

The FCO Cockpit Global Bubble Status Report

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The Financial Crisis Observatory (FCO) monthly report discusses the historical evolution of bubbles in and between different asset classes and geographies.

It is the result of an extensive analysis done on the historical time series of about 450 systemic assets and about 850 single stocks. The systemic assets are bond, equity and commodity indices, as well as a selection of currency pairs. The single stocks are mainly US and European equities. The data is from Thomson Reuters.

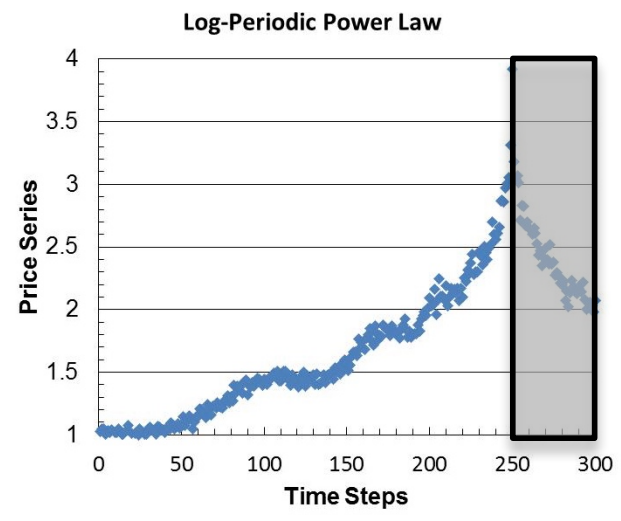
In the first part of this report, we present the state of the world, based on the analysis of the systemic assets. In the second part, we zoom in on the bubble behavior of single stocks and discuss some specific cases.

For an intuitive explanation of the methodology and the specifics of the indicators that are used in this report, we refer to: D. Sornette and P. Cauwels, Financial bubbles: mechanisms and diagnostics. Review of Behavioral Economics 2 (3), 279- 305 (2015)
<http://arxiv.org/abs/1404.2140> and <http://ssrn.com/abstract=2423790>

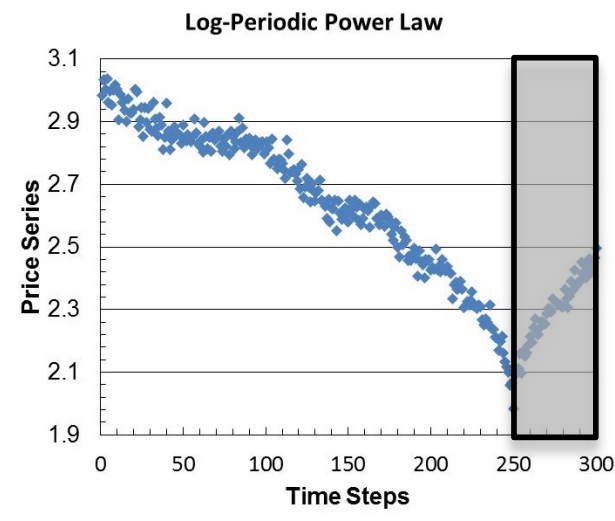
We use the Log-Periodic Power Law Singularity (LPPLS) model to hunt for the distinct fingerprint of **Bubbles**:

1. Price rises **faster than exponentially**, therefore the logarithm of the price rises faster than linearly;
2. There are accelerating **oscillations**, with a distinct characteristic.

Starting Nov 2017, we have a major upgrading of our LPPLS bubble warning signals. The new method significantly increases the prediction power of the signal, and better normalizes the signal values. A bubble signal is identified if our new bubble indicator is larger than 0%. Bubble Size is the cumulative return since the starting point of the bubble we identified.



Positive bubble: imitation in buying

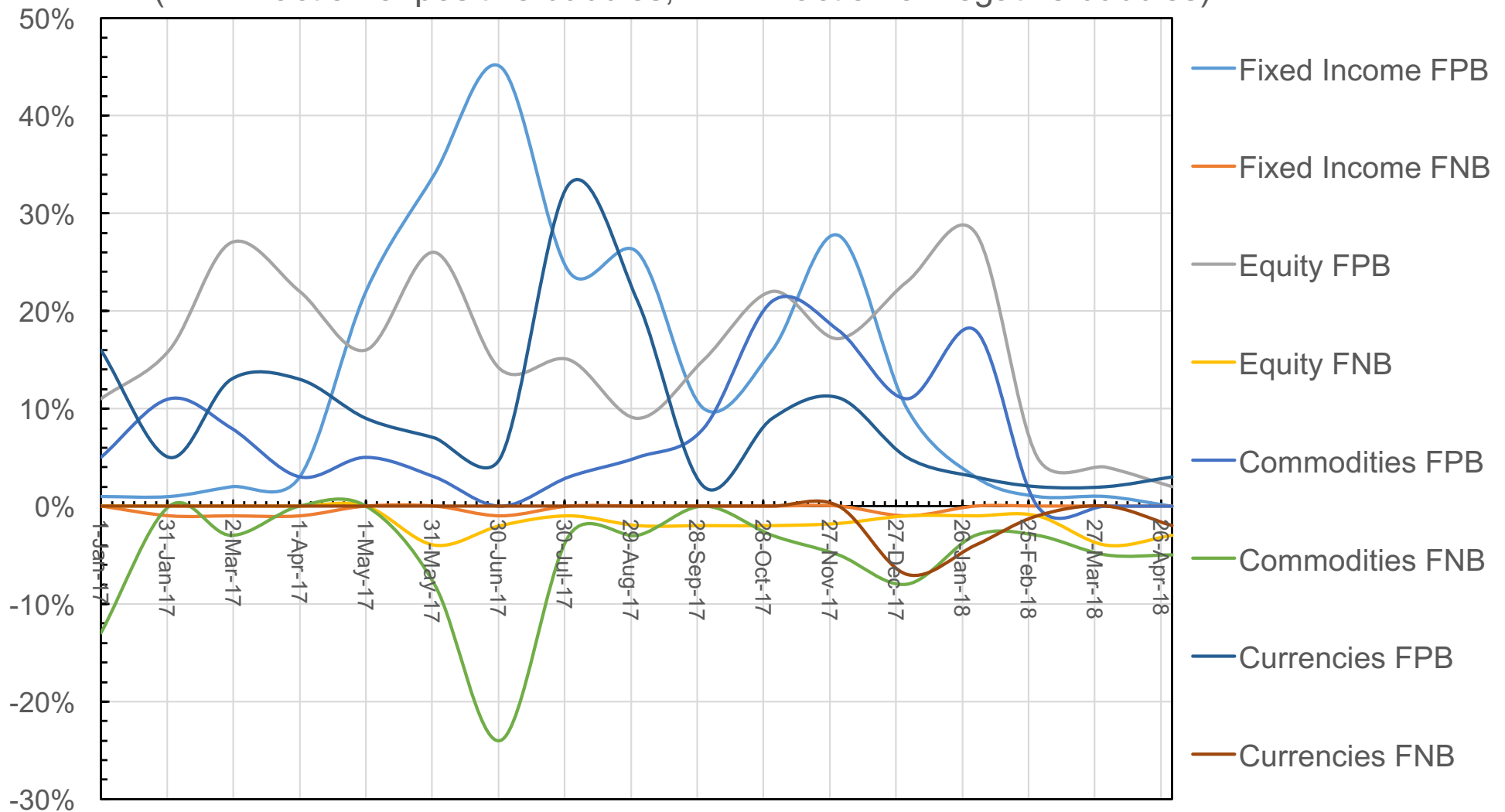


Negative bubble: imitation in selling

General Results – The Big Picture

Historical evolution of the fraction of assets within an asset class that show significant bubble signals

(FPB: fraction of positive bubbles; FNB: fraction of negative bubbles)



General Results – This Month's Overview

Category	Analyzed Assets	Fraction of Pos. Bubbles [%]	Fraction of Neg. Bubbles [%]
Fixed Income	155	0	0
Government Bonds	55	0	0
Finance and Insurance	21	0	0
Corporate Bonds	79	0	0
Equity	169	2	3
Country Indices	73	5	1
Europe	36	0	0
United States	60	0	7
Commodities	38	0	5
Forex	106	3	2

As visible in the plot on the previous slide, we see a general trend of lowering bubble activity during recent months across all sectors.

Bubble activity in the Fixed Income sector, which has been low already, has decreased to a level of zero on May 1st 2018. Signals of positive and negative bubble activity in equities have dropped from (4%,4%) last month to (2%,3%) now. The fractions of bubbles identified in assets amongst the Commodities sector remain exactly the same. Bubble activity in the Forex sector increases impalpably to (3%,2%) from last month's (2%,0%) niveau.

All in all, we can confirm our diagnostic of no significant large market correction risks.

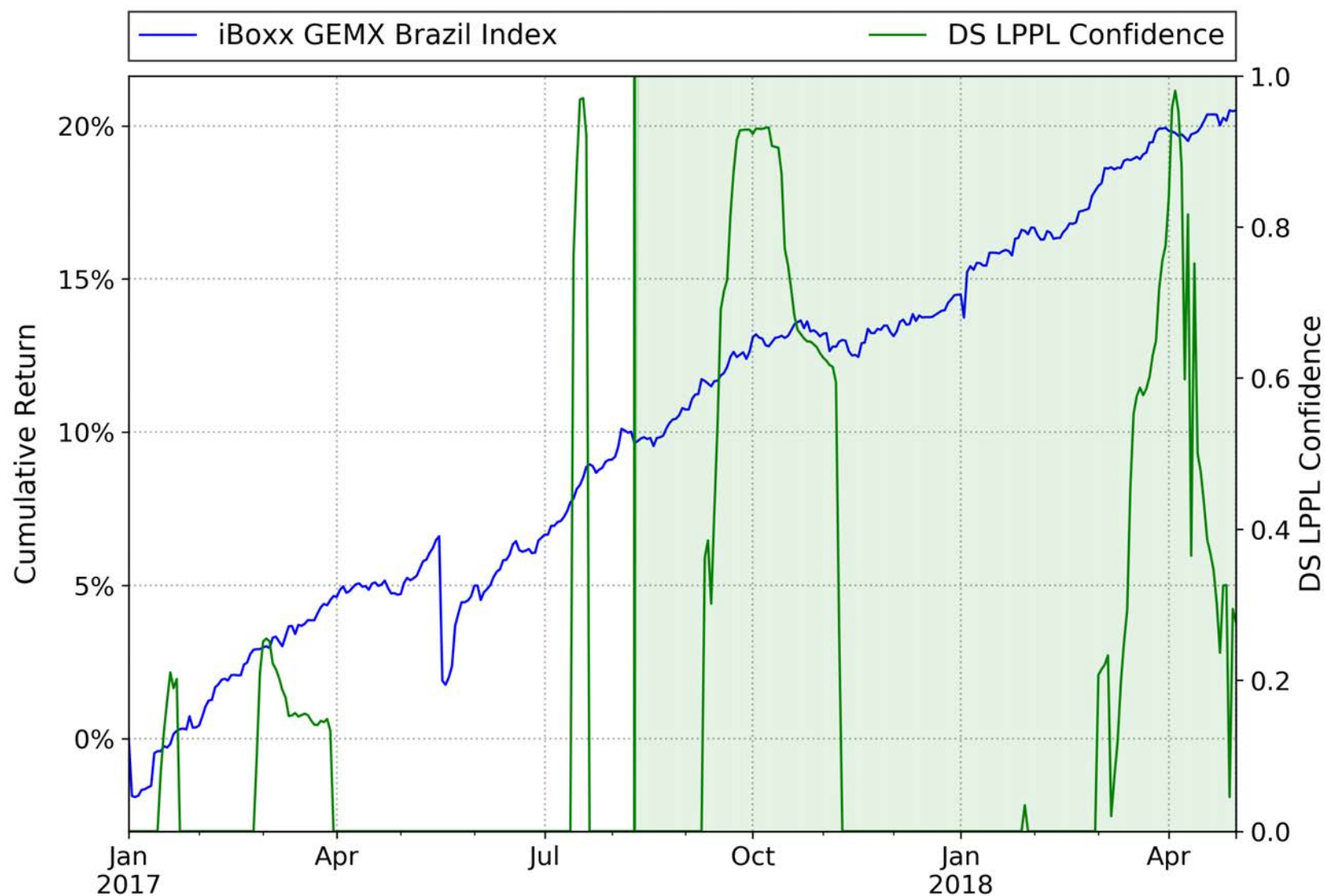
Fixed Income

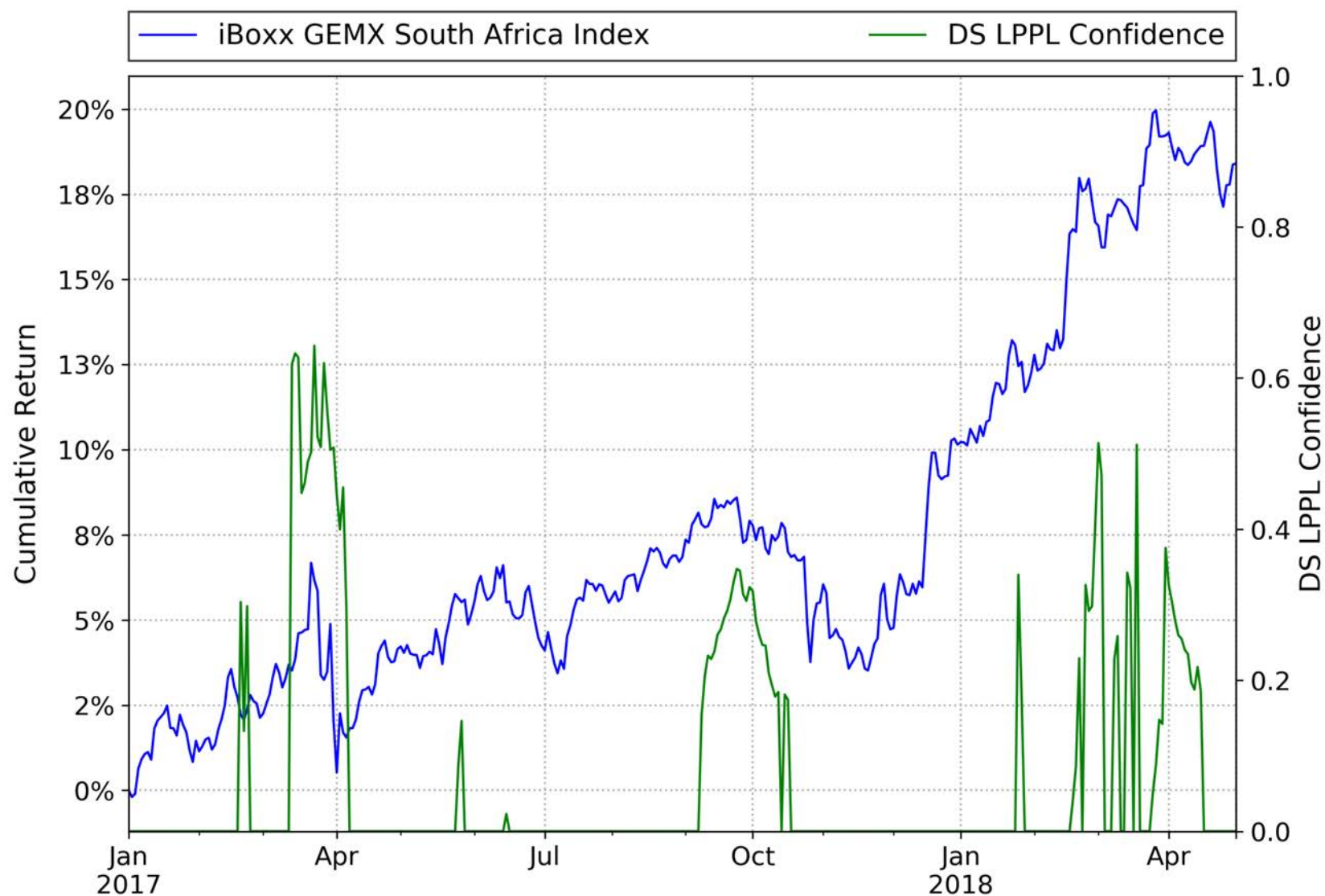
Name	Bubble Size [%]	Bubble Duration [days]	DS LPPL Confidence [%]	Geometric Average [%]
Positive Bubbles				
-	-	-	-	-
Negative Bubbles				
-	-	-	-	-

As mentioned, there are no bubbles amongst the three analyzed Fixed Income Asset Classes, namely Government Bonds, Corporate Bonds, as well as Financial & Insurance Bonds.

