Handout 4.Managed Futures and CTA's

Managed Futures is an asset class which focuses on worldwide futures markets in currencies, fixed income, stock indices, agriculturals, and metals.

Professional Trading Managers called Commodity Trading Advisors (CTAs)

Uses the Liquidity, Leverage, and Credit structures provided by futures markets

Through selected legal structures, allows ease of administration and performance reporting

CTA is A professional trading manager (registered in the U.S. by the Commodity Futures Trading Commission - CFTC) who manages customer money in the futures and options markets

CTAs use tested trading methods and money management techniques in their attempt to achieve profits and control risk

Styles

Systematic traders follow proprietary systems that focus on technical factors; usually computer based models that focus on market trends and/or mean reversion and capital and risk control

Fundamental managers base trading decisions on events which affect supply and demand; typically discretionary in nature

Futures markets are regulated by government, quasi-government agencies worldwide

Futures transactions have no counterparty risk: the Clearing Corporation stands between each buy and sell order

Daily closing prices which are quoted globally

Accounts are settled daily

Participants mostly institutional: hedgers and speculators

Futures are Traded

Australia	Germany	Norway
Austria	Hong Kong	Philippines
Belgium	Hungary	Singapore
Brazil	Ireland	South Africa
Canada	Israel	Spain
Chile	Italy	Sweden
China	Japan	Switzerland
Denmark	Malaysia	United Kingdom
Finland	Netherlands	United States
France	New Zealand	

Some Futures Conracts

Currencies
British Pound
Euro
Japanese Yen
Canadian Dollar
Swiss Franc
Australian Dollar
Singapore Dollar
Malaysian Ringitt
Thai Bhat
Czech Kroner
Mexican Peso
US Dollar Index
Crosses on all of above

Stock Indices
U.S. S&P 500
Japanese Nikkei
Japanese TOPIX
Australian All Ords
French CAC40
German DAX
Hong Kong Hang Seng
British FTSE
EuroStoxx

Stock Indices (cont'd)
Korean Kospi

Interest Rates
US Treasury Bond
US Treasury 10 yr. Note
US 5 yr. Note
Eurodollar
Canadian Bonds
Canadian B.A.
Euro Bund
Euro Bobl
Euro Shatz
Euro Swiss
French Notional Bond
British Long Gilt
British Short Sterling
Euro Yen
Japanese Bonds
Australian Tbills
Australian Notes/ Bonds

Metals
Gold
Silver
Copper
Platinum
Palladium
Tin
Lead
Zinc
Nickel
Aluminum

Grains/Ags
Soybeans
Soybean Oil
Soybean Meal
Corn
Wheat
Azuki Beans

Energy
Crude Oil
Heating Oil
Unleaded Gas
Natural Gas
Brent Crude
London Gas Oil

Livestock/Softs/Others
Sugar
Cocoa
London Cocoa
Coffee
London Coffee
Lumber
Orange Juice
Cotton
Live Cattle
Live Hogs
Pork Bellies
Feeder Cattle
Rubber

CTA's have Low Correlation with traditional asset classes

CTAs tend to be <u>long volatility</u> (trend-followers) and make their best returns under <u>divergent market conditions</u>

Most stock, bond, and hedge fund managers tend to be short volatility and look for markets to converge to historical levels around equilibrium prices.

CTAs are also dynamic: portfolios can react quickly to price movements and seek to take advantage of trends in many different markets

CTAs will focus on those markets which have the best opportunity and risk/reward

CTAs have the ability to be Long or Short with equal ease--no short selling restrictions

CTA STRATEGIES

Trend Following (Long Term, Short Term)

Mean Reversion

Fundamental

Spreads

Other

Trend-Following

Identifies trends in prices early and try to jump on the moves.

