HEDGE FUNDS,
LONG TERM CAPITAL MANAGEMENT,
and VALUE AT RISK (VAR) METHODOLOGY

I. HEDGE FUNDS - are unregulated mutual funds.

~ There are 3,000-5,000 such funds world wide.
- $250 to $400 billion dollars in assets under management.

~ First hedge fund formed in 1949 by Alfred Winslow Jones.

~ Biggest fund is the Tiger Fund run by Julian Robertson.
- bad reputation: seen as a highly leveraged speculator
- activities that can put financial market in turmoil
  - e.g. when $U.S. fell vs Yen, Tiger was accused of worsening the fall as it pulled out of the dollar.

~ Usually structured as limited partnerships to remain unregulated.

~ Fees are usually very high: normally 20% of profits.

~ Self-defined as "arbitrageurs" rather than speculators.
- look for mispriced assets: buy "cheap" assets and selling off "expensive" assets
  - Some trading is pure arbitrage
  - Most trading involves risk. Many hedge funds have lost a large part of their capital base

~ Hedge funds blamed for many big market swings

II. LONG TERM CAPITAL MANAGEMENT

Strategy - the fund would leverage its capital to take advantage of pricing "anomalies" in global markets.

- LTCM would be "market neutral" : uncorrelated to stock, bond, or currency markets.

~ Assured investors they would use a ratio of investment capital to assets of only 20 to 1.

~ Restrictions: no withdraws for 3 years, $10 million minimum.

~ Fees: management charge of 2% vs 1% for other funds,
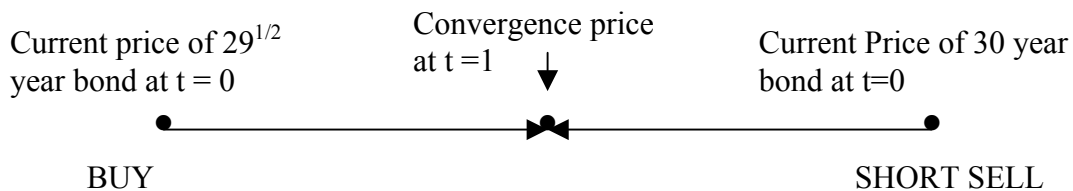 profit charge of 25% vs 20% for other funds

History

~ February 1994: trading activity begins for LTCM
  - found ample disparities between price and value of bonds
  - return was 19.9% after fees

~ Example of 1994 trade:
  - $29^{1/2}$-year U.S. Gov. bond seems too cheap relative to 30-year bond, and the price is expected to converge:

Current price of $29^{1/2}$ year bond at t = 0	Convergence price at t =1	Current Price of 30 year bond at t=0
BUY		SHORT SELL

  - LTCM bought $2 billion of the $29^{1/2}$ year bonds and sold short $2 billion of the 30 year bonds
  - six months after transaction, $25 million in profit made on $12 million in capital

~ 1995: return of 42.8% vs 16% other funds.

~ 1996: return of 40.8% vs 17% other funds.

~ Big gains prompted more competition - profit margins squeezed
- LTCM began investing beyond core strategy
- higher leverage and riskier bets

~ Engaged in *stock-takeover arbitrage*.
- strategy is to buy stocks slated for takeover and sell positions in the acquiring company
- risky business: fund lost $100 million on proposed takeover of (former) MCI Communications Corp.
- LTCM became the biggest player in markets for some highly illiquid securities

~ 1997: momentum begins to fall and losses begin.
- fund returns 17.1% after fees
- debates ensue over core strategy
  - Bad bet on German interest rates.

~ June 1998: first sign of trouble
- losses in bond markets worldwide
- 10.1% loss in June

~ August 1998: "The big shock": Russia defaults on part of its debt and lets the rouble fall
- LTCM has big investment in Russian debt
- domino effect begins

~ August 21st: Huge losses
- Dow Jones Industrial Average down 283 points
- Euro bond market in shambles
- markets become illiquid: difficult to manoeuvre successfully out of large trading bets
- by 11 am lost $150 million betting on two telecommunication stocks involved in takeover bid

- soon after, lost $100 million on U.S. bond market bet
- by day's end, half a billion dollars lost
- equity down a third to $3.1 billion

September 17th: meeting with Goldman Sachs - partnership talks.
- Deal: in exchange for $2 billion in capital, LTCM agreed to some supervision. However, Goldman Sachs could not get investors to buy into the deal
- LTCM portfolio fell to $1.5 billion

~ Goldman approached Buffet and the Federal Reserve
- rescue package could not be put together quick enough
- LTCM faced continued margin calls
- fear was that fund default would force securities to close out fund's positions at fire-sale prices
- wave of selling would cause heavy losses on trading desks that had placed similar bets

~ Fed organised a rescue plan with 14 Wall Street Banks
- a $3.625 billion bailout was funded by the banks
- debate ensued over whether saving the fund was necessary

~ By the end:
- LTCM lost more than 90% of its assets
- partner stakes fell from $1.6 billion originally to only $30 million

~ LTCM is a unique case:
- few funds are as largely leveraged as LTCM
- almost a third of hedge funds do not borrow
- 54% of hedge funds borrow no more than the amount of equity in the portfolio
- rare to see leverage greater than 10 to 1.