Looking back at our subjects from the previous report, we can see that bubble signals in the Brazilian iBoxx index have dropped during April, due to a slight flattening of the price trajectory. The plot shows that we can still identify a positive bubble frame (green shaded region), but the associated last value of the LPPL confidence indicator (right y-scale) given on May 1st, is too small to pass our filtering criteria of at least 10% bubble size and indicator value. Therefore, it is not listed in the table above.

Related to the previous report, we also consider the plot of the South African iBoxx bond index. We observe a minor price decrease during April, which is accompanied by the confidence index going to zero, suggesting the confirmation of the change of growth regime.





Equities - Country Performance

	Name	Bubble Size [%]	Bubble Duration [days]	DS LPPL Confidence [%]	Geometric Average [%]
Positive Bubbles					
1	Bursatil Index	23415	235	28	809
2	EGX 30 Index	31	120	16	22
3	Bucharest SE BET Index	11	132	37	20
4	OMX Vilnius_GI	10	157	32	18
Negative Bubbles					
1	Dubai Financial Market General Index	-15	210	32	22

In the equity country index section, we list five bubble assets this month, four of which are found to be in a positive bubble state.

We still observe the Bursatil index at the top of the table, but this is just the mirror of the hyper-inflation that prevails in Venezuela.

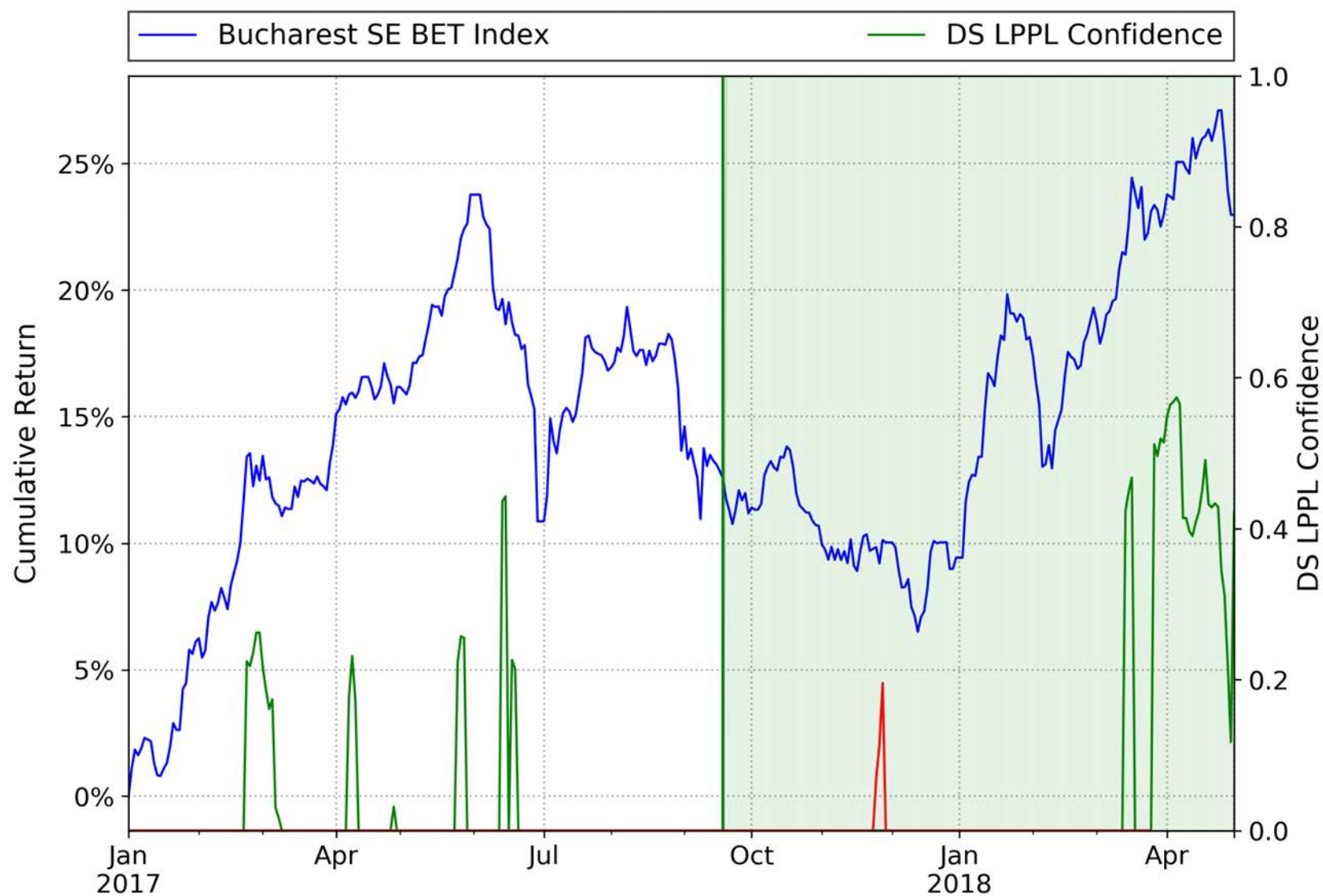
Newly in the list we see the Egyptian EGX30 Index. As visible in the corresponding plot on the following slide, we determine a large >30% positive market bubble with LPPL Confidence Indicator values having risen recently. The index had already seen strong growth in advance to the Egypt presidential elections in late March and continued to soar afterwards until now. Overall, the associated indicator signal is still fairly low, though. This signals that only on a few time scales we identify bubble dynamics obeying the LPPL model. We will keep an eye on the further development of these dynamics in the coming reports.

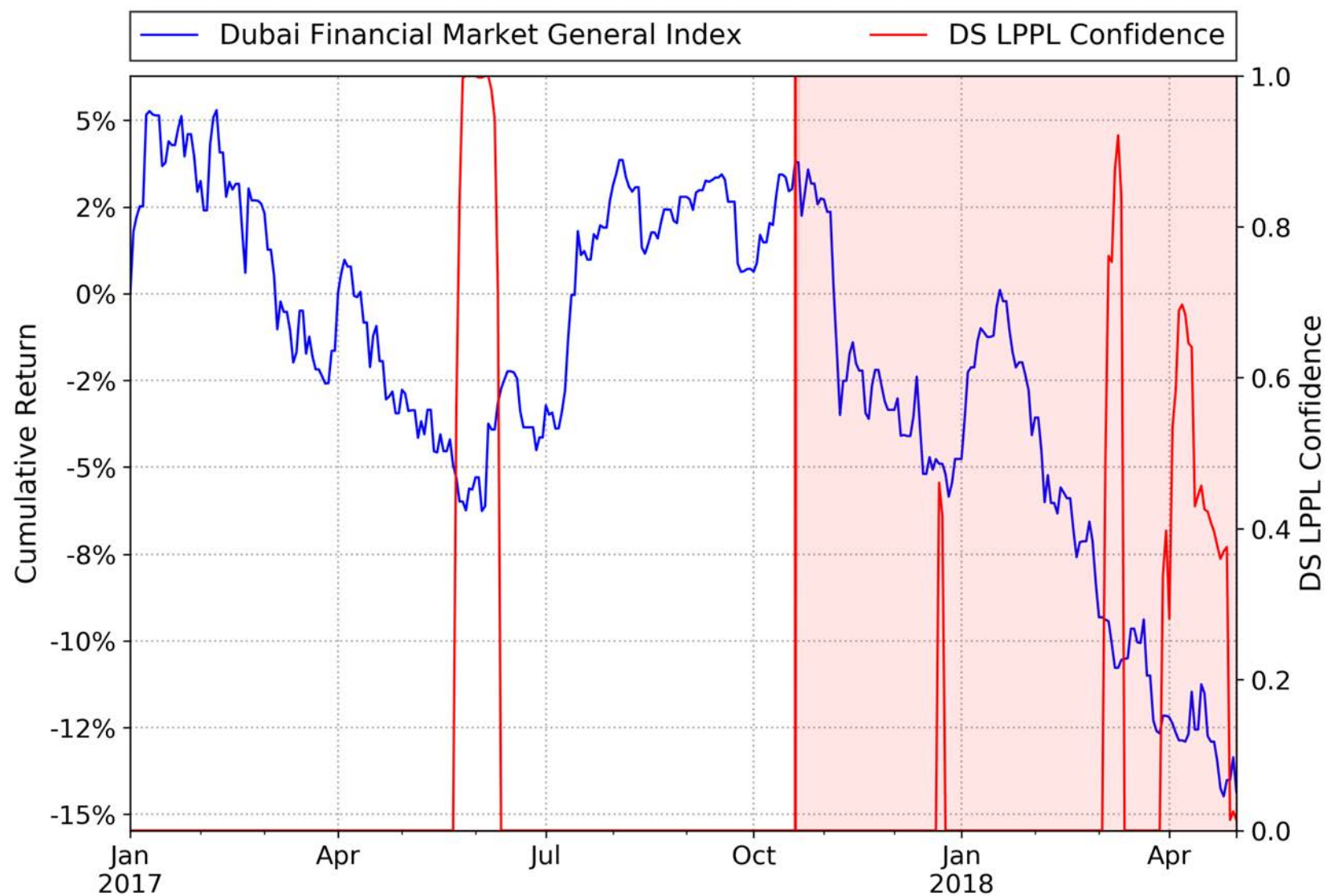
In the subsequent plots of listed assets, notice the Dubai Index, which is still in a negative bubble, identified for the second consecutive month.

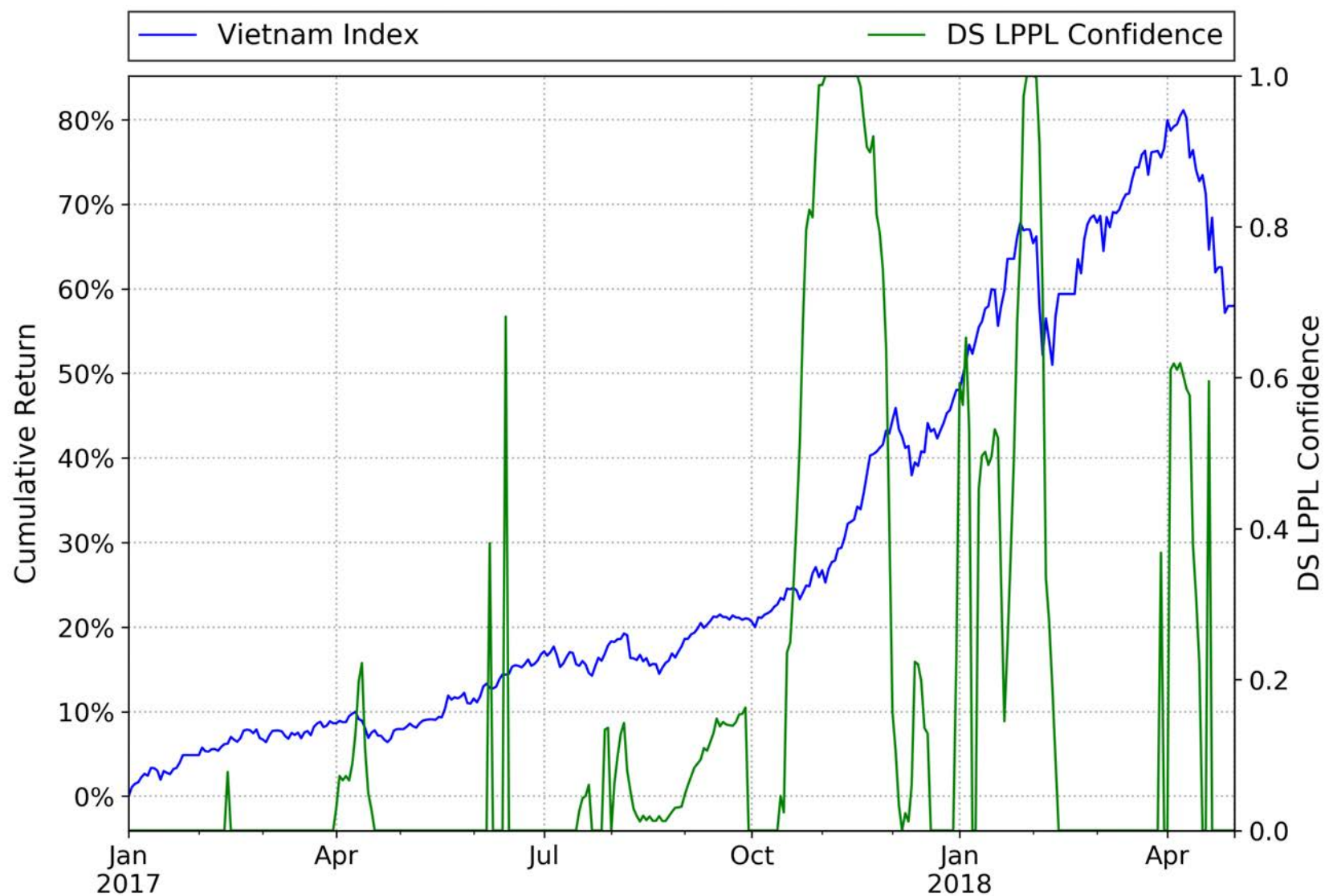
Furthermore, we can now see a clear change of regime in the Vietnam Index. We reported predictions for this in previous reports.