Typical Techniques: Moving Averages, Channel Breakouts
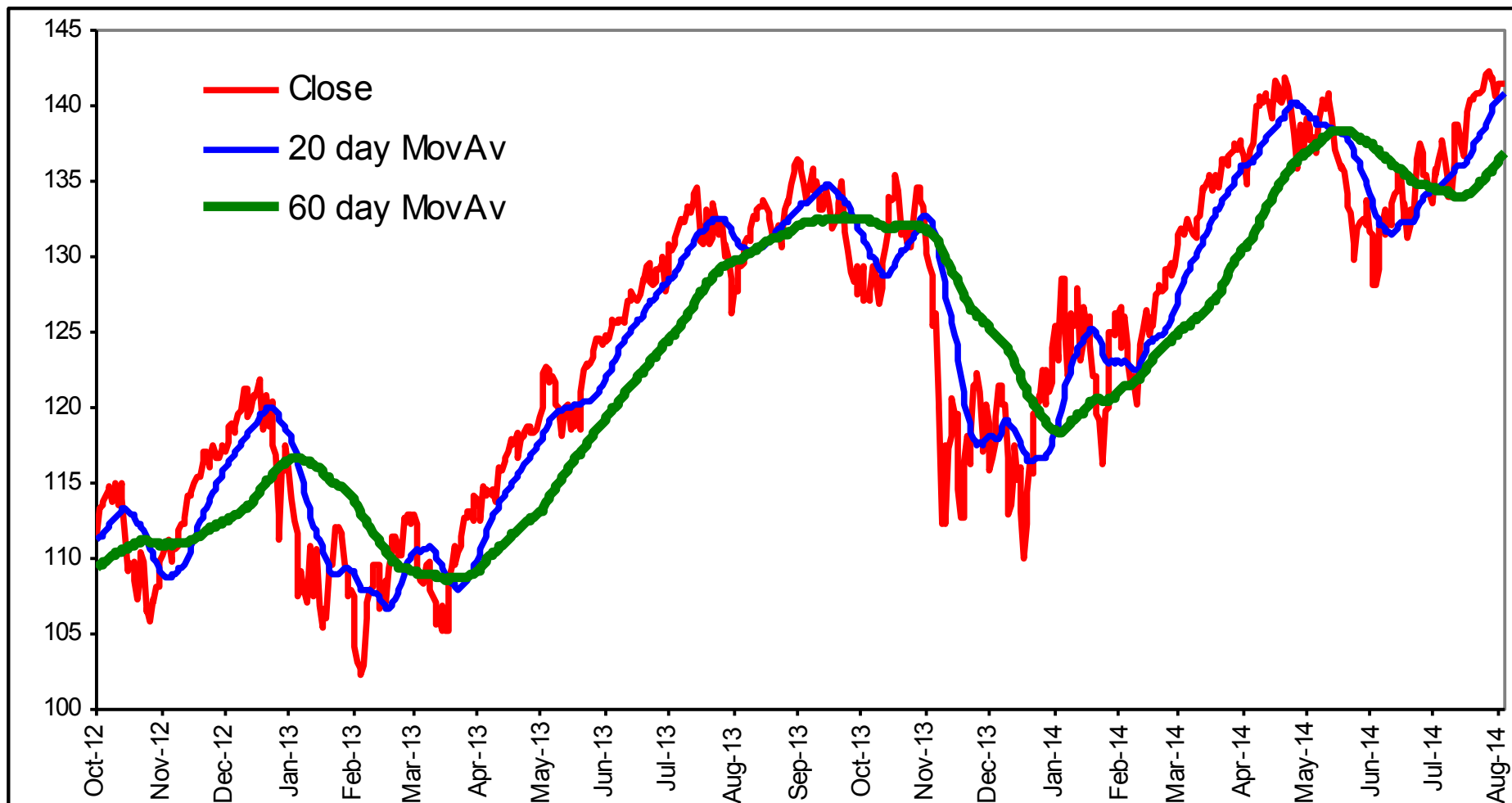
Example: Commodity XXX

Long and short alternatively.

