

LTCM Case Presentation

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Losses By Trade Types

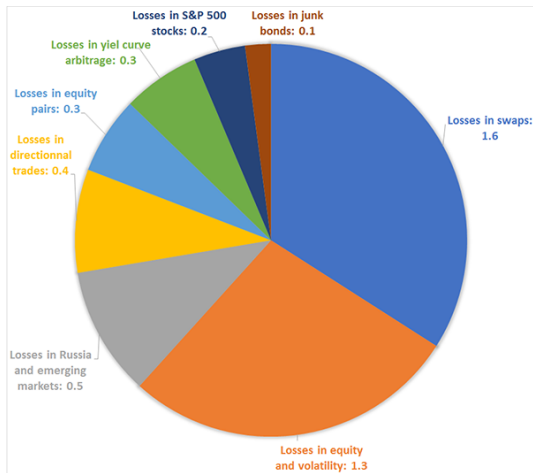
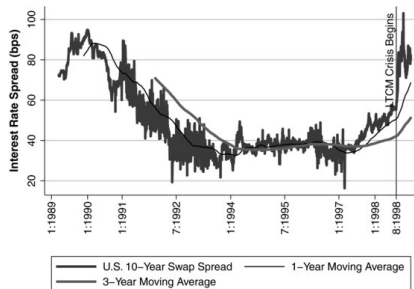


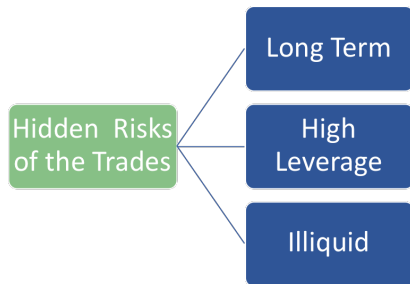
Figure 1: 70% of LTCM's loss in August & September 1998 resulted from the fixed-income relative value trades & the equity volatility trades

Risk of the Trades



- **Long Term:** Relative value/ convergence trades might take a long time to unwind with profit
- **High Leverage:** Requires high leverage to generate a considerable profit

Risk of the Trades



- **Illiquid:** Aims to arbitrage liquidity misallocations
- Many positions (off-the-run bonds, long-term options etc.) are comparably illiquid.

Current Economic Environment

Exhibit 3: A Sudden Stop in Q2, Followed by a Gradual Recovery

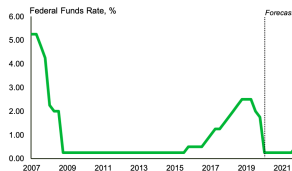


* Includes cutbacks to consumption categories requiring face-to-face interaction.
** Includes reduced domestic and foreign demand for goods, supply chain disruptions, and plant shutdowns.
*** Includes cutbacks to structures investment, homebuilding, and home sales.

Source: Goldman Sachs Global Investment Research

(a) Real GDP

Chart 2: Fed Funds Rate Back to the Floor

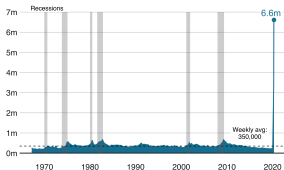


Source: FRB, TD Economics

(b) Interest Rate

US jobless claims at record high

More than 6 million people file claims as coronavirus hits



Source: US Bureau of Labor Statistics

(c) Unemployment

Macro Stress Scenario

- Possibility of prolonged COVID-19 risks the world economy significantly.
- Recovery signals in developed countries will not necessarily signal recovery globally.
- Developing country driven pandemic shock can further bring down global economic outlook.
- Unlike developed countries, permanent damages in productivity of developing countries are possible.

Economy at Risk

Figure 1
Headline Personal Consumption Expenditures Price Inflation: Actual and Current Forecast

Percent change from 12 months earlier

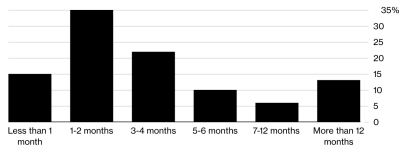


SOURCE: Bureau of Economic Analysis; Haver Analytics; and Federal Reserve Bank of St. Louis.

