FX Carry Suprise Index Technical Writeup (Rough Draft)

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1 Introduction

This paper covers a strategy regarding carry. At the specific moment (the date listed on the writeup) the strategy and its idea is in its infancy. Its yet to be decided if it's worth pursuing further but for the most part the results have proven to be successful. At this time the modeling has only used Citi Surprise Indices as inputted variables and the Deustche Bank G10 FX Carry Index as a proxy for carry returns. Although the Deustche Bank Index is not tradable its a reasonable proxy for carry and its been used in other buy-side literature as a proxy. If further initial tests prove useful then incorporating individual carry return indices will be necessary.

2 Data

The Deustche Bank index and Citi Surprise Indices were collected from Bloomberg Terminal. Since its a G10 index only the "relevant" indices were used. Below is the data and what indices were used.

3 Initial Approach

The Citi Surprise index is *surprisingly* a good proxy for trading the DB Carry Index. Conditioning on the Citi Surprise Index generates can generate reasonable returns, and then extending that model to OLS performs well.

3.1 Raw Citi Surprise Index

The Citi Surprise index is a non-stationary time series that generates positive and negative values. Below is a plot of the raw values of the Citi Surprise indices.

All Citi Surprise Indices
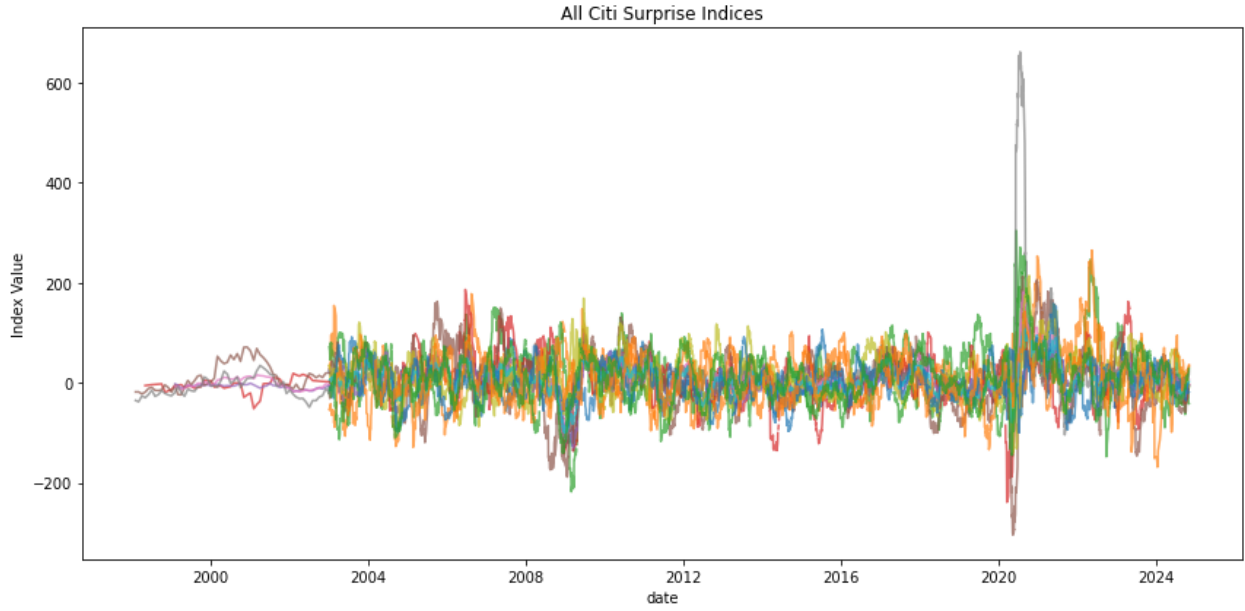
From a time series quality standpoint they have reasonable Q-Q plots which may serve itself useful if signal optimization is ever needed.

Q-Q Plot of Raw Citi Surprise Indices
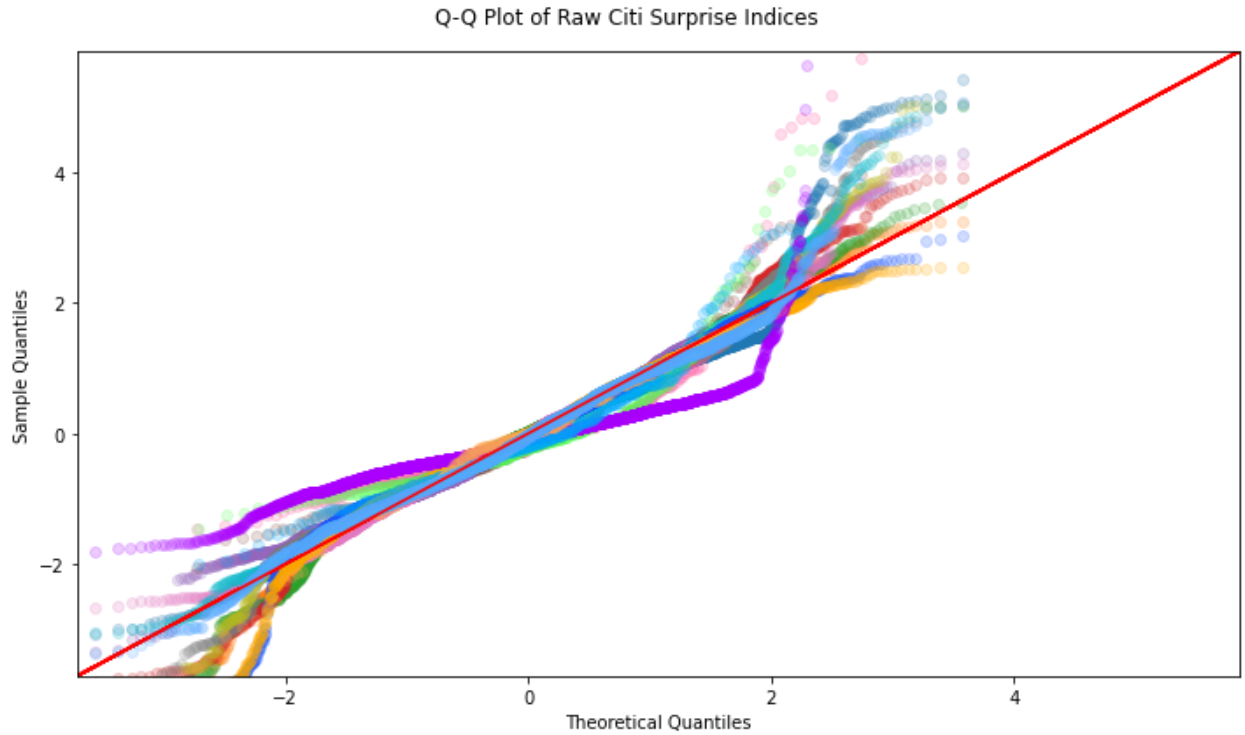
3.2 Conditioned Raw Citi Surprise Index

