

# 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.

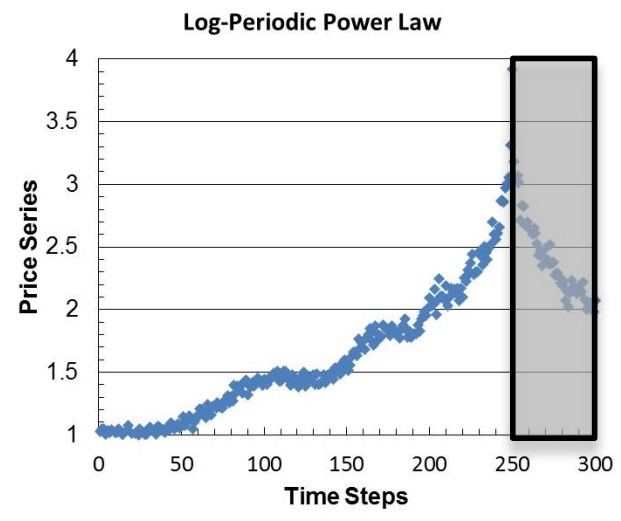
In the first part of this report, we present the state of the world, based on the analysis of the systemic assets. In the second part, we zoom in on the bubble behavior of single stocks and discuss some specific cases.

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>

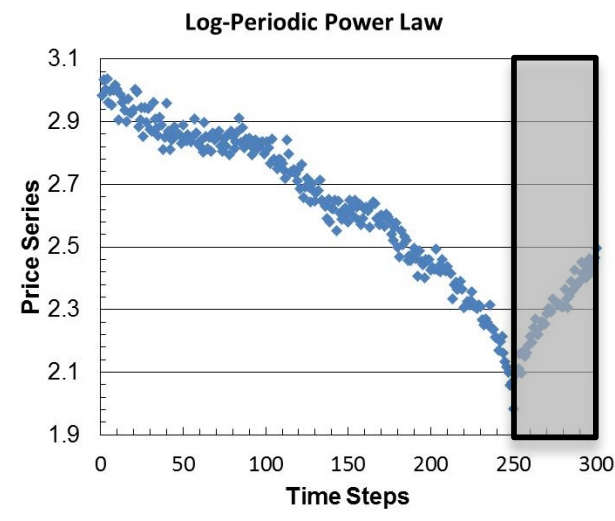
We use the Log-Periodic Power Law Singularity (LPPLS) model to hunt for the distinct fingerprint of **Bubbles**:

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.



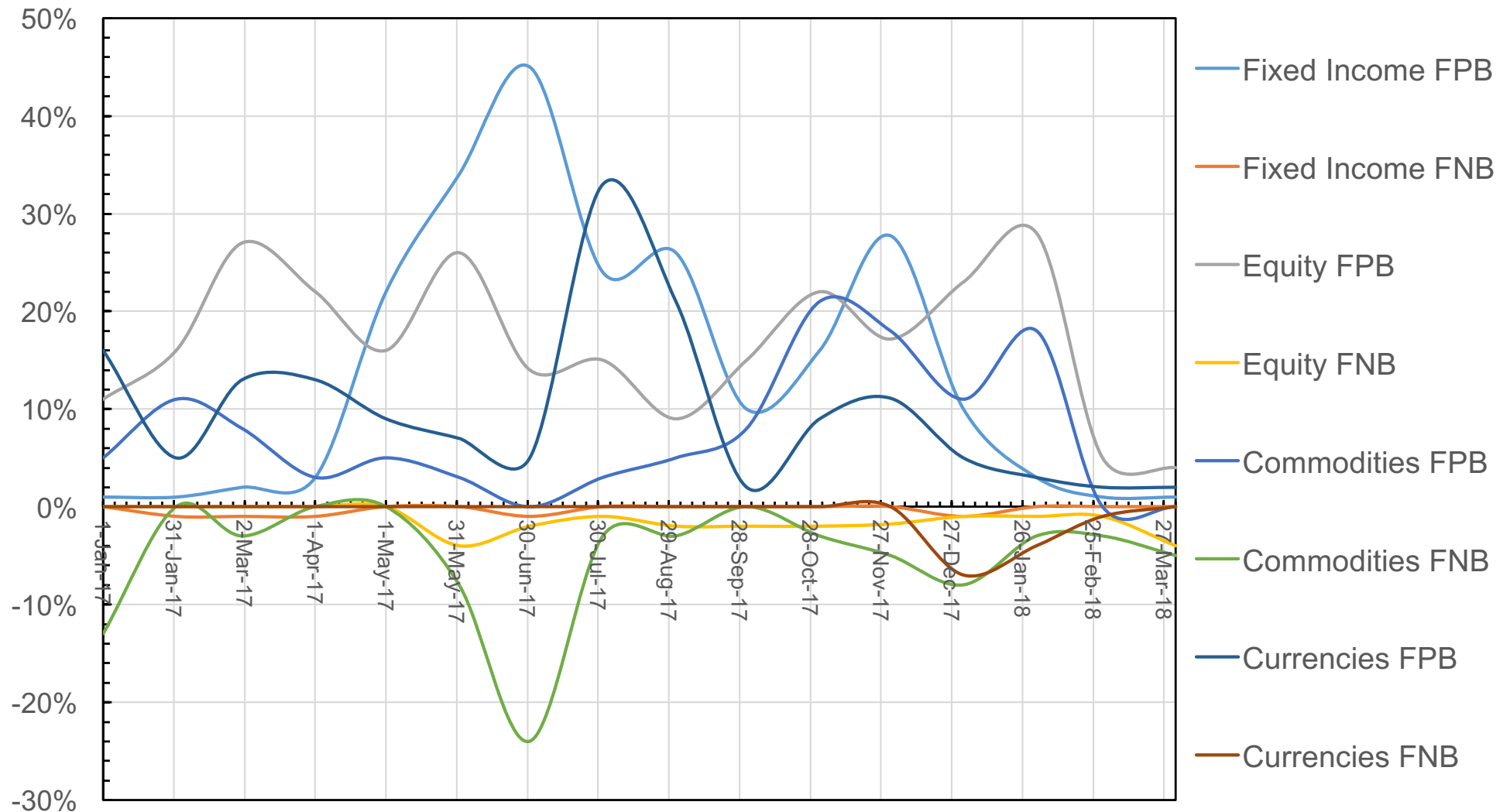
Positive bubble: imitation in buying



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



# General Results – This Month's Overview

Asset Class	Category	Analyzed Assets	FPB	FNB
<b>Fixed Income</b>		<b>155</b>	<b>1</b>	<b>0</b>
	Government Bonds	55	4	0
	Finance and Insurance	21	0	0
	Corporate Bonds	79	0	0
<b>Equity</b>		<b>169</b>	<b>4</b>	<b>4</b>
	Country Indices	73	5	1
	Europe	36	0	6
	United States	60	3	5
<b>Commodities</b>		<b>38</b>	<b>0</b>	<b>5</b>
<b>Forex</b>		<b>108</b>	<b>2</b>	<b>0</b>

FPB – Fraction of assets in asset class showing positive bubble signals, Unit: %

FNB – Fraction of assets in asset class showing negative bubble signals, Unit: %

This month, overall, we report a continuation of last month's trend, namely a fairly low level of bubble activity amongst all analyzed asset classes.

In the fixed income sector, again, we only observe positive bubble signals in few government bond indices.

Negative bubble activity amongst the equity indices has increased while positive activity remains at the same level.

In both the commodities as well as the currency asset classes, we measure close to zero bubble activity.

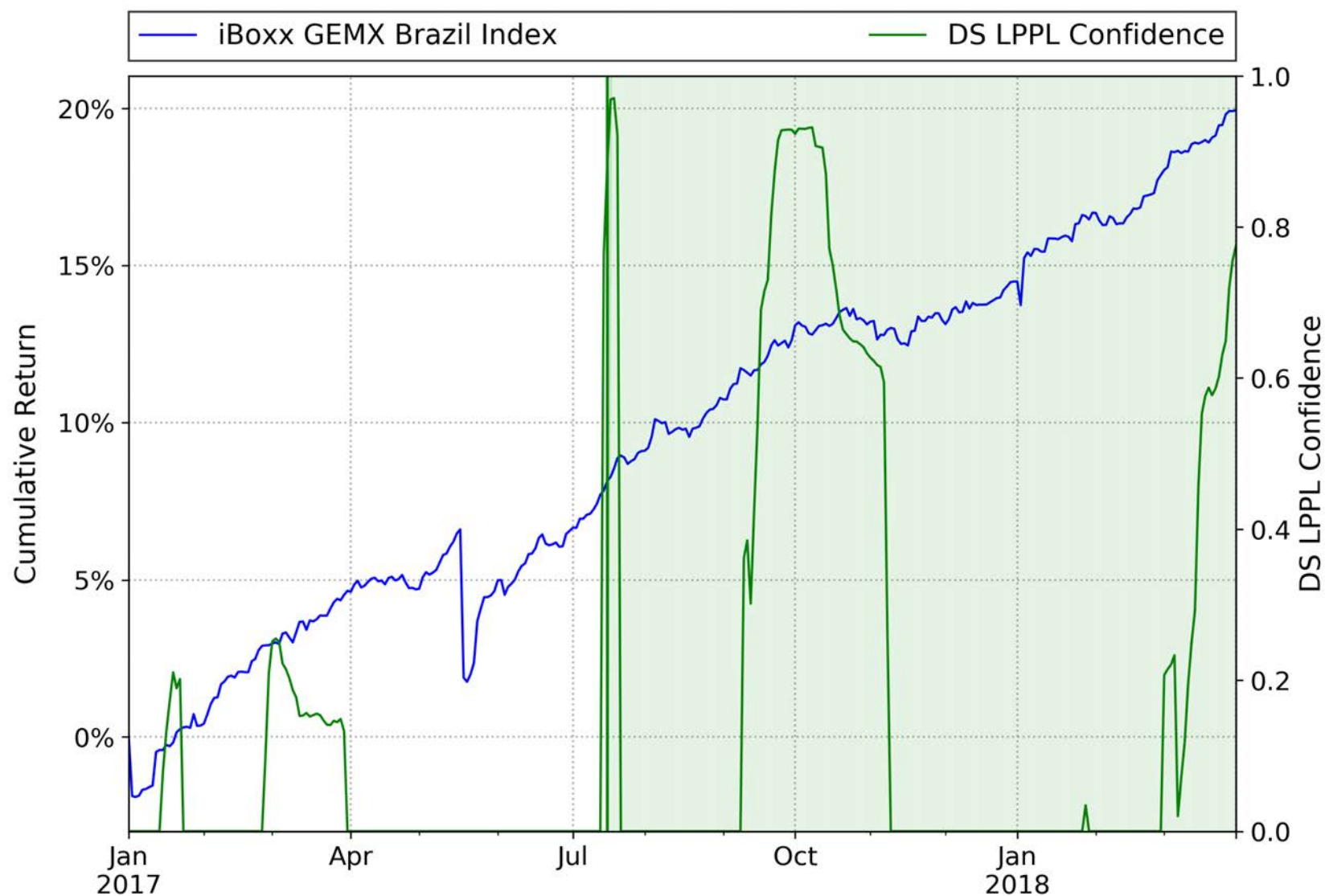
# Fixed Income - Government Bonds

Name	Bubble Size [%]	DS LPPL Confidence [%]	Geometric Average [%]
<b>Positive Bubbles</b>			
iBoxx GEMX Brazil Index	11	84	30
iBoxx GEMX South Africa Index	11	33	19
<b>Negative Bubbles</b>			
-	-	-	-