(d) PCPI

Survival Time for Small Businesses

How long will you be able to operate under current economic conditions?



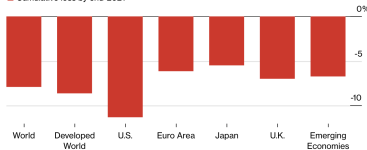
NFIB March 30 survey

(e) Small Business

Serious Losses

JPMorgan says virus could cost world at least \$5.5 trillion in lost output

■ Cumulative loss by end-2021



Source: JPMorgan Chase

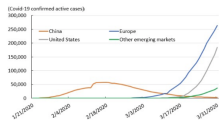
Note: Forecasts show deviation from Jan. 24 baseline

(f) Output Loss

Developing Countries at Risk

Rapid spread

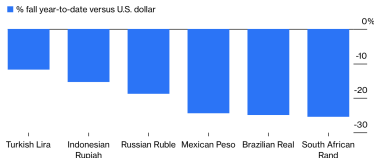
The coronavirus, first reported in China, is spreading quickly to other countries.



(g) Virus Spread

Emerging Contagion

The biggest EM currencies have underperformed versus the dollar this year



(h) EM Currency

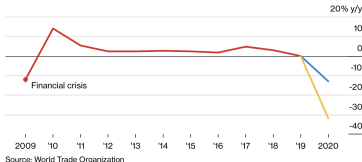
Ugly Numbers

The World Trade Organization says 2020 trade could fall as much as 32%

Annual change in volume of world merchandise trade

Optimistic scenario

Pessimistic scenario



(i) Trade Volume

Manufacturing activity

Manufacturing in emerging markets is slowing down sharply but in China it is improving modestly.



(j) Manufacturing

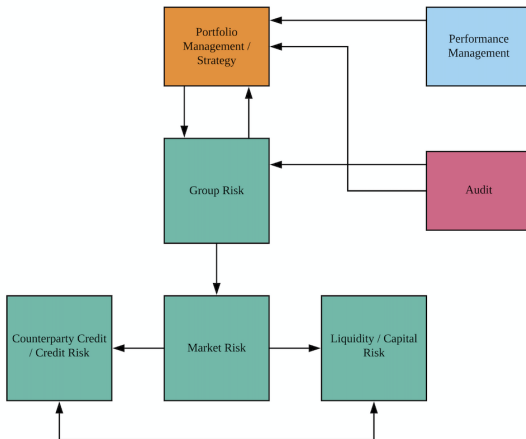
Macro Stress Scenario Summary

- A prolonged pandemic can damage household/small business significantly; Recovering productivity is a key driver.
- Even larger risks present in developing countries.
- Such risks in developing countries can potentially result in temporal abrupt capital flows in developing countries' financial markets.
- At worst, increased volatility can infuse chaos in (developed country) firm's decision making.
- Yet, benefits driven by less competition are generally expected.

Risk Governance Structure

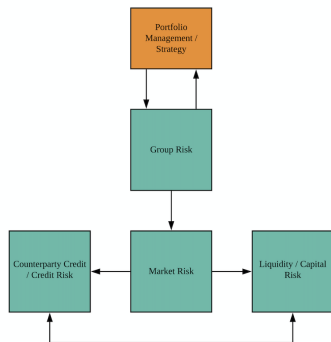
- In order to systematize solid risk practice, we propose a risk governance structure in resemblance to 3 lines of defence from typical investment bank risk management.
- Entities belong to three different lines of defence exercise their powers and restrict one and another in competitive ways.

Risk Governance Structure



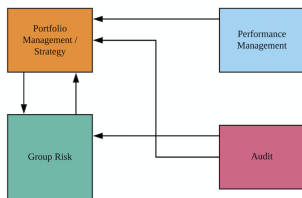
(k)

First and Second Line



- First Line: Portfolio Manager, Strategist (Risk Owners)
- Second Line: Risk Manager (Risk Oversight)

Third Line



- Third Line: Auditor, Performance Manager

Potential Conflict?