Egyptian EGX30 Index







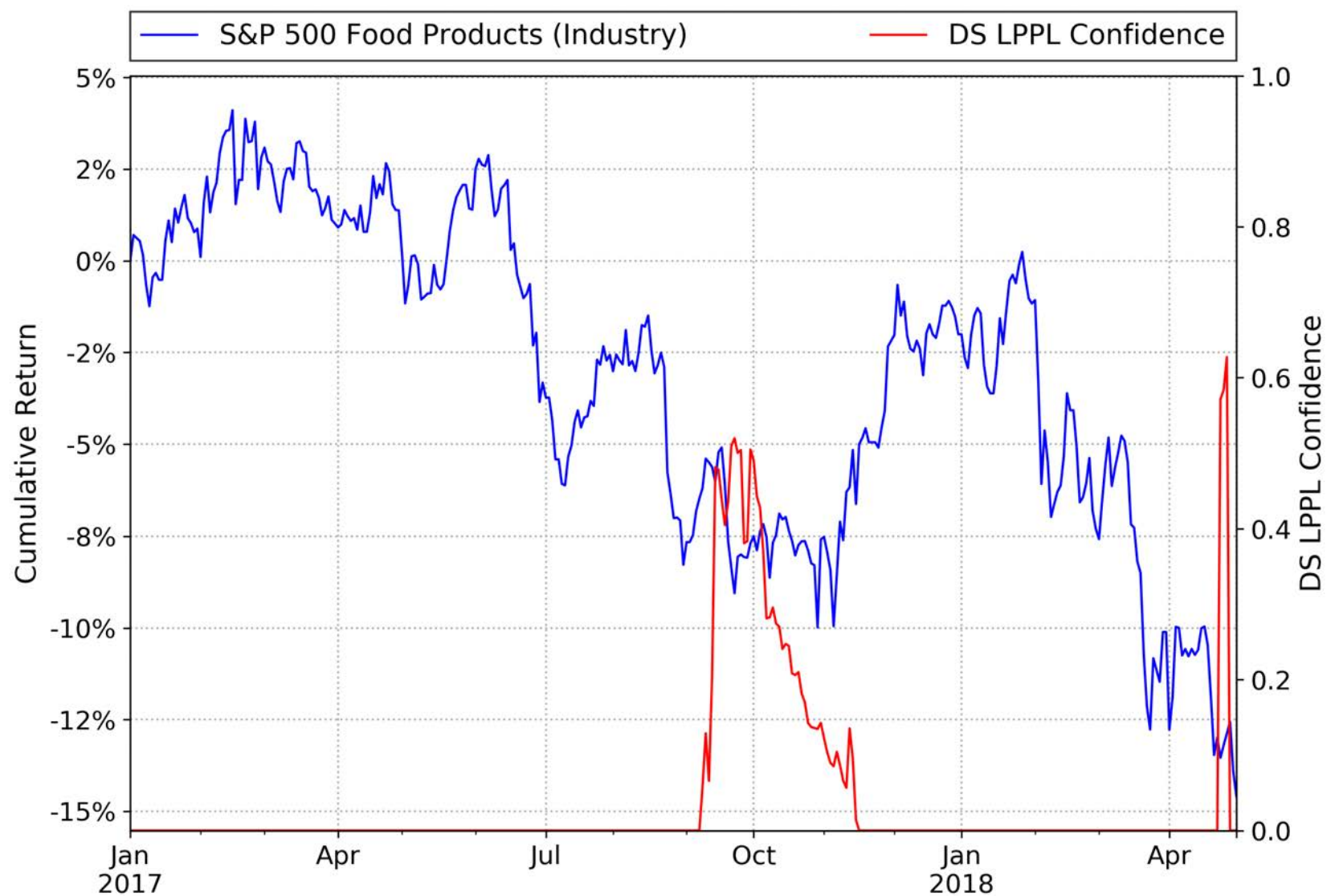


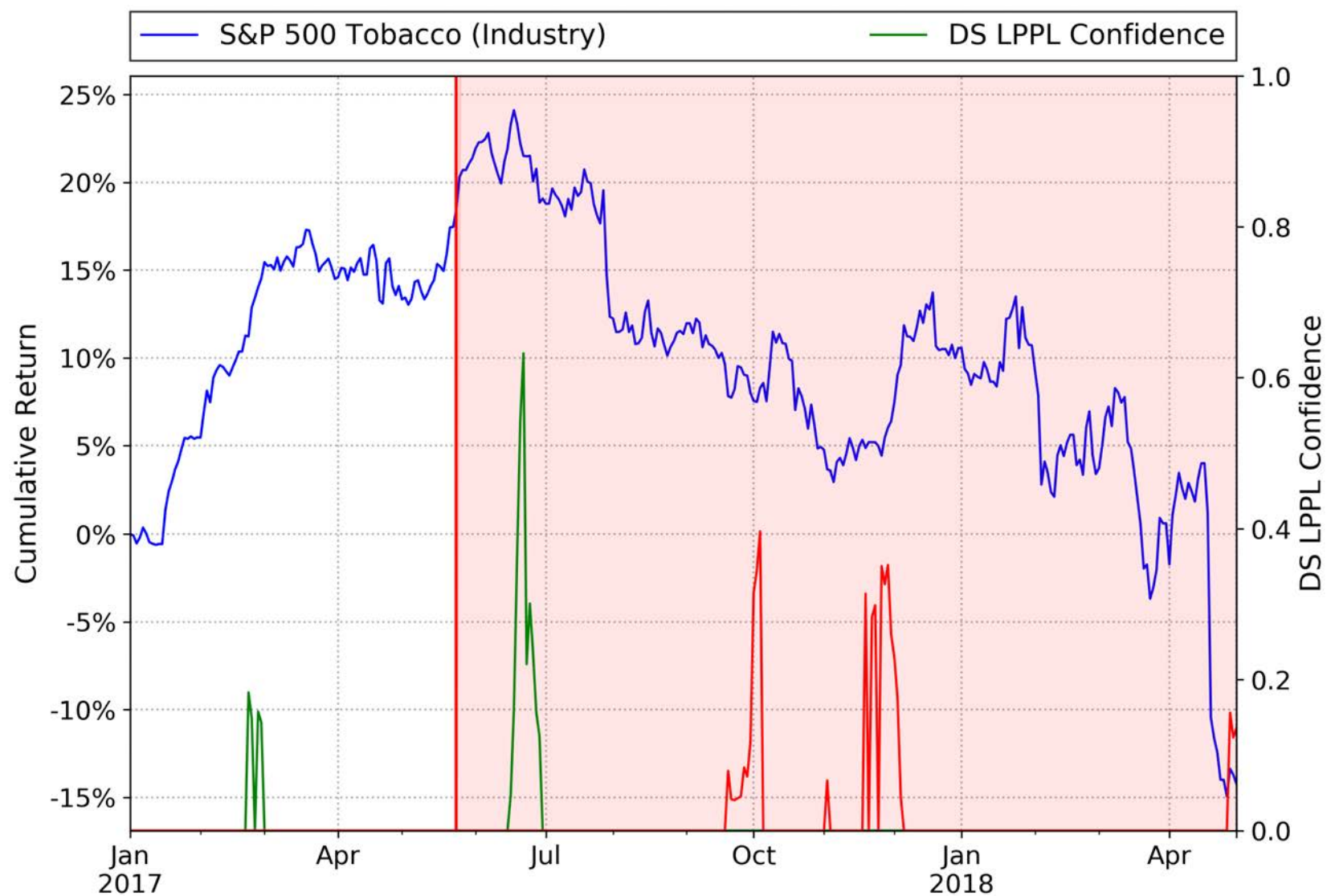
Equities - United States and Europe

	Name	Bubble Size [%]	Bubble Duration [days]	DS LPPL Confidence [%]	Geometric Average [%]
Positive Bubbles					
	-	-	-	-	-
Negative Bubbles					
	-	-	-	-	-
	Name	Bubble Size [%]	Bubble Duration [days]	DS LPPL Confidence [%]	Geometric Average [%]
Positive Bubbles					
1					
Negative Bubbles					
1	S&P 500 Food Products (Industry)	-15	109	64	31
2	S&P 500 Tobacco (Industry)	-23	107	21	22
3	S&P 500 Household Products (Industry)	-18	245	23	20
4	S&P 500 Industrial Conglomerates (Industry)	-16	111	12	14

We report no bubble signals in European Equity Indices this month.

In the US Sector, the fraction of positive bubbles has decreased to zero (from 3%), while the fraction of negative bubbles has increased to 7% (from 5%). The corresponding plots are provided in the following.





Commodities

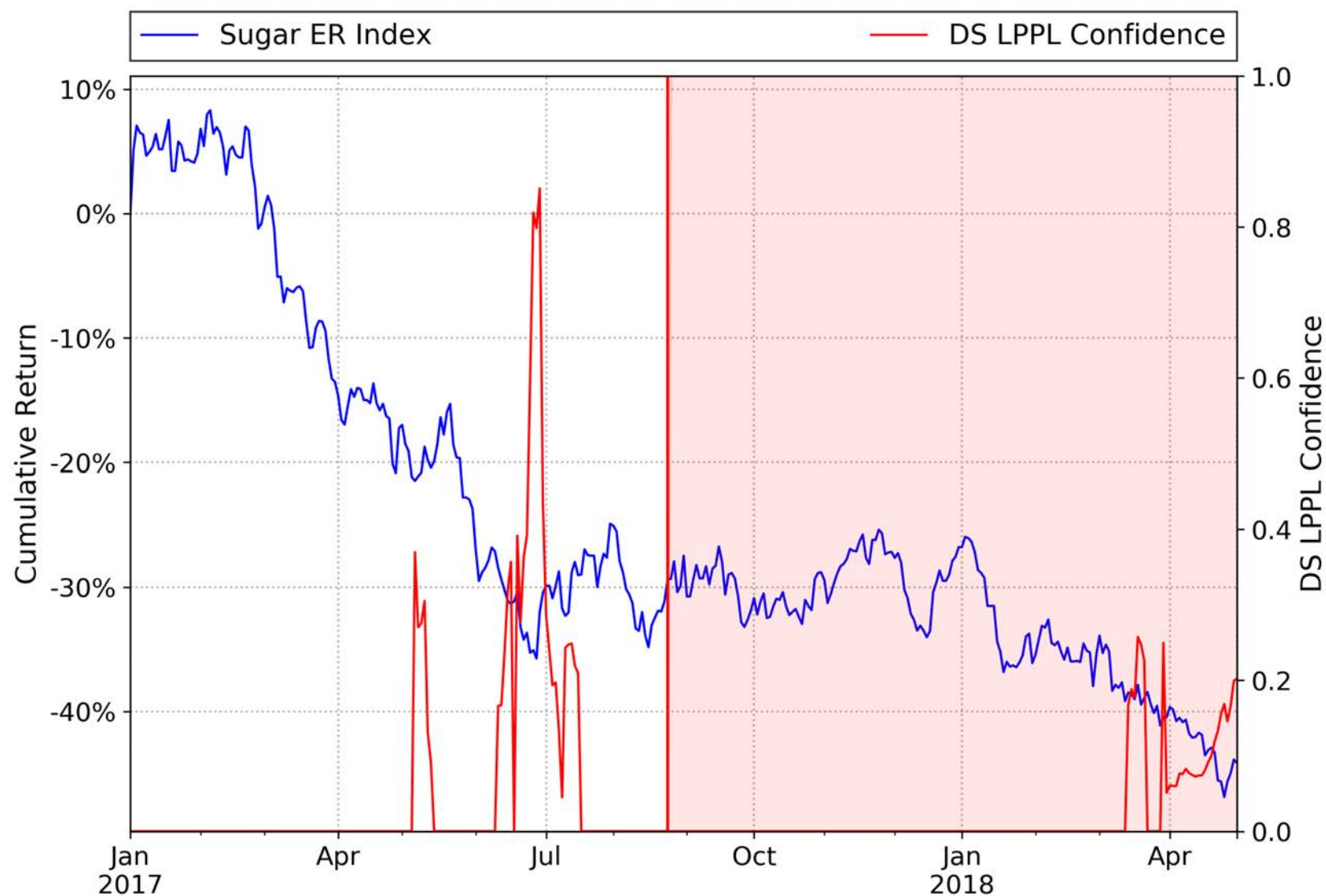
	Name	Bubble Size [%]	Bubble Duration [days]	DS LPPL Confidence [%]	Geometric Average [%]
Positive Bubbles					
1					
Negative Bubbles					
1	White Sugar ER Index	-15	218	46	26
2	Sugar ER Index	-21	180	19	20

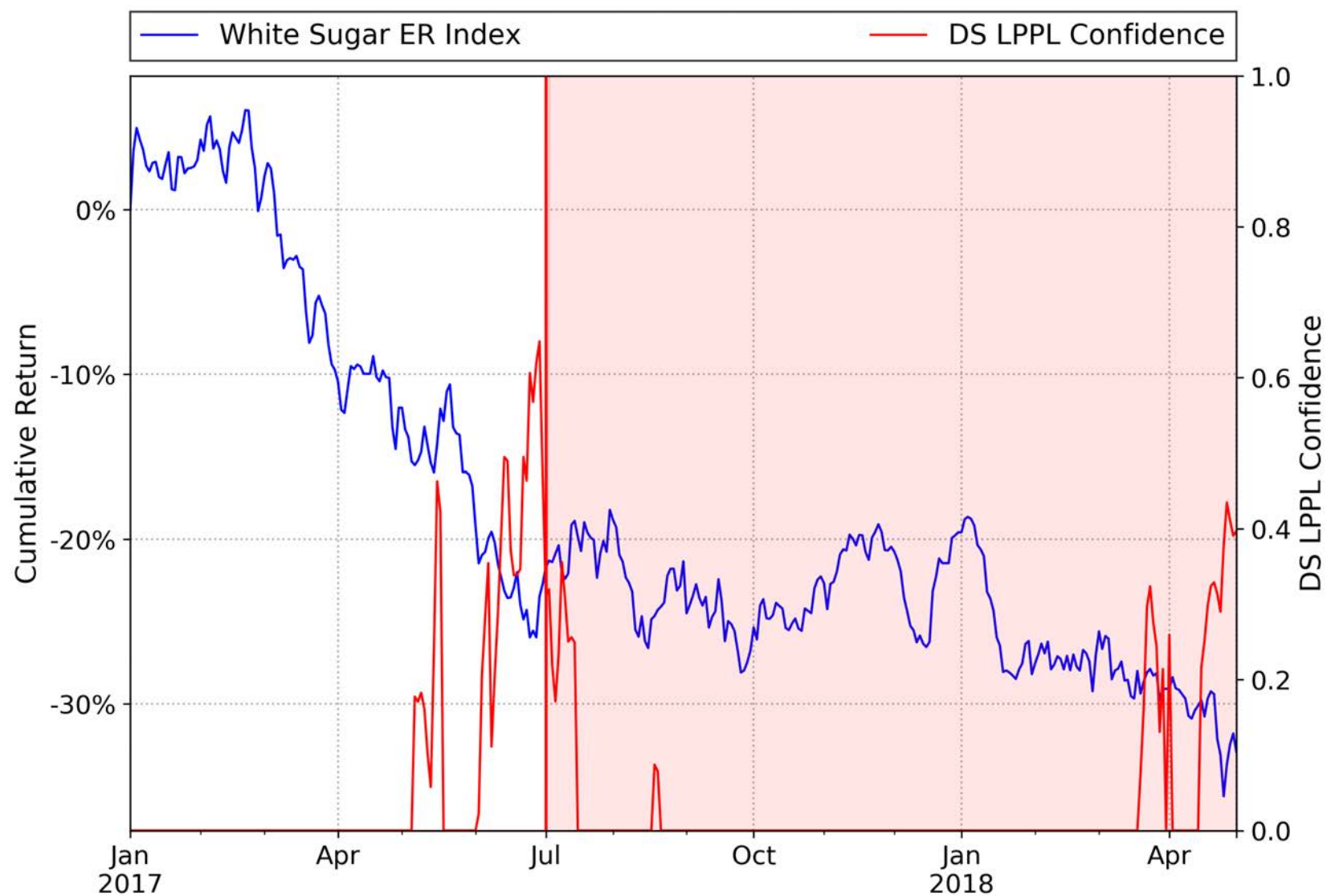
At the start of May, there are no positive commodities bubbles identified.

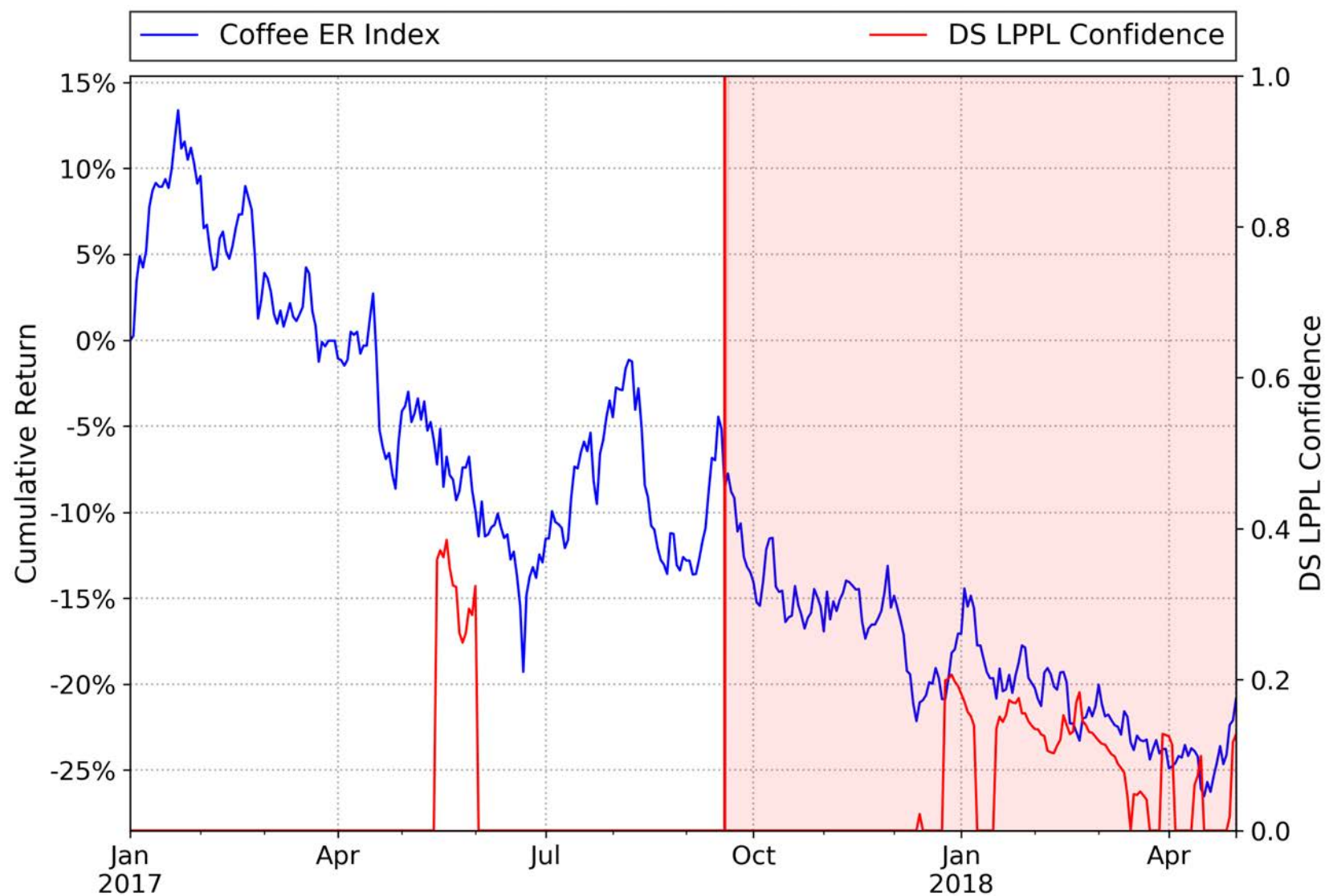
About 5% of all assets show negative bubble signals, only two of them passing the filtering criteria for bubble size (>10%) and DS LPPL Confidence Indicator (>10%), though.