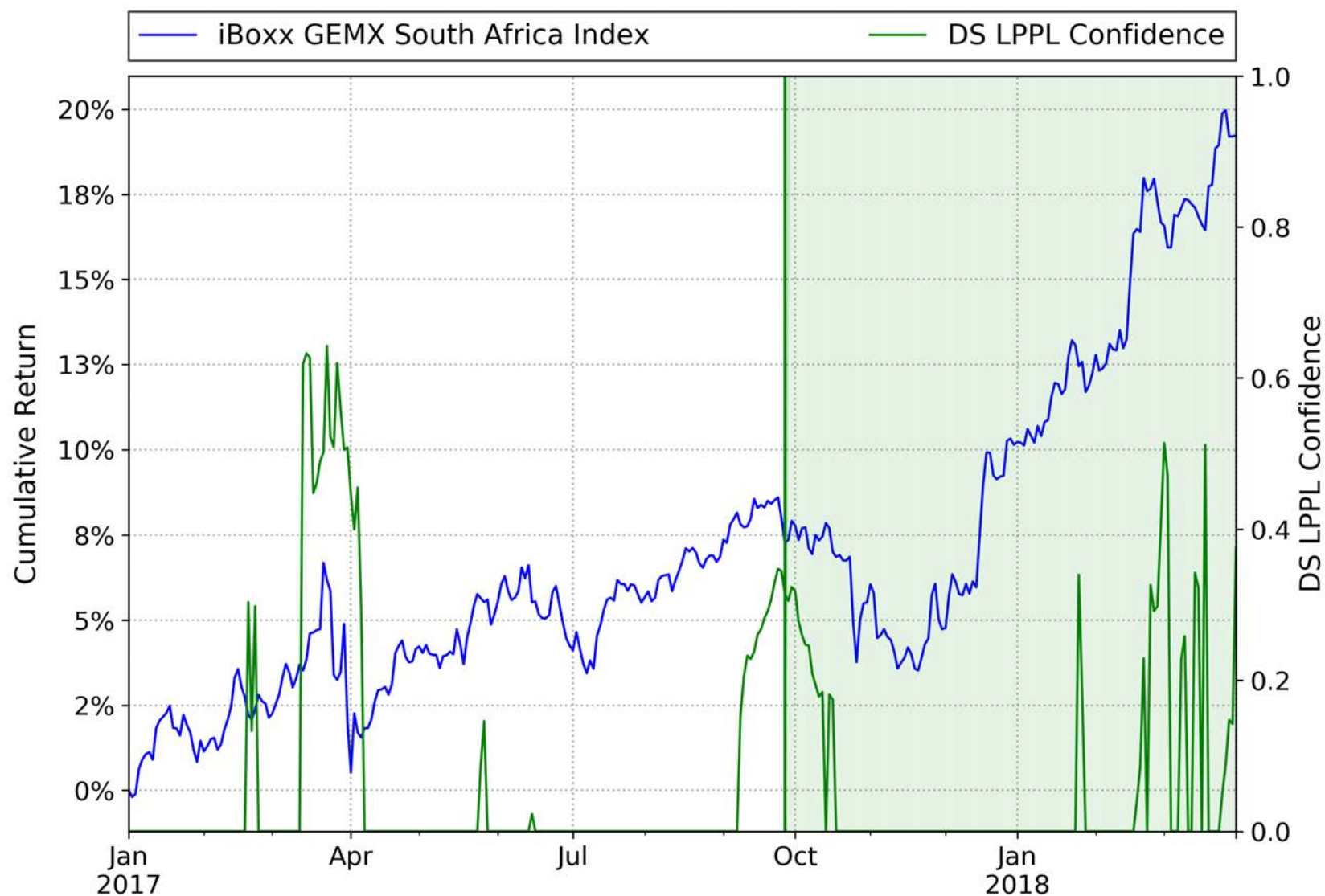
The only fixed income asset class exhibiting bubble activity this month is the government bond sector. Amongst the analyzed indices, we identify two that show positive bubble price dynamics.

Positive bubble signals are detected on the GEMX Brazil index. It has continuously grown by more than 15% within less than one year. At currently 11%, the positive bubble size has not reached a critically large value yet.

At the beginning of March, we already listed the South African Index as a positive bubble asset. It appears once again in our warning list of this month. The reported indicator value is at 33% (52% before) while the calculated bubble size is slightly lower at 13% (compared to 11% before).







# Equities - Country Performance

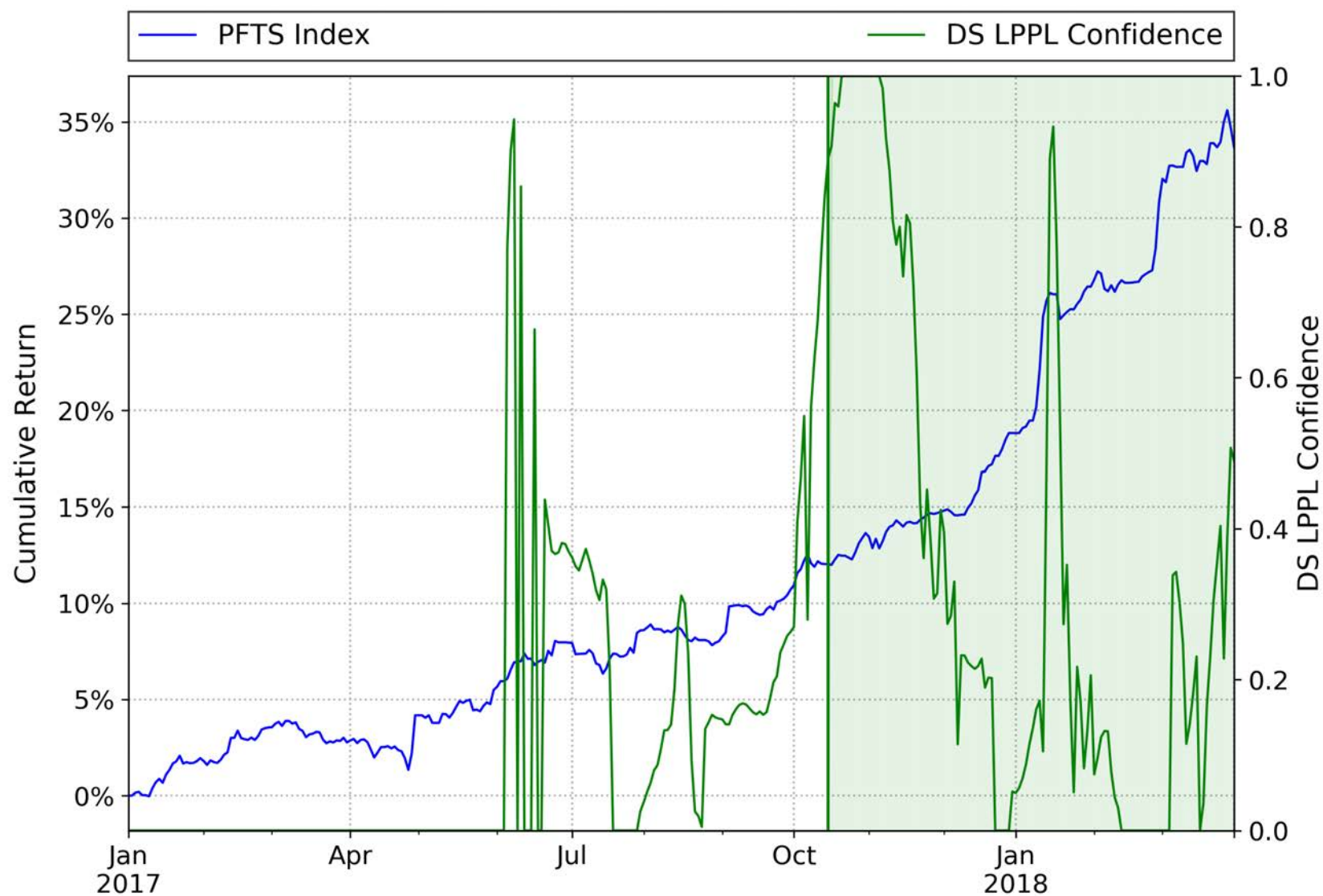
Name	Bubble Size [%]	DS LPPL Confidence [%]	Geometric Average [%]
<b>Positive Bubbles</b>			
Bursatil Index	4464	31	370
PFTS Index	22	50	33
EGX 30 Index	32	19	25
PX Prague SE Index	13	13	13
<b>Negative Bubbles</b>			
Dubai Financial Market General Index	-15	33	22

