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FERM, Sweeting - Ch 20: Case Studies

20.1: Introduction

This lesson goes over historical case studies to illustrate past risk management failures, and how ERM can be used to make smarter decisions in the future

20.2: 2007-2011 Global Financial Crisis

Causes of the Crisis

The recent global financial crisis had many different causes

1. **The role of China**
    - The growth of the Chinese economy resulted in large flows of money into China
    - People's Bank of China kept the Chinese renminbi artificially low, however, in order to make Chinese exports competitive in the U.S. market
    - China invested a large proportion of its income from exports into US treasury bonds, resulting in inflated bond prices and lower yields
2. **Role of Housing Markets**
    - Low interest rates on treasury bonds resulted in low mortgage rates
    - This increased demand to buy houses, causing housing prices to rise
3. **The role of regulation**
    - The Gramm-Leach-Bliley Act of 1999 allowed commercial and retail banks to carry out investment banking activities, which had originally been forbidden by the Glass-Steagall Act of 1933.
        - In stressed markets, this means that catastrophic losses in the investment banking arm can adversely affect retail and commercial account holders
    - Basel I system of capital requirements gave incentive for banks to convert credit risk (i.e. mortgages) to market risk by securitising loans
        - This resulted in an explosion of mortgage-backed securities
        - However, the main buyers of these securities were other banks, which resulted in the banking sector to be more interconnected with each other in terms of exposure to the housing market
        - In addition, the holder of an MBS does not have the same level of information on borrowers that the bank that sold the mortgage does.
            * This resulted in many financial institutions underestimating the creditworthiness of the MBS they owned

4. **The Role of Incentives**

    - Securitisation meant that once a loan had been taken on, profit could be made immediately by packaging the loan in an MBS
    - This gave banks less incentive to ensure the creditworthiness of borrowers, leading to an overall decline in credit quality of loans
    - Banks had an incentive to exploit the mis-pricing of CMO tranches by rating agencies by retaining particular (under-priced) CMO tranches, and selling the (over-priced) remaining tranches
    - For issuers that trade and structure MBS and CDOs, a significant proportion of earnings is paid as a bonus, giving employees an incentive to take significant risks to earn those bonuses
        - These bonuses are often based on short-term results, so there is an incentive to make short-term profits without considering the long-term impact of a trade
        - Bonuses are also based on team performance, resulting in little incentive to do anything differently from the rest of the team

5. **The Role of Models**

    - The models used to price CDOs and CMOs (which relied on the Gaussian copula) were not sufficiently accurate
    - Senior management had an excessive reliance on the output of models, and did not understand the models' limitations

6. **Organizational Issues**

    - Many banks were exposed to housing market risks both directly through mortgages and indirectly through MBSs, but many senior managers did not recognize this concentration of risks

Evolution of the Crisis

Many mortgages sold in the housing boom were to subprime borrowers, resulting in higher than average risk of default for those mortgages

- Many banks had large losses due to widespread exposure to mortgages
- The complexity of some of the products used meant that many banks could not quantify their exposure to future losses
- Banks became reluctant to lend to each other, resulting in a liquidity crisis that spread to the wider economy as firms and individuals found it harder to borrow
- The resulting slowdown in economic growth combined with the cost to governments of stabilizing financial institutions has resulted in large budget deficits

Lessons of the Crisis

1. **Organization Structure of Banks**
   - The Gramm-Leach-Bliley Act, which allowed retail banks to perform investment banking activities, may be overturned
   - Within banks, ERM should have a much higher status, and CROs should have much higher power
   - Those who design and work with complex models should be given a greater say in the use of those models
2. **Capital Structure**
   - Banks should hold more *liquid* capital in case the economic outlook changes adversely
3. **Bank bonuses**
   - Bank bonuses should reflect the term of the instruments being traded (full bonuses should not be awarded before the risk inherent in a deal has run its course)
   - Good risk management should be be financially rewarded
4. **Models**
   - Models should be used as tools - their outputs should be used to help make decisions, but no more
   - Those making decisions based on model output should understand the model's capabilities and limitations
   - If models are used for a purpose other than what they were designed for, they should be used with caution
   - There are times at which using simple models are better than complex ones

20.3: Barings Bank

Background of the Collapse

Nick Leesson was the general manager and head trader of Barings Bank's futures trading subsidiary in Singapore

- He carried out proprietary trading on behalf of the bank (reporting to London) **and** trading as a broker on behalf of external clients (reporting to Tokyo)
- He also had control over accounting for trades

The proprietary trading strategy Nick was supposed to conduct for London was futures arbitrage

