

Task 2 - ML for Finance. Argimiro Arratia. BSE- 2023

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- Register your team in sheet HW2 of the spreadsheet ML4Finance23_HWteams in the drive.
- Do not hand in R/Python output, use cut/paste to write a report (LaTeX or Word), and it is not necessary to keep all decimal digits in reported results.
- Put team members names in the report. Teams should be of at most 3 students.
- Always comment your results (as a Data Scientist would do!).
- **Submit your report in PDF format plus R/Python code and extra data (if any, not given out by me), all in a .zip folder via the Classroom with subject: “BSE Task 2 - Team - members names -”. Only one member of team makes the submission for all.**¹

1. (50%) Backtesting trading strategies based on sentiment indicators. Consider the dataset `dataSent.zip` provided in Classroom/Home Work 2 containing the stock price history and associated sentiment indicators for various stocks. Select two and register their tickers in the spreadsheet in column Prob. 1. Try to select different pair from those selected by others (not mandatory). Use the R script `Rlab6_TradingStrategywCost.R` which builds the following compositions of sentiment indicators:

$$BULL = positivePartscr + certaintyPartscr + finupPartscore$$

$$BEAR = negativePartscr + uncertaintyPartscr + findownPartscore$$

$$BBr = 100 \cdot BULL / (BULL + BEAR) \quad \text{with NAs interpolation}$$

$$PNlog = 0.5 \cdot \log((positiveP + 1) / (negativeP + 1))$$

and defines performance measures and a trading strategy based on Moving Average crossover (*MAcross*) applied to some explanatory variable (*ev*). There are two test functions: one for trading the whole period, other for a rolling window analysis over fixed length periods (window-size= 1 yr, 6 mon).

Your team's task is to do the following with your selected stocks

¹Failing to submit as requested will be penalised -10%

- Design ONE trading strategy (i.e. the signalling sequence) different from the *MAcross* strategy shown in Lecture 6, using any (or all) sentimental indicators $ev \in \{positiveP, negativeP, BULL, BEAR, BBr, PNlog\}$, and *RVT* (volume of news), and test performance of your strategy for the cases where you either allow long-only or long-short trading, and using the rolling window analysis with window sizes = 254 (1 year) or 127 (6 months). **Any other parameters of your strategy must be tuned.**

(Suggestions: adapt some of the many strategies from Technical Analysis to the sentimental indicators ev .)

See <https://www.avatrade.com/education/technical-analysis-indicators-strategies>; other examples in <https://www.tradingview.com>, or <https://rpubs.com/johnakwei/207852>, or explore the web for *technical analysis trading strategies*)

In all cases report successful results (where excess return $Me - BH$ is positive); include all metrics of performance seen in class and number of trades done by your strategy.

2. (50%) Choose 9 stocks from the dataset `dataset.rds` for Lec. 8 on Factor Models and Sentiment, and compute for these the Robust (ellipsoid) Global Maximum Return Portfolio using as perturbation matrix Sigma (S) corresponding to the factor models: 1) the Fama-French 3-factors returns 3FF; and 2) the Sentiment indicator PNlog factor model. Use a two consecutive years of data for experiments selected from 2015-01 to 2020-06; register this period of data in column Prob. 2 of sheet HW2 of the spreadsheet `ML4Finance23_HWteams` in the drive. Try to select different 2-years period from those selected by others (not mandatory). Try different kappas (at least 3 values in $(0,1)$) and multiple robust noisy solutions to check for sensitivity. Comment on the differences/similarities of results for both cases of Sigma.