We report a negative bubble in the Sugar, respectively White Sugar Index. The two indices are highly correlated. The slight differences between the two price time series do not significantly change the corresponding pattern of the LPPL Confidence Indicator time series, confirming the robustness of the indicator with respect to minor disturbances.

Furthermore, the ER Coffee Index is still found in a negative bubble, notwithstanding its appreciation by about 5% during the end of April.







Currencies – Real Effective Exchange Rates & PCA

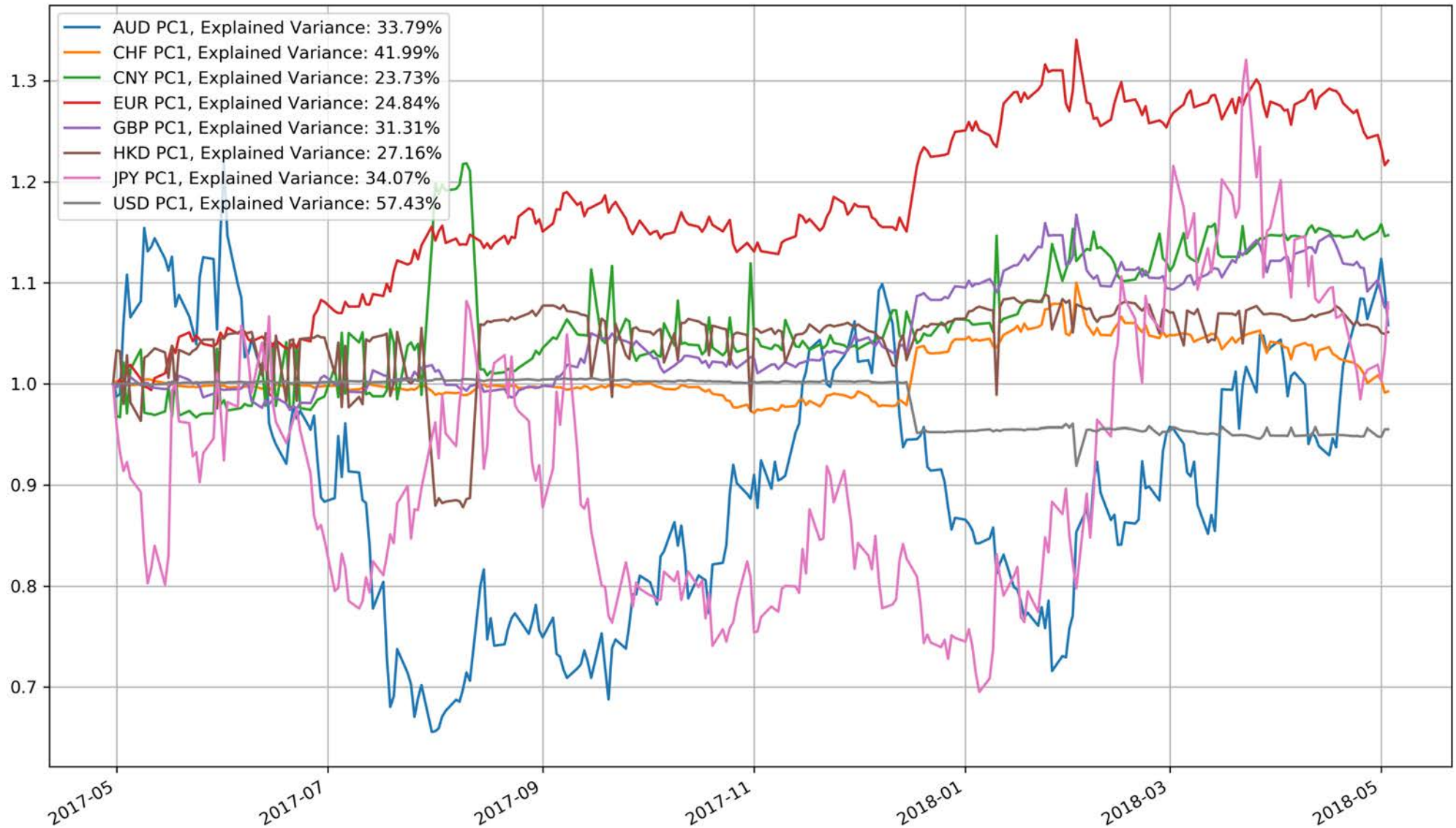
	Name	Bubble Size [%]	Bubble Duration [days]	DS LPPL Confidence [%]	Geometric Average [%]
Positive Bubbles					
1	REER Index Venezuela	33	174	17	23
2	REER Index Ukraine	12	114	35	20
3	REER Index Venezuela	30	157	12	19
Negative Bubbles					
1	REER Index Brazil	-10	240	28	17
2	REER Index Pakistan	-11	194	18	14

The only sector with (only slightly) increased positive and negative bubble activity this month is the Currency sector. Here, as usual, we observe the REER Indices of major fiat currencies. Additionally, we perform the Principal Component Analysis (PCA), as elaborated in previous reports. No LPPL signals are detected on the first Principal Components (see next slide) generated by the PCA.

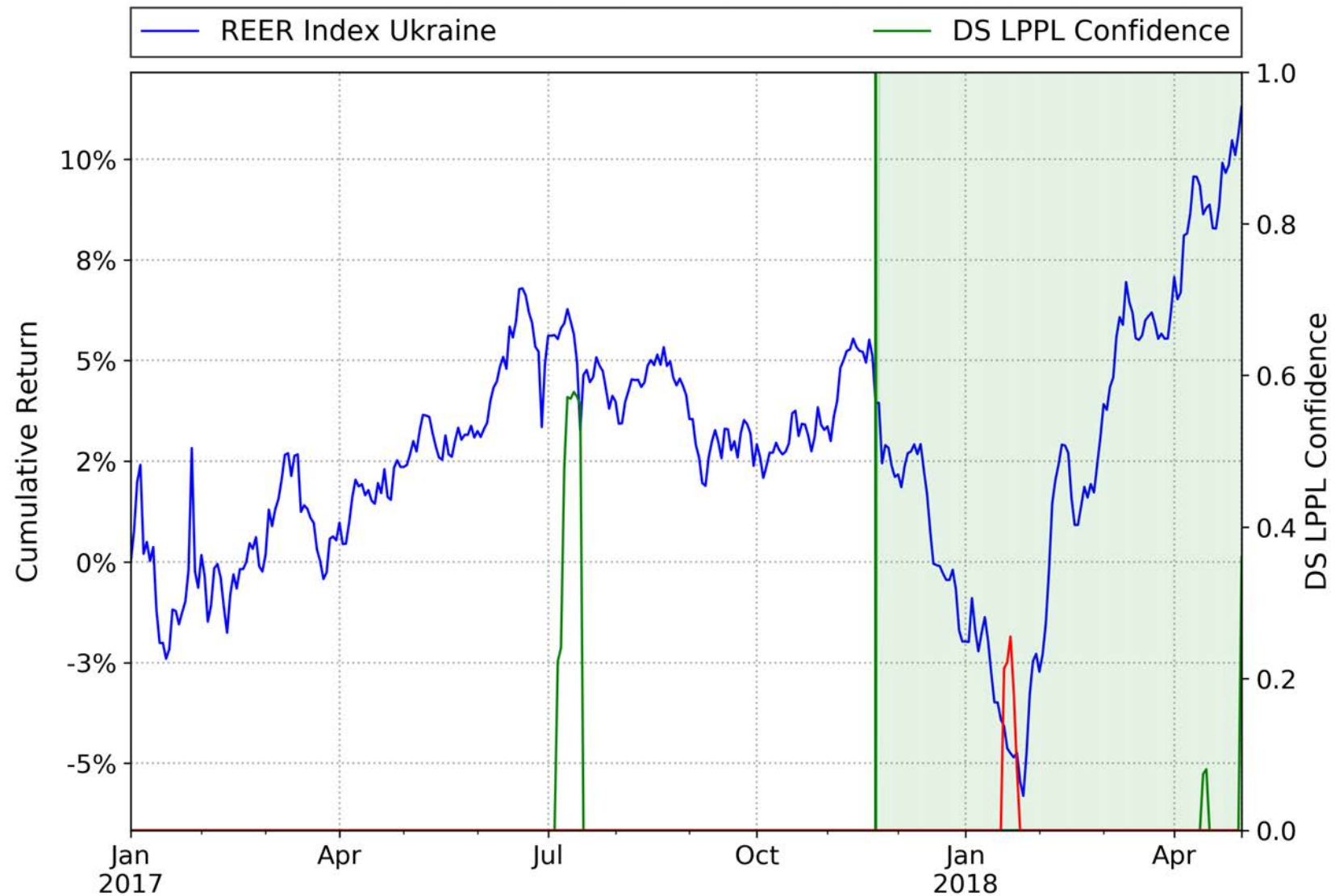
We detect signals in the Venezuelan currency, which we already reported in the last report. This is again related to the ongoing socio-economic crisis and associated hyperinflation in the country's money. We furthermore see positive bubble signals in the Ukraine REER Index. Negative bubble activity was discerned in the Brazil and Pakistan Indices. We have mentioned these in previous reports, as well. See the following plots for more information.

Currencies – PCA

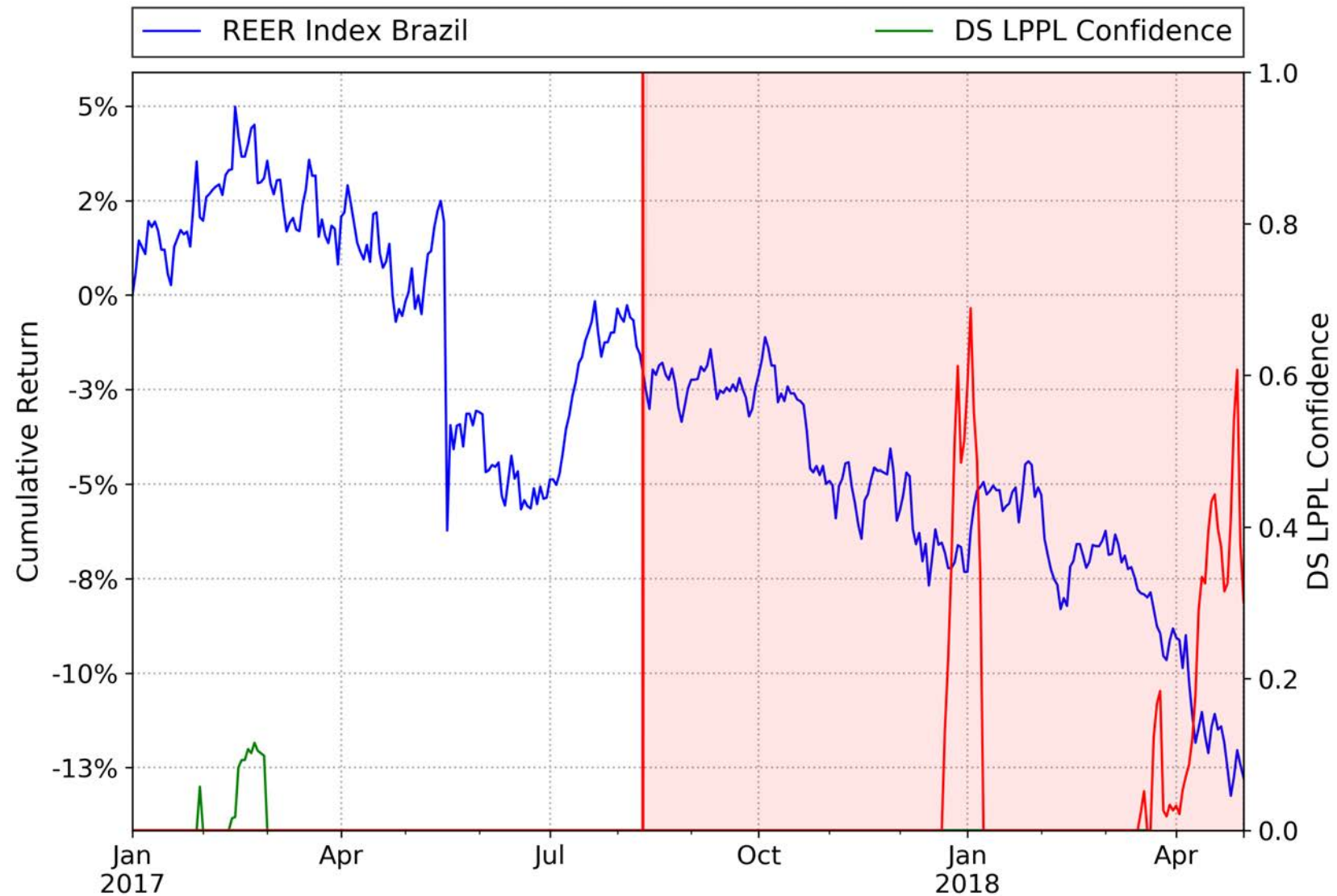
Plot of the first principal components of the ten analyzed major currencies