Trading the DB Index based on a couple of Citi Surprise indices shows some reasonable results. *Cherry-Picking* some Citi surprise indices shows reasonable results. They are somewhat *cherry-picked* but their is a reasonable argument to use the G10 & G10 Fixed Weight as an indicator. Even the use of the Citi US surprise make sense since USD is the international reserve currency. Citi Surprise Indices like Japan,

Australia, and UK likely have less application to G10 carry.
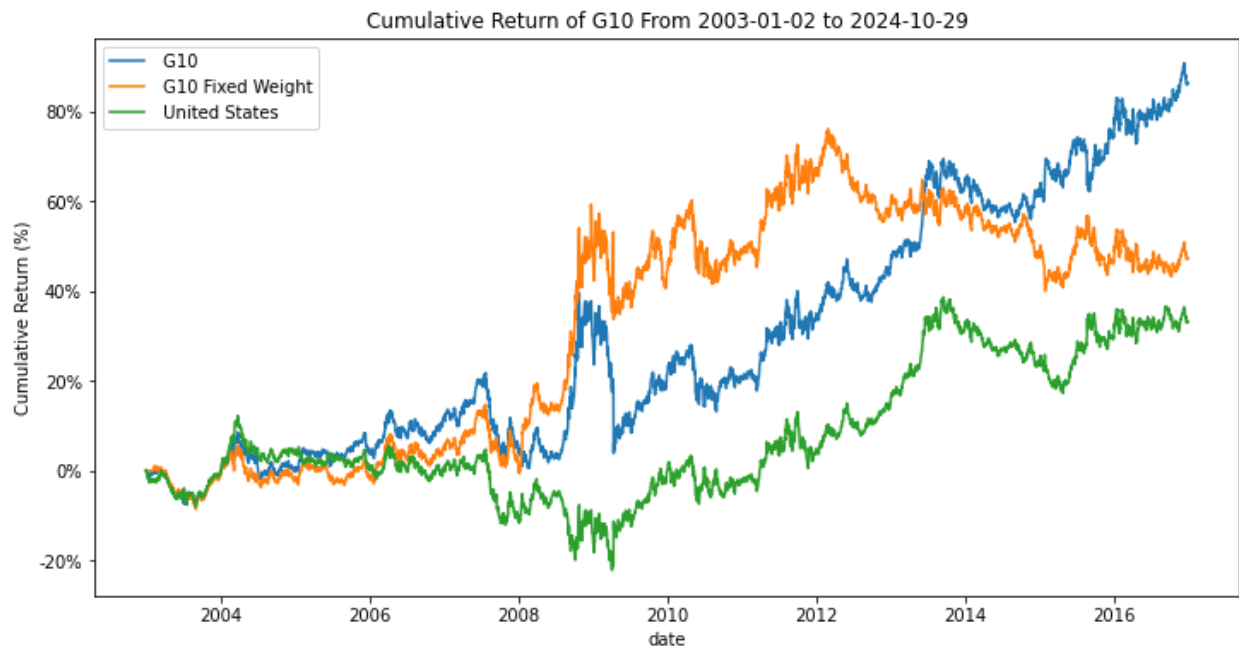
Graphically its evident that most of the returns drivers come post '08 financial crisis which ended covered interest parity (CIP). This hypothesis needs to be fully tested later on. Those sharpes are reasonable for FX.

