Test Performance of Trading Strategy or Portfolio

1. Rationing of trading strategy
2. Study period
3. Research design
4. Portfolio performance analysis
5. Sensitivity Analysis
6. Computer programming

Rationing of Trading Strategy

Explanation of the concept

- Why should this concept be tested? Give some explanation.
- Why can this concept help making profit? (optional)

Rationing of Trading Strategy

Explanation of the concept

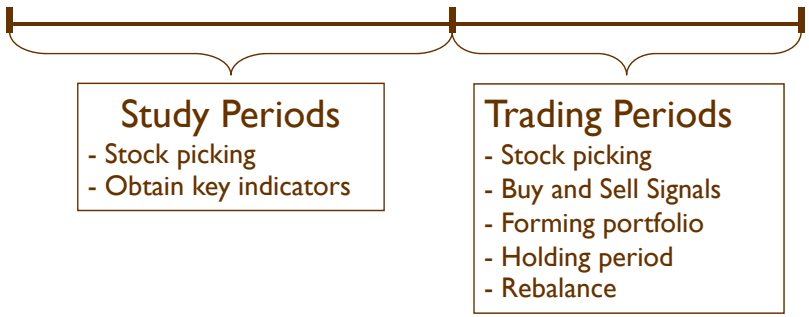
- How to Determine Fundamental Value of the Stock and/or Set Up Optimization Problem?
- Set up Objective Function & Constraint Equations – Mean-Variance Portfolio Optimization
- State Optimization Technique
- Trading concerning on certain objective
- Determine Buy and sell signals

Study Periods

Formation (Study or Training) Periods

Trading Periods

Reasons of choosing the periods of study



Research Design

Stocks Picking

Formation (Study or Training) Periods

How to set up trading rule

Analysis of the criterion using in trading rule

Trading Periods

Portfolio formation

Trading rule using in the study

Holding periods and portfolio rebalance

Transaction cost, tax, and dividend

Portfolio Performance Analysis

Portfolio Performance Measure Index

- Return computed from Net Asset (Portfolio) Value.
- Jensen's Alpha
- Sharpe Ratio
- Treynor Ratio
- Sortino (Risk-adjusted return) Ratio
- Others – DEA, Bootstrap (p-value) Jensen's Alpha, VaR

Benchmark

Portfolio Performance Analysis

Return computed from Net Asset (Portfolio) Value.

$$r_j = \frac{NAV_{jt}}{NAV_{jt-1}} - 1$$

Jensen's Alpha

- CAPM $r_j - r_f = \hat{\alpha}_j + \hat{\beta}_j \left(r_m - r_f \right)$

- Fama-French $r_{jf} = \hat{\alpha}_j + \hat{\beta}_{1j} r_{mf} + \hat{\beta}_{2j} SMB + \hat{\beta}_{3j} HML$

- Carhart $r_{jf} = \hat{\alpha}_j + \hat{\beta}_{1j} r_{mf} + \hat{\beta}_{2j} SMB + \hat{\beta}_{3j} HML + \hat{\beta}_{4j} PR1YR$

Portfolio Performance Analysis

Sharpe Ratio
or reward-to-variability ratio $= \frac{r_{jf}}{\sigma_{r_j}}$

Treynor Ratio $= \frac{r_{jf}}{\beta_j}$

Sortino (Risk Adjusted Return) Ratio

$$= \frac{r_j - r_{Target}}{\sigma_{Downside}}$$

Portfolio Performance Analysis

DEA – Efficiency Index

Frontier Production Function

Production Function vs. Productivity

Given $Q = f(K, L)$

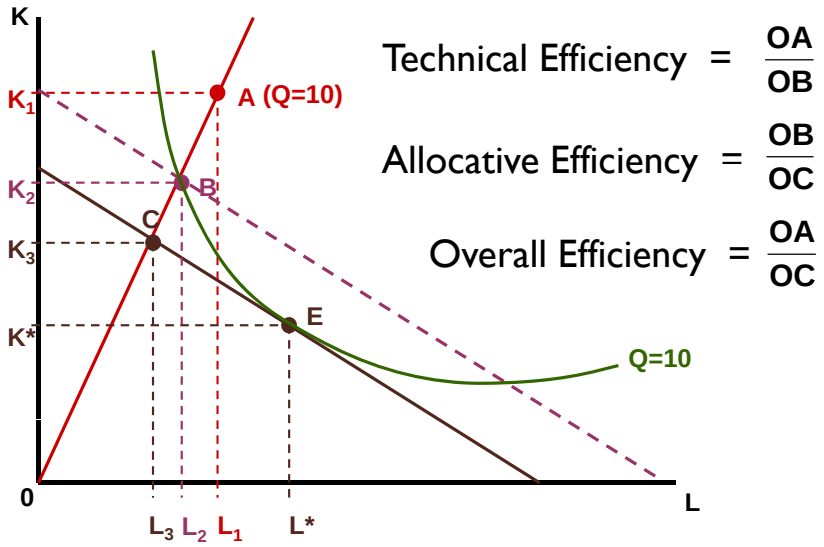
Production depend on K and L

Increasing in K and L will lead to an increasing in Q

However, increasing Q does not mean that productivity increase.

Portfolio Performance Analysis

Frontier Production Function



Technical Efficiency = $\frac{OA}{OB}$

Allocative Efficiency = $\frac{OB}{OC}$

Overall Efficiency = $\frac{OA}{OC}$

Portfolio Performance Analysis

Efficiency Measurement

- Deterministic Frontier
  Data Envelopment Analysis (DEA)
- Stochastic Frontier Analysis (SFA)

Efficiency Index

- Efficiency Change
- Technical Change
- Total Factor Productivity (TFP) Change

Portfolio Performance Analysis

Bootstrap p-value

Purpose of using bootstrap

1. When conventional methods such as standard error computation are difficult to implement – mostly empiricalist.
2. When usual asymptotic methods does not work well. They apply bootstrap to obtain a better approximation in-finite sample by employ a more advance asymptotic refinements techniques.

Portfolio Performance Analysis

Bootstrap p-value

1. Given data, draw a bootstrap sample of size N using selected method.
2. Calculate appropriate statistic using the bootstrap sample.
3. Repeat steps 1 and 2 for B independent times.
4. Using these B bootstrap replications to obtain a bootstrapped version of the statistic.

Sensitivity Analysis

w vs w/o Transaction Cost, Tax, and Dividend

Different Methods of Calculation

Different Duration of Formation Periods

Different Holding Periods

Different Performance Measurement Indices

Sector Analysis

Sub-period or Sub-sample Analysis

- Bull, Bear, & Sideway market condition

Simulated Market Analysis

- Bootstrap Simulation

Sensitivity Analysis

Simulated Market Analysis

Bootstrap Simulation

1. Estimate data generating process (DGP) model of the return or price using the observed data.
2. Compute residuals from the estimated results of DGP and resample the residuals with replacement.
3. Construct the simulated return or price using estimated coefficients of DGP and the resampling residuals.
4. Perform each trading rule using the simulated price and compute return of each trading rule

Repeat step 2 to 5 for B times.

Computer Programming

Formation Period

- Determinants of fundamental values of the stocks
- Estimated values of parameters using in optimization of the trading objective

Trading Period

- Portfolio formation
- Buy and sell signals & Holding period
- Portfolio rebalancing

Computer Programming

Performance Evaluation

- Performance Indices Calculation
- Benchmark

Sensitivity Analysis

- Different Duration of Formation Periods
- Different Holding Periods
- Sector & Sub-period or Sub-sample
- Simulated Market