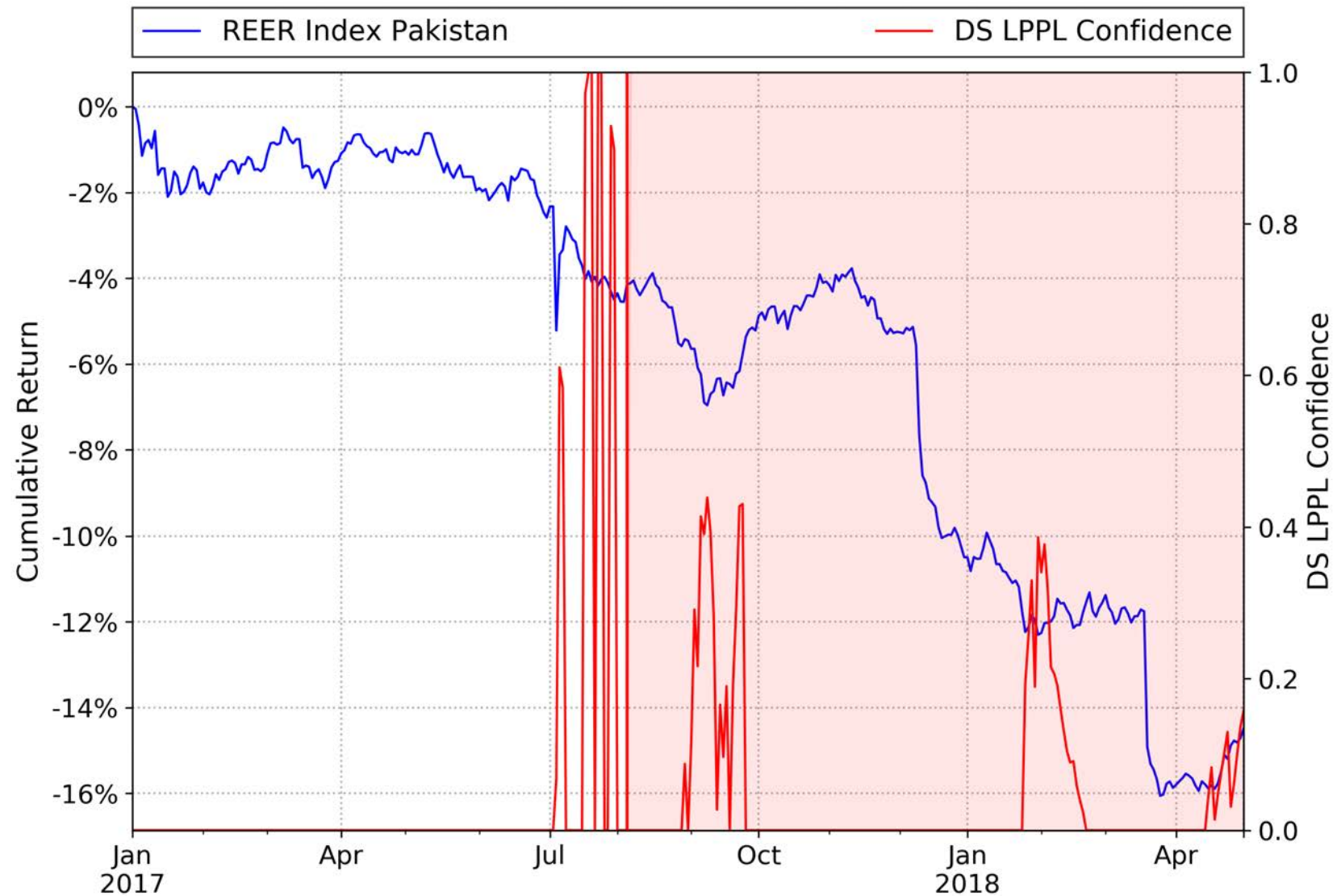
Currencies



Currencies



Currencies

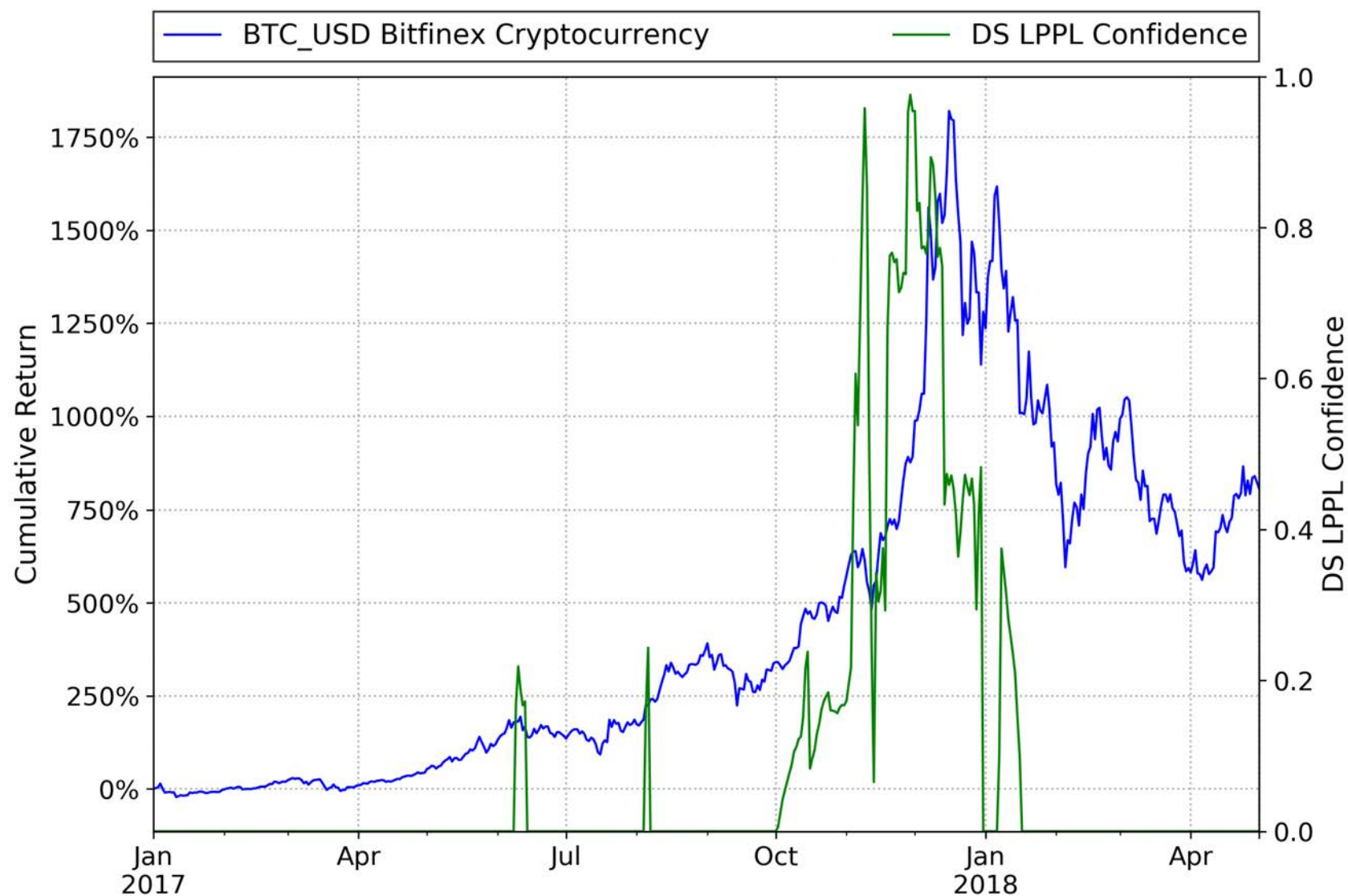


Currencies – Cryptocurrencies

Name	Bubble Size [%]	Bubble Duration [days]	DS LPPL Confidence [%]	Geometric Average [%]
Positive Bubbles				
-	-	-	-	-
Negative Bubbles				
-	-	-	-	-

The cryptocurrencies section again lists no bubble signals amongst the top five cryptocurrencies, which according to coinmarketcap.com are, at the beginning of May 2018, Bitcoin BTC, Ethereum ETH, Ripple XRP, Bitcoin Cash BCC and EOS. We checked all currencies against their US Dollar exchange rates listed at the Bitfinex Exchange.

The next slide shows the price and confidence index time series for Bitcoin. Since the big crash following mid December 2017, before which the confidence index peaked, it remains constant at zero.



For 808 stocks, we calculate the bubble warning indicators as well as two financial strength indicators, which indicate the fundamental value of the stock and the growth capability respectively.

The stocks are the constituents of the Stoxx Europe 600, the S&P 500 and the Nasdaq 100 indices. From these, all doubles and stocks with incomplete data are removed. Because our financial strength indicators are specifically designed for corporates, all financial institutions are taken out of the set as well.

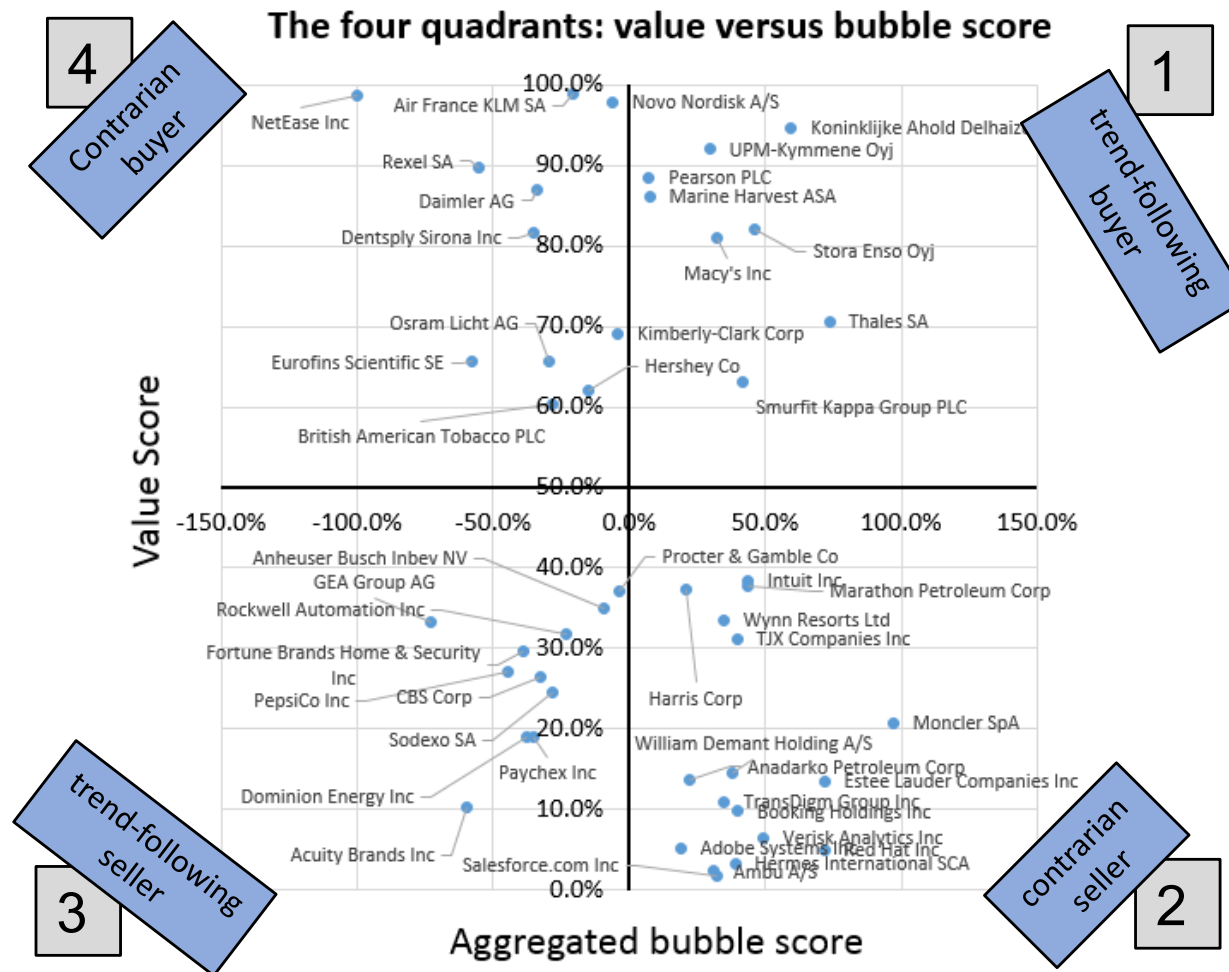
The two financial strength indicators are:

A value score that is based on the ROIC (Return on Invested Capital) taking into account the EV (Enterprise Value) to normalize for high/low market valuations and/or high/low debt; Value scores are calculated by comparing ROIC level versus EV/IC in each industry.

A growth score that has characteristics similar to the PEG ratio, which is the Price to Earnings ratio normalized by the expected growth of the EPS (Earnings per Share).

Both scores give a value between zero and one, one being the best of the set and zero the worst, so the higher the score, the higher the financial strength.

Single Stocks



By plotting the value score against the aggregated bubble score, we can divide the stocks into four quadrants*:

1. [Quadrant 1](#): Stocks with a strong positive bubble score and a strong value score (e.g. Macy's Inc);
2. [Quadrant 2](#): Stocks with a strong positive bubble score and a weak value score (e.g. Harris Corp);
3. [Quadrant 3](#): Stocks with a strong negative bubble score and a weak value score (e.g. CBS Corp);
4. [Quadrant 4](#): Stocks with strong negative bubble score and a strong financial strength (e.g. NetEase Inc)

*A strong positive bubble signal is identified if bubble score is larger than 10%, and a strong negative bubble signal is identified if bubble score is smaller than -10%.
A strong value score is identified if value score is larger than 60%, and a weak value score is identified if value score is smaller than 40%.

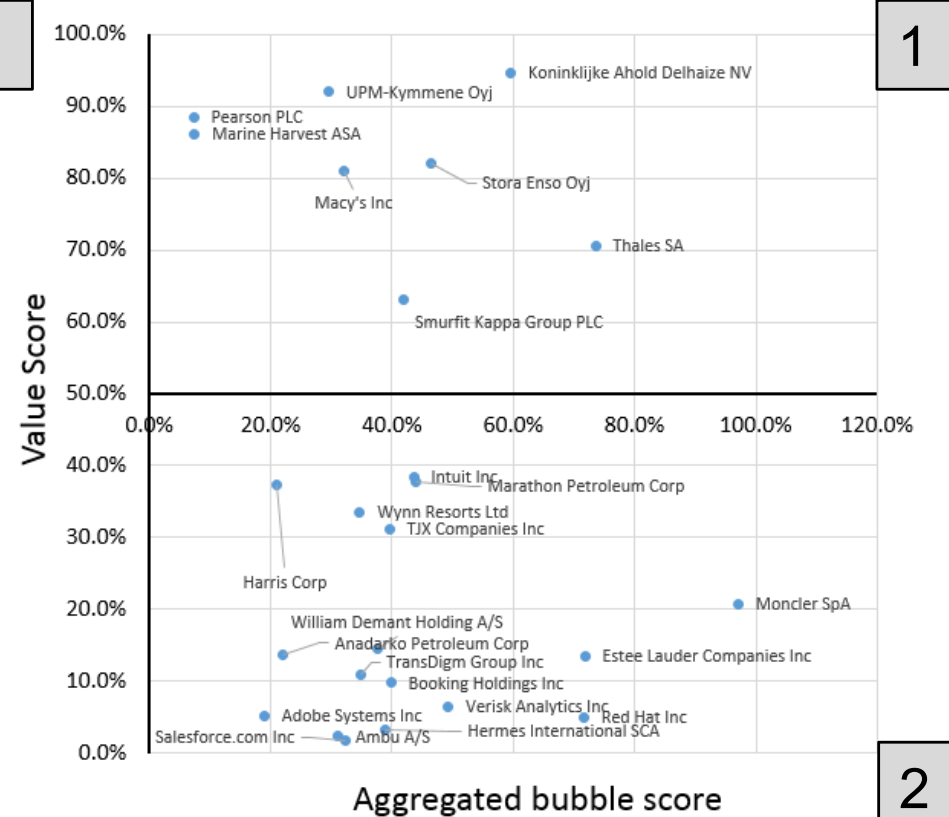
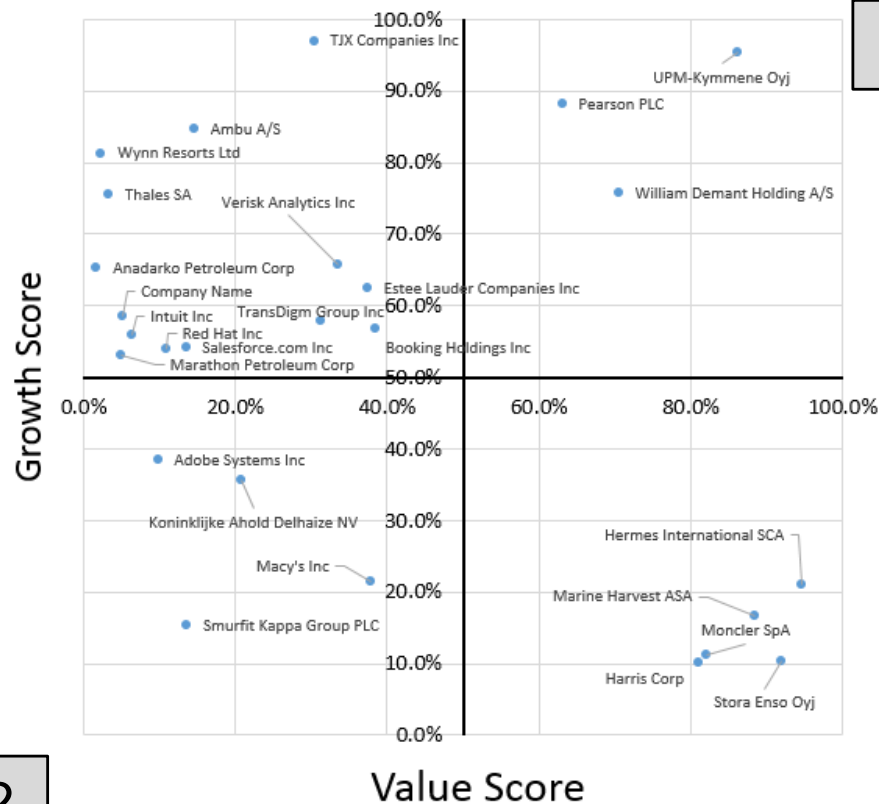
Each quadrant has its own specs:

