Empirical Finance: Course Work 1

Your team has been recently hired by **Imperial Global Asset Management**, and your task is to carry out a set of exercises. Below, you find the guidelines about your assignments, but you can amend the specifications if you have plausible economic arguments. Report your analysis in the form of an investment report, written from the perspective of a financial economist, with a maximum length of 5,000 words (this limit is indicative rather than binding). Describe what you have done and present the key results. You can also be creative and report whatever may convince an investor to bet on your strategy. Whether a strategy works or not, try to come up with an economic story that explains why this is the case. Last but not least, make any assumptions you need, but please mention them. You do not need to submit codes and/or Excel files.

Data

You have collected the following long-span data (for example from Global Financial Data):

- Stock market index for the US and UK,
- Short-term Treasury yields for the US and UK,
- Long-term Treasury yields for the US and UK,
- GBPUSD exchange rate.

Exercise 1 [30%]

Take data for the US (i.e., stock market index, short-term yield, long-term yield, and exchange rate) and answer the following questions.

Questions

1. Present and comment their summary statistics.

2. Present and comment the ACF and PACF.

3. Identify the appropriate time-series specification, and estimate the key parameters. Present and discuss your results.

Exercise 2 [30%]

Consider the following models:

1. Benchmark model

$$y_t = \alpha + \varepsilon_t$$

2. Competing model

$$y_t = \alpha + \beta x_{t-1} + \varepsilon_t$$

where

- y_t is the monthly stock return between $t-1$ and t,
- x_{t-1} is the term spread (long-term minus short-term yield) at time $t-1$.

3. Use a 10-year rolling window (start with 10 years of data) to generate out-of-sample (OOS) forecasts for both models using US data

Questions

1. Compute the **OOS R-squared** or R^2_{oos},

2. Test the **null hypothesis of equal predictive ability** using the Clark and West test.

3. Bootstrap the critical value of the Clark and West statistic.

4. Present and discuss your results.

Exercise 3 [40%]

Using the same setup as in Exercise 2, take the perspective of a US-based investor and assume that you can allocate your wealth among the following assets:

- the US risk-free asset,
- the US stock market, and
- the UK stock market.

Questions

- Set $\sigma^* = 10\%$ per annum as target volatility, and rebalance your portfolio every month using your OOS forecasts.
- Report portfolio **mean** and **volatility** in % per annum, **SR** and **SO** per annum,
- Report the **performance fee** $\mathcal{P}$ in basis points per annum,
- Report the **break-even** transaction costs τ in basis points per month,
- Plot the cumulative returns, portfolio weights, and the one-year rolling SR.

Good Luck!