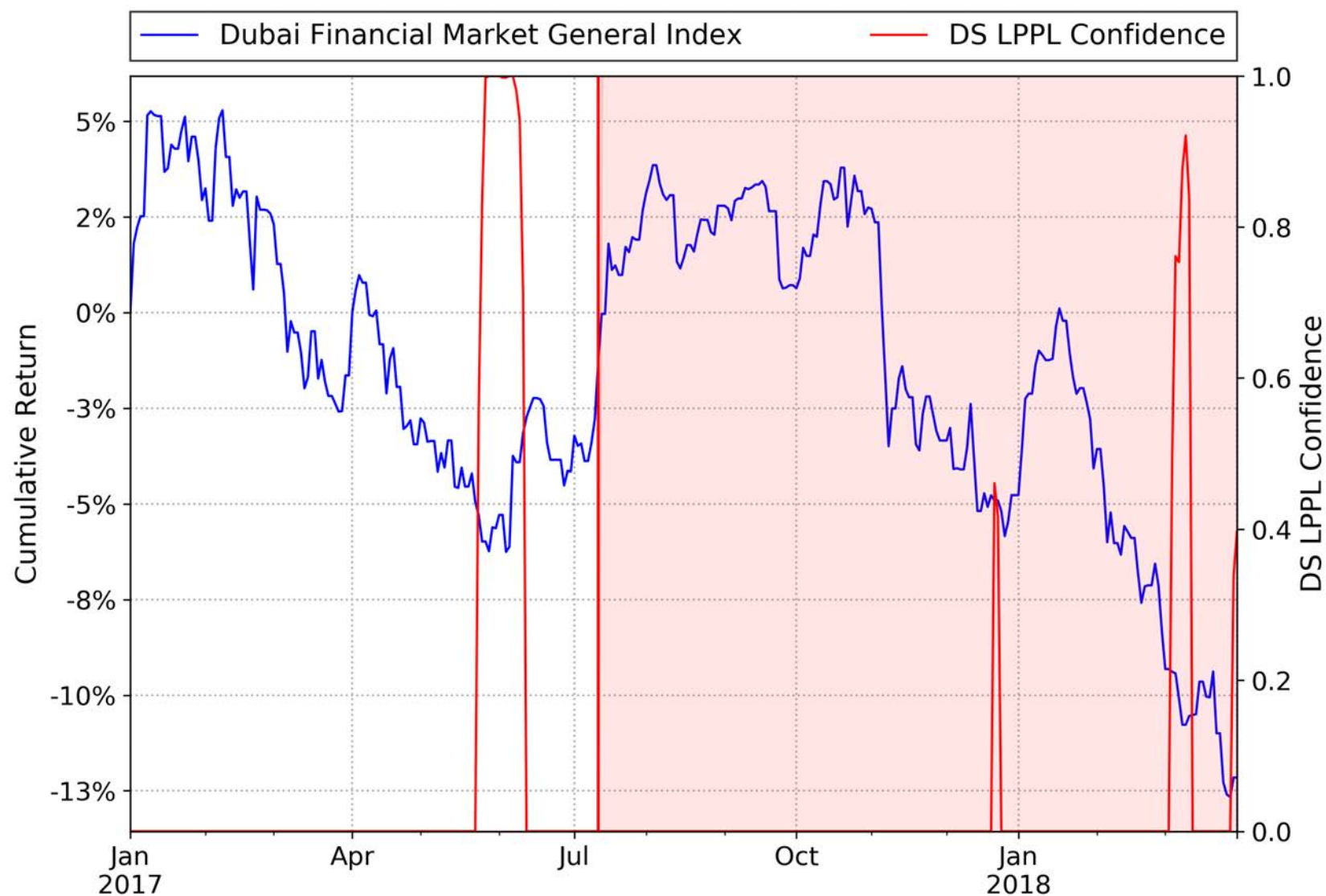
This month, as seen before, the Index exhibiting strongest bubble activity is the Venezuelan Bursatil Index, which is however more associated with a galloping inflation than exuberance.

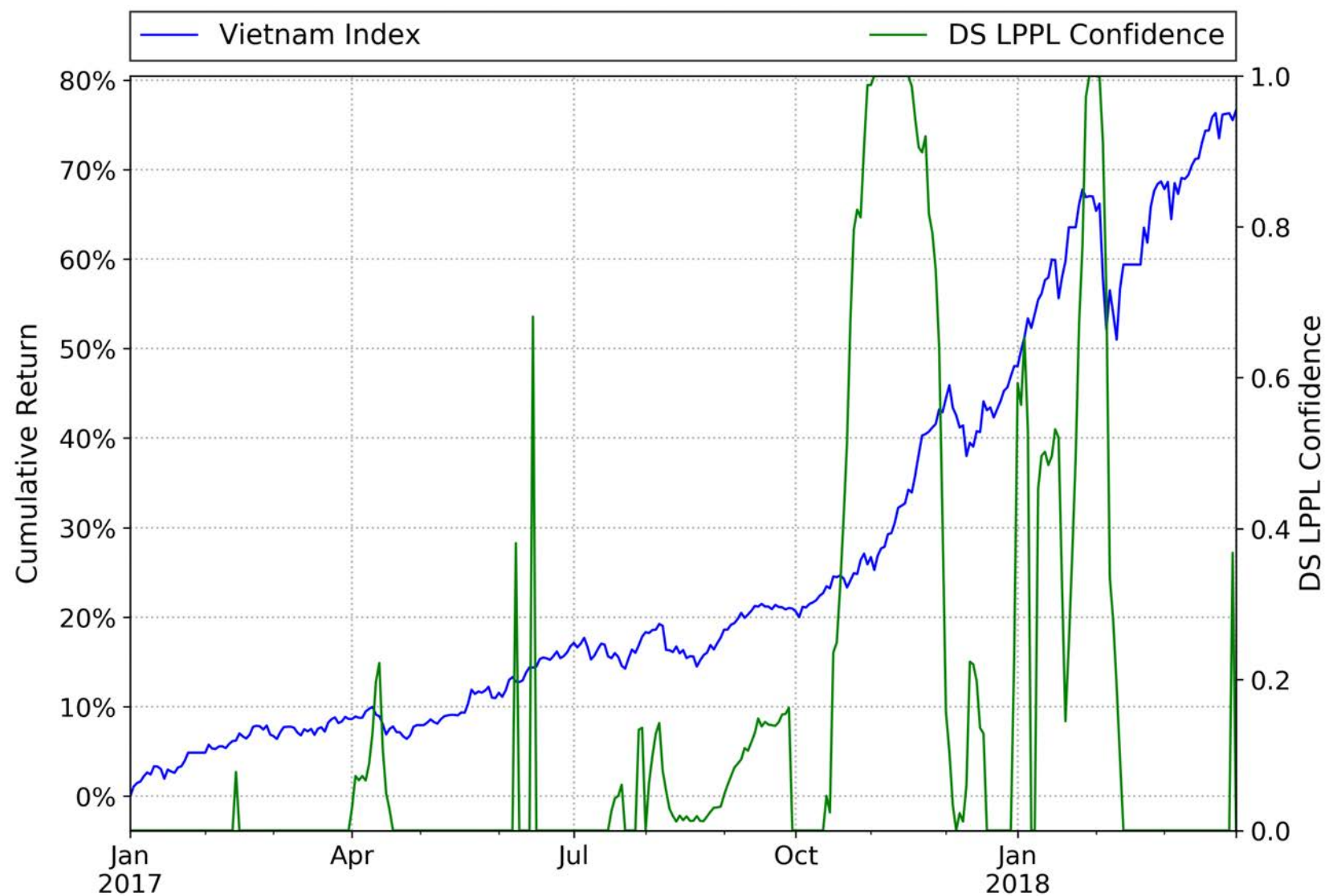
Secondly, we identify the Ukrainian PFTS index. The price trajectory of the index repetitively accelerated and plateaued, in the past. This led to fluctuating indicator values. Presently, a medium value of the indicator is obtained. The computed corresponding bubble size amounts to more than 20%.

We furthermore highlight a negative trend in the Dubai General Index. The index decreased by more than 10% within the previous two months. Beforehand, it lost about 40% in value, impacted by the large drawdown of oil prices in 2014. The presently reported negative bubble is around 15% in size with a confidence indicator value of 33%.

Additionally, the Vietnam Index, which was discussed in previous reports, is depicted again. We see several short but intense price surges followed by minor setbacks. These repetitive movements can be regarded as the log-periodic oscillations frequently observed during bubble formation. Note that the indicator correctly identifies the setbacks.







# Equities - United States and Europe

Name	Bubble Size [%]	DS LPPL Confidence [%]	Geometric Average [%]
<b>Positive Bubbles</b>			
-	-	-	-
<b>Negative Bubbles</b>			
STOXX Europe 600 Telecommunications EUR Price Index	-13	40	23
STOXX Europe 600 Health Care EUR Price Index	-11	44	21

Name	Bubble Size [%]	DS LPPL Confidence [%]	Geometric Average [%]
<b>Positive Bubbles</b>			
S&P 500 Health Care Equipment & Supplies (Industry)	21	34	27
S&P 500 - Life Sciences Tools & Services (Industry)	17	24	20
<b>Negative Bubbles</b>			
S&P 500 Automobiles (Industry)	-14	43	25
S&P 500 Industrial Conglomerates (Industry)	-18	17	18
S&P 500 - Health Care Technology (Industry)	-11	22	16