1. Quadrant 1: Stocks with a strong value score are cheap relative to their earnings potential. The strong positive bubble signal should be interpreted as a momentum indicator possibly the consequence of a repricing based on the fundamentals. *As an investor, one could be a trend-following buyer.*
2. Quadrant 2: Stocks with a weak value score are expensive relative to their earnings potential. The strong positive bubble signal is an indication of sentiment and herding increasing the price until it is not linked to fundamentals anymore. *As an investor, one could be a contrarian seller.*
3. Quadrant 3: These stocks are expensive relative to their earnings potential. On top of that, there are clear negative bubble signals. Such stocks should be considered as falling knives. *As an investor, one could be a trend-following seller.*
4. Quadrant 4: These stocks are cheap relative to their financial performance. The strong negative bubble signal is an indication of sentiment and herding. These stocks can be considered as over-sold. *As an investor, one could be a contrarian buyer.*

Single Stocks

Quadrant 1 and 2 stocks

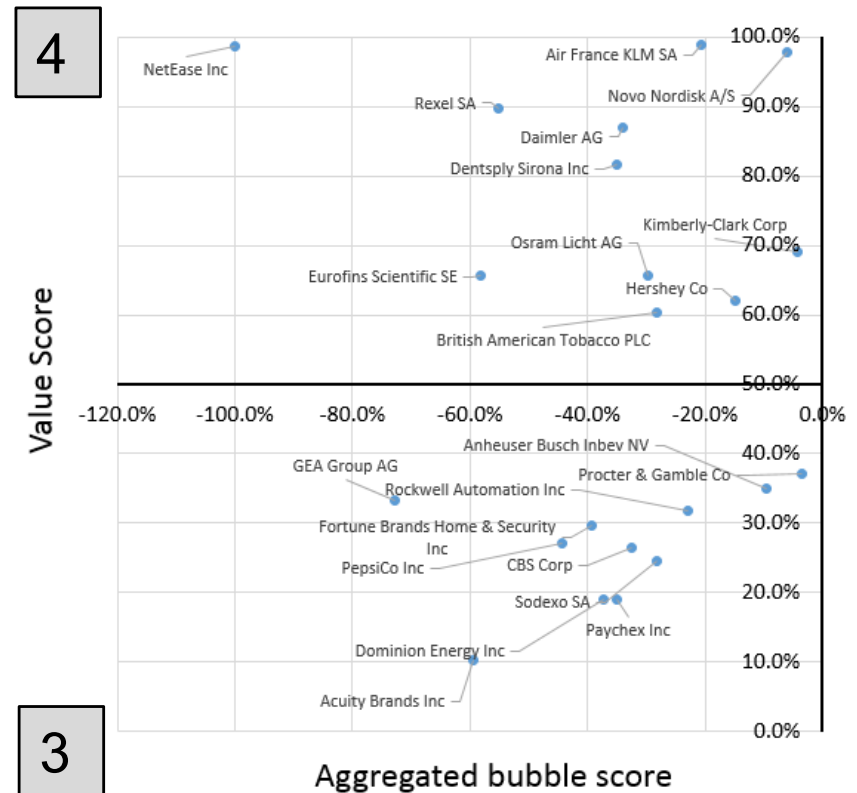
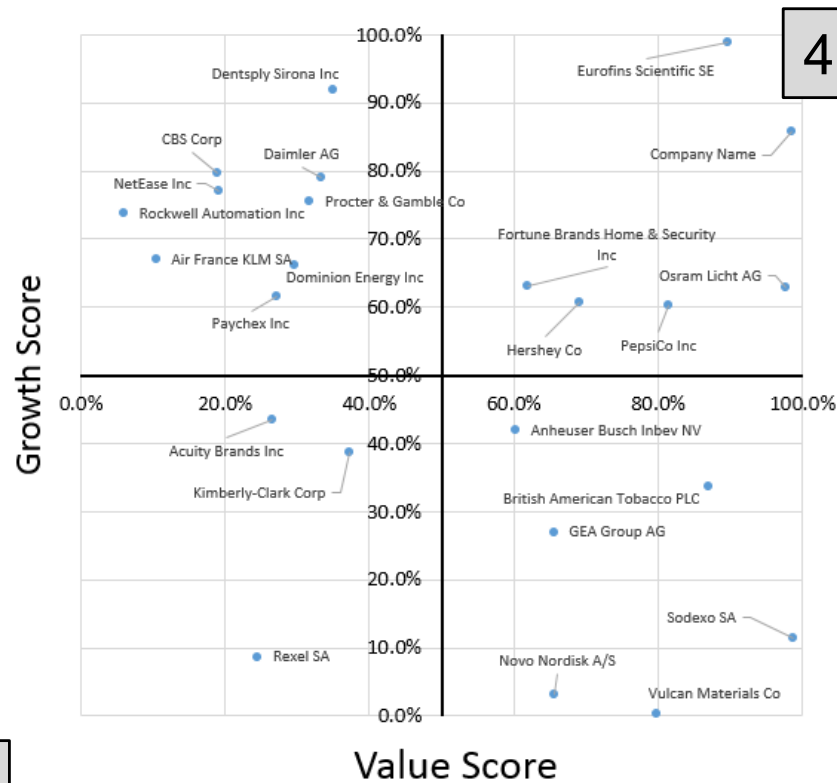
Strong positive bubble signals with strong (respectively weak) fundamentals



Single Stocks

Quadrant 3 and 4 stocks

Strong negative bubble signals with weak (respectively strong) fundamentals



Single Stocks

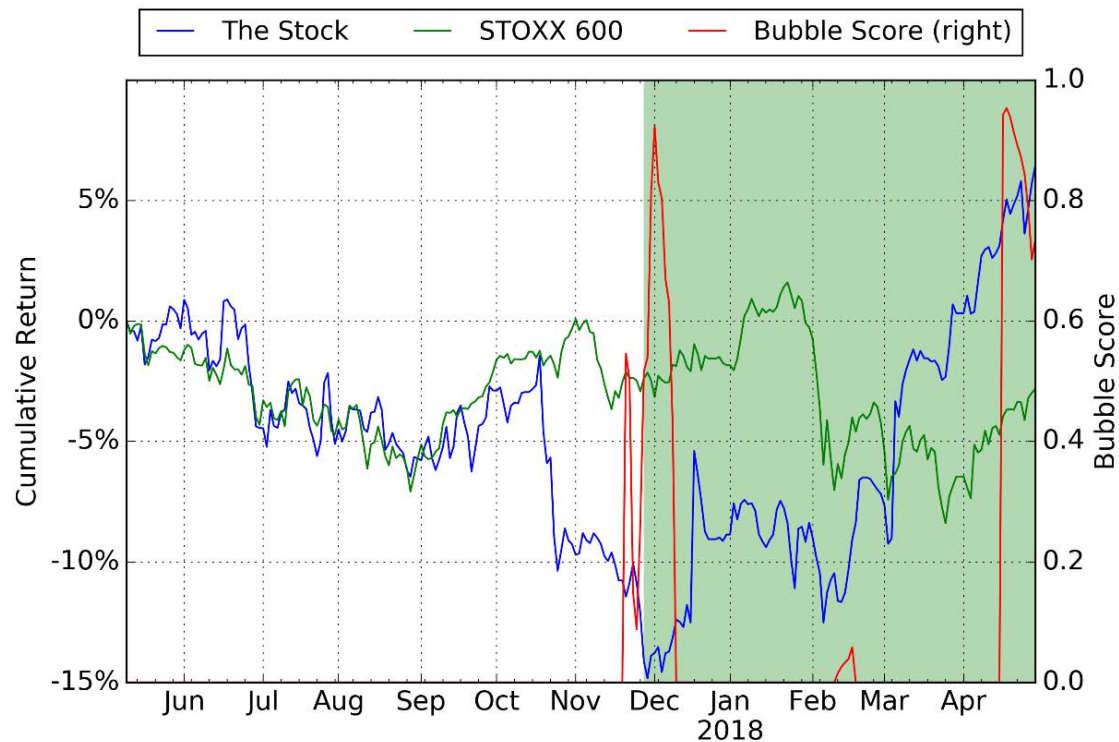
Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Thales SA	France	Capital Goods	6.9%	24.0%	Nov-17	73.5%	70.5%	75.7%
Koninklijke Ahold Delhaize NV	Netherlands	Food & Staples Retailing	0.3%	11.2%	Nov-17	59.6%	94.5%	21.1%
Stora Enso Oyj	Finland	Materials	43.9%	27.8%	Nov-17	46.3%	82.0%	11.2%
UPM-Kymmene Oyj	Finland	Materials	20.8%	26.2%	Jul-17	29.6%	91.9%	10.3%
Marine Harvest ASA	Norway	Food, Beverage & Tobacco	16.8%	26.8%	Dec-17	7.4%	86.1%	95.4%
Pearson PLC	United Kingdom	Media	19.5%	42.3%	Sep-17	7.3%	88.5%	16.7%
Smurfit Kappa Group PLC	Ireland; Republic of	Materials	37.3%	43.7%	Aug-17	41.9%	63.1%	88.1%
Macy's Inc	United States of America	Retailing	31.6%	41.9%	Jun-17	32.1%	81.0%	10.0%
Swedish Match AB	Sweden	Food, Beverage & Tobacco	33.2%	32.6%	Jun-17	9.0%	97.9%	64.3%
Telia Company AB	Sweden	Telecommunication Services	12.7%	14.9%	Oct-17	7.9%	74.2%	94.5%

Single Stocks - Quadrant 1 stocks

Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

Example: Thales SA.

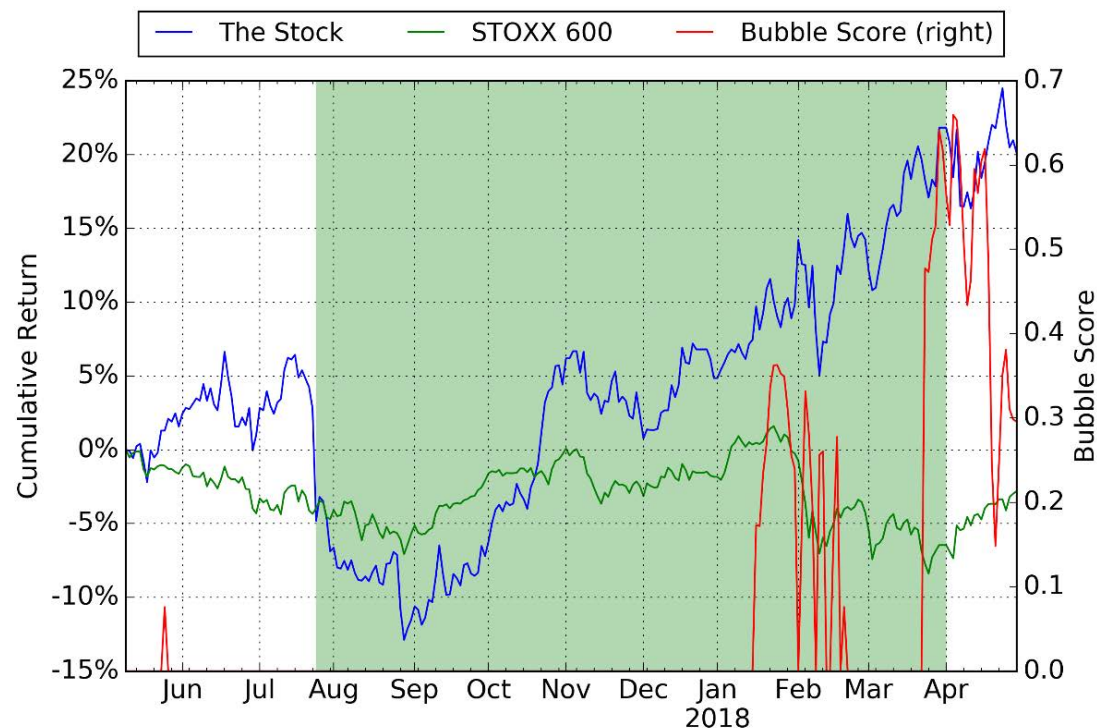


The above graph shows the one year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period is the strong positive bubble we identified. The Bubble Score of this five month bubble has reached 73.5% with a bubble size 24%.

Single Stocks - Quadrant 1 stocks

Last month example: strong positive bubble signals with strong fundamentals, UPM-Kymmene Oyj.

The figure below plots the one year cumulative return of the stock (blue), STOXX 600 (green) and LPPLS Bubble Score (red lines on the right y-axis). The green shaded period is the strong positive bubble we identified and reported last month. Note that the stock went up again after a small correction at the beginning of this month, which is in agreement with the DS LPPLS indicator, and the strong fundamentals.



Single Stocks - Quadrant 2 stocks

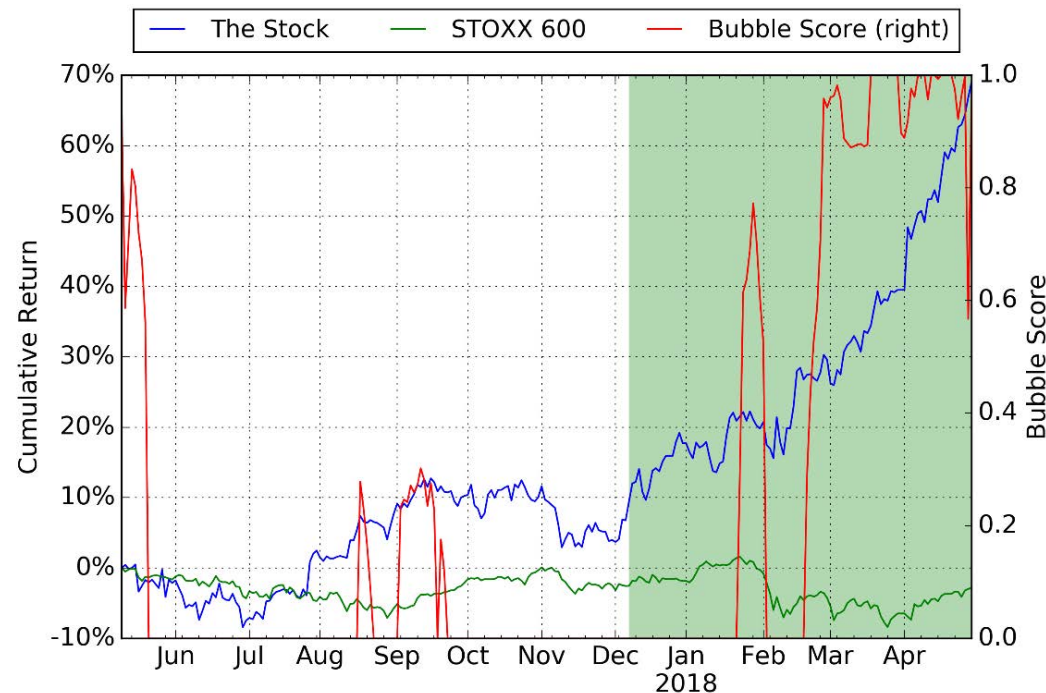
Quadrant 2 stocks: strong positive bubble signals with weak fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Adobe Systems Inc	United States of America	Software & Services	61.9%	28.7%	Oct-17	19.0%	5.2%	58.5%
Booking Holdings Inc	United States of America	Retailing	19.8%	26.5%	Nov-17	39.8%	9.8%	38.5%
Intuit Inc	United States of America	Software & Services	46.1%	20.4%	Oct-17	43.6%	38.4%	56.8%
Verisk Analytics Inc	United States of America	Commercial & Professional Services	36.3%	18.4%	Nov-17	49.3%	6.4%	55.9%
Wynn Resorts Ltd	United States of America	Consumer Services	48.6%	29.8%	Sep-17	34.7%	33.5%	65.7%
Ambu A/S	Denmark	Health Care Equipment & Services	73.2%	36.8%	Nov-17	31.1%	2.4%	81.3%
William Demant Holding A/S	Denmark	Health Care Equipment & Services	44.3%	46.9%	Aug-17	37.6%	14.6%	84.6%
Hermes International SCA	France	Consumer Durables & Apparel	20.9%	21.6%	Nov-17	38.8%	3.3%	75.6%
Moncler SpA	Italy	Consumer Durables & Apparel	69.2%	54.5%	Dec-17	97.0%	20.8%	35.7%
Anadarko Petroleum Corp	United States of America	Energy	30.4%	48.4%	Jun-17	22.0%	13.6%	15.4%
Salesforce.com Inc	United States of America	Software & Services	35.9%	26.0%	Sep-17	32.4%	1.7%	65.3%
Estee Lauder Companies Inc	United States of America	Household & Personal Products	59.4%	19.5%	Nov-17	71.8%	13.5%	54.2%
Harris Corp	United States of America	Capital Goods	45.2%	21.3%	Sep-17	21.0%	37.4%	62.5%
Marathon Petroleum Corp	United States of America	Energy	42.2%	21.8%	Nov-17	43.8%	37.8%	21.6%
Red Hat Inc	United States of America	Software & Services	84.8%	30.1%	Dec-17	71.6%	5.0%	53.0%
TransDigm Group Inc	United States of America	Capital Goods	31.8%	24.8%	Sep-17	34.9%	10.9%	54.0%
TJX Companies Inc	United States of America	Retailing	9.8%	23.1%	Jul-17	39.6%	31.2%	58.0%
Elekta AB (publ)	Sweden	Health Care Equipment & Services	5.1%	43.0%	Nov-17	17.8%	30.4%	97.0%
Swedish Orphan Biovitrum AB (publ)	Sweden	Pharmaceuticals, Biotechnology & Life Sciences	37.8%	60.5%	Nov-17	96.0%	4.3%	80.4%

Single Stocks - Quadrant 2 stocks

Quadrant 2 stocks: strong positive bubble signals with weak fundamentals

Example: Moncler SpA.

