



THE MUTUAL FUNDS OFFERED BY MAJOR SPANISH BANKS GENERATES ALFA?

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Introduction: Business Problem

In this project we will try to analyse if the "active" mutual funds offered by the major spanish banks **generates alpha (obtain better results vs benchmark) in a consistent way along the time**, in other words if it's worth to pay highers commisions for buy this mutual funds before to buy ETFs.

Our main objective its to **show with data if the active management in the mutual funds industry works properly** and try to answer several questions like:

- Can the active mutual funds management by the major banks generates alfa?
- Its better the performance in the active management vs the pasive management?

We will use our data science powers to generate a stadistical and visual analyse using some machine learning techniques as Linear and Multiple Regression.

Data and Packages

Based on definition of our problem, data that will influence in our analysis are:

- End of day historical prices of main mutual funds offered by spanish major banks from 2001 until now.
- End of day historical prices of main index, for Europe market: EuroStoxx 50 Index.

The source of all the data used in the analysis its provided by Bloomberg across xlsx files.

Methodology

Speaking about statistical techniques we are focus in:

- Correlation historical analysis
- Pearson coefficient
- Matrix Correlation
- Histogram analysis
- Value at Risk
- Linear Regression
- Tracking Error Ratio
- Sharpe Ratio
- Alfa Ratio

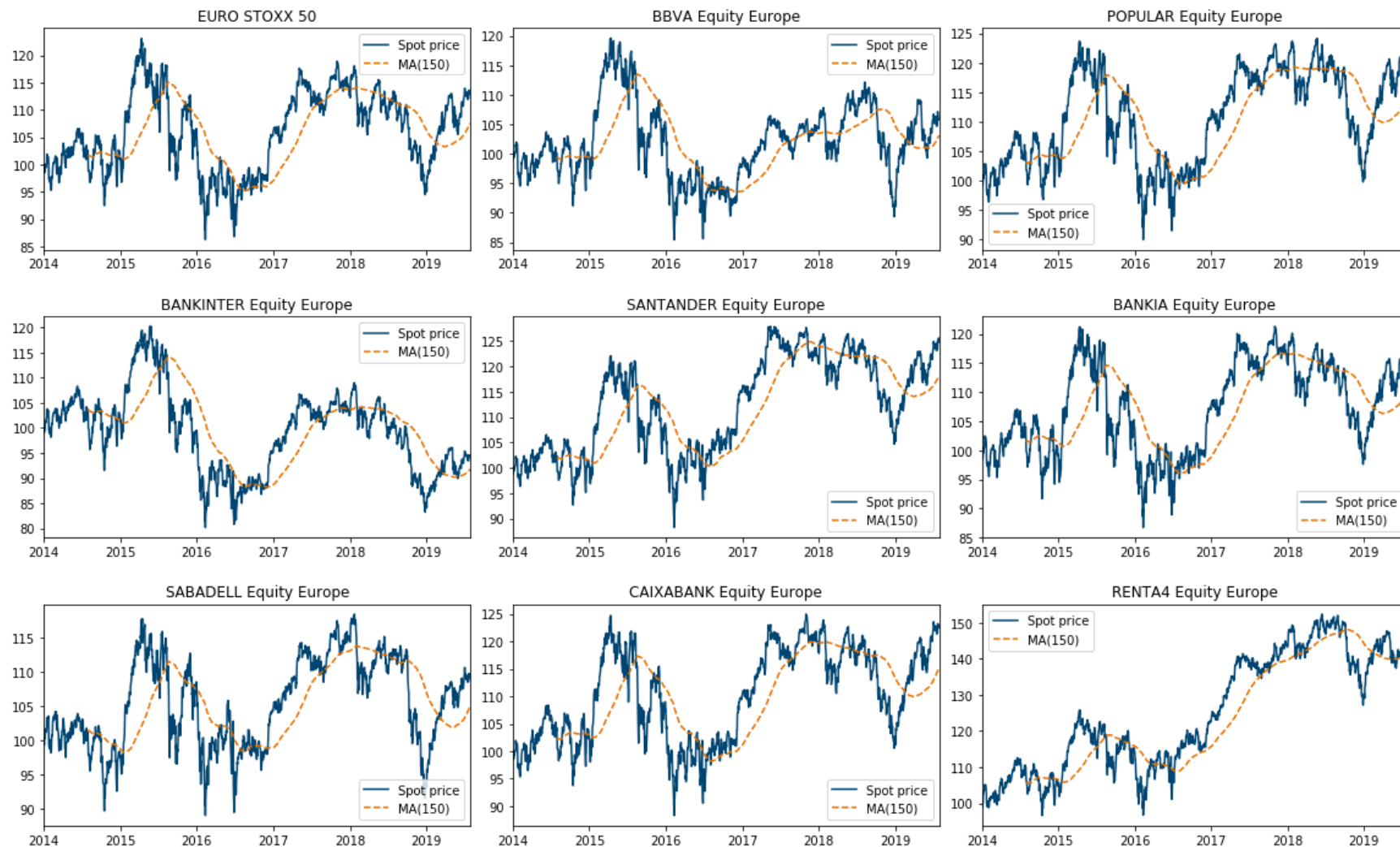
Speaking about visualization we are going to use:

- Frequency histograms
- Boxplots charts
- Scatter plots
- Bubble plots
- Area plots