Annualized Sharpe of Each Strategy
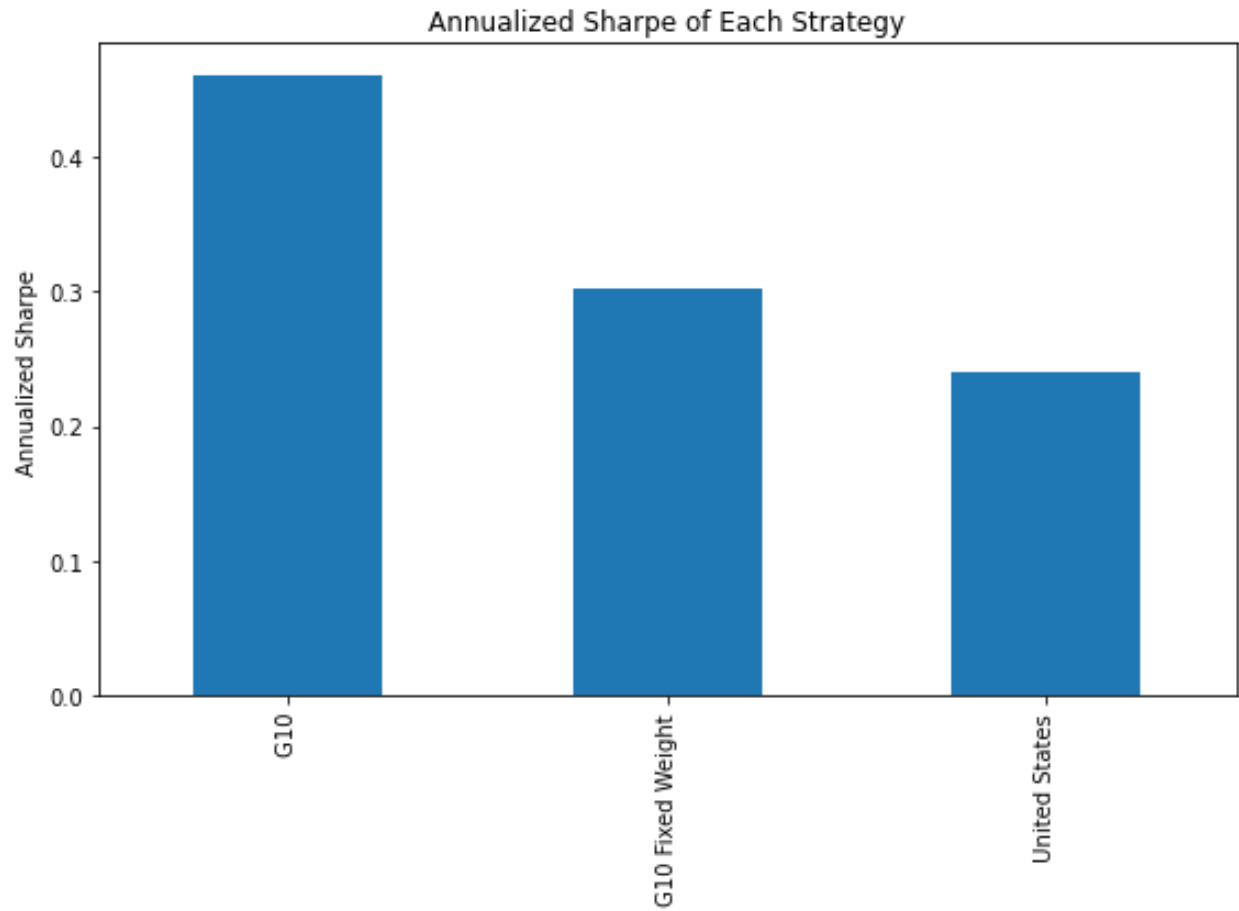
The correlation between the strategies is quite high. In this case the correlation between G10 and the G10 fixed weight has a 83% correlation. The correlation between United States and its G10 & Fixed Weight G10 is around 40% correlation.
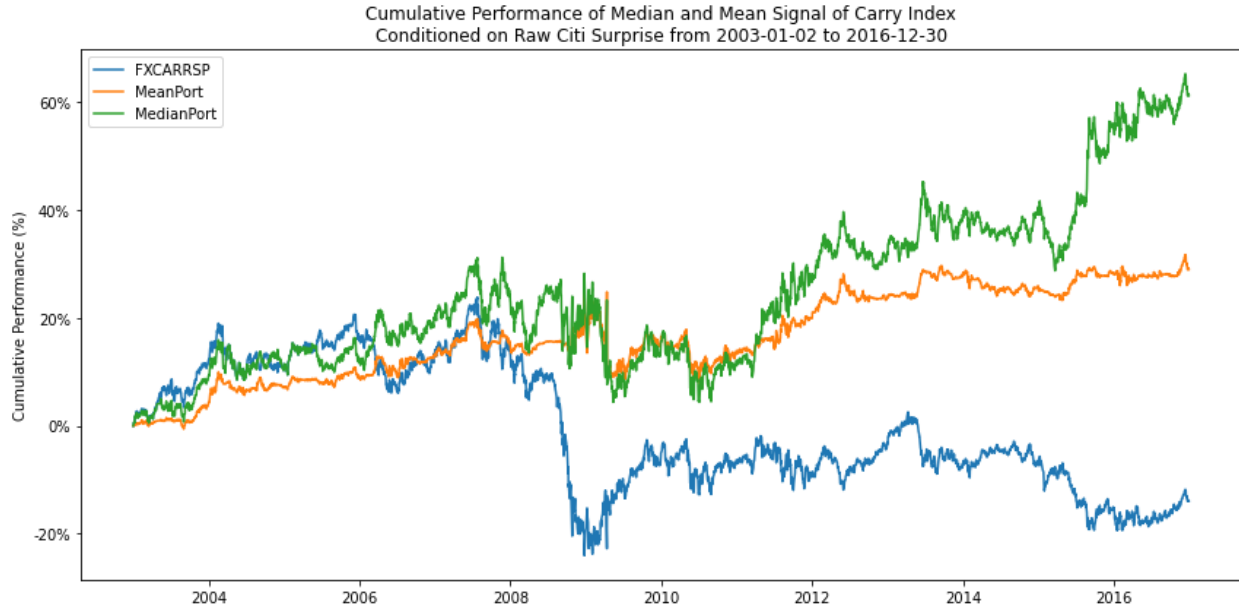
Correlation Matrix of Each Strategy
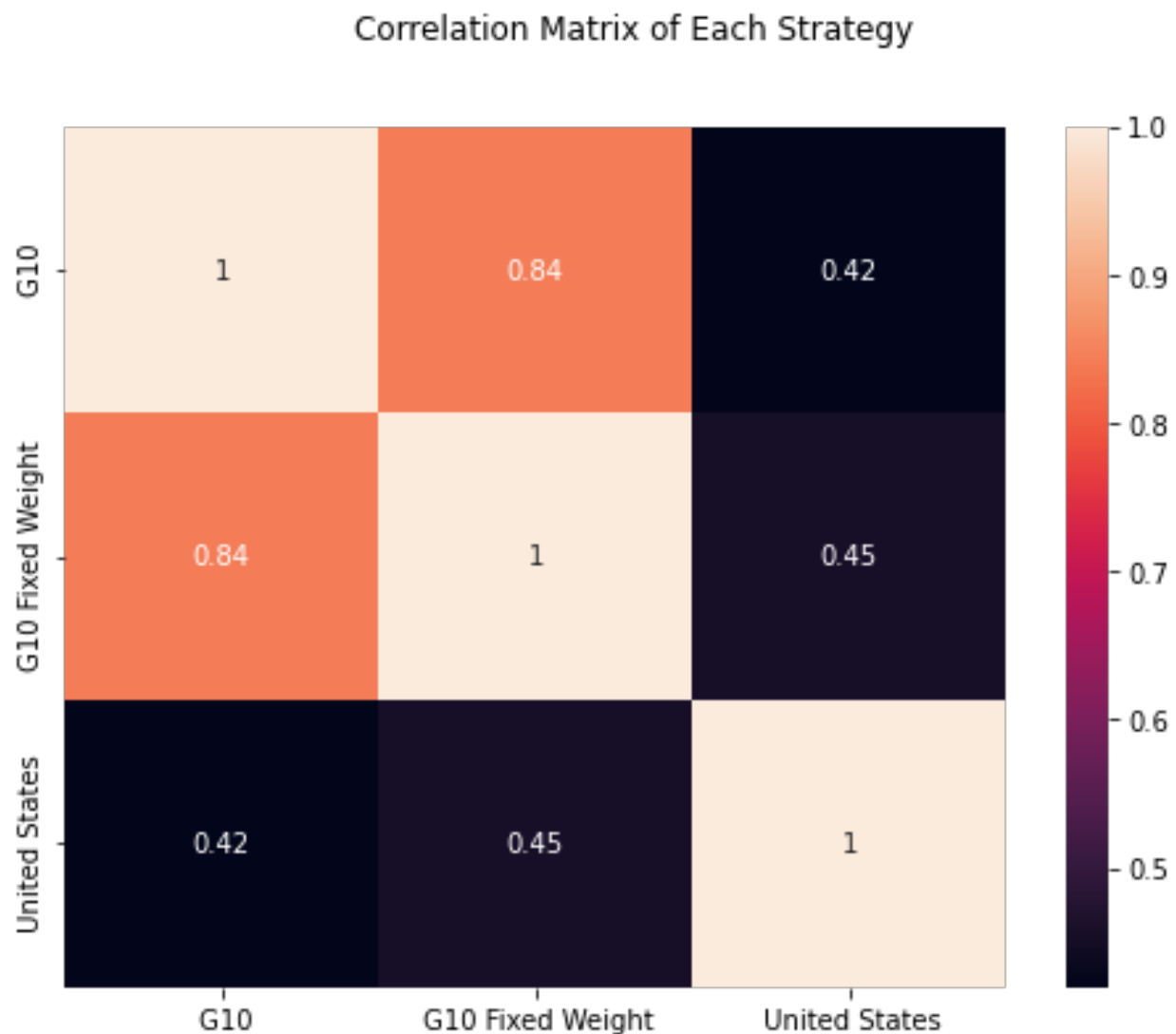
Although the results are reasonable for specific Citi Surprise indices, it doesn't give a full and accurate representation. Although there is an *economically-motivated* reason for picking those indices from a statistical standpoint they are *cherry-picked*. Since the goal is to trade based on all Citi Surprise Indices it is important to understand how all of them perform. Below is a plot of the benchmark conditioned on each of Citi Surprise Indices