Entrance: When the 20 day moving average crosses over the 40 day moving average, go long when the market opens. The crossover suggests that the trend has recently turned up.

Exit: Exit long and go short the next day when 20 day MA crosses over 40 day MA. The crossover suggests that the trend has turned down.

Stop loss: Stop loss based on maximum loss acceptable based on recent volatility. Example: Stop 4 times 10 day Average Daily Range.

Trend Following. Continued

Channel Breakouts: Channel boundaries

Highest High d days
Lowest Low d days

Example: Commodity XXX

Entrance: When open above Highest High d days + y% go long.
Stay long until stopped.
When open below Lowest Low d days + y% go short.
Stay short until stopped.

Stop loss: Stop loss based on maximum loss acceptable based on
recent volatility. Example: Stop 4 times 10 day Average Daily Range.

DIFFERENT PORTFOLIO ALLOCATION SCHEMES IN FUTURES TRADING

1. Fixed maximal number of contracts per futures market

2. Fixed allocation of dollar risk per futures market (as volatility increases
   position decreases to keep same dollar risk).

3. Grouping Futures in Groups (US Equity indices, US Bonds, etc)
    then fixed allocation of dollar risk per group and within group
    allocating risk dynamically with some restrictions on position
    size within group.

4. Dynamic Risk Allocation using optimization procedures

5. Other

Mean Reverting Trading Strategies

Example. Bollinger (Volatility) Band Type Strategies

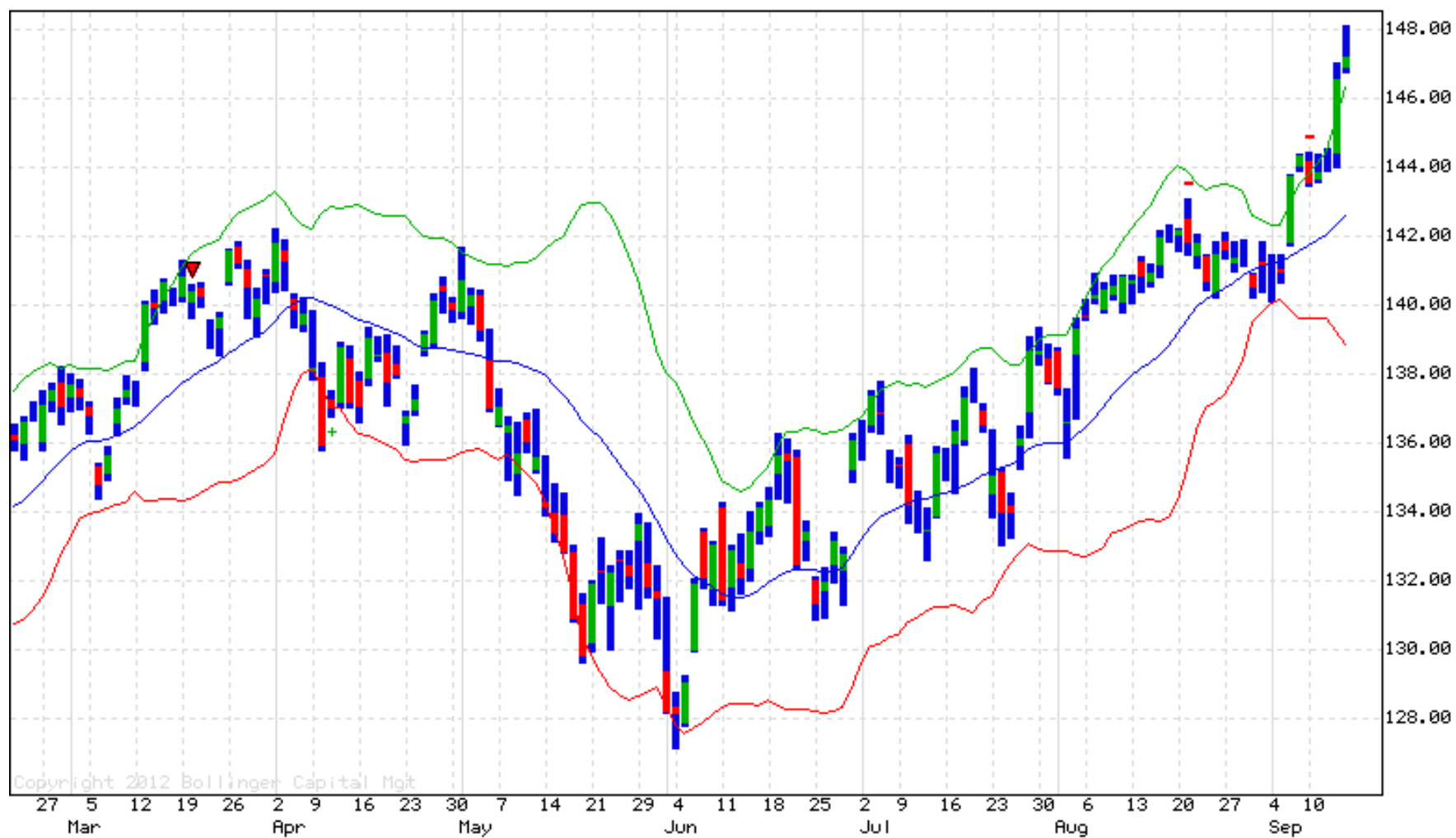**Bollinger Bands consist of:**

N-period moving average (MA)