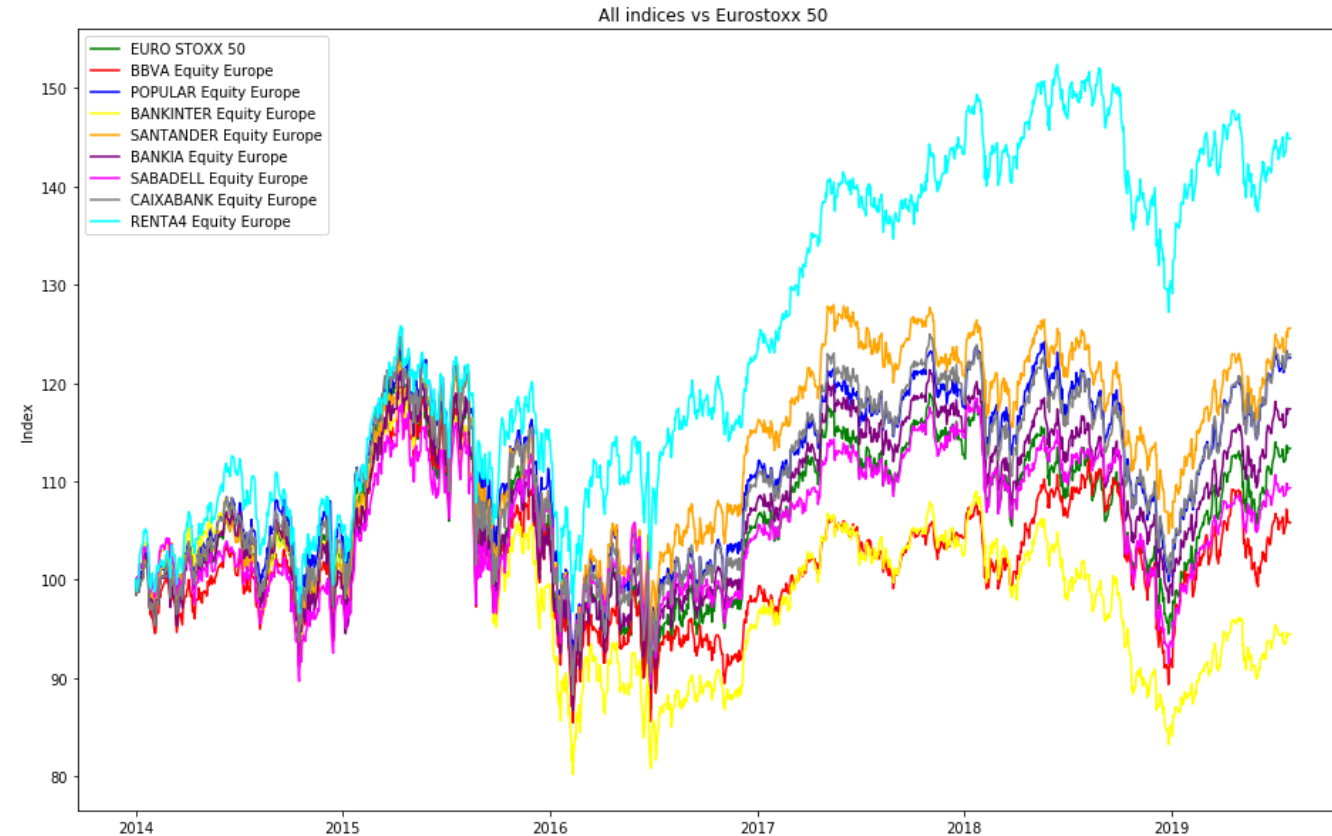
Speaking about Data Science Techniques we are going to use:

- Data Wrangling to clean the differents datasets.
- Data Analyst
- Data Modelling

Analysis: Five Years Evolution Price



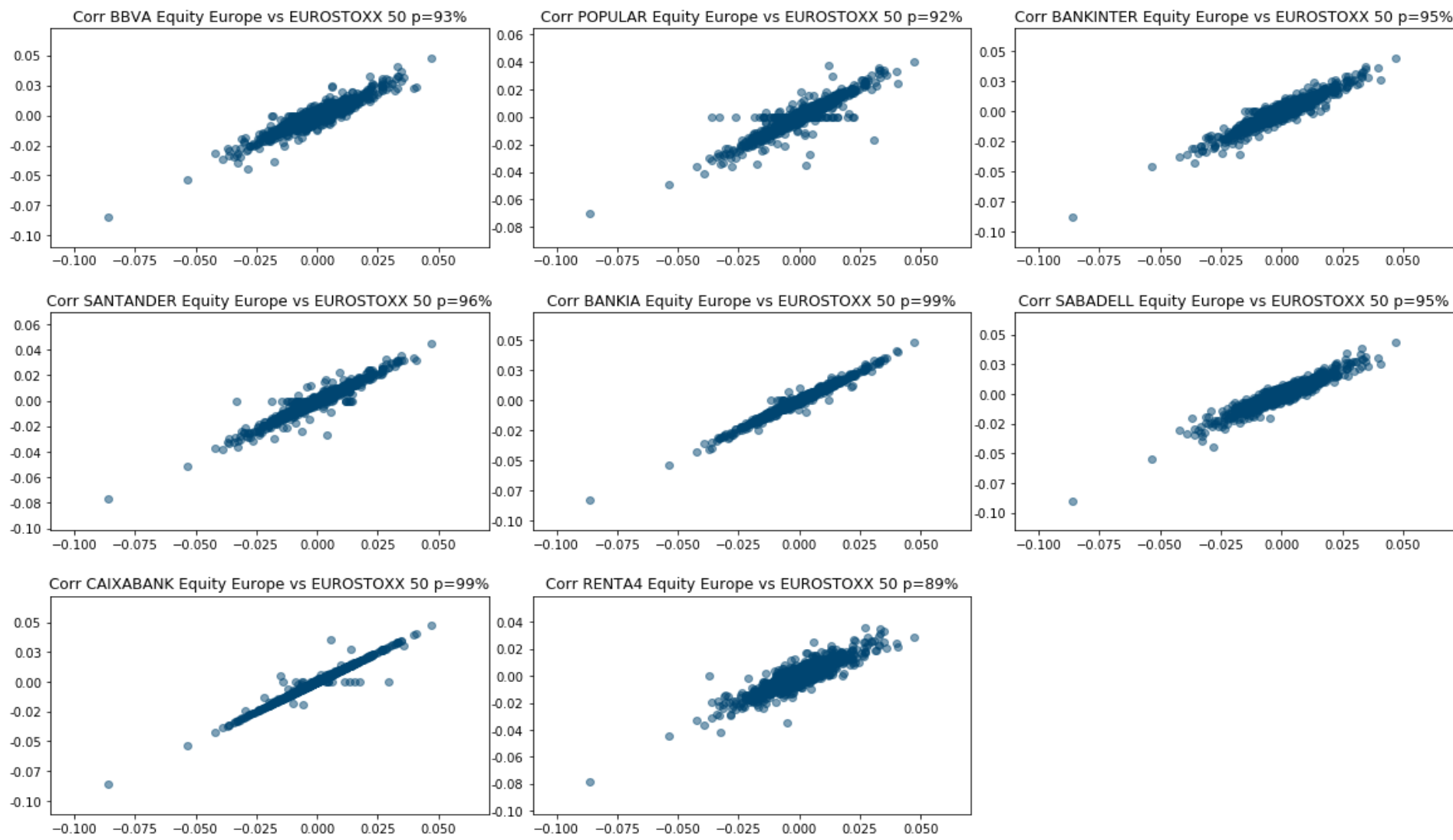
Analysis: All the Indices vs Eurostoxx 50



We are going to focus all the analysis in the 5 year term. This is a reasonable window for the active management inside the mutual fund industries...all the calculations are made with this temporal horizon.