Cumulative Return For Trading DB Index conditioned on each Citi Surprise Factor
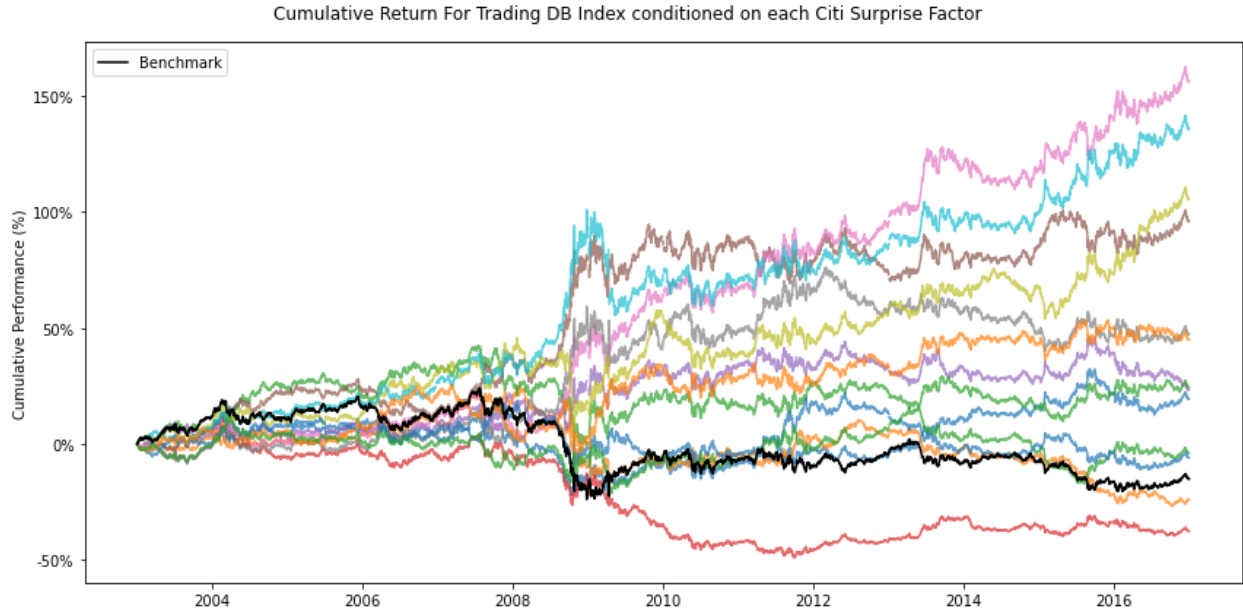
Almost all of the signals outperform the benchmark with a few exceptions. From a sharpe perspective each of them outperform as well.

Sharpe Comparison of Index Return conditioned on Raw Citi Values
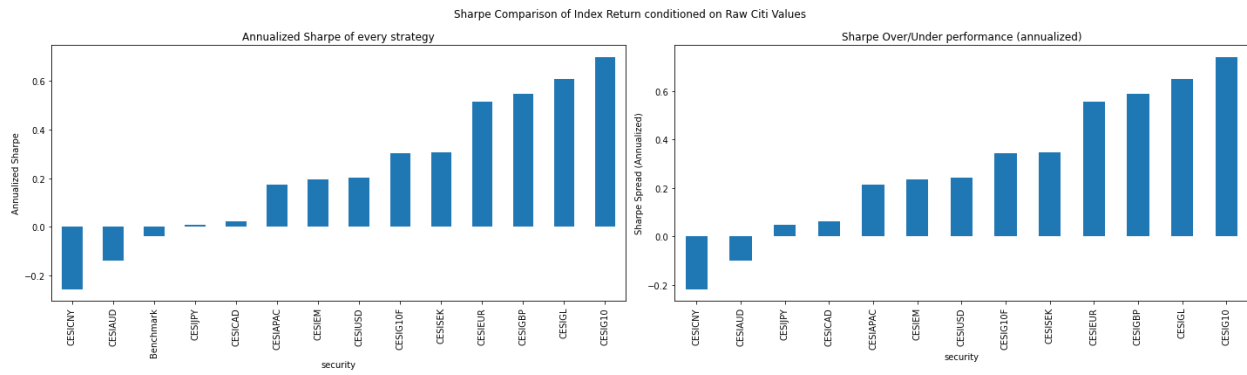
To further this approach take the mean and the median of each signal and analyze its performance. In this case they both beat out the benchmark