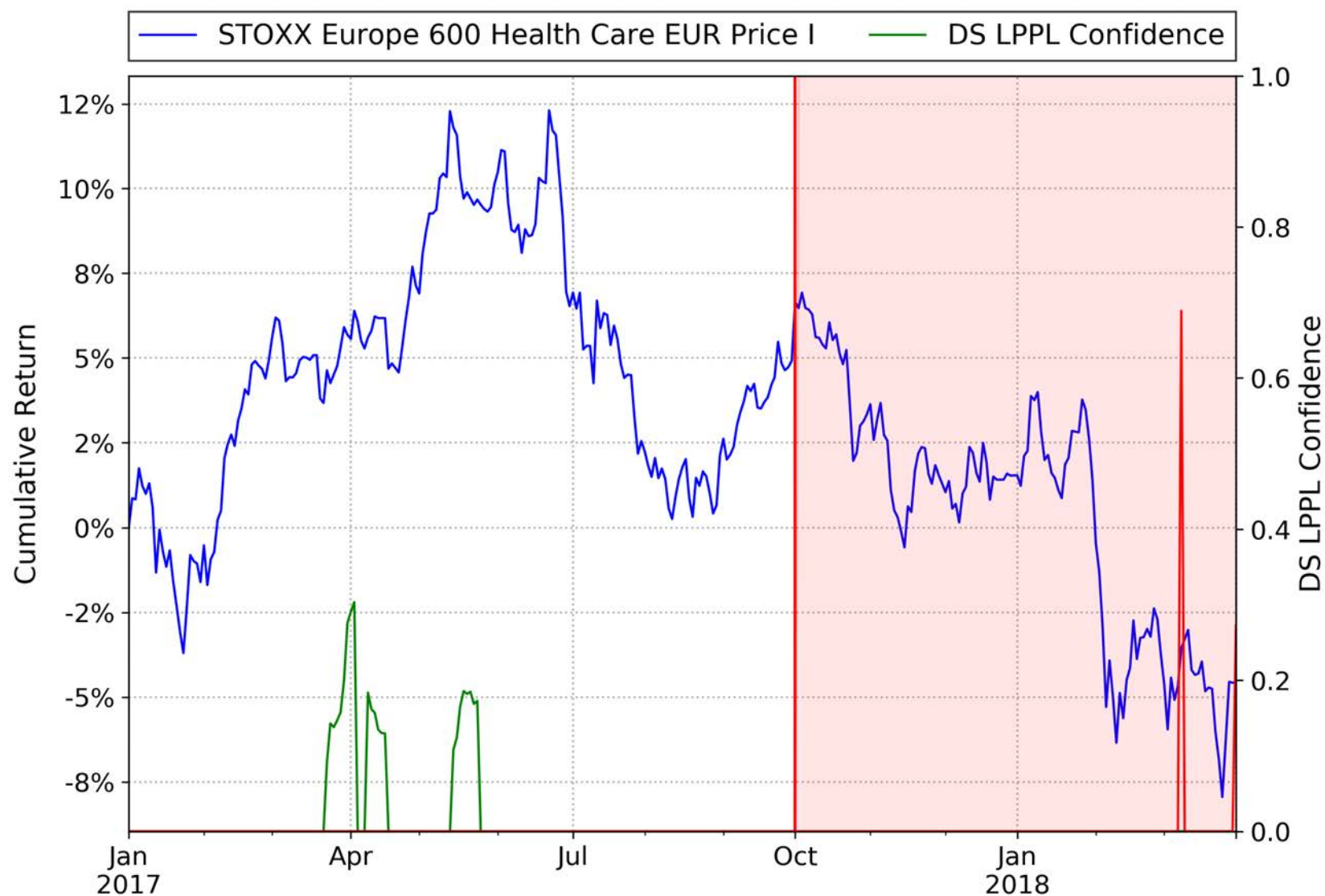
This month, positive bubble activity amongst the European equities indices remains at zero intensity whereas two negative bubble signals are identified.

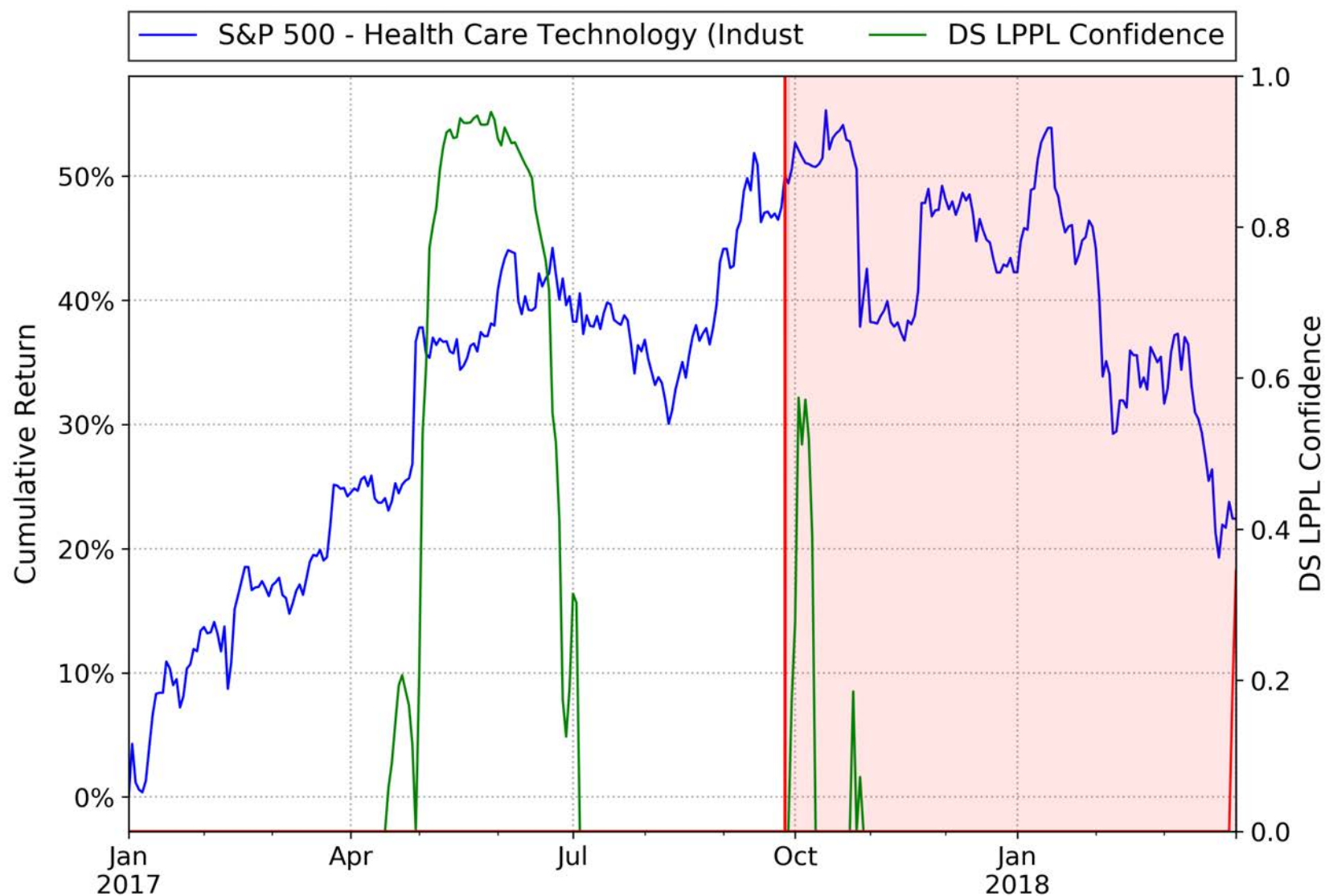
In the Health Care Sector, both the European and the US indices show signs of negative bubble formation at an equal bubble size of 11%. In the plots, we can in fact observe correlations between the two.

The US Health Care Equipment & Supplies Index, on the other side, signals positive bubble price dynamics.

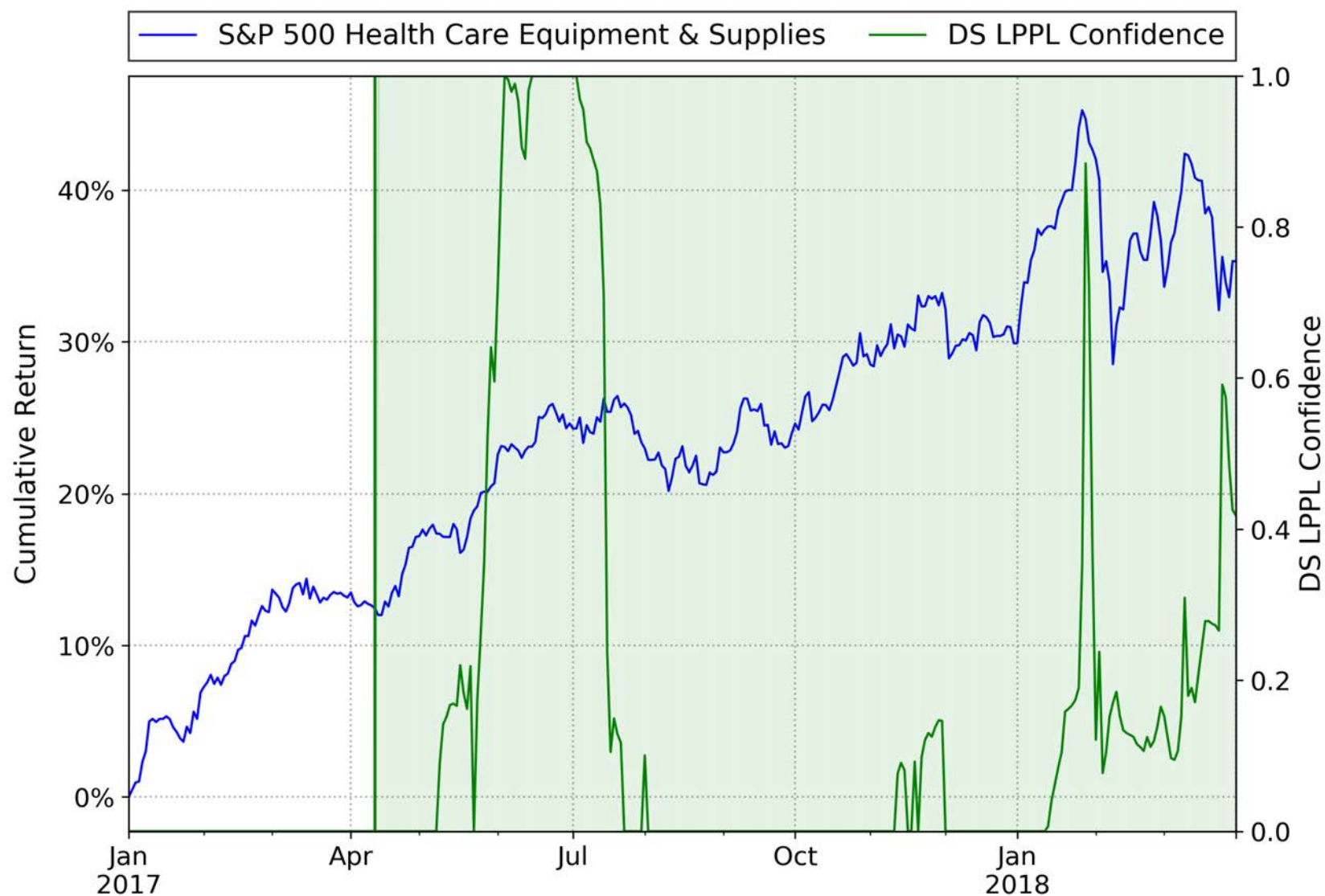
The Health Care Sector and US Health Care Equipment & Supplies Index have indeed been following very different price trajectories.