In this chart we can compare the different funds in index numbers (January 2014=100). We can see that all the funds have more or less the same behaviour except the RENTA 4 fund.

Analysis: Correlation Eurostoxx 50 vs Active Mutual Funds

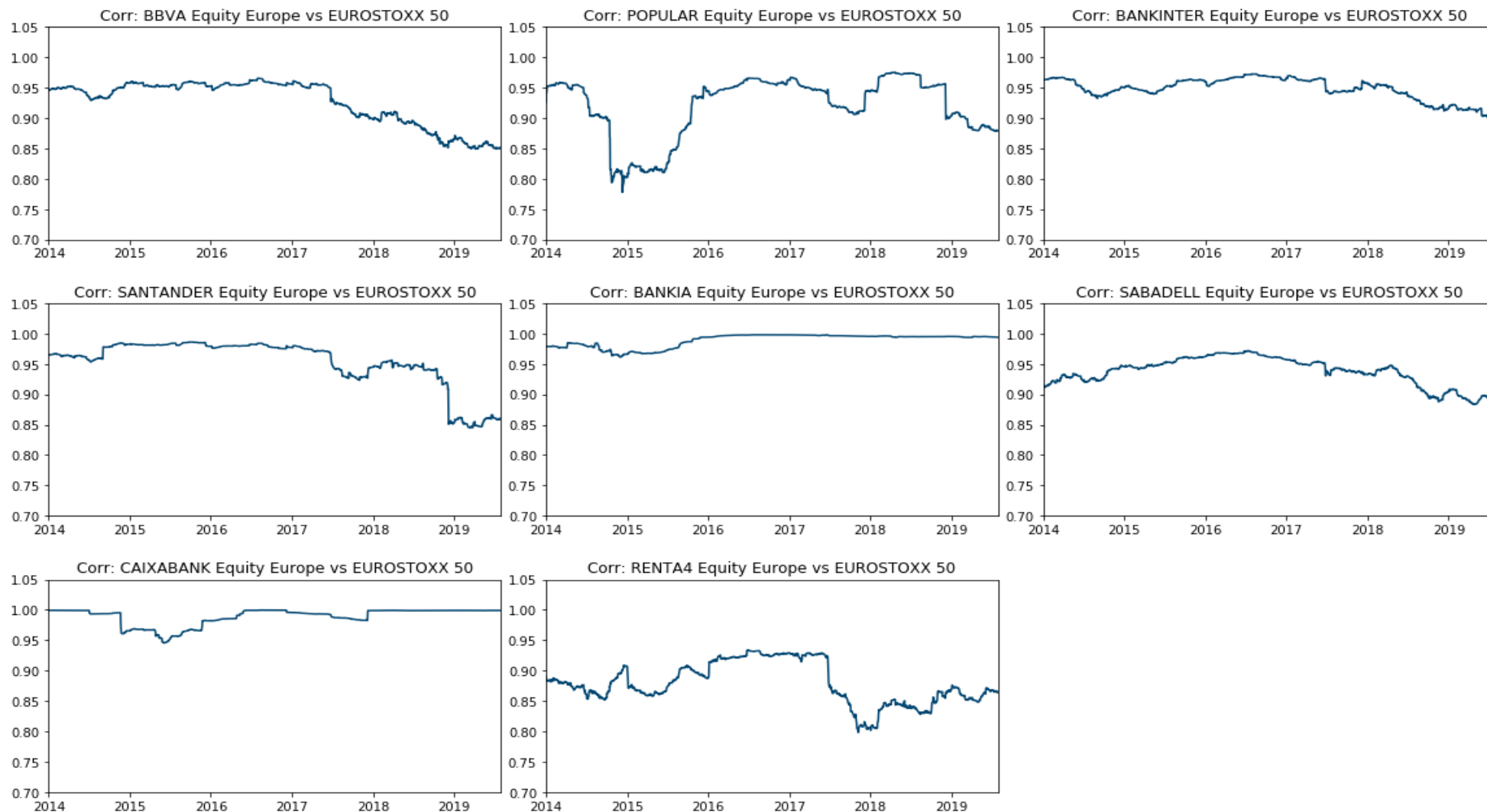


Analysis: Correlation Eurostoxx 50 vs Active Mutual Funds

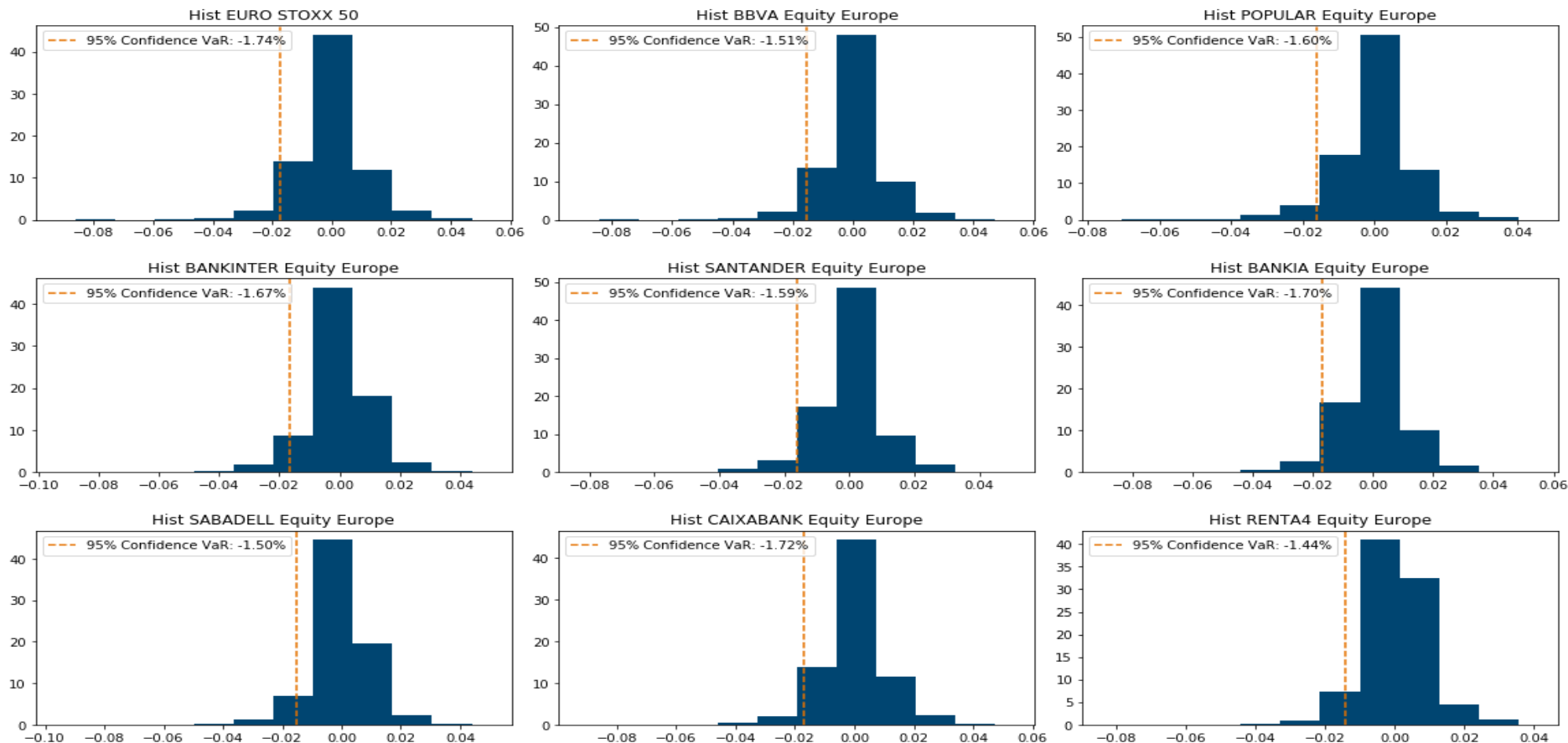
EURO STOXX 50	1.00	0.93	0.92	0.95	0.96	0.99	0.95	0.99	0.89
BBVA Equity Europe	0.93	1.00	0.89	0.93	0.93	0.93	0.95	0.92	0.89
POPULAR Equity Europe	0.92	0.89	1.00	0.90	0.92	0.91	0.89	0.91	0.84
BANKINTER Equity Europe	0.95	0.93	0.90	1.00	0.94	0.95	0.93	0.94	0.90
SANTANDER Equity Europe	0.96	0.93	0.92	0.94	1.00	0.96	0.93	0.95	0.88
BANKIA Equity Europe	0.99	0.93	0.91	0.95	0.96	1.00	0.94	0.98	0.90
SABADELL Equity Europe	0.95	0.95	0.89	0.93	0.93	0.94	1.00	0.94	0.89
CAIXABANK Equity Europe	0.99	0.92	0.91	0.94	0.95	0.98	0.94	1.00	0.89
RENTA4 Equity Europe	0.89	0.89	0.84	0.90	0.88	0.90	0.89	0.89	1.00
EURO STOXX 50									
BBVA Equity Europe									
POPULAR Equity Europe									
BANKINTER Equity Europe									
SANTANDER Equity Europe									
BANKIA Equity Europe									
SABADELL Equity Europe									
CAIXABANK Equity Europe									
RENTA4 Equity Europe									

- The correlation between the Euro Stoxx 50 and the rest of the mutual funds are very high.
- The pearson ratio is higher than 90% for the vast majority, this factor its very negative in our expectatives to find a good active funds, because if the movements in the prices are very similar its very complicated to have better results vs Benchmark...
- The unique fund that we can consider with some difference in the returns movements its RENTA4 but we need to continue the analysis...

Analysis: ¿It's consistent the correlation ratios?