upper band at K times an N-period standard deviation above the moving average (MA + Kσ)

lower band at K times an N-period standard deviation below the moving average (MA − Kσ)

Typical values for N and K are 20 and 2

Sell at upper band, close at moving average

Buy at lower band, close at moving averag

Margin to equity, leverage, drawdown.
Sharpe and other ratios.

Margin to Equity- Risk Measure for CTAs showing what percentage of assets in the fund can be allocated for margin (typical range 5%-35%)

Gross leverage – sum of notional values of all futures contracts in the fund (typical range 1-15 times)

Ratios:
Annualized Return over d years/Max drawdown

DRAWDOWN AS ANOTHER MEASURE OF RISK

P(t) be a portfolio value at time *t*.

M(t) be a maximal value of a portfolio prior to *t.*

If portfolio value is below its maximal prior value, portfolio is said to be in ***drawdown.***

Unless portfolio is at its up to date peak it is in drawdown.

Absolute drawdown ***ADD(t)=P(t)-M(t)*** where ***M(t)=Max(P(s), s<t).***

Percentage Drawdown ***PDD(t)*** is absolute drawdown as percentage of ***M(t).***

Sharpe Ratio = $\dfrac{\textbf{(Annual Return - Risk Free Rate)}}{\textbf{Annual Volatility of Excess Returns over Risk Free rate}}$

Sortino Ratio = $\dfrac{\textbf{(Annual Return – Minimal Accepted Return)}}{\textbf{Annual Downside Deviation}}$

Downside deviation =Square root of 1/n of the sum of the squared distances between the returns and the Min Acc Return, where the sum is restricted to those returns that are less than the Min Acc Return. n- is the total number of returns.