Cumulative Performance of Median and Mean Signal of Carry Index
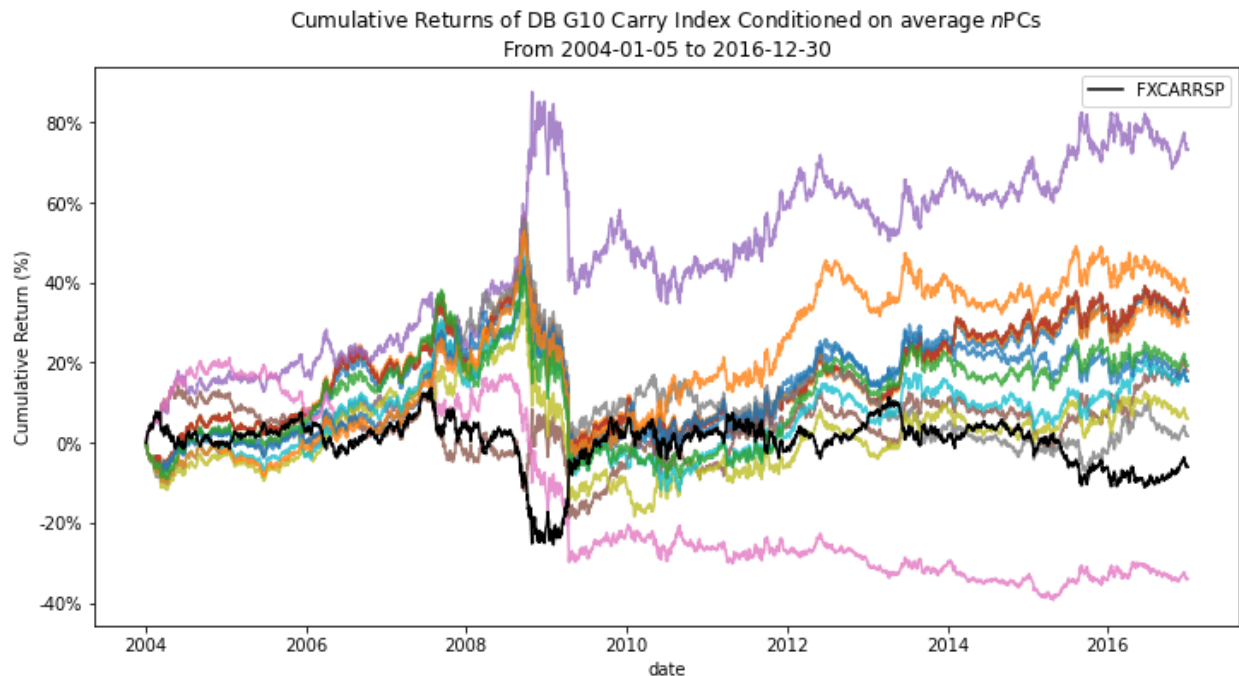Conditioned on Raw Citi Surprise from 2003-01-02 to 2016-12-30

Then compare their sharpes relative to the benchmark. The sharpes are reasonable with respect to their asset class but relatively weak from a pure trading standpoint.


Annualized Sharpe of Mean and Median Strategy
Conditioned on Raw Citi Surprise Index
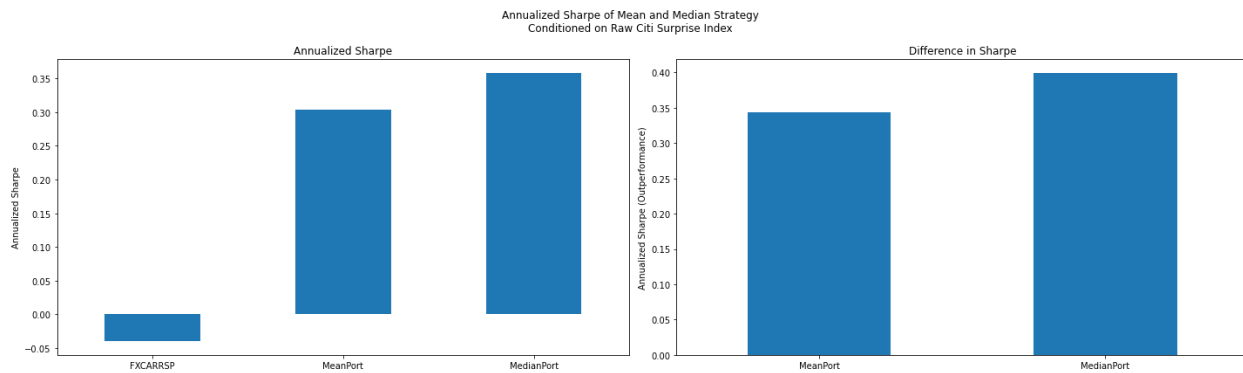
4 Citi Surprise PCA Raw Values

In this case to enhance the signals they can decomposed into their principal components. The overall goal is to be able to capture the overall economic suprise factor. In this case each of those PCs can be traded on their own. In this case a portfolio can be built taking the average of the n number of PCs. Each portfolio doesn't trade the PC separately, but combines them. For example the 10th portfolio trades the first 10 PCs and not the 10th PC.