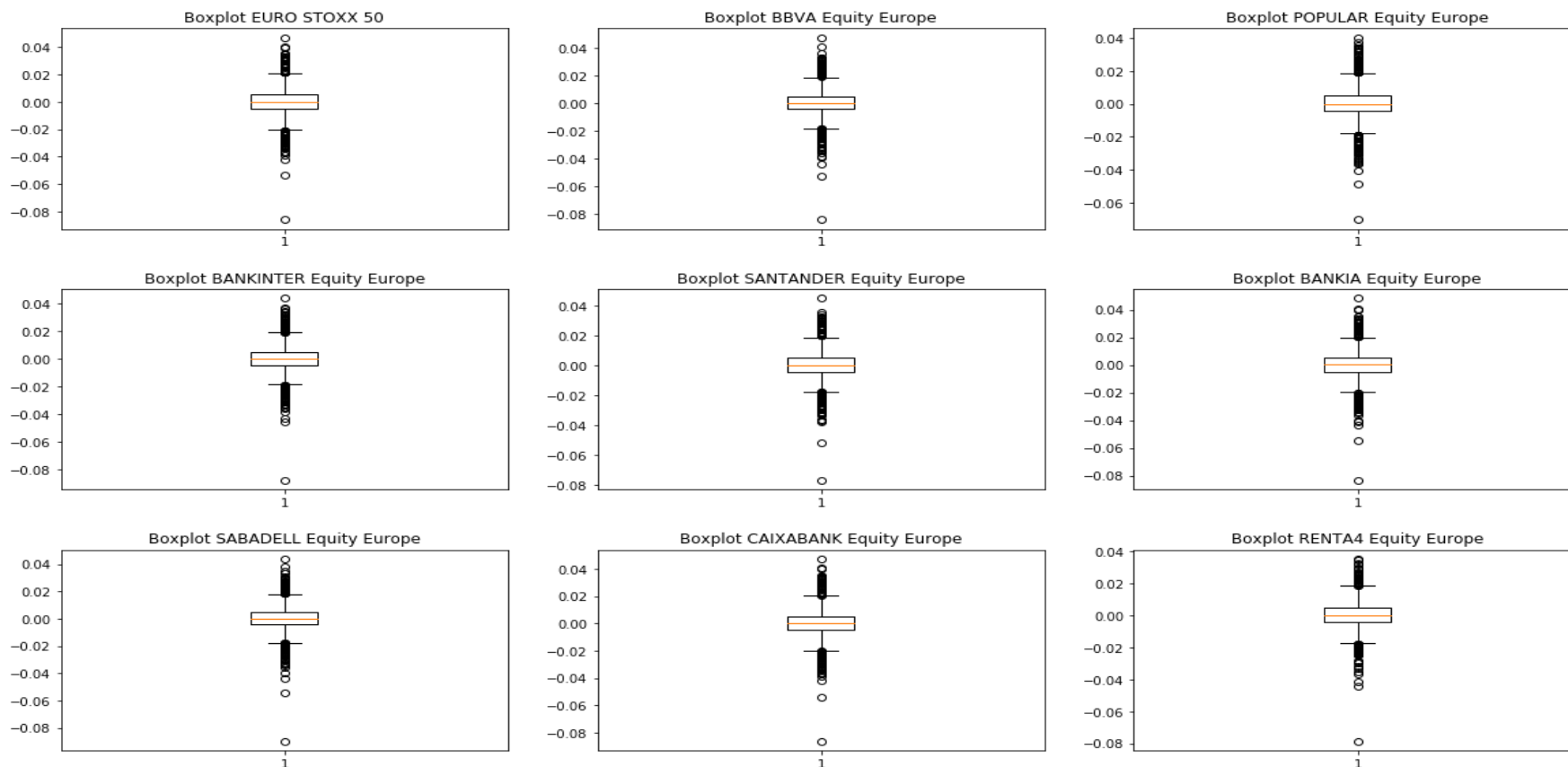


Analysis: Histogram returns and Value at Risk (VAR 95%)



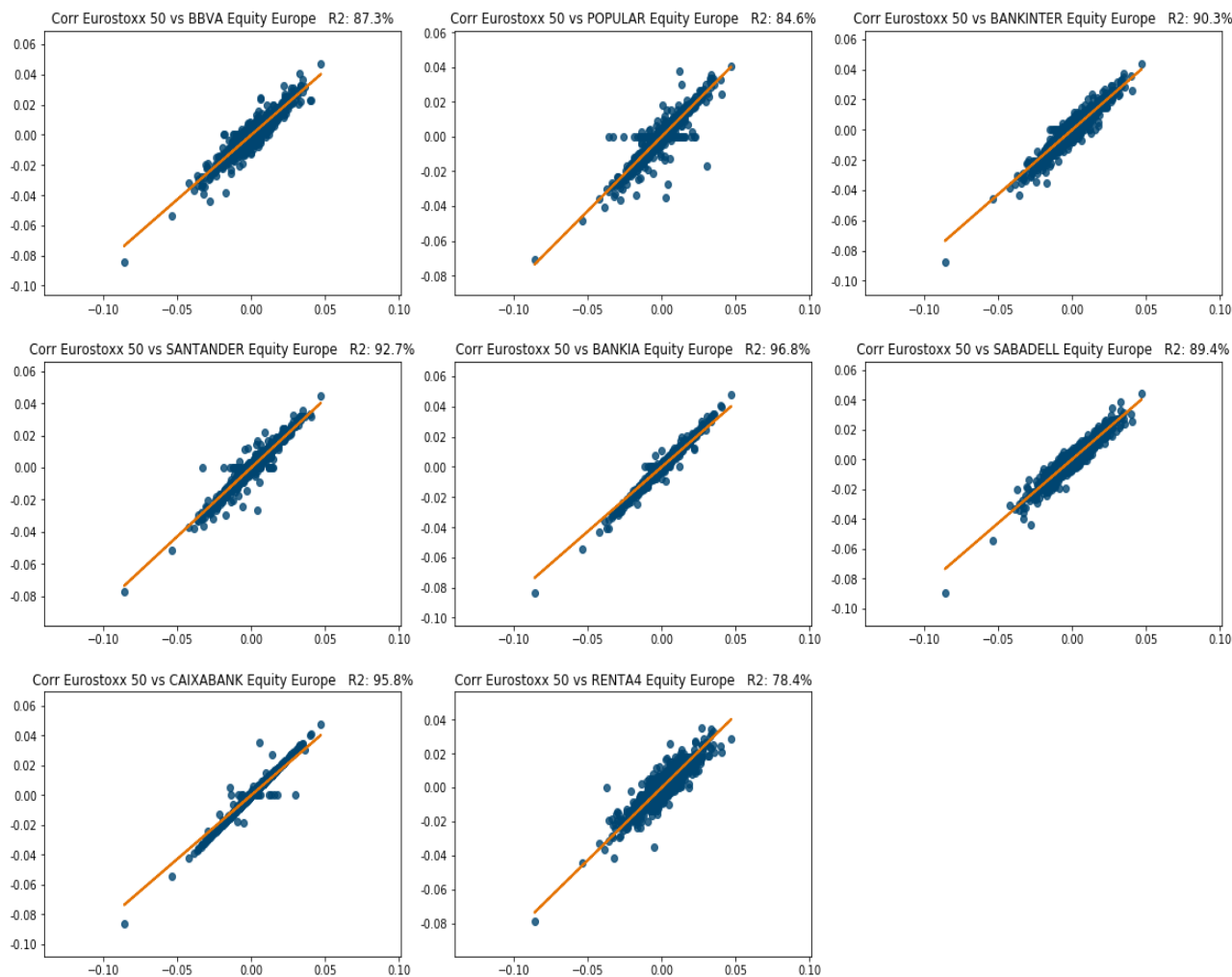
*The frequency histogram are very similar in all the funds except in the RENTA4 fund, this fund has more positive tails than the others distributions and at the same time has a lower VAR ratio...this suppose a important difference and its a very important characteristic in the active mutual funds...

Analysis: Boxplot (How it's the behavior of the returns?)



*The boxplot chart it's very useful to see how is the daily returns behavior. In our analysis we can see that almost all the funds has the same returns with a very similar interquartile range...this its very negative in terms of find active funds...due to his behavior its the same than the benchmark index...