Percentage and Absolute Drawdowns of a Sample Portfolio
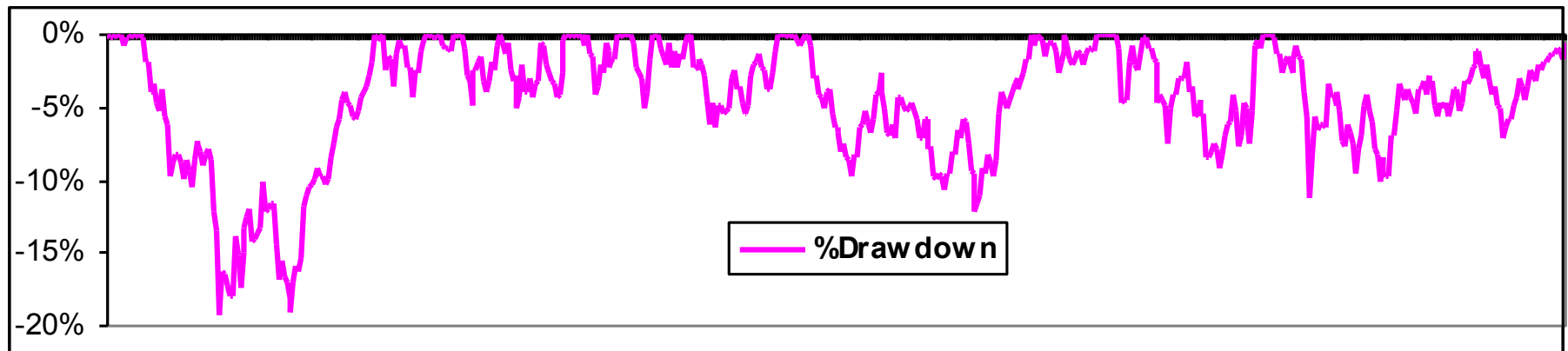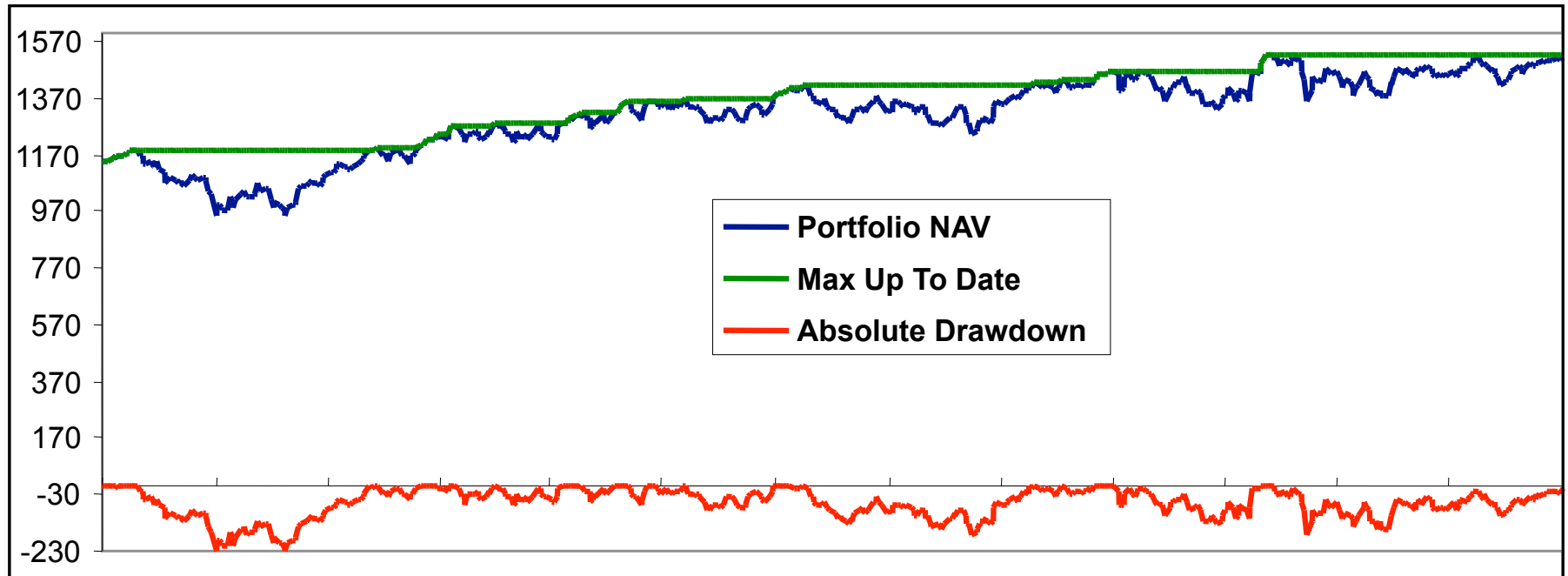
Design and Construction of Futures Trading Systems.