- Trade Nikkei 225 futures on both the SIMEX and OSE
- The net exposure to changes in the Nikkei 225 would be zero at all times, and only profit would be arbitrage profit made from temporary mis-pricing

Development of the Collapse

Leeson tried to enhance the return on the arbitrage strategy by holding net long and short positions on the Nikkei 225 futures contract, exposing Barings to movements in the Nikkei 225

- The strategy appeared to be very profitable, but Leeson would hide any losses in a secret account, 'Error Account 88888'

In 1995, an earthquake struck Japan, causing Nikkei 225 to fall sharply

- At the time, Leeson had a long futures position in the index, and he suffered large losses
- By this point, Leeson was also engaged in trading a straddle strategy (selling both put and call Nikkei 225 options), which also suffered massive losses when the volatility of the Nikkei index spiked after the earthquake

Reasons for the Collapse

- Leeson was responsible for both trading and accounting, making it easier for him to hide trading losses in secret accounts
- There was also insufficient scrutiny from London, as large profits from a low-risk arbitrage strategy should have been a clear warning sign
- There was insufficient analysis on the size of transfers requested by Leeson to fund his trading
- The reporting structure was flawed, as Leeson had two separate reporting lines (one to London and one to Tokyo), making it easier to hide trade losses in Error Account 88888
- The bonus structure was based on performance over a very short period, thereby influencing Leeson to take excessive short-term risk

Lessons from the Collapse

1. Internal and external auditors should carry out their jobs more rigorously
2. A clearer and more direct reporting line should have been in place
3. Separate parties responsible for trading and for back office work
4. Should have more robust analysis of the consistency of the profits being made with the strategy being undertaken (i.e. arbitrage strategies should correspond with low risk, low return)
5. The bonus structure should be closer in size to base salary, and take into account profits over a longer period

20.4: Equitable Life

Background

Equitable Life was a mutual insurance company that adopted a bonus strategy that involved distributing as much of its reserves to its with-profits policyholders as possible

- Equitable Life was able to write a large volume of business, but was also exposed to more adverse market conditions (since it did not hold as much capital)

A significant proportion of the business Equitable Life wrote were with-profits pension policies that came with guaranteed annuity rates (GARs)

- A large number of these policies were sold in the 1970s and 1980s when interest rates were high
- However, Equitable Life's liability on these policies increase when interest rates decrease

In addition, in 1988, Equitable Life's terminal bonus was redesigned and GARs were dropped for new contracts

- However, policyholders were not told this, and no separate bonus series was started
- As a result, Equitable Life believed that even if interest rates did decrease and the GAR guarantees became in-the-money, the directors of the company would be able to adjust terminal bonuses to recoup the cost of any guarantees

Roy Ransan, Equitable Life's appointed actuary, also became CEO of the company

- This can create a conflict of interest, as the CEO acts in the interest of shareholders, while the appointed actuary acts in the interest of policyholders
- Combining both roles resulted in too great of concentration of power in a single individual

Development of the Collapse

Interest rates began to fall in the 1990s, and the GARs became in-the-money, resulting in large costs for Equitable Life

- Equitable Life tried to deal with this issue by awarding different rates of terminal bonuses depending on whether a policy had a GAR or not (policies with a GAR would get a lower bonus)
- However, angry policyholders sued, and the courts sided in their favor
- The final ruling left Equitable Life unable to manage its GAR policies, and it eventually closed its new business

Reasons for the Collapse

- Equitable Life had insufficient capital backing its liabilities (the GARs)
- Failed to predict that interest rates would decrease
- A cultural attitude of arrogance resulted in Equitable Life failing to notice changes in the financial landscape that affected all insurance companies
- Insufficient scrutiny of its own business model
- Concentration of the key roles of appointed actuary and chief executive in a single individual

Consequences of the Collapse

- Corley Inquiry recommended that appointed actuaries be subject to external peer review
- FSA replaced the role of appointed actuary with two roles: actuarial function holder and with-profits actuary
  - This was intended to give with-profits policyholders greater protection
- Led to independent regulation of UK actuaries and new body for setting actuarial standards.