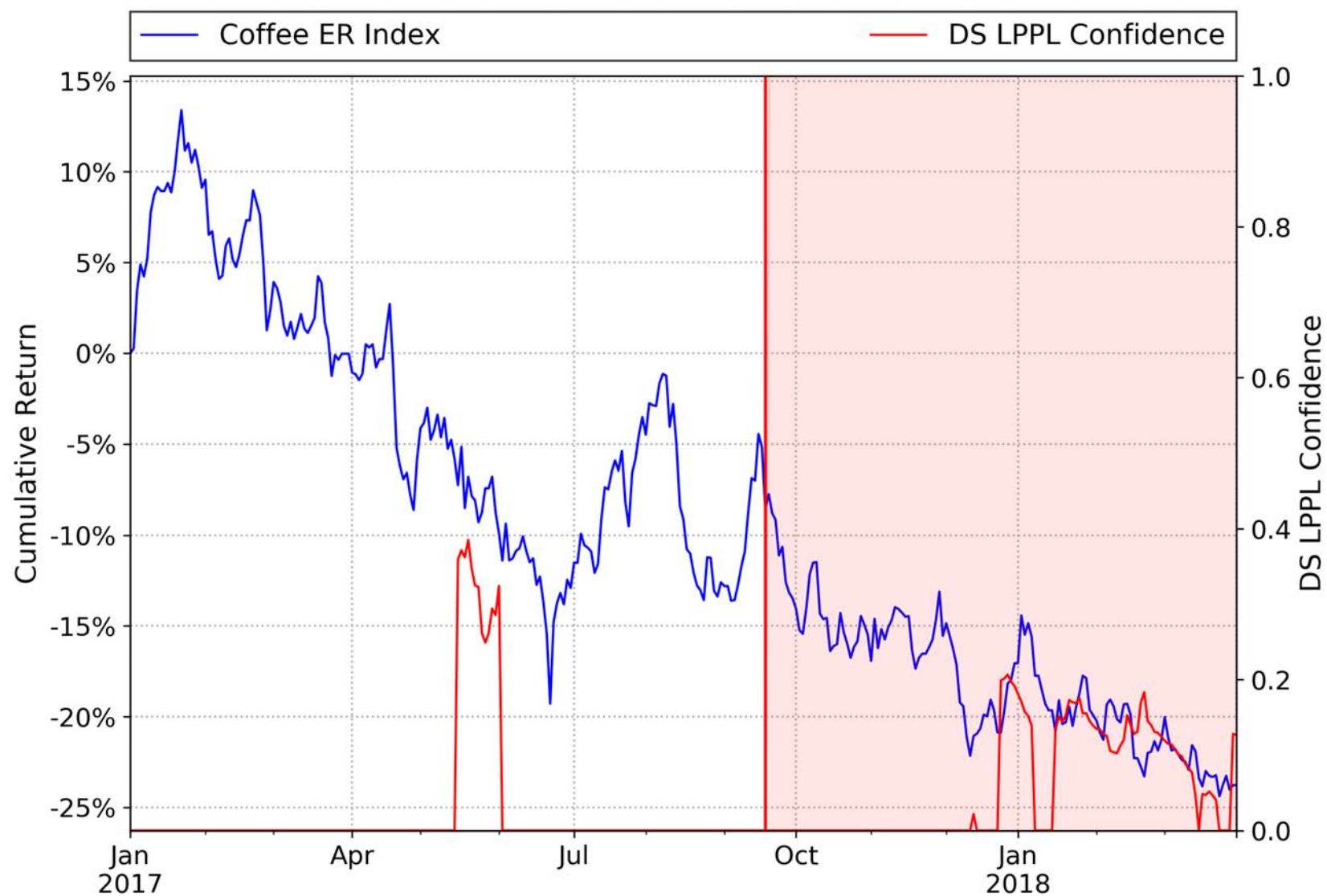
Name	Bubble Size [%]	DS LPPL Confidence [%]	Geometric Average [%]
<b>Positive Bubbles</b>			
-	-	-	-
<b>Negative Bubbles</b>			
Lean Hogs ER Index	-13	70	30
Coffee ER Index	-17	12	14

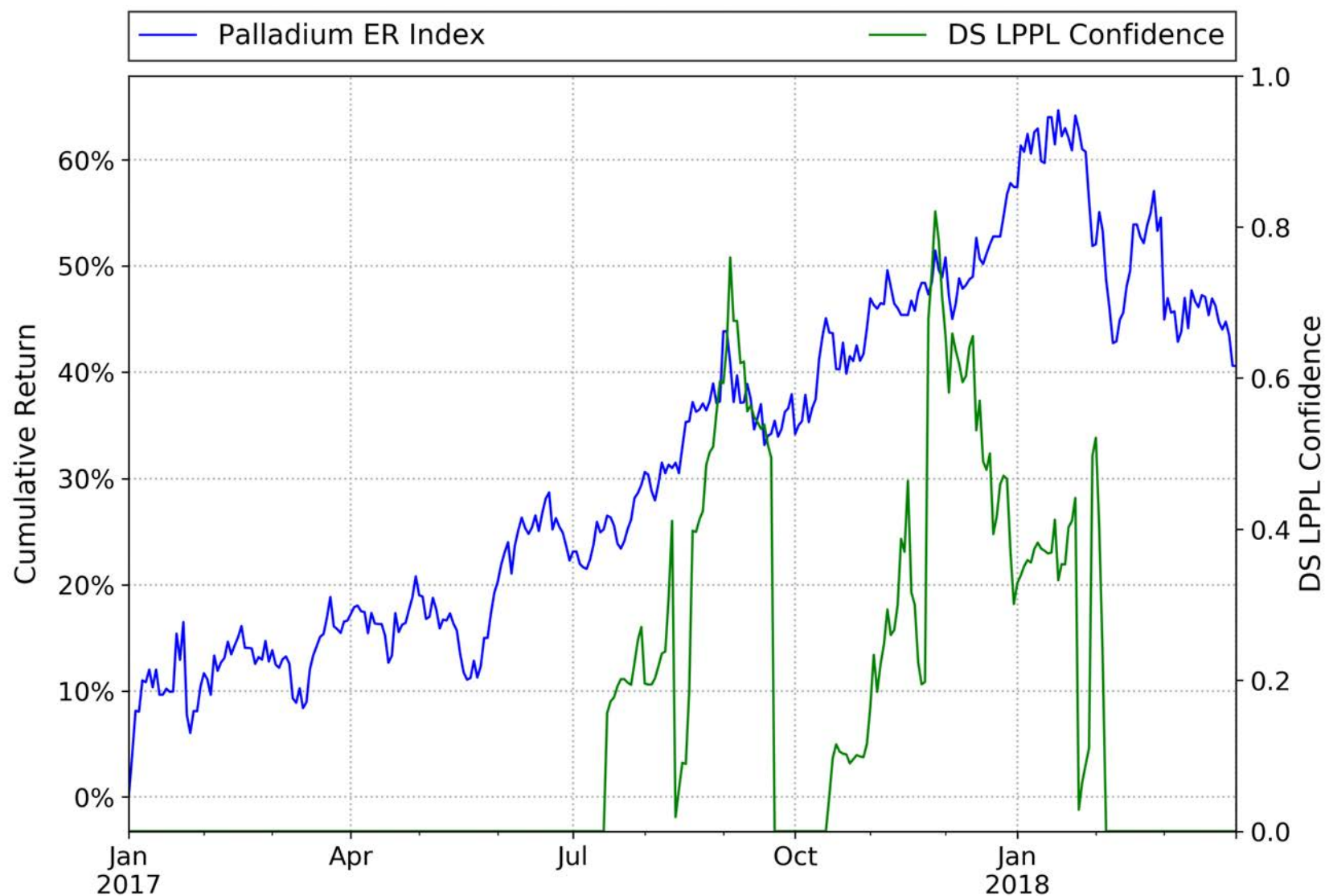
The commodities sector again exhibits low bubble activity.

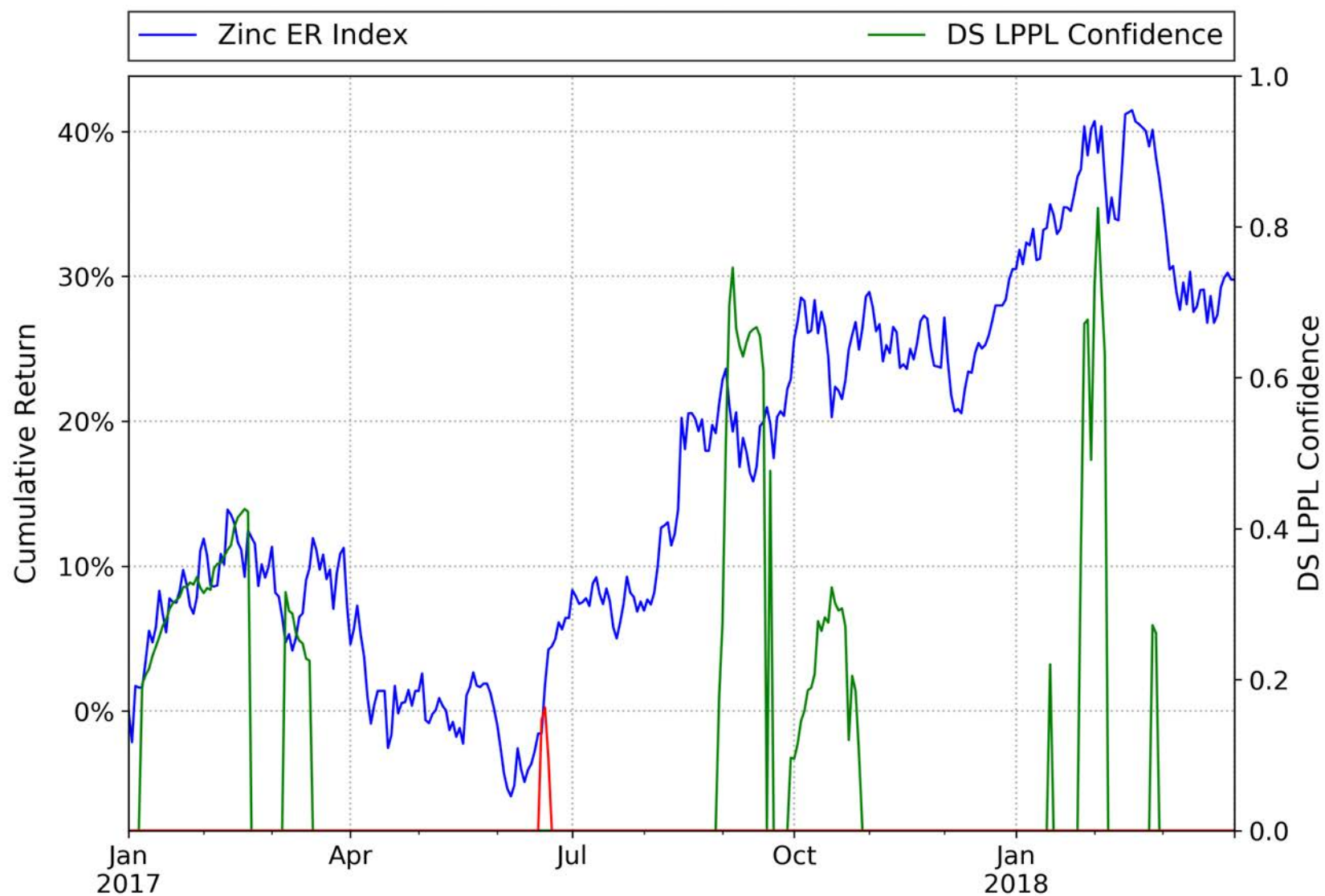
The Coffee ER Index has been listed as a negative bubble for the fourth consecutive month. Its bubble characteristics remain approximately unchanged.