Optimization of Futures Trading Systems.

EXAMPLES

Sharpe ratio was introduced in 1966 by William Sharpe (1990 Nobel Prize in Economics for the capital asset pricing model). It is a risk/return measure and one of the simplest of such measures.

$$\text{Sharpe Ratio} = \frac{\text{(Annual Expected Portfolio Return} - \text{Ann Risk Free Rate)}}{\text{Annual Volatility of Excess Returns over Risk Free rate}}$$

Sharpe ratio measures fund's risk-adjusted performance.

The higher Sharpe ratio is the better is the fund manager.

Typical range 0.6 to 2.5. Sharpe 2.5 is VERY VERY good.

Negative Sharpe ratio implies that a cash would perform better than the fund. Cash would have no volatility.
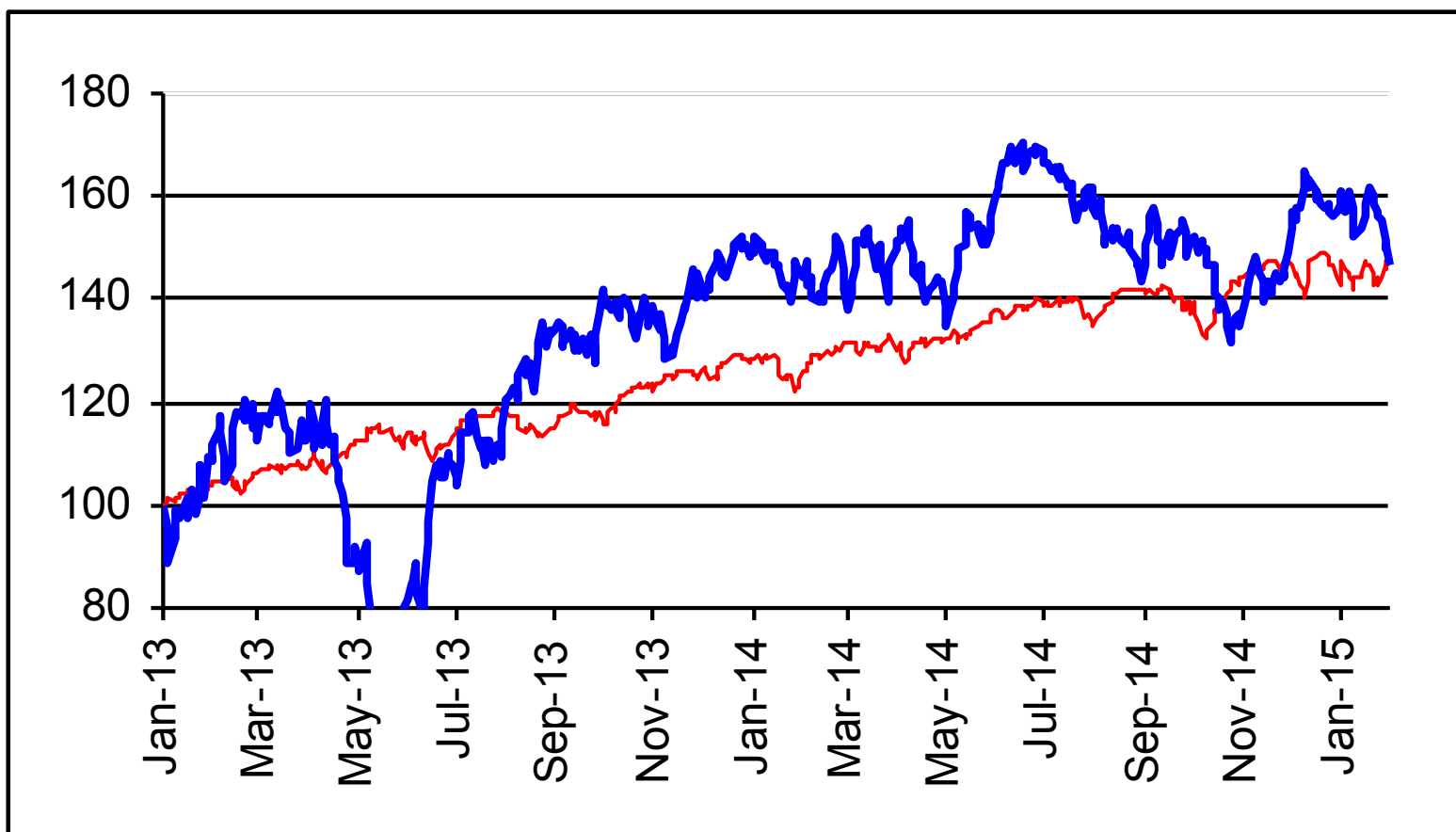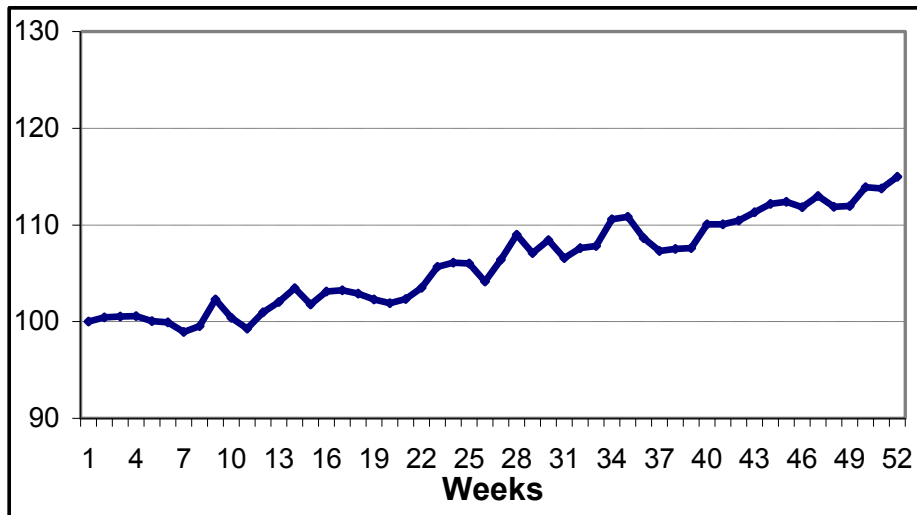
High Sharpe ratio fund (red thin line)   Sharpe=1.6
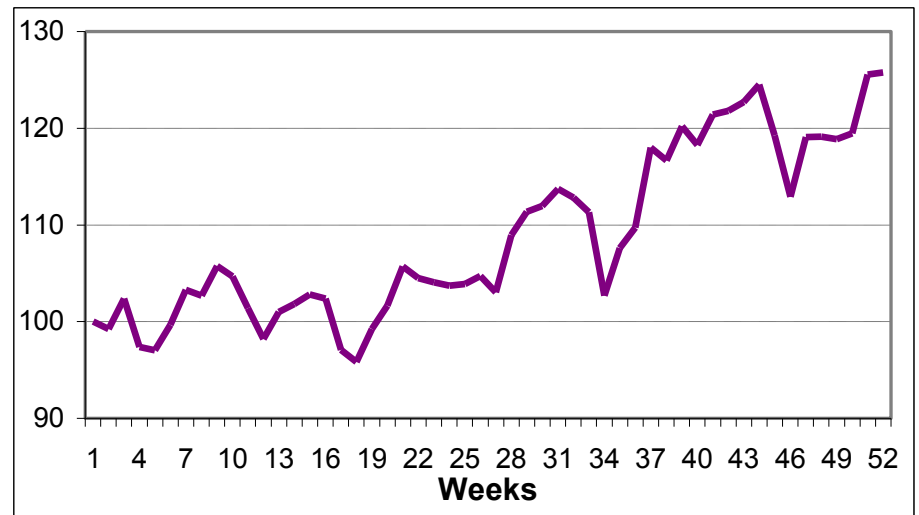Low Sharpe ratio fund (blue thick line)   Sharpe=0.7