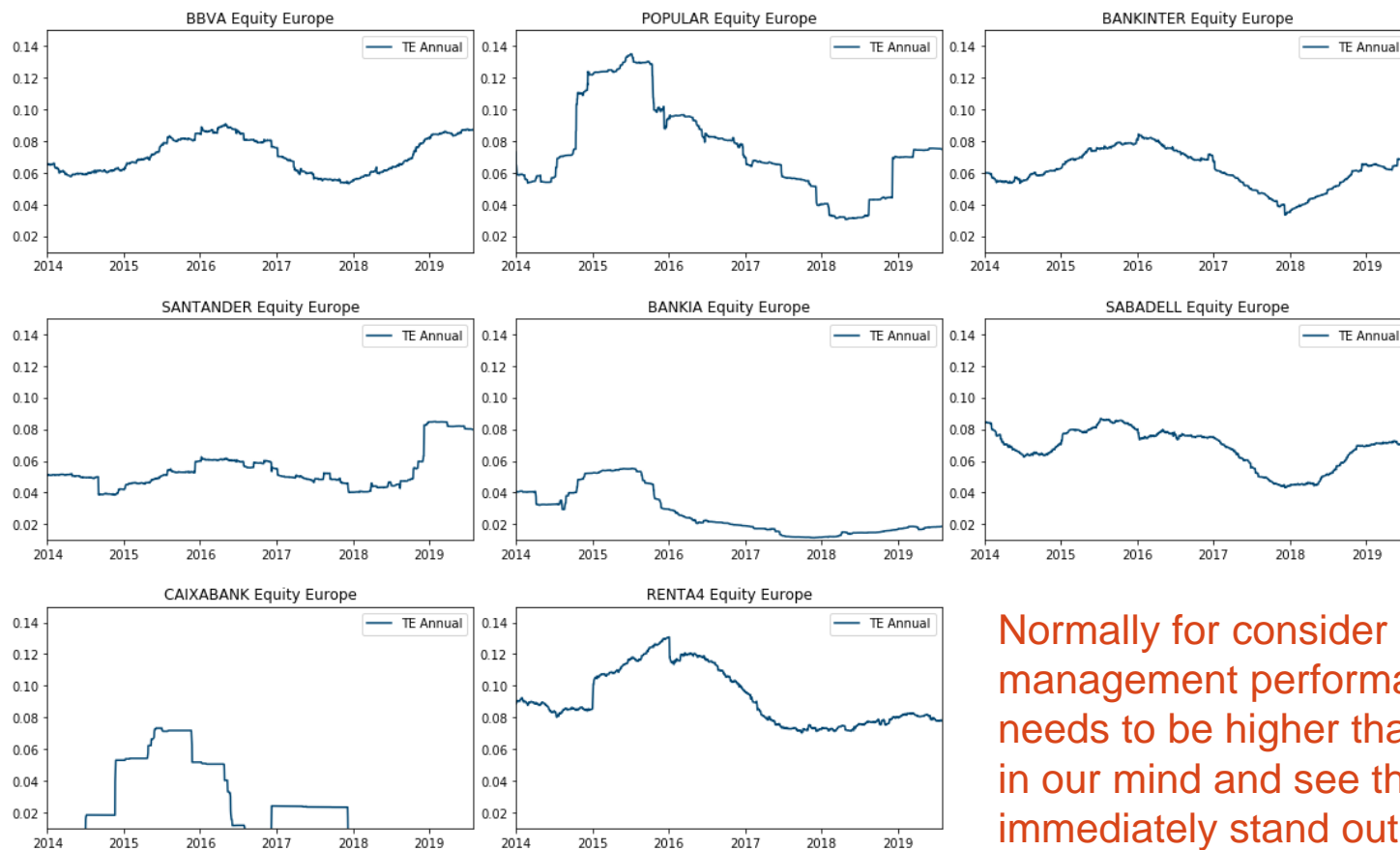
Analysis: Linear Regression between Eurostoxx 50 vs Active Mutual Funds



All the funds have a very high correlation and R2 ratio, and we can see clearly that the movements in his returns are very similar at the Euro Stoxx 50 daily returns...

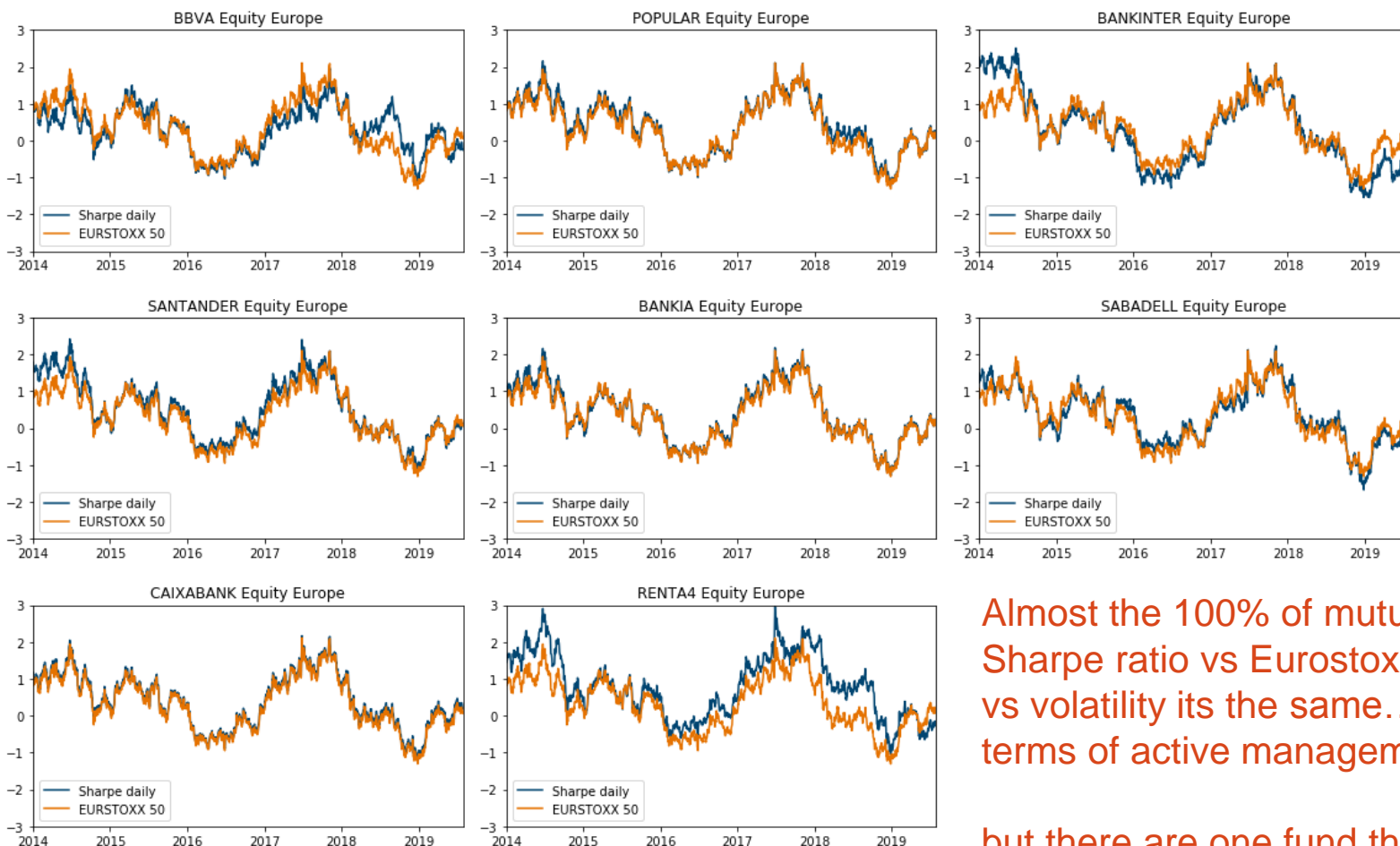
This give an idea about the active management grade...only the RENTA4 has a ratio lower than 80%.