III. RISK MANAGEMENT; VALUE AT RISK (VAR) MODEL

~ Recent years have seen many financial crisis:
- the 1987 stock market crash
- break-up of Europe's exchange rate mechanism
- bond market crash in February 1994
- Mexican peso crisis of 1995

~ VAR used to measure risk in actively traded portfolios
- VAR is favoured by banks, and used extensively by LTCM

Definition: VAR is the maximum amount of money a portfolio many lose over a specified period with a specified probability.

~ Daily VAR can be computed, but for less actively traded portfolios, monthly VAR is used.

~ eg: a portfolio with a one-month 95% VAR of $4 million
- expect to lose less than $4 million with 95% probability.
- based on current portfolio composition and recent market behaviour

Example: One-Month 95% VAR
Exhibit 1
Probability Density
VAR $4MM
5%   95%
-$5MM $0 $5MM
One-Month Profit/Loss
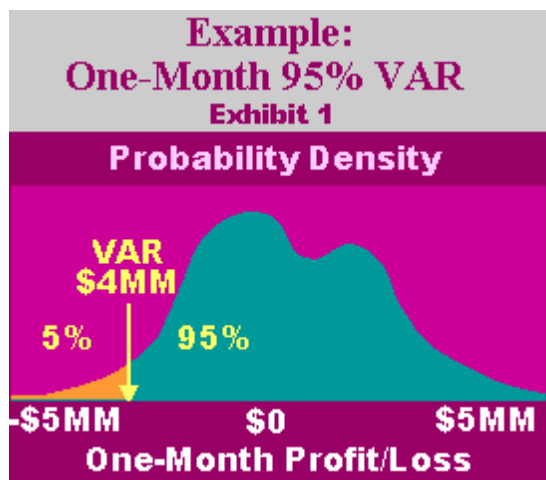
~ Another more specific example:
- assume you hold $100 million is medium-term notes
- how much could you lose in a month?
- want to know whether returns received is appropriate compensation for risk
- must first analyse the % returns of medium term notes
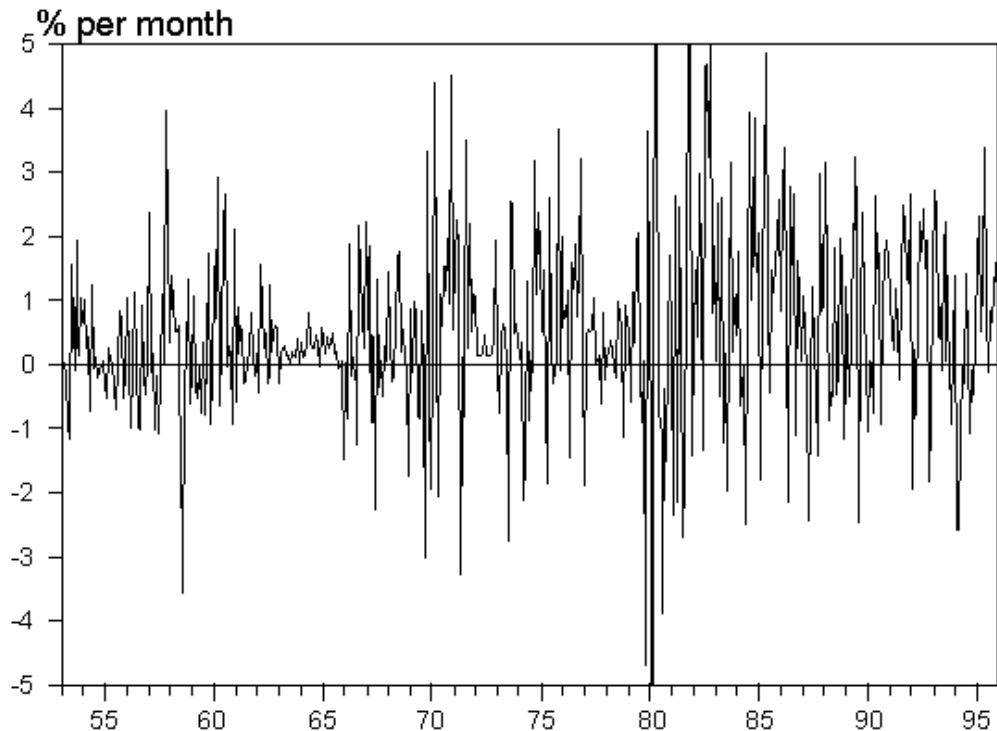
- here we obtain monthly returns of medium term bonds from 1953-1995
- returns range from a low of -6.5% to a high of 12%
- construct intervals of the possible returns from lowest to highest
- count how many observations fall into each interval
- for example, there is one observation at -5%, another between -5% and -4.5%,…etc