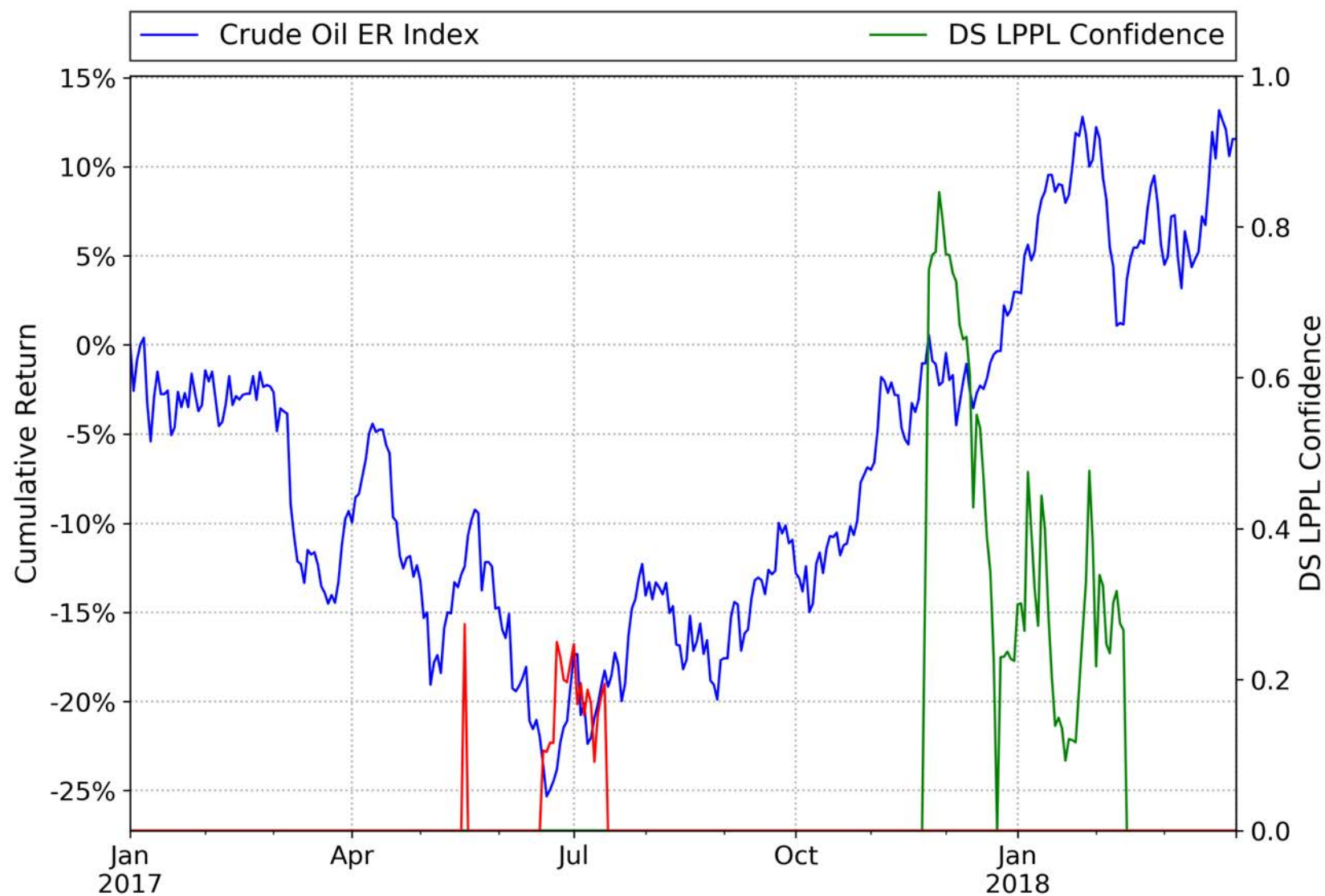
In previous reports, we frequently focused on a positive bubble diagnosed in Palladium. The corresponding index is depicted again, here. We can observe that the price trajectory has recently undergone a change of regime. The change in price behavior has been foreseen through the rising values of the LPPL Confidence indicator in advance to the regime shift.

For completeness, we also attach the indicator series for the Zinc and Crude Oil commodity indices that were reviewed in previous reports.











# Currencies – REER, PCA & Cryptocurrencies

Name	Bubble Size [%]	DS LPPL Confidence [%]	Geometric Average [%]
<b>Positive Bubbles</b>			
REER Index Venezuela	21	69	38
<b>Negative Bubbles</b>			
-	-	-	-

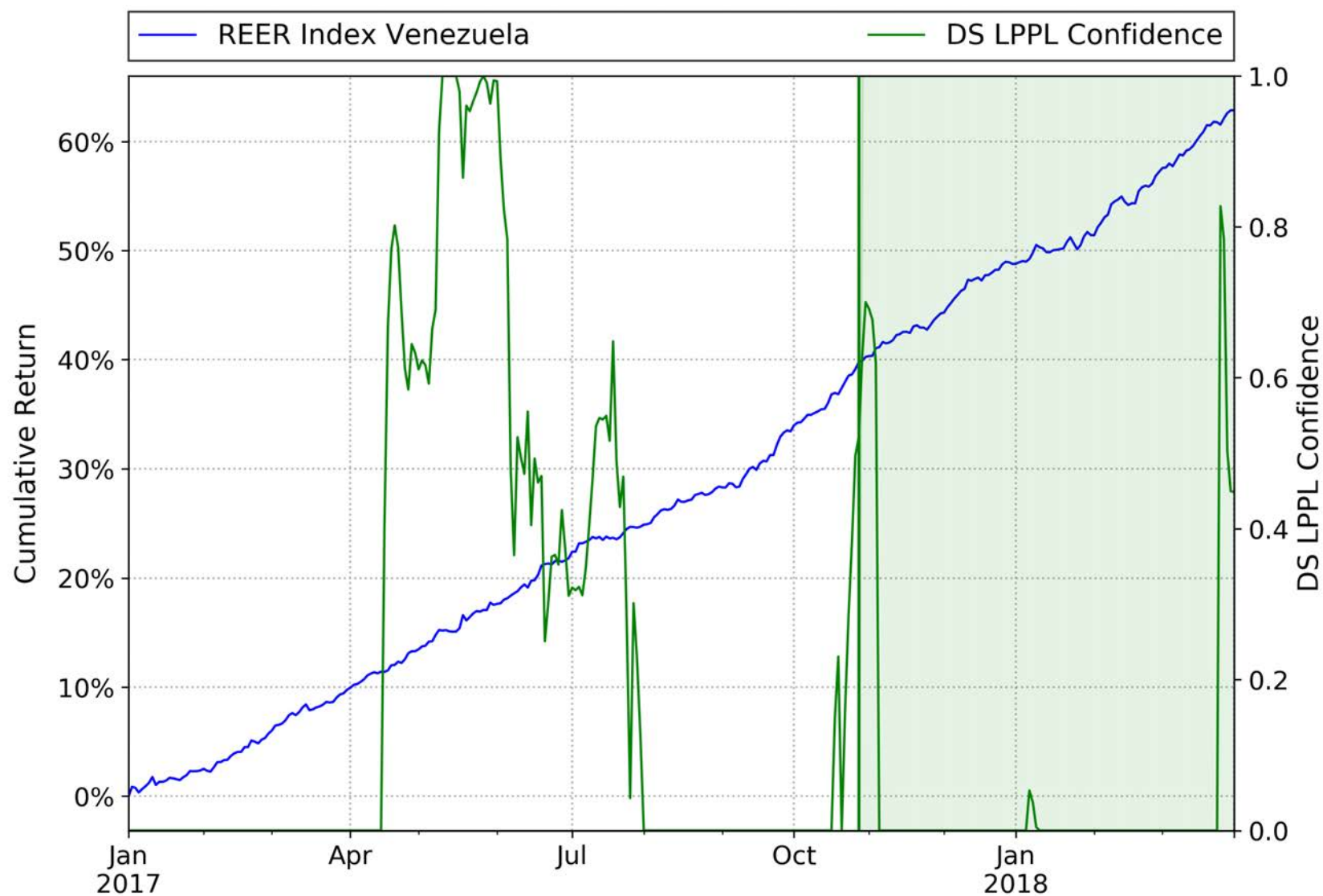
In the foreign exchange rate index sector, the rate of bubbles remained near-zero during March.

Simultaneously to the signals identified in the Bursatil Index, we identify a positive bubble in the corresponding REER Index of Venezuela, which is associated with the large inflation. The plot is depicted on the following slide.

Furthermore, we do not detect any bubble activity on the analyzed Principal Components.

