Dear Mr. Fundamensky

Below are my findings about the data set you provided.   
  
Quick notation: R01 investigated return column 1. There are 10 columns last one is R10

R01\_07 represent the delayed vector for R01 with 7 days

## Summary of findings based on linear regression

1. R09 – R10 are correlated
   1. R10
      1. R10 is highly correlated with R9 with a coefficient of 0.48; R10 ~ R09 \* 0.48
   2. R09
      1. R09 is highly correlated with R10 with a coefficient of 3.82; and might be correlated with R02\_08 \* R07\_08. (corrected P value 0.038, coeff = -0.09)
2. R07 and R05 are correlated
   1. R07
      1. R07 is highly correlated with R05. R7 ~ 0.54\*R05
   2. R05
      1. R05 is highly correlated with R07. R05 = 0.48\* R07
3. R04 and R03 are correlated
   1. R04
      1. R04 is highly correlated with R03. R04 ~ 0.45 \* R03
      2. R04 might be correlated with R04\_05 \* R07\_05 with coeff 0.13. (Corrected P value is 0.0315)
   2. R03
      1. R03 is highly correlated with R04. R03 ~ R04 \* 0.34

## Visual Investigation

Correlation map of features up to lag10 (attached) indicates the rules are not varying in time. i.e. Rule 1 on weekdays and rule 2 on weekends is not the case

R02 is correlated with itself with a 2-day lag; i.e.   
R02 is correlated with R02\_2, R02\_4, R02\_6…

R08, R06, R04, R02 are the features that are correlated with their history

R06 time series have changes in variation; annually almost for 1 month it rests around 0

At that time intervals R09 and R10 correlations are visually clear. That indicates R10 is related effected by R06. A that point I cannot find the rule that defines the dependence.

## ML Results

I also run GAMs, XGBoost, and neural networks. In none of those tries I can reach a high accuracy. I also saved importance in the predictions; that were calculated on test data by adding impurities into individual columns.   
  
They those investigation also cannot give details of the f() structures but gives idea about feature importance for the predicted features.

## What might I also TRY

I can try to get rid of noise by smoothing algorithms if I have more time.