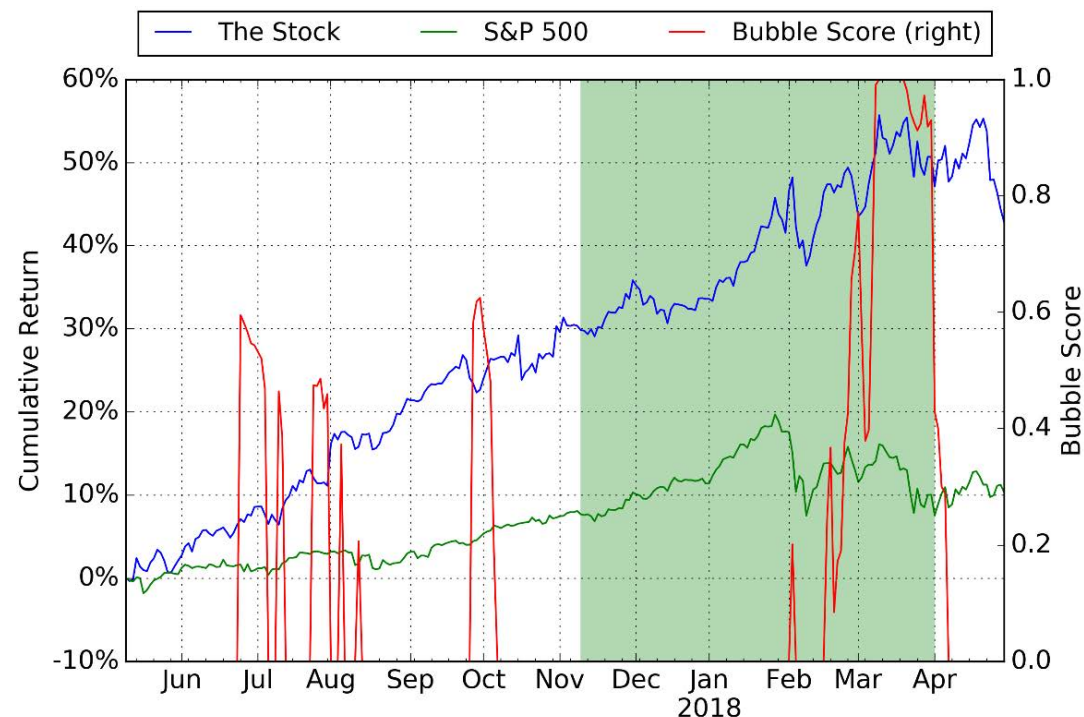


The above graph shows the one year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period is the strong positive bubble we identified. The Bubble Score of this five month bubble has reached 97% with a bubble size 54.5%. The strong positive bubble signals and weak fundamentals indicate a high probability of correction in the future.

Single Stocks - Quadrant 2 stocks

Last month example: strong positive bubble signals with weak fundamentals, Xylem Inc.

The figure below plots the one year cumulative return of the stock (blue), S&P 500 (green) and LPPLS Bubble Score (red lines on the right y-axis). The green shaded period is the strong positive bubble we identified and reported in last month. Note that the stock has started a strong correction recently, in agreement with our DS LPPLS indicator and the weak fundamentals.



Single Stocks - Quadrant 3 stocks

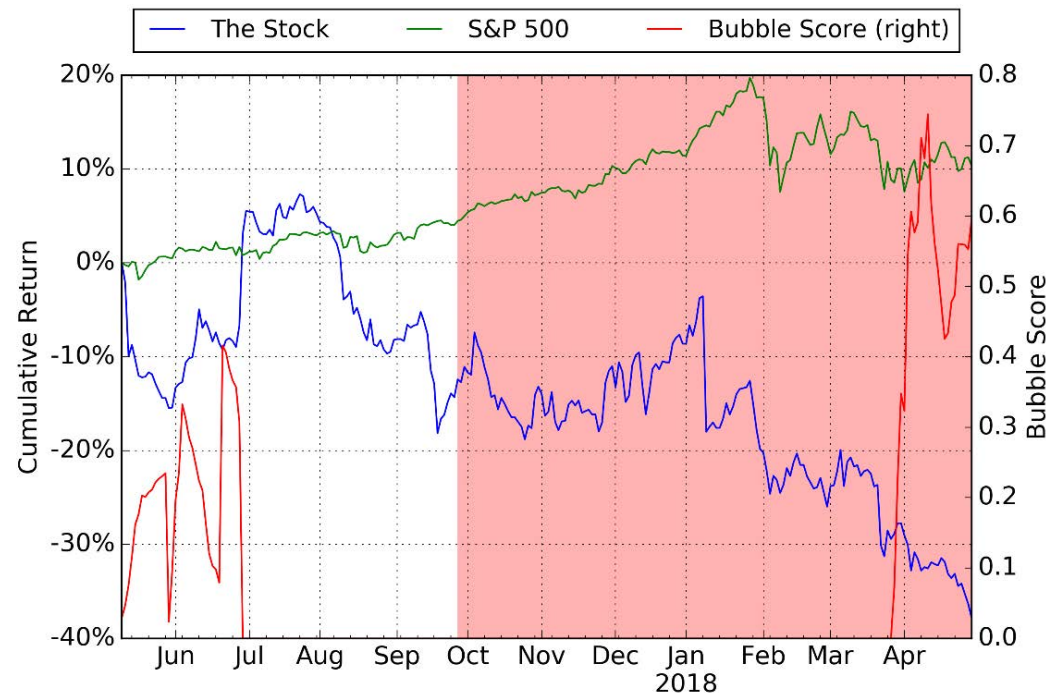
Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Paychex Inc	United States of America	Software & Services	6.0%	-10.0%	Nov-17	-35.1%	19.1%	77.1%
PepsiCo Inc	United States of America	Food, Beverage & Tobacco	-10.6%	-12.8%	Nov-17	-44.4%	27.1%	61.6%
Anheuser Busch Inbev NV	Belgium	Food, Beverage & Tobacco	-24.4%	-21.2%	Jul-17	-9.6%	34.9%	91.9%
GEA Group AG	Germany	Capital Goods	-13.1%	-20.0%	Nov-17	-72.9%	33.3%	79.1%
Sodexo SA	France	Consumer Services	-31.2%	-24.9%	Oct-17	-28.3%	24.5%	8.7%
Acuity Brands Inc	United States of America	Capital Goods	-30.9%	-29.0%	Sep-17	-59.5%	10.4%	67.0%
CBS Corp	United States of America	Media	-20.9%	-18.7%	Sep-17	-32.4%	26.5%	43.5%
Dominion Energy Inc	United States of America	Utilities	-14.6%	-15.4%	Aug-17	-37.4%	19.0%	79.8%
Fortune Brands Home & Security Inc	United States of America	Capital Goods	-12.6%	-18.4%	Oct-17	-39.2%	29.6%	66.2%
Procter & Gamble Co	United States of America	Household & Personal Products	-16.1%	-16.1%	May-17	-3.5%	37.2%	38.7%
Rockwell Automation Inc	United States of America	Capital Goods	5.7%	-14.4%	Dec-17	-23.0%	31.7%	75.5%
Vulcan Materials Co	United States of America	Materials	-12.9%	-8.3%	Aug-17	-7.7%	5.9%	73.7%

Single Stocks - Quadrant 3 stocks

Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

Example: Acuity Brands Inc.

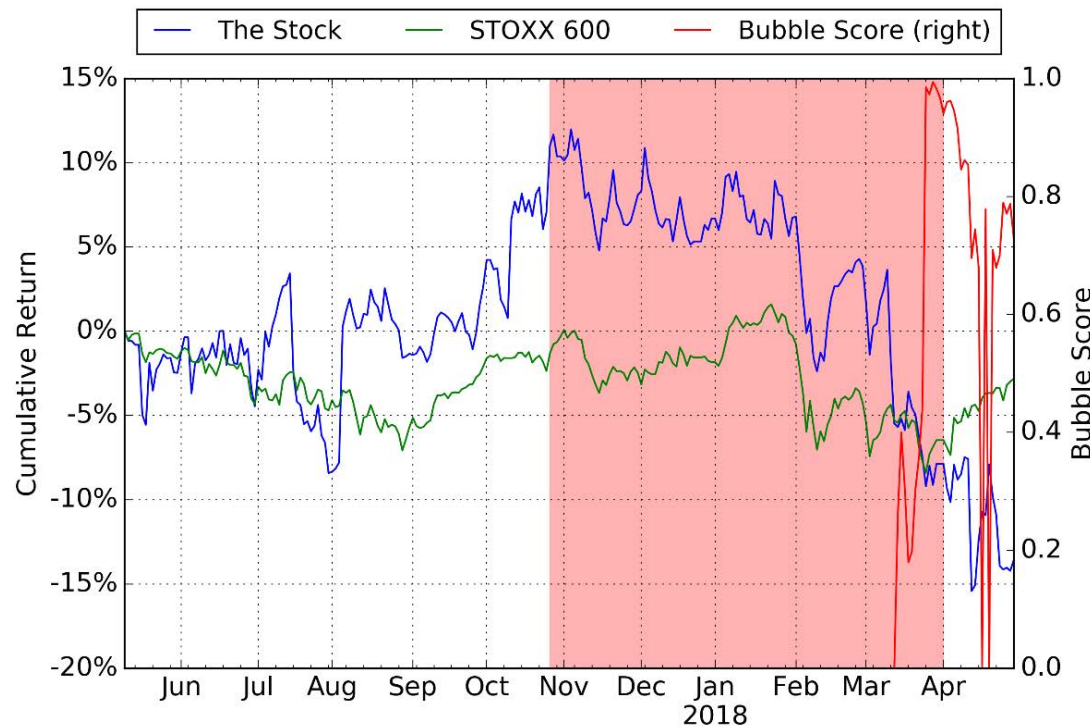


The above graph shows the one year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period is the strong negative bubble we identified. The Bubble Score of this seven month bubble has reached 59.5% with a bubble size -29%.

Single Stocks - Quadrant 3 stocks

Last month example: strong negative bubble signals with weak fundamentals, GEA Group AG.

The figure below plots the one year cumulative return of the stock (blue), STOXX 600 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period is the strong negative bubble we identified and reported in last month. Note that the stock has shown recently an increase in volatility with further losses, which is in agreement with our DS LPPLS indicator with the weak fundamentals. One should remain cautious as this stock is still identified with strong negative bubble signals this month.



Single Stocks - Quadrant 4 stocks

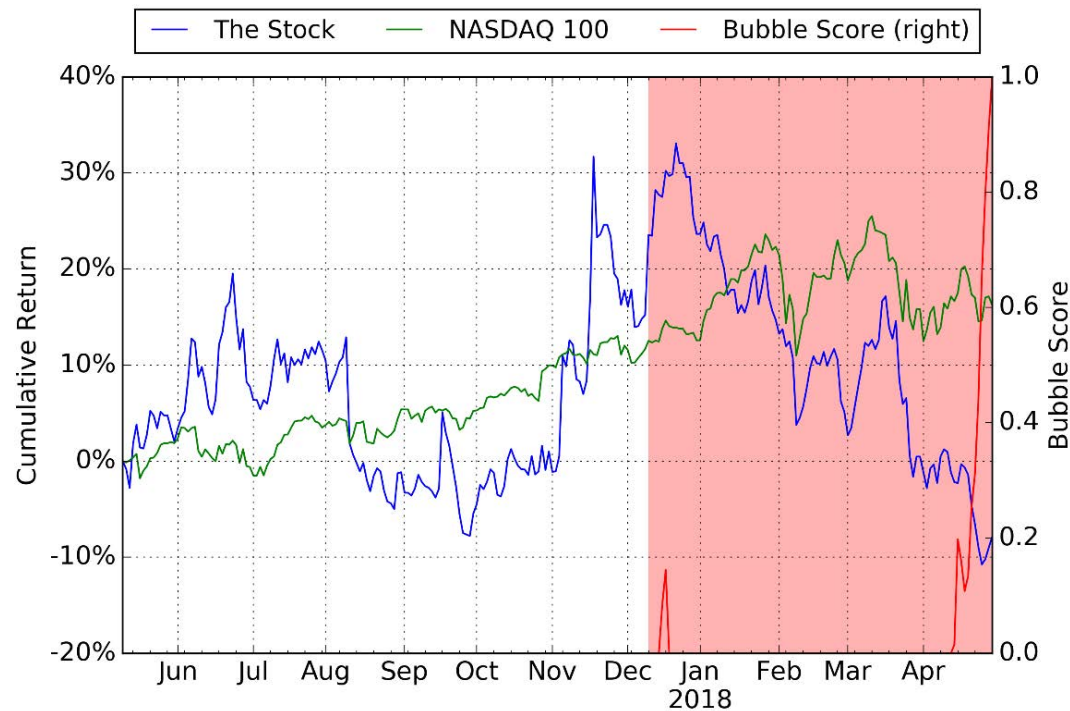
Quadrant 4 stocks: strong negative bubble signals with strong fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
NetEase Inc	China	Software & Services	-5.2%	-25.4%	Dec-17	-100.0%	98.6%	85.9%
Dentsply Sirona Inc	United States of America	Health Care Equipment & Services	-18.3%	-24.4%	Nov-17	-35.0%	81.5%	60.3%
British American Tobacco PLC	United Kingdom	Food, Beverage & Tobacco	-26.1%	-28.5%	May-17	-28.3%	60.2%	41.9%
Daimler AG	Germany	Automobiles & Components	-5.2%	-7.9%	Oct-17	-34.1%	87.0%	33.6%
Osram Licht AG	Germany	Capital Goods	-30.0%	-31.5%	Jun-17	-29.7%	65.6%	27.0%
Novo Nordisk A/S	Denmark	Pharmaceuticals, Biotechnology & Life Sciences	6.1%	-10.4%	Nov-17	-6.1%	97.8%	62.8%
Eurofins Scientific SE	Luxembourg	Pharmaceuticals, Biotechnology & Life Sciences	-2.9%	-12.0%	Dec-17	-58.1%	65.7%	3.2%
Rexel SA	France	Capital Goods	-17.3%	-14.7%	Oct-17	-55.2%	89.6%	98.9%
Air France KLM SA	France	Transportation	-11.6%	-35.1%	Nov-17	-20.7%	98.8%	11.5%
Hershey Co	United States of America	Food, Beverage & Tobacco	-14.1%	-16.2%	Sep-17	-14.9%	62.0%	63.1%
Kimberly-Clark Corp	United States of America	Household & Personal Products	-19.1%	-19.1%	May-17	-4.2%	69.0%	60.7%
Getinge AB	Sweden	Health Care Equipment & Services	-44.0%	-39.5%	Oct-17	-57.8%	79.8%	0.4%
John Wood Group PLC	United Kingdom	Energy	-24.8%	-19.1%	Nov-17	-45.4%	92.3%	95.7%

Single Stocks - Quadrant 4 stocks

Quadrant 4 stocks: strong negative bubble signals with strong fundamentals

Example NetEase Inc.