Ultimately, no signs of bubble activity were unveiled in the cryptocurrency section.

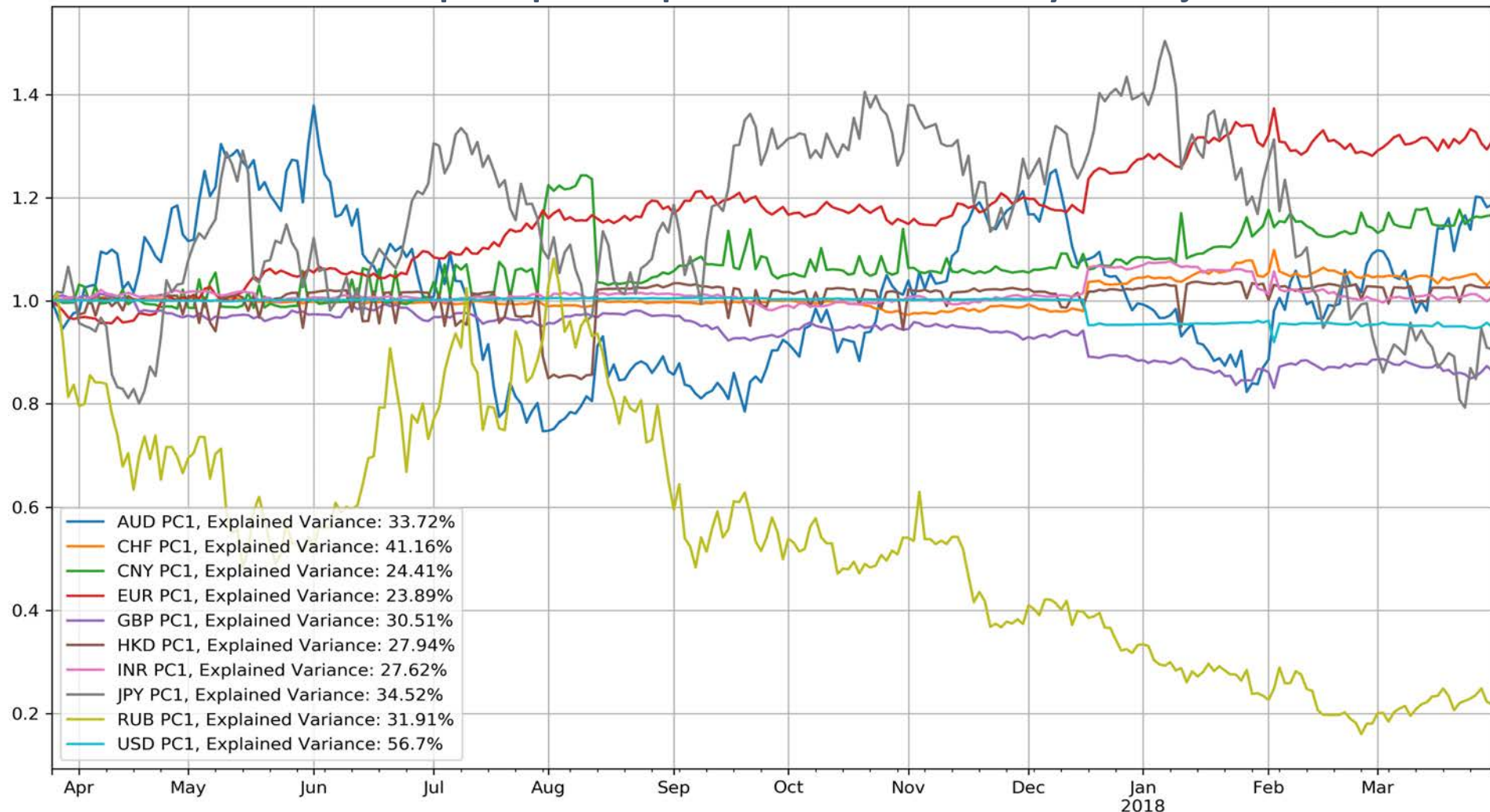
REER: the real effective exchange rate is the weighted average of a country's currency relative to an index or basket of other major currencies, adjusted for the effects of inflation.





# Currencies – PCA

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



We use 73 currency cross rates for each of the shown currencies. Then for currency X, we perform the PCA on the ensemble of all exchange rate time series that are crossed with this currency X. Before application of the PCA, the cross rates are inverted (or not) such that they all point in the same direction. Then, we pick the first PCA (PC1) of the results which explains the largest share of the variance (as calculated from the Eigenvalues).

For 790 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.

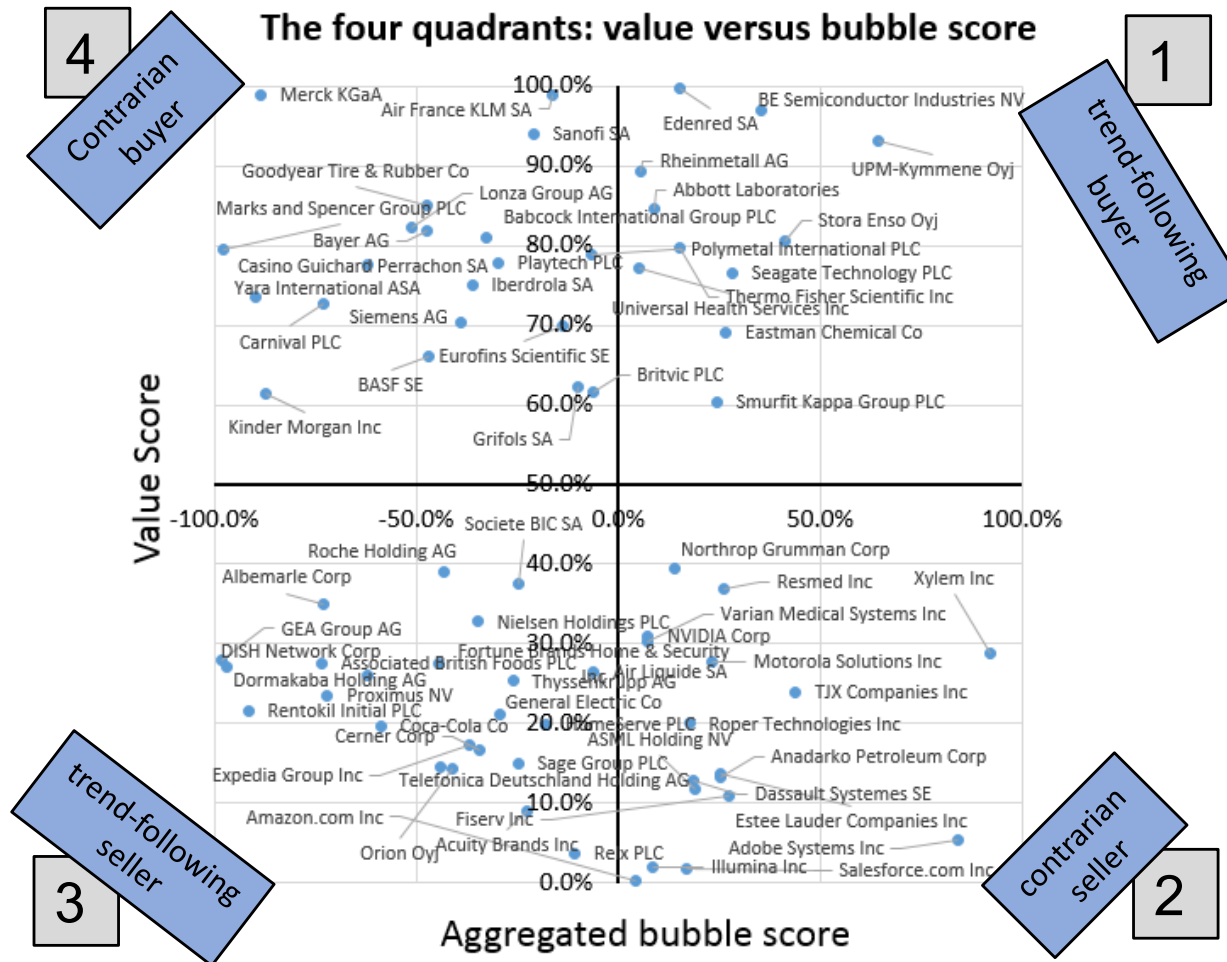
The two financial strength indicators are:

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 for expected EPS-growth (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. Edenred SA);
2. [Quadrant 2](#): Stocks with a strong positive bubble score and a weak value score (e.g. Xylem Inc);
3. [Quadrant 3](#): Stocks with a strong negative bubble score and a weak value score (e.g. Roche Holding AG);
4. [Quadrant 4](#): Stocks with strong negative bubble score and a strong financial strength (e.g. BASF SE)

\*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%.