Cumulative Returns of DB G10 Carry Index Conditioned on average *n*PCs
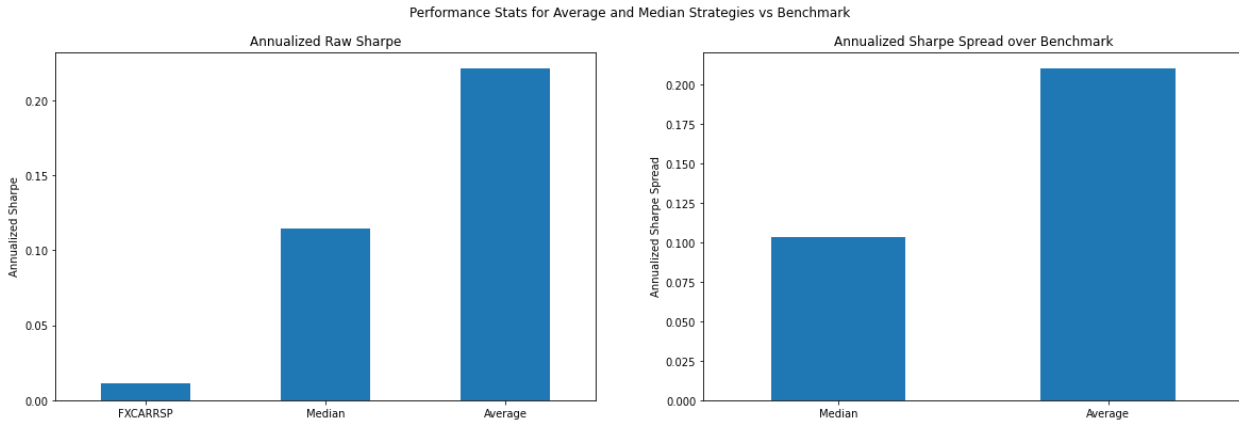From 2004-01-05 to 2016-12-30

The performance doesn't particularly beat out the Citi Raw Conditioned portfolios. The sharpes are bit better since all but 3rd portfolio deliver positive sharpe.

Annualized Sharpe of Strategies
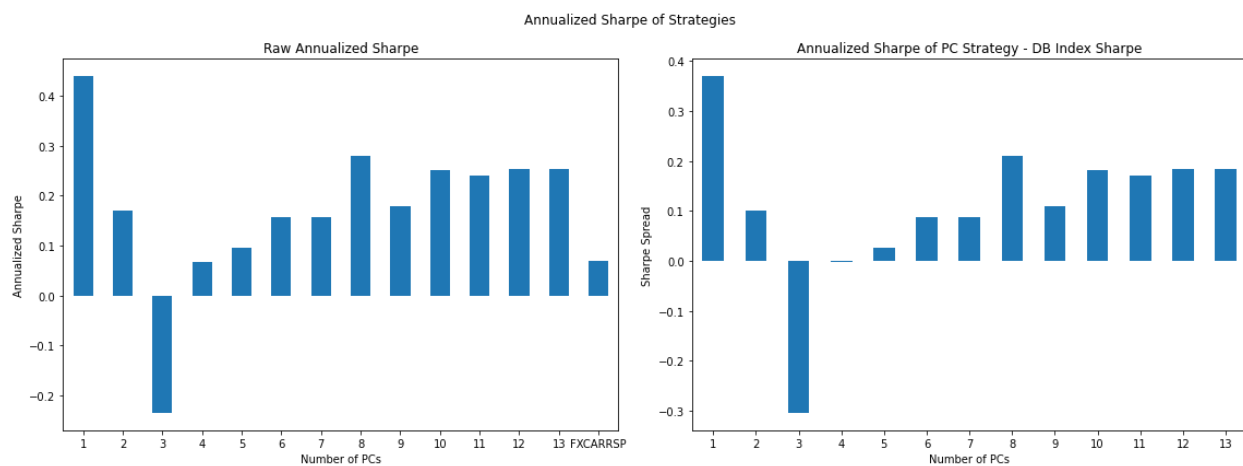
The same median and mean portfolios can be generated. It should be considered that only a few PCs will be needed. At this point it's not completely clear how many PCs to use. In this case the mean and median are used even though in application a few PCs are likely needed rather than all. The performance of the mean and median portfolios are
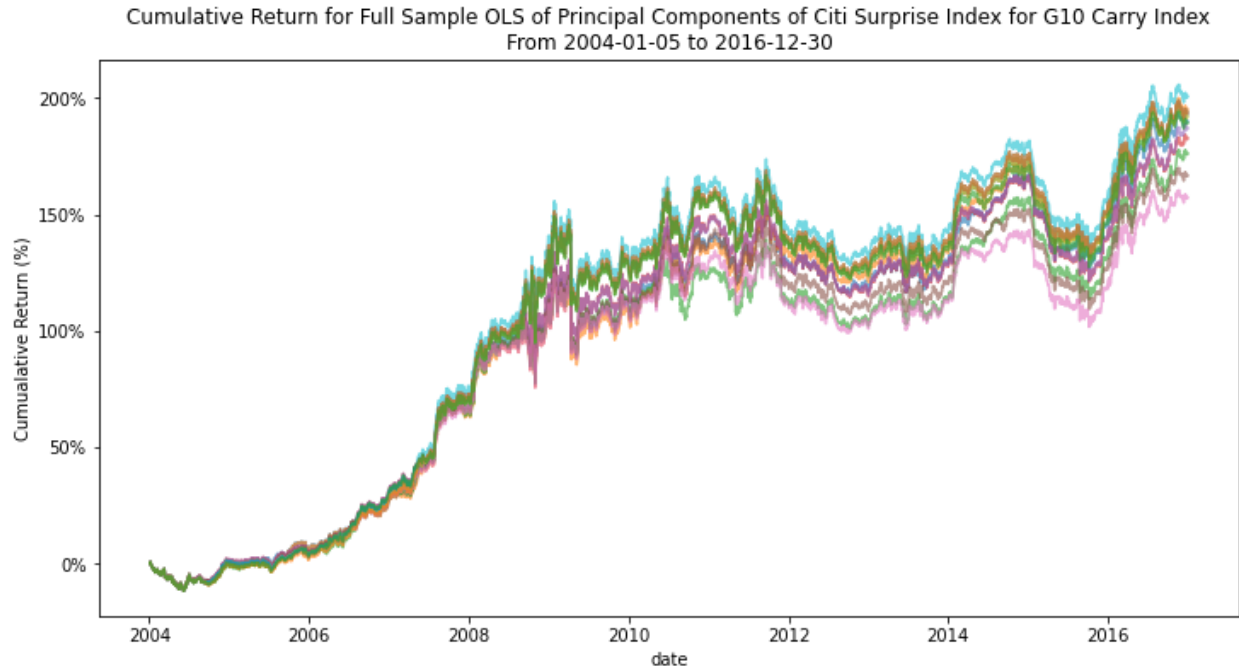
Average & Median Signal Performance vs. Underlying Benchmark
From 2004-01-05 to 2016-12-30
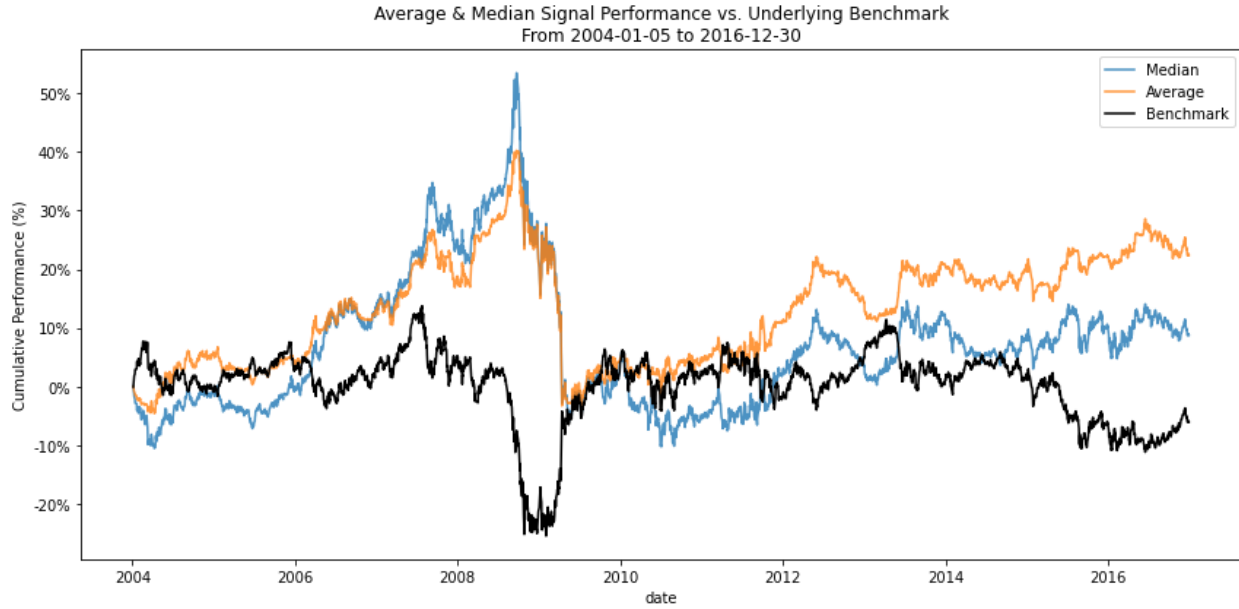
Same as above compare their sharpes.