~ Result: a "probability distribution" for the monthly returns
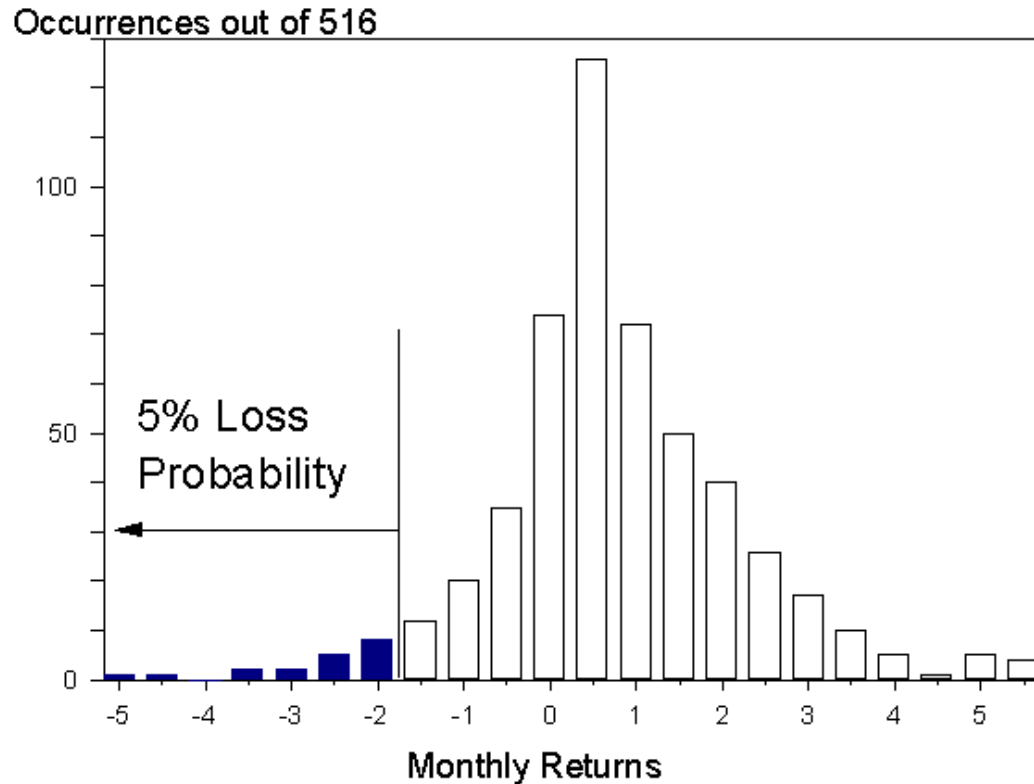
~ For each return can compute a probability of observing a lower return.

~ Pick a confidence level of 95%
   • at 95%, can find on the graph a point such that there is a 5% probability of finding a lower return
   • in this example the number is -1.7%
   • all occurrences of returns less than -1.7% add up to 5% of the total number of months (26 out of 516)
   • result could also be obtained from the sample standard deviation if returns are approximately normally distributed

Now can compute VAR of $100 million portfolio:

- only a 5% chance that the portfolio will fall by more than 1.7 million ($100 million x (-1.7))
- therefore VAR is $1.7 million

~ Note: choice of horizon is arbitrary at one month.

~ Horizon:
- ideally, holding period should correspond to the largest period needed for an orderly portfolio liquidation
- for a trading portfolio invested in highly liquid currencies, one-day horizon may be acceptable
- for an investment manager with monthly rebalancing, 30-day period may be appropriate

~ Confidence level:
- should reflect degree of risk aversion of the company and the cost of a loss of exceeding VAR
- higher risk aversion, or greater costs, implies a greater amount of capital should cover possible losses - the result is a higher confidence level

Summary:
- VAR number summarises the portfolios exposure to market risk as well as the probability of an adverse move
- VAR uses historic data to predict future risk and is not reliable if the model generating returns has or will change.