- Taking risk vs Limiting risk: Conflicts between first and second line due to different views and mandates
- Solution: Build principle guideline on limit setting from managements of first and second line
- Second line can corporate with flexibility while protecting the power to limit risks.

Counterparty Structure

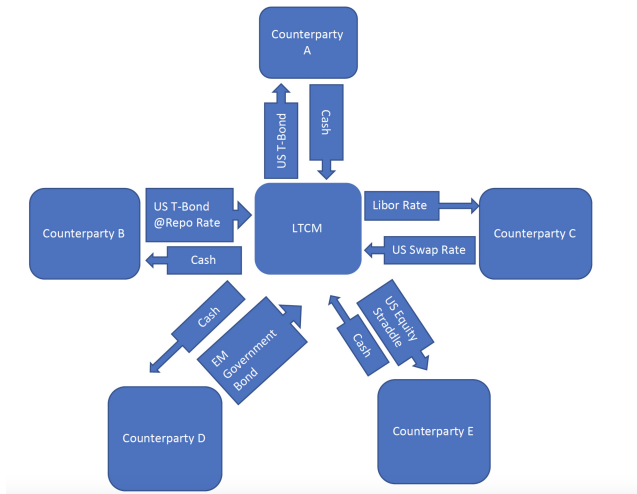
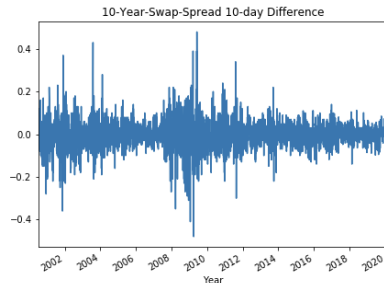
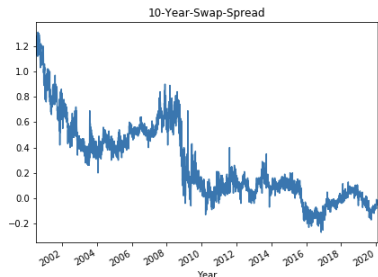


Figure 2: Counterparty Structure of LTCM

Expected PnL



- Short swap spread
- Consider maximum 10-day swap spread change in history
- Short position on T-bond would experience 4.5% loss
- Loss will become **135%** with 30-time leverage

Expected PnL

- Short US equity volatility
- short straddle:
At-the-Money (SPX 2760),
implied volatility 23%
- High Vega: 1% increase in
volatility causes 3% loss
- Assume long-term
volatility goes to 43%
- Loss will be as high as **60%**
- Long emerging market
bonds
- Russian bond return index
dropped more than **70%** in
1998
- Downside of similar
magnitude is anticipated if
emerging market debt
crisis breaks out

- Present of central clearing house should have limited leveraging activities of LTCM.
- This helps to reduce the notional of the trades and to reduce the liquidity risk of LTCM's portfolio by partially canceling out cashflows from daily margining.

Liquidity Crisis - Russian Default



Liquidity Crisis



Liquidity Crisis or Solvency Crisis?

- With injection of more capital, LTCM would have survived.
- Even though LTCM had huge positions and leverage, its trades were constructed that it will work in the long run and in the rational market.
- LTCM could not meet short term obligations due to fluctuations in increased risk aversion of investors, creditors, and the overall market.

What caused liquidity crisis?

- 
- Strategies: Long term, illiquid assets
 - Large size, positions by leveraging
 - Inadequate Risk Management

Summary

- The demise of LTCM was largely due to lack of risk management, especially leverage and liquidity risk.
- Trading Strategies of LTCM by nature inherits significant risks.
- We have identified global economic recession conditional on prolong pandemic as a macroeconomic stress test scenario.
- We also provided risk governance structure which can effectively manage and monitor risks in portfolio.
- We investigated the counterparty structure of LTCM and calculated the expected PnL of the trades under our stress test scenarios.
- LTCM's failure was a liquidity crisis and serves as an example for funds to account for liquidity risks when practicing risk management.