Performance Stats for Average and Median Strategies vs Benchmark

# 5 Trading Residuals of Citi Surprise OLS

Now that there has been some groundwork using the raw signal the raw PCs can be regressed into the model. In this case being *long* the residuals generate substaintial return for full-sample in-sample OLS. Using the same approach as above where each portfolio has the n number of PCs gets regressed and then the residuals are traded.

Cumulative Return for Full Sample OLS of Principal Components of Citi Surprise Index for G10 Carry Index
From 2004-01-05 to 2016-12-30

The variation of strategy and sharpe are relatively stable Comparing the best and worst performer portfolios on a sharpe still deliver susbtantial returns from a FX standpoint and from a pure-sharpe perspective.
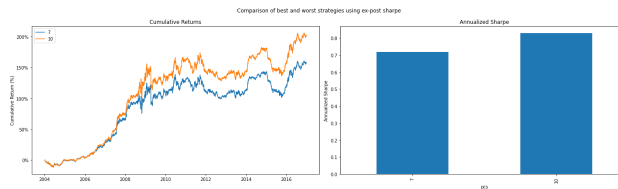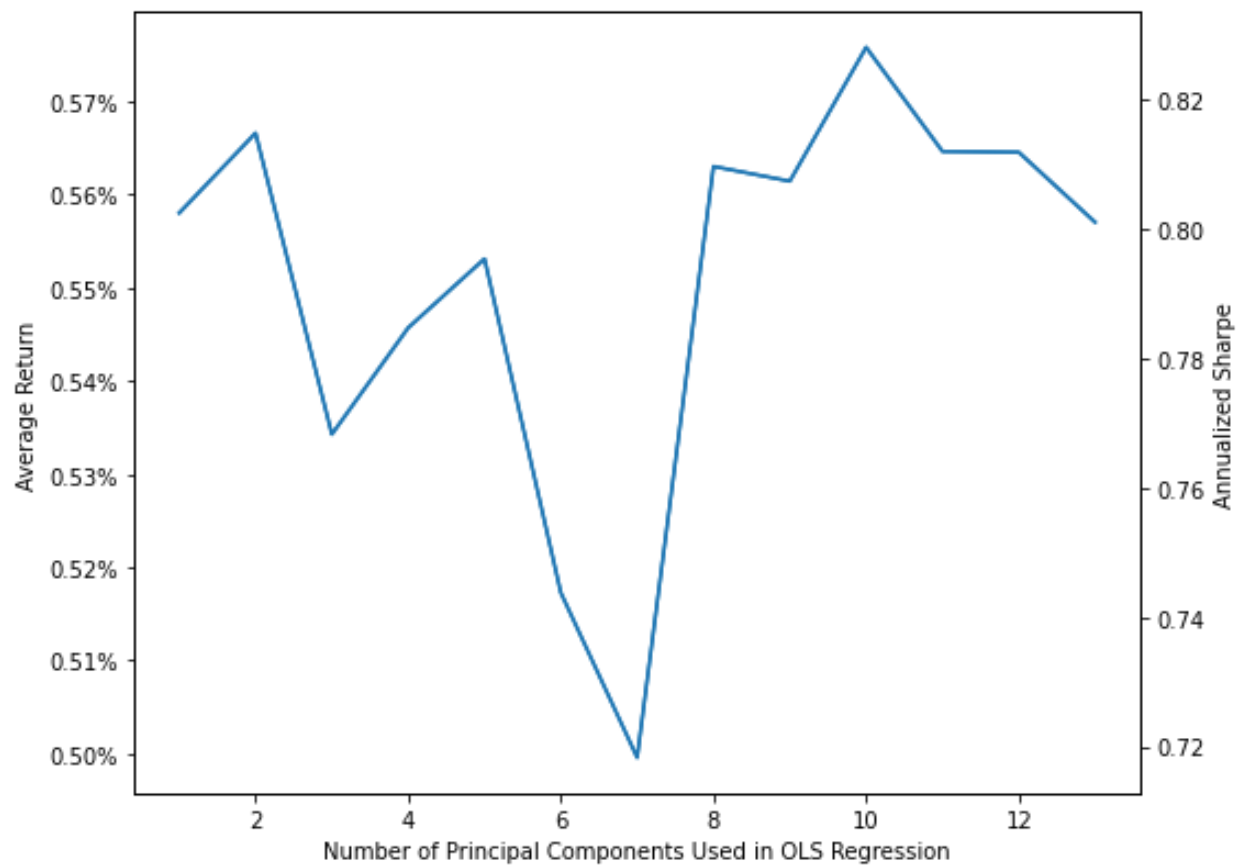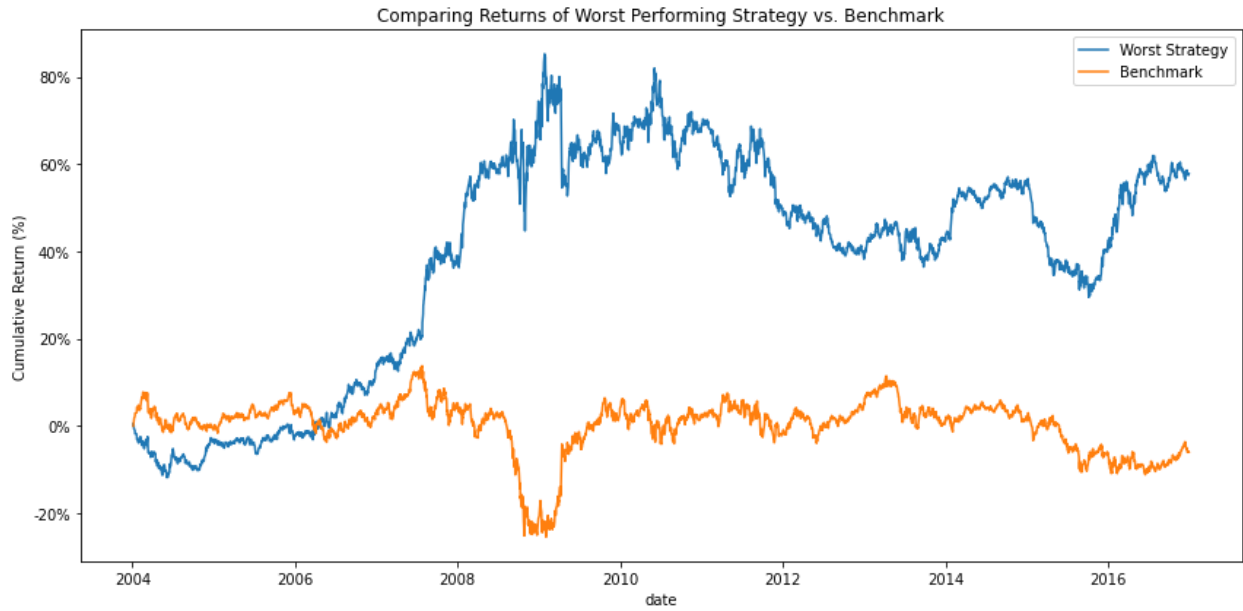

This idea can be expanded even more by getting the daily best, worst and median returns. Those strategies still outperform their benchmark and their deliver substantial sharpe.
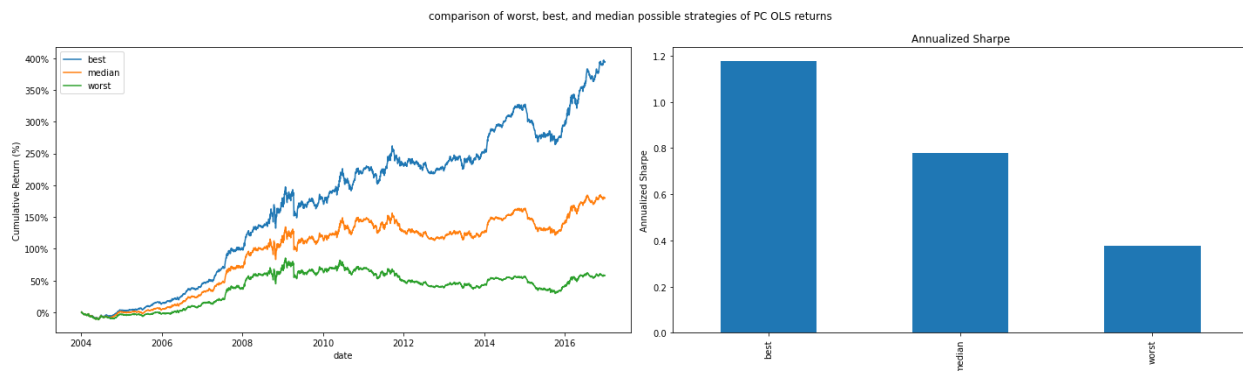
Comparing the worst-performing strategy directly with the benchmark still greatly outperforms the benchmark.

10

Comparison of Sharpes and Average Return per each Principal Component

Comparing Returns of Worst Performing Strategy vs. Benchmark

All strategies deliver substantial alpha against the benchmark with a slight negative beta.

Monthly Regression of returns for each returns scenario

Best Alpha: 1.07% Beta: -0.22
R2: 4.79%

Median Alpha: 0.71% Beta: -0.2
R2: 3.91%

Worst Alpha: 0.34% Beta: -0.19
R2: 4.09%