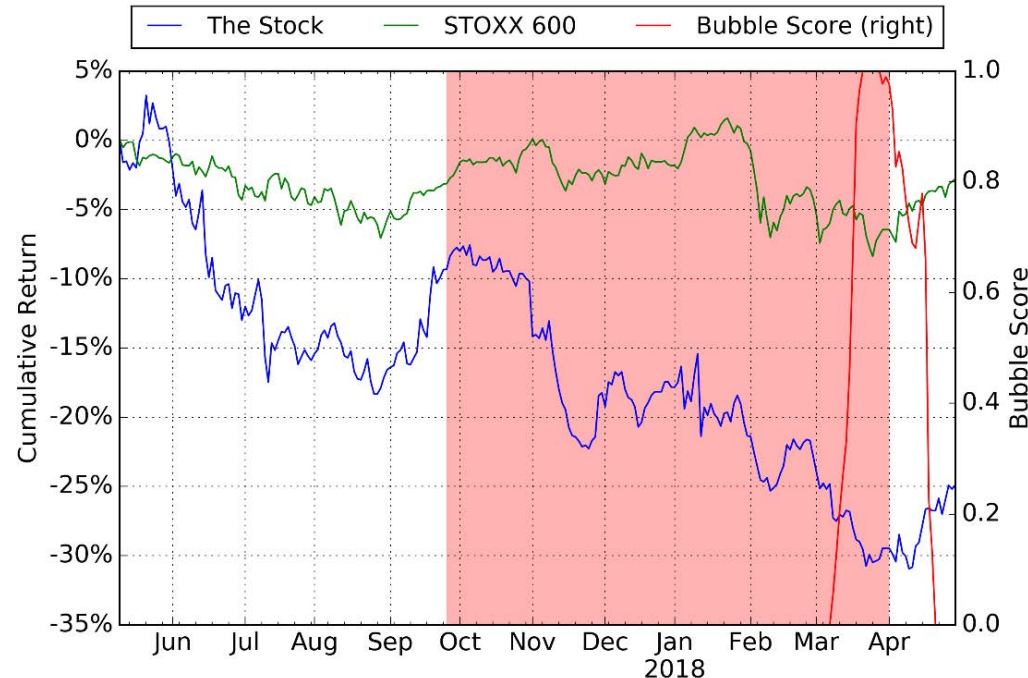


The above graph shows the one year cumulative return of the stock in blue (left hand scale), NASDAQ 100 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period is the strong negative bubble we identified. The Bubble Score of this five month bubble has reached 100% with a bubble size -25.4%. We expect a rebound in the future, which is due to our diagnostic of a negative bubble signal with strong fundamentals, calling for a contrarian buyer position.

Single Stocks - Quadrant 4 stocks

Last month example: strong negative bubble signals with strong fundamentals, Marks and Spencer Group PLC.

The figure below plots the one year cumulative return of the stock (blue), STOXX 600 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period is the strong negative bubble we identified and reported in last month. The stock started a rebound in the past month, which is in agreement with our DS LPPLS indicator together with the strong fundamentals. We expect this stock to further appreciate in the future due to the strong fundamentals and following its neglect by investors in previous months.



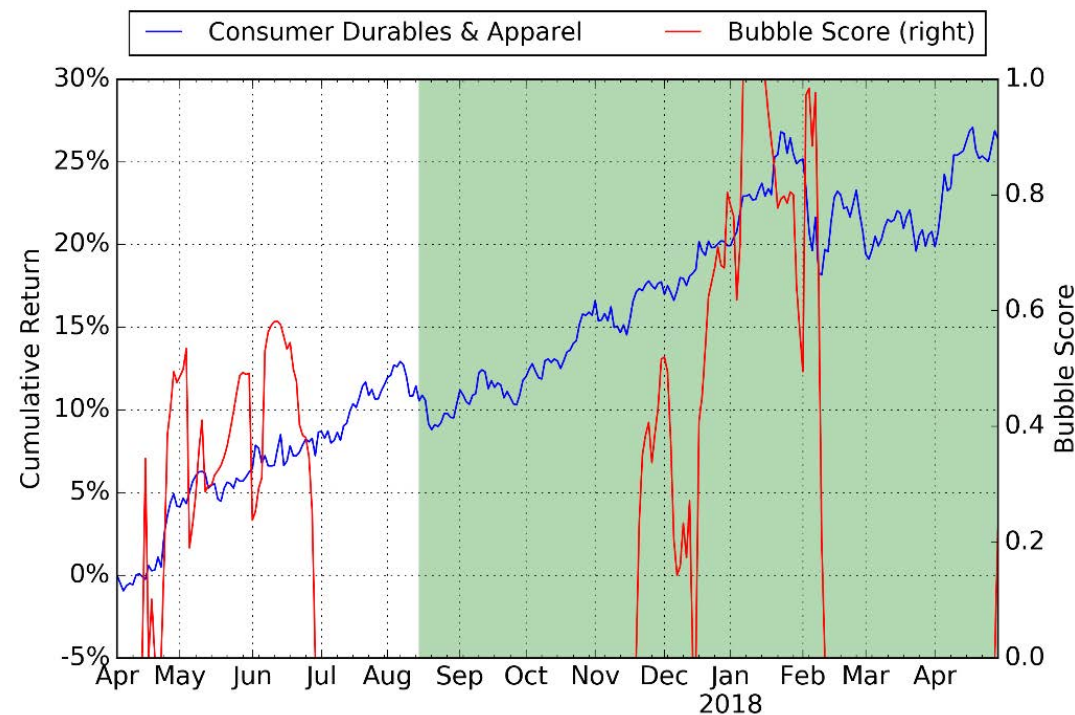
Sectors

GICS Industry Group Name	Yearly Return		Bubble Size		Bubble Score		Value Score		Growth Score	
	May 1st	Apr 1st	May 1st	Apr 1st	May 1st	Apr 1st	May 1st	Apr 1st	May 1st	Apr 1st
Pharmaceuticals, Biotechnology & Life Sciences	0.1%	3.7%	0.0%	0.0%	0.0%	0.0%	62.9%	63.2%	57.1%	57.1%
Consumer Services	13.2%	17.9%	0.0%	0.0%	0.0%	0.0%	28.8%	28.4%	49.0%	48.4%
Retailing	27.9%	28.6%	0.0%	0.0%	0.0%	0.0%	18.0%	18.6%	57.5%	54.6%
Transportation	14.0%	14.8%	0.0%	0.0%	0.0%	0.0%	56.8%	57.2%	56.1%	56.8%
Consumer Durables & Apparel	20.1%	20.5%	14.3%	0.0%	21.8%	0.0%	37.3%	40.7%	54.0%	52.0%
Semiconductors & Semiconductor Equipment	24.4%	39.6%	0.0%	0.0%	0.0%	0.0%	67.3%	66.0%	28.6%	29.7%
Technology Hardware & Equipment	12.2%	20.9%	0.0%	0.0%	0.0%	0.0%	71.7%	68.2%	39.2%	39.5%
Automobiles & Components	14.6%	19.5%	0.0%	0.0%	0.0%	0.0%	77.8%	77.8%	51.2%	51.2%
Telecommunication Services	-2.2%	-3.9%	0.0%	0.0%	0.0%	0.0%	53.9%	54.2%	38.3%	37.9%
Energy	12.7%	0.2%	0.0%	0.0%	0.0%	0.0%	50.0%	50.4%	52.8%	52.4%
Software & Services	22.6%	28.2%	0.0%	0.0%	0.0%	0.0%	36.7%	37.4%	47.5%	47.0%
Materials	14.6%	12.7%	0.0%	0.0%	0.0%	0.0%	50.7%	50.6%	46.5%	46.3%
Health Care Equipment & Services	16.9%	16.8%	0.0%	0.0%	0.0%	0.0%	62.6%	61.5%	59.6%	59.2%
Capital Goods	8.1%	13.9%	0.0%	0.0%	0.0%	0.0%	46.9%	45.1%	53.7%	54.4%
Media	-7.9%	-7.5%	0.0%	0.0%	0.0%	0.0%	41.9%	40.6%	53.6%	55.3%
Commercial & Professional Services	6.9%	10.1%	0.0%	0.0%	0.0%	0.0%	28.3%	27.0%	52.0%	52.1%
Food & Staples Retailing	3.5%	1.7%	0.0%	0.0%	0.0%	0.0%	57.7%	57.6%	60.0%	60.0%
Household & Personal Products	-1.3%	3.6%	0.0%	0.0%	0.0%	0.0%	36.3%	36.4%	50.6%	51.0%
Food, Beverage & Tobacco	-6.5%	-1.1%	0.0%	0.0%	0.0%	0.0%	42.6%	42.8%	59.3%	59.3%
Utilities	2.7%	1.2%	0.0%	0.0%	0.0%	0.0%	52.4%	52.4%	43.0%	43.2%
Insurance	12.2%	13.1%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Real Estate	3.0%	0.9%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Diversified Financials	17.0%	19.8%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Banks	10.2%	13.1%	0.0%	0.0%	0.0%	0.0%	-	-	-	-

Sectors

Since Dec 2017, we are using the MSCI World Industry Group Indices to calculate bubble size and bubble score of the corresponding sectors. To determine the value scores and growth scores of the sectors, we average over the corresponding values for each stock of a given sector, weighted by market cap.

This month, we find only 1 industry group with positive bubble score: Consumer Durables & Apparel, as shown in the figure below.



Here we illustrate the methodology of the portfolio construction process based on the results of our previous analyses.

For individual stocks that we identified in the 4 quadrants, we constructed 4 portfolios based on the 4 quadrants defined in the last report. Each portfolio consists of all the stocks listed in the corresponding quadrant.

(1)Trend-Following Long Stock Portfolio (TFLSP) is made of the stocks that have a **positive** bubble signal as well as a **strong** value score. For instance, TFLSP November consists of all the stocks listed in quadrant 1, identified in slide 37 of November 2017 FCO Report.

(2)Trend-Following Short Stock Portfolio (TFSSP) is made of the stocks that have a **negative** bubble signal as well as a **weak** value score.

(3)Contrarian Long Stock Portfolio (CLSP) is made of the stocks that have a **negative** bubble signal as well as a **strong** value score.

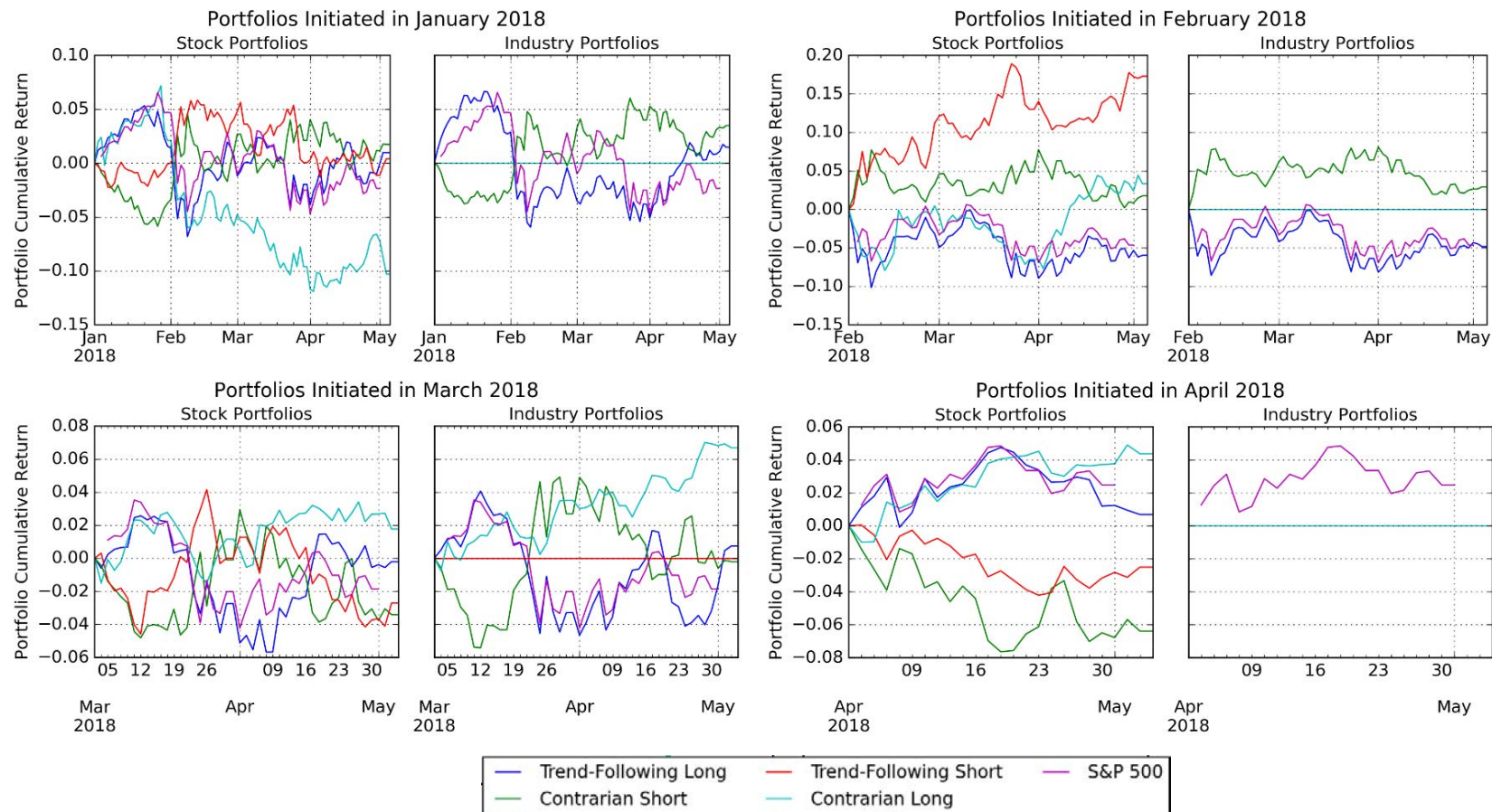
(4)and Contrarian Short Stock Portfolio (CSSP) is made of the stocks that have a **positive** bubble signal as well as a **weak** value score.

At the same time, we also classified 20 industries into 4 quadrants, and constructed 4 type of industry portfolios based on the 4 industry quadrants. Each portfolio consists of all the stocks in the industries listed in the corresponding quadrant. Following the same definitions as above, we have Trend-Following Long Industry Portfolio (TFLIP), Trend-Following Short Industry Portfolio (TFSIP), Contrarian Long Industry Portfolio (CLIP), and Contrarian Short Industry Portfolio (CSIP).

In each month, we initiated 8 new portfolios based on the updated results. The performance of every 8 portfolios we initiated since November 2017 are presented in the next slide. All of the stocks in our portfolios are weighted by their market capitalizations and we don't consider transaction cost in the portfolio performance.

Since we started to use a new version of bubble signals and algorithm in November 2017, we only present the portfolios we initiated in November 2017 and later.

Portfolio Construction & Performance



This month, we find that Portfolios initiated in January, February, March and April 2018 are highly volatile, due to the increased market volatilities after the major corrections in February. Contrarian Portfolios are more delicate to use due to their sensitivity to timing the expected reversal and exhibit very volatile performances, indicating that most of bubbles in the market are still dominating and that fundamentals have not yet played out. We expect trend-following positions to perform in the months following the position set-up and then contrarian positions to over-perform over longer time scales as the predicted corrections play out.

Visit the Financial Crisis Observatory for more information

<http://www.er.ethz.ch/financial-crisis-observatory.html>