Analysis: Tracking Error Eurostoxx 50 vs Active Mutual Funds



Normally for consider a fund as active management performance the Track error ratio needs to be higher than 6%. If we keep this idea in our mind and see the results of our analysis immediately stand out the CAIXABANK and the BANKIA funds because his Tracking Error ratio are close to 02...in opposite we have the Renta4 fund with a TE ratio higher than 8% given us a clearly idea about his active performance...

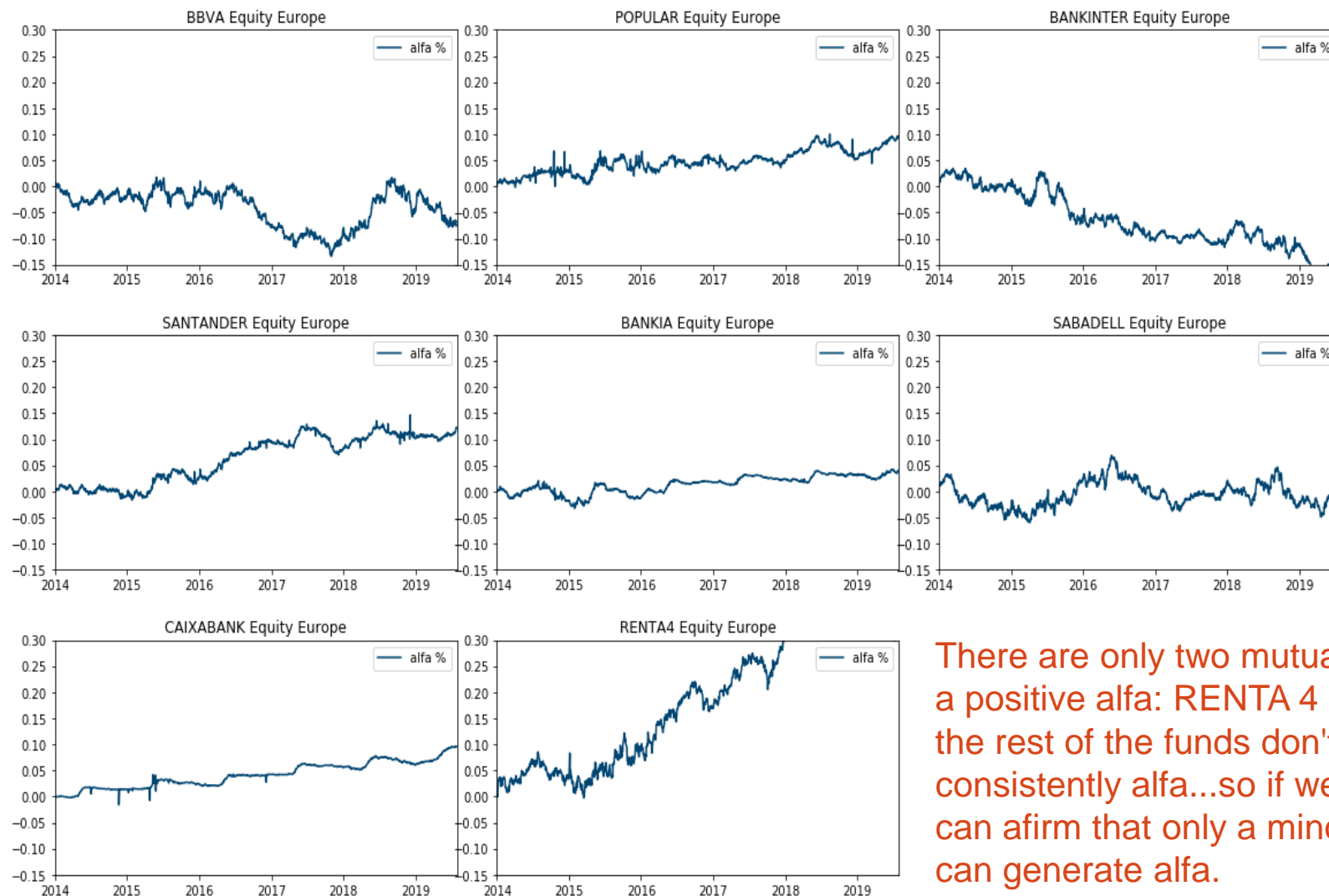
Analysis: Sharpe Ratio



Almost the 100% of mutual funds have the same Sharpe ratio vs Eurostoxx 50 so the ratio return vs volatility its the same...this its a bad signal in terms of active management...