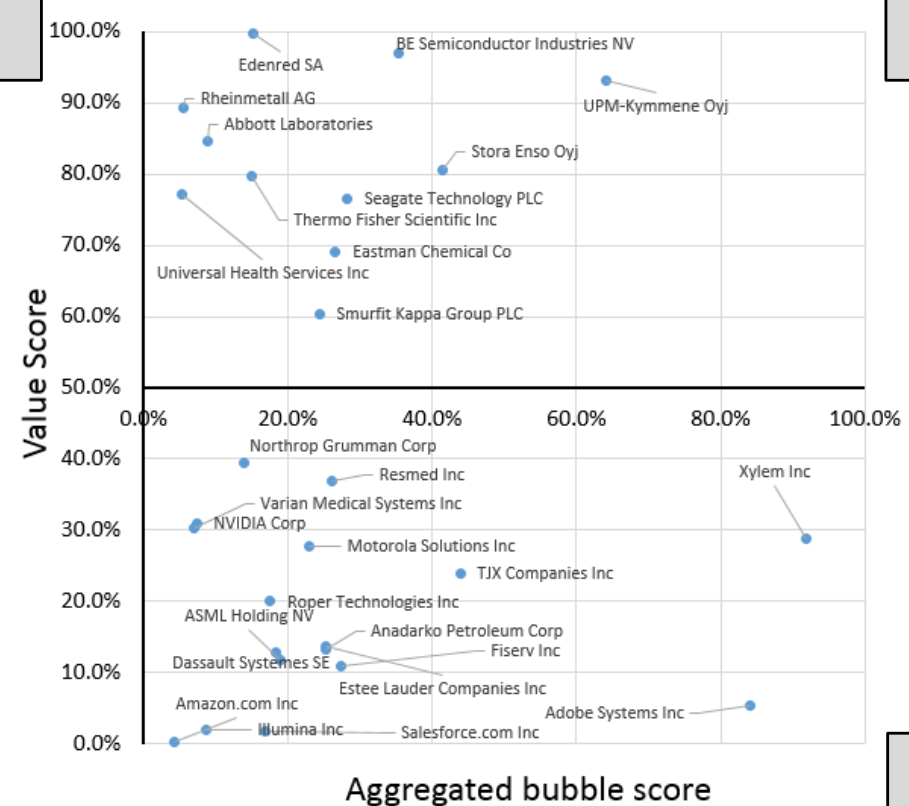
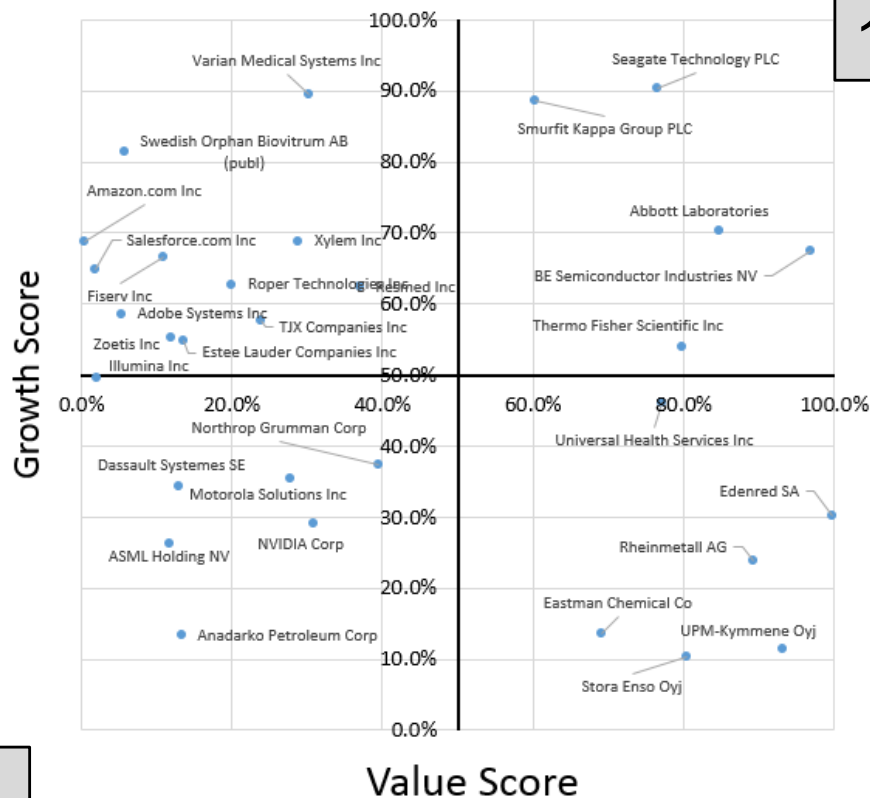
Each quadrant has its own specs:

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



**Entrepreneurial**  
Risks  
**ETH** zürich

## Strong negative bubble signals with weak (respectively strong) fundamentals





# Single Stocks

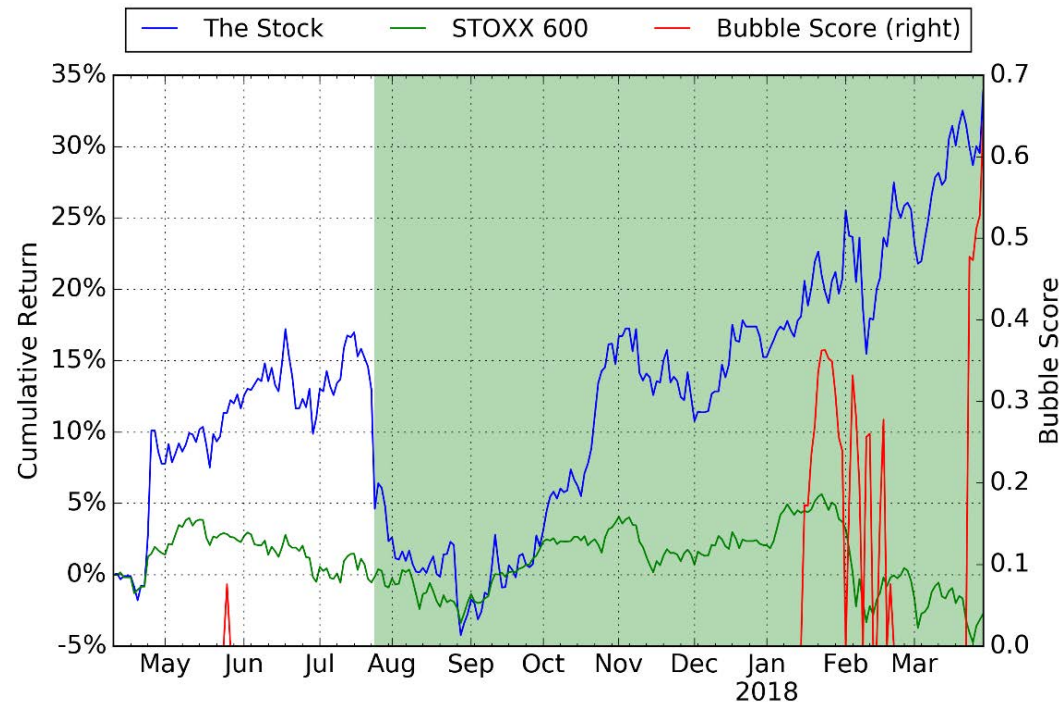
## Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Seagate Technology PLC	Ireland; Republic of	Technology Hardware & Equipment	21.1%	76.3%	Jul-17	28.2%	76.5%	90.4%
Rheinmetall AG	Germany	Capital Goods	41.0%	37.4%	Apr-17	5.5%	89.4%	23.9%
Edenred SA	France	Commercial & Professional Services	23.6%	23.7%	Jun-17	15.2%	99.7%	30.1%
BE Semiconductor Industries NV	Netherlands	Semiconductors & Semiconductor Equipment	103.7%	44.7%	Sep-17	35.4%	96.8%	67.5%
Stora Enso Oyj	Finland	Materials	32.1%	35.1%	Aug-17	41.4%	80.5%	10.4%
UPM-Kymmene Oyj	Finland	Materials	34.3%	28.0%	Jul-17	64.1%	93.2%	11.5%
Smurfit Kappa Group PLC	Ireland; Republic of	Materials	35.1%	27.5%	Jul-17	24.4%	60.4%	88.6%
Abbott Laboratories	United States of America	Health Care Equipment & Services	37.8%	20.8%	Jul-17	8.8%	84.7%	70.3%
Eastman Chemical Co	United States of America	Materials	34.2%	25.5%	Aug-17	26.6%	69.1%	13.7%
Thermo Fisher Scientific Inc	United States of America	Pharmaceuticals, Biotechnology & Life Sciences	35.4%	20.7%	May-17	15.1%	79.7%	54.1%
Universal Health Services Inc	United States of America	Health Care Equipment & Services	-3.8%	9.0%	Aug-17	5.3%	77.1%	46.2%

# Single Stocks - Quadrant 1 stocks

**Quadrant 1 stocks:** strong positive bubble signals with strong fundamentals

Example: UPM-Kymmene Oyj.



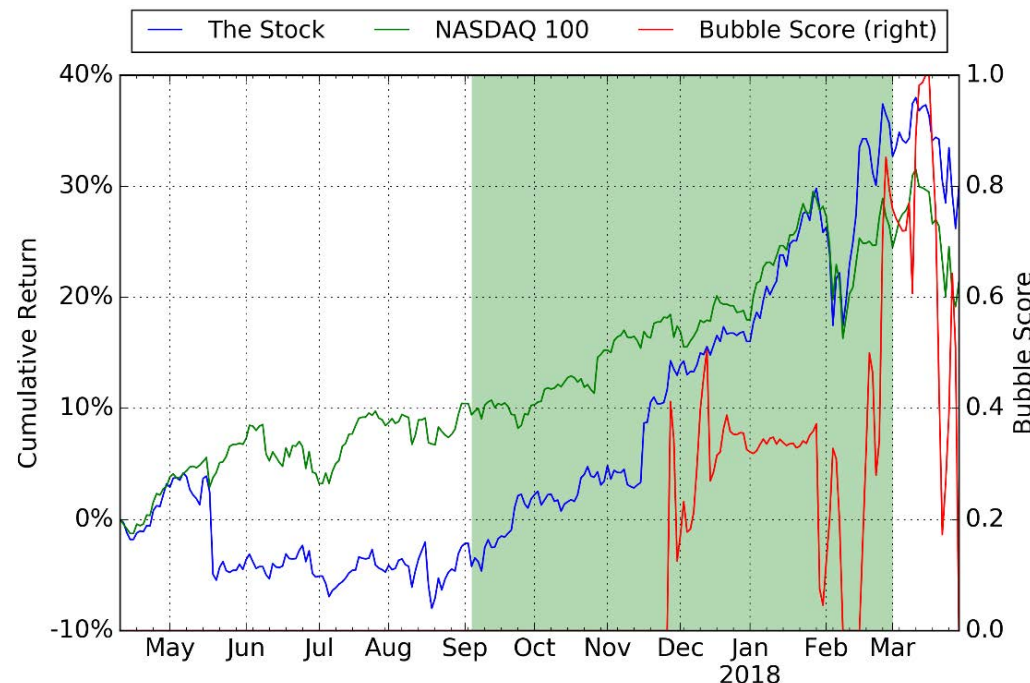
The above graph shows the one year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period is the strong positive bubble we identified. The Bubble Score of this eight month bubble has reached 64.1% with a bubble size 28%.



# Single Stocks - Quadrant 1 stocks

**Last month example:** strong positive bubble signals with strong fundamentals, Cisco Systems Inc.

The figure below plots the one year cumulative return of the stock (blue), NASDAQ 100 (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 has started a correction recently, which is in agreement with the DS LPPLS indicator, notwithstanding the strong fundamentals.



# Single Stocks - Quadrant 2 stocks

