Long-term capital management was a hedge fund that was put together by stars: John Meriwether (master bond trader), Donald Mullins (Fed vice-chairman) and two Nobel Laureates (Robert Merton, Myron Scholes)
- Used a convergence trading strategy: whenever a spread between two closely related portfolios gets out of line with historical relationships, then buy the cheaper one and sell short the more expensive one. Chapter 3 “On the Run” in *When Genius Failed* describes this strategy.

- LTCM went on to much more complicated trades and riskier ones, including bets on interest rate convergence across countries. When some of these countries (notably Russia) had political difficulties, spreads widened rather than narrowed and LTCM suffered huge losses.
- They were leveraged extremely highly (and demanded extreme terms from banks that lent them money with securities as collateral)
- Ross: “With positions of over \$100 billion, leverage of about 25 to 1 and nominal footings of over \$1 trillion dollars, everyone who was anyone in the financial markets was involved. If you weren’t an investor you were a creditor and, with manic press ravings about the downfall of capitalism, the government had to get involved. In the end, no matter what the economics, LTCM was going down and there was no place for it to hide. Stories abounded about the scavengers in the market knowing LTCM’s situation and waiting to prosper by the inevitable unwinding of their positions.
- Ross: “The hedge funds that went under were textbook examples of the adage that in times of crisis, liquid debts are king. Assets and position holdings may be marked-to-market, but debts are contractually stated. In difficult times, why should a lender risk anything on the convergence of prices when they can simply demand their money back immediately and force liquidation? Liquidity dries up just when those who are in trouble most need it. In times of market turmoil, creditors — given their own agency problems — call in lines of credit and force distress sales.”
- Directly relevant to recent events: LTCM was wound up by a consortium of major NY banks brought together by the Federal Reserve System. (A similar approach was tried with Lehman Brothers, but did not work out)

Case 3: ENRON

- Ross: ENRON's strategy was to acquire assets or businesses where trading markets are bilateral and not well established. The focus was the energy business, but their grasp extended further than electricity to include the internet, the telecommunications spectrum, steel, and other activities. The basic objective was to modernize these markets by introducing financial instruments and derivatives for trading and hedging. To implement this strategy, ENRON would buy a stake in a venture in a target market — BADCO. Characteristically, BADCO would have high initial costs and a hoped for long term payoff.
- Ross: The number and complications of these deals is daunting, but to simplify matters the financing of a typical deal looked something like this. First, ENRON would set up an offshore SPV (special purpose vehicle), NEWCO, partially funded by outside investors. NEWCO would buy BADCO from ENRON or hedge BADCO's risks thereby taking BADCO off of ENRON's books — usually at a profit to ENRON. But, ENRON would retain control of NEWCO and would guarantee NEWCO against losses.

Enron cont'd

- As with the other financial collapses, lurking in the background, there is always a theory. ENRON's "theory" was based on its belief that it could profit by making inefficient markets efficient. The wide bid/offer spreads typical of inefficient markets were profit opportunities. ENRON hoped to "commoditize" these markets and prosper by narrowing the inefficient spreads. The strategy was implemented by using offshore special purpose vehicles (SPV's). "Aggressive accounting techniques" kept losses and risks off ENRON's balance sheet, presumably insulating its stock price from bad news.

Enron cont'd

- Ross: “this theory has some inherent flaws. ENRON’s ventures are long term investments and some long term investments don’t ever pay off and, if they do, it can take a long time. Furthermore, using your own stock to finance a sale of your own interests in BADCO to NEWCO and controlling NEWCO isn’t a sale at all — it is overly aggressive accounting. Even aggressive accounting must eventually realize deep losses and ENRON’s financing could only work in a rising market. Theories, however flawed, can always be right some of the time.”
- Ross: “Unfortunately, though, bad things happen. Contrary to what many had come to believe in the 1990’s, stock prices actually do fall as well as rise. With the collapse in the US stock markets, ENRON stock and all of its other ventures fell in value along with the market. The leverage inherent in ENRON’s structures magnified the fall. Using ENRON stock to finance the SPV’s works as long as it’s rising. As the market fell, ENRON and its SPV’s suffered accelerating losses. Furthermore, as word of its overly aggressive accounting practices leaked out, the stock price fall accelerated, and, as the reality became more apparent, the ENRON house of cards collapsed.”
- Ross: “the lesson from efficient markets cannot be so easily dismissed, and that is a fundamental problem with the ENRON theory. Inefficiencies may be more apparent than real. In many markets bilateral trading arrangements and other peculiarities exist for solid economic reasons.”

Enron: agency problems

- Agency issues are endemic in a corporate setting where ownership and control are separated; management runs the company not the shareholders. In the case of ENRON, the evidence of the difference in incentives between the management and the board on the one hand, and the shareholders on the other is mounting. As an example, ENRON management held direct economic stakes in the SPV's. To the extent to which these interests were not coincident with those of ENRON, incentives are clearly misaligned.
- Agency problems are dealt with by a combination of three approaches. First, agents, i.e., **managers, must be monitored.** Second, **incentives have to be aligned,** and, third, **managers have to be controlled.**

Read and think about Ross's final section

- Concerning Citibank, some of Ross's comments seem pretty relevant: "there must also be an internal auditing function and a separation of risk control from risk taking. Internal auditing is an important risk control mechanism for senior management in its efforts to control those who report to them. Like external audits, internal audits must also be independent, but there is no way to assure this unless internal auditors and risk monitors report directly to the board of the company and, to some degree, feel free to do so without interference by the very management to whom they also report."