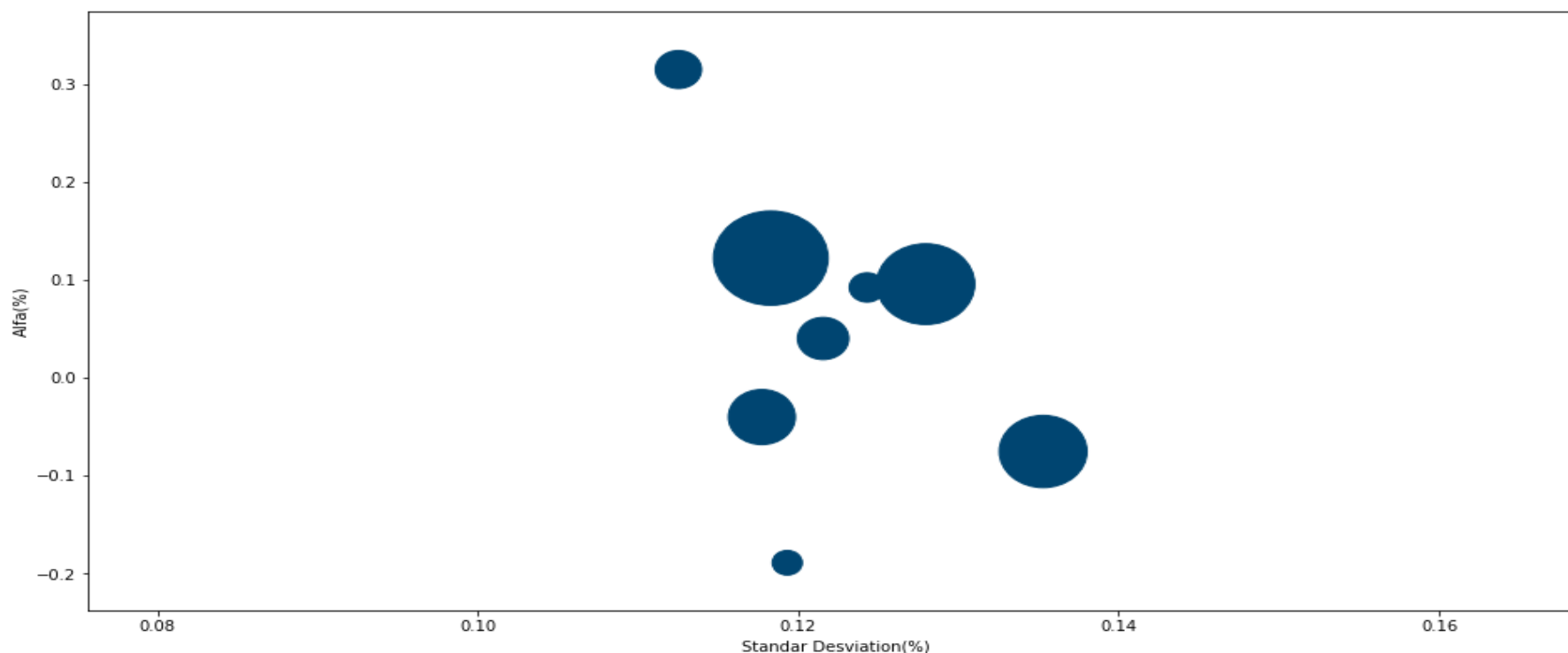
but there are one fund that best this performance and get a better sharpe ratio: RENTA4, so this fund has better results in terms of returns assuming less risk...

Analysis: Alfa Analysis



There are only two mutual funds that can get a positive alfa: RENTA 4 and SANTANDER, the rest of the funds don't generate consistently alfa...so if we see the results we can affirm that only a minority of mutual funds can generate alfa.

Analysis: Mutual Fund size vs Alfa



There is no lineal relation between volume and alfa generation and we can't find clearly relationships between the risk and the alfa generation, so the key factor is the chief economist knowledge about the different sector and corporates

Results and Discussion

Summary Table:

Mutual Fund	Alfa	Standar-Desviation	Sharpe-Ratio	Track-Error-Ratio	Pearson-Ratio	R2-Ratio	VAR95%-Ratio
BBVA Equity Europe	-0.075278	0.135290	-0.244579	0.087285	0.934266	87.3	-1.514373
POPULAR Equity Europe	0.092391	0.124299	0.187279	0.074894	0.919829	84.6	-1.603305
BANKINTER Equity Europe	-0.188986	0.119315	-0.550266	0.066357	0.951067	90.3	-1.668539
SANTANDER Equity Europe	0.122363	0.118286	0.105925	0.079787	0.963157	92.7	-1.588134
BANKIA Equity Europe	0.040247	0.121554	0.139839	0.018571	0.990355	96.8	-1.695701
SABADELL Equity Europe	-0.040060	0.117728	-0.209338	0.068787	0.945945	89.4	-1.499833
CAIXABANK Equity Europe	0.095792	0.127955	0.208462	0.006922	0.986935	95.8	-1.716250
RENTA4 Equity Europe	0.315127	0.112520	-0.285242	0.077958	0.893857	78.4	-1.435818

Results and Discussion

BBVA, SABADELL, BANKINTER

This fund in the 5 year horizon dont seems to generate alfa, normally his returns are very similar than the benchmark returns even has a worst behaviuor (alfa ratio negative).

In other hand the pearson correlation with the benchmark is so high (higher than 90%) and the R2 ratio is in a similar level.

The Value at risk its almost equal vs Benchmark and happended the same with the return histogram.

The track error is more and less a 6% and the sharpe ratio is normally worst than benchmark.

SANTANDER, CAIXABANK, POPULAR, BANKIA

This fund in the 5 year horizon seems generate a bit of alfa, normally his returns are very similar than the benchmark.

The Value at risk its almost equal vs Benchmark and happend the same with the return histogram.
The track error is more and less a 8% and the sharpe ratio is normally the same than benchmark.

RENTA4:

This fund in the 5 year horizon seems generate a lot of alfa, always his returns are better than the benchmark.

The Value at risk its almost very different vs Benchmark and happend the same with the return histogram, you can see a very different histogram form...

The track error is sometimes higher than 10% and the sharpe ratio is with difference better vs benchmark (less risk better results).

Conclusion

After analyse all the data and make a deep satatistical and visualization analyst we can conclude the next:

- **The vast majority of Spanish mutual funds have the same behavior vs benchmark, not only in his prices but in the performance of his returns....so this mutual funds must be consider as passive management and not worth pay higher commissions. We recommend to hire ETF before this funds.**
- **The Renta 4 fund, the small fund speaking in terms of volume has show a very different behavior, improving considerably respect the benchmark. Is the only fund that shows clearly an active management improving systematically an improvement respect the benchmark...so we can recommend this fund.**



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