

Systematic Investing
Assignment: TREND Following Systems
Professor Dhar
Spring 2024

In this assignment you will build a couple of simple trend following systems and test them.

As we discussed in class, the simplest types of trend following systems are moving average crossover and breakout systems. Implement the following four systems on the ten year note (fixed income), the Euro (currency), and the S&P500 (equity): 10/30, 30/100, and 80/160, 30 day breakout.

1. Calculate and report the Sharpe ratios for the three individual instruments beginning March 8 1999 (from when the Euro data begins) until December 31, 2010. Which of the four works best for each instrument?
2. Now pick the best result for each instrument and combine the three instruments' returns to produce the overall portfolio return stream.
 - 2a. What are the Sharpe ratios?
 - 2b. What is the largest drawdown and when does it occur?
3. Now combine the best result returns in inverse proportion to their trailing 20 day volatility. What is the Sharpe Ratio of this series?

Extra Credit: create a 10/30 system based on *exponential* moving averages and evaluate its performance. Does it do better than a vanilla 10/30 system?

Some Details:

- a. For MA10/30 and Brk30 cases, you can start using the data for calculating performance from April 16, 1999 which is when you have the first available value for MA30 and Brk30 series
- b. For the MA30/100, you can start using the data for calculating performance from July 27, 1999 which is when you have the first available value for MA100 series
- c. For the MA100/160, you can start using the data for calculating performance from Oct 20, 1999 which is when you have the first available value for MA160 series
- d. To calculate the performance of the combination, start calculating the combined returns for Problem #2 above on October 20, 1999 when performance data for the slowest system is available.