20.5: Korean Air

In August 1997, Korean Air flight 801 was trying to land in bad weather in Guam

- Worried about the conditions, the flight engineer sought to warn the captain, but did it in such a polite manner that the warning was ignored

Reasons for the accident

The hierarchical nature of Korean society was primarily responsible for the accident

- The members of the flight crew were reluctant to openly challenge the captain's decision

Lessons from the Accident

- Make the only language allowed in a Korean Airlines jet be English
  - This reduces risk of communication problems between flight crew and air traffic control
  - By communicating in English, Korean flight crew are able to remove themselves from a traditional Korean setting, and be more willing to challenge decisions made by other members of the crew
- In terms of implications for financial organizations, the Korean air example demonstrates the importance of recognizing the external context in which business is carried out and the problems the context can cause

20.6: Long Term Capital Management

Background

LTCM was a US hedge fund set up by partners that included Nobel Prize winners Myron Scholes and Robert Merton.

The fund adopted a strategy of fixed income arbitrage between on-the-run and off-the-run treasury bonds within the US, Japanese, and European government bond markets

- This involves taking a short position in the most recently issued bond (aka 'on the run', which is typically more expensive due to liquidity reasons) and taking a long position in the off-the-run bond (typically cheaper)
- An arbitrage profit will be realized if both positions are held to maturity, since the bond prices will converge
- Because this is an arbitrage strategy, potential profits are small, so trades are often levered in an attempt to increase profits

As LTCM's asset base grew, the partners explored a wider range of trades to earn more profit, including looking at trades that tried to perform arbitrage **between** different bond markets as well

- The traders relied on complex models to exploit any perceived mispricing of bonds from expected long-term relationships
- However, this was not true arbitrage as it relied on convergence of markets to some long-term norm

Market Events

- In 1997, the Thai baht collapsed, which prompted many other Asian currencies to collapse as well
- This led to a wider financial crisis in Asia, and the fall in economic activity resulted in a sharp fall in commodity prices
- Commodities are a large export of Russia, so falling commodity prices hurt Russia's economy, forcing it default on its debt in 1998
- These developments resulted in investors selling Japanese and European government bonds for the safety of US Treasuries

All these movements resulted in large losses for LTCM

- The losses were compounded by the fact LTCM's positions were levered
- Arbitrage positions that would have ultimately converged also had to be sold

Lessons from LTCM

- LTCM was caught off guard by large, unexpected movements in the markets
- LTCM's strategy relied too heavily on models, and LTCM's failure shows that over-reliance on models at the expense of good judgement can be damaging
- The presence of two Nobel Prize winners in LTCM's management team resulted in many investors being star-struck
  - In the future, investors need to objectively assess the returns available from strategies that are being advertised, and understand the risks that are being taken

20.7: Bernard Madoff

Background

Bernie Madoff ran a securities firm that provided high stable returns to his investors

- Madoff claimed to be using a collar strategy, which involved buying OTM put options and selling OTM call options on a stock, while holding the stock itself
- The long positions in the put options limit losses if the stock price falls, while the premiums on the call options pay for the puts

However, it eventually became clear that Madoff had in fact been running a Ponzi scheme

- He would fund payments to existing investors from contributions made by new investors
- The fraud happened because Madoff was working in a small organization with little or no oversight
- The fraud also exposed the reluctance of potential investors to analyze Madoff's investment strategy

20.8: Robert Maxwell

Robert Maxwell illegally transferred funds from the pensions of a group of companies he owned in an attempt to financially support the companies

- These transfers had not been authorized by the trustees of the pension fund
- The fraud was possible because a number of key positions in the group and trustee boards were held by the same individuals
- Robert Maxwell was also an imposing man, and there was a large concentration of risk at the head of the company

After the fraud occurred, a UK government report recommended improving the independence of trustees of the pension fund

- A third of all pension fund trustees must now be nominated by pension scheme members
- Trustees are no longer allowed to act as either auditor or actuary to the pension scheme

20.9: Space Shuttle Challenger

On 28 January 1986, the Space Shuttle Challenger broke apart 73 seconds after take-off

- The cause of the accident was a failure in the rubber seal (the "o-ring") in one of the booster rockets
- The cold weather made the o-ring elastic and less able to provide a good seal, resulting in fuel escaping the booster rocket and igniting the shuttle

Organizational Failures Inside NASA

- Management underestimated the risk of failure
- The definition of failure was also flawed
  - There were many o-ring leaks during test launches, but these launches were not classified as "failured" because no explosion occurred
- NASA managers faced pressure to deliver on the shuttle launch, resulting in them making promises that the engineers did not think they could keep

Conclusions

A number of factors occur over and over again in these case studies:

1. People seem willing to invest in high-returning investment opportunities without determining the source of these returns
2. The importance of culture (ex: too strict a hierarchy can limit communication, too strong leadership can stifle dissent)
3. The importance of incentives is crucial
   - It is important not to have a bonus structure that encourages excessive risk taking over the short term