Measuring of Performance of Leveraged Investment

Example.

Fund A, Annual Return 15%

Fund B, Annual Return 25%

Which one is better to choose if one can leverage the investment?

Postulate:

If two funds X and Y have the same return

then the fund that has less risk as measured by "oscillation" or standard deviation of returns is better.

Note that risk can be measured by other measures like drawdown, downside deviation etc.

Answer. The one with higher Sharpe ratio.

Suppose that the risk free rate is 5% (one can borrow and lend money at 5%). Define Sharpe Ratio, named after economist W.Sharpe as

$$\text{Sharpe Ratio} = \frac{\text{(Annual Return} - \text{Risk Free Rate)}}{\text{Annual Volatility of Excess Returns over Risk Free rate}}$$

Fund A.
Annual Return   15%,
Annual Volatility   10%
(of returns over 5% risk free)

$$\text{Sharpe Ratio} = \frac{(15\% - 5\%\text{Risk Free Rate})}{10\%} = 1$$

Fund B.
Annual Return   25%,
Annual Volatility   30%
(of returns over 5% risk free)

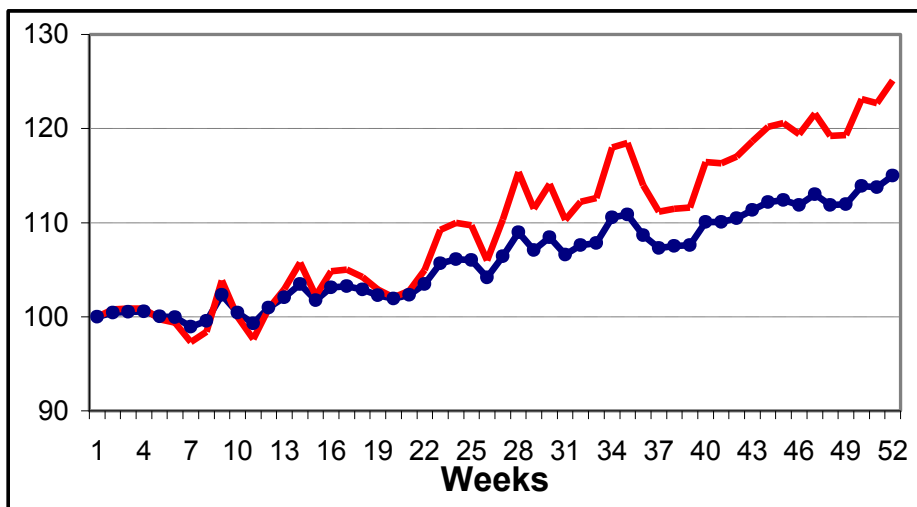$$\text{Sharpe Ratio} = \frac{(25\% - 5\%\text{Risk Free Rate})}{30\%} = 0.66$$

Fund A Leveraged 2 to 1.

Annual Return   25%=2×15% - 5%(borrowing),

**Annual Volatility 20%=2×10%
(of returns over 5% risk free)**

$$\text{Sharpe Ratio} = \frac{(25\% - 5\%\text{Risk Free Rate})}{20\%} = 1$$

Fund A Leveraged 2 to1, Return 25%, Vol.20%   **Fund B, Return 25%, Volatility 30%**