ERP Prediction Contest - Rules

1 *Best Prediction* Category

The rules for this category are as follows.

1. The target variable for the prediction problem is "ASPFWR5" as provided in the Hull Tactical data set. This is the 5 (trading) day forward ERP of the S&P 500 adjusted for dividends.
2. This category of the contest will have two evaluation phases. Phase I will involve an out-of-sample test and Phase II will involve a real-time prediction scenario.
3. Phase I of the contest will be judged on the best R-square measure of your prediction algorithm based on some period in 2018 (as a result the data set you are given does not include 2018). The last date for submitting your algorithm for phase I will be April 7th, 11:59 P.M.
4. Phase II involves a live contest that will run from April 8th to May 8th. It will evaluate your prediction algorithms on real time S&P 500 returns. You will be able to update your code at the end of every day for following day prediction.
5. Phase II will include a live leaderboard. These live scores will again be based on R-squared performance.
6. The winner of the Best Prediction category will be based on the average of the final R-square scores from the two phases.
7. Using additional data sources is also allowed provided you source them programmatically. Your final implementation will be made public under a free software license.

1.1 Phase I evaluation details:

Here we provide an example for evaluation of Phase I.

- Using the time series of predicted ERP $(\hat{Y}_1, \hat{Y}_2, \ldots, \hat{Y}_T)$ and realized ERP $(Y_1, Y_2, \ldots, Y_T)$, we evaluate the performance of your model for phase I using: $R_I^2 = 1 - \frac{\sum_{t=1}^{T}(Y_t - \hat{Y}_t)^2}{\sum_{t=1}^{T}(Y_t - \bar{Y})^2}$, where $\bar{Y} = \frac{1}{T}\sum_{t=1}^{T} Y_t$. The winner will have the highest R_I^2.
- Given your model, let us assume the chosen period for evaluation of your model for this phase is March 5, 2018 (Monday) - June 29, 2018 (Friday). The two time series $(Y_1, Y_2, \ldots, Y_T)$, $(\hat{Y}_1, \hat{Y}_2, \ldots, \hat{Y}_T)$ will be generated as follows:
- First prediction of 5 (trading) day forward ERP of the S&P 500 $\hat{Y}_1$ is made on the morning of March 5, 2018 (using data at the end of last trading day before March 5, 2018). Corresponding realized ERP Y_1 will be computed in the morning on March 12, 2018 (using data at the end of last trading day before March 12, 2018).
- Similarly, prediction $\hat{Y}_2$ on the morning of March 6, 2018 (using market close data from March 5) will be realized Y_2 before market open on March 13, 2018.
- Finally, prediction $\hat{Y}_T$ on June 29, 2018 will be realized Y_T on July 6, 2018.

1.2 Phase II evaluation details:

This phase involves a live contest from April 8th to May 8th and we will have a live leaderboard updated everyday.

- The live leader board will start from April 12th and you will be allowed to update your model everyday by mid-night.
- The final evaluation will be based on predicted 5 (trading) day forward ERP on the $(\hat{Z}_1, \hat{Z}_2, \ldots, \hat{Z}_T)$ and corresponding realized time series $(Z_1, Z_2, \ldots, Z_T)$.
- We evaluate the performance of your model for phase II using: $R^2_{II} = 1 - \frac{\sum_{t=1}^{T}(Z_t - \hat{Z}_t)^2}{\sum_{t=1}^{T}(Z_t - \bar{Z})^2}$, where $\bar{Z} = \frac{1}{T}\sum_{t=1}^{T} Z_t$.

More details to follow closer to the April 8, 2019.

1.3 Final Winners and Presentation:

1. All the submission will be ranked using $\mathbf{R}^2 = \frac{R^2_I + R^2_{II}}{2}$.
2. Winners will deliver a presentation to explain their ideas on May 16th.

2 *Most Creative* Category

1. The Most Creative category will expand the judgement criteria to topics other than just prediction. This could be an explanation of some market phenomena, a novel trading strategy or an insightful analysis.
2. Some example entries could include:
   - Interesting visualization (graphs, animations, etc).
   - Discovering new nonlinear relationships in the data.
   - Proposing new data transformations.
   - Testing a new variable for predictive power.
   - Explaining a market anomaly pertaining to stock returns.
3. The submitted entries in the form of a typewritten report will be judged by a panel of experts consisting of three UCSB faculty and two Hull Tactical professionals.