Linear Factor Models

Performance Measurement

Risk_Factors.xlsx contains monthly observations of the risk-free rate and the three Fama–French risk factors (expressed as percentages), over the ten-year period from Jan 2004 through Dec 2013.

Using excess returns for the ten industry portfolios, calculate the following performance metrics:

- Sharpe ratio

- Sortino ratio (using risk-free rate as target)

- Treynor ratio (using CAPM β)

- Jensen's α

- Three-factor α

The sample semi-variance can be estimated as: $\frac{1}{T}\sum_{t=1}^{T} \square \min\{R_{it} - R_{ft}, 0\}^2$

where R_i is return on industry portfolio and R_f is risk-free rate.

- Create a table showing the performance metrics for the ten industry portfolios.

- Plot your results as a bar chart for each performance metric.

- Briefly explain (in words, without mathematical equations or formulas) the economic significance and pricing implications of each of the three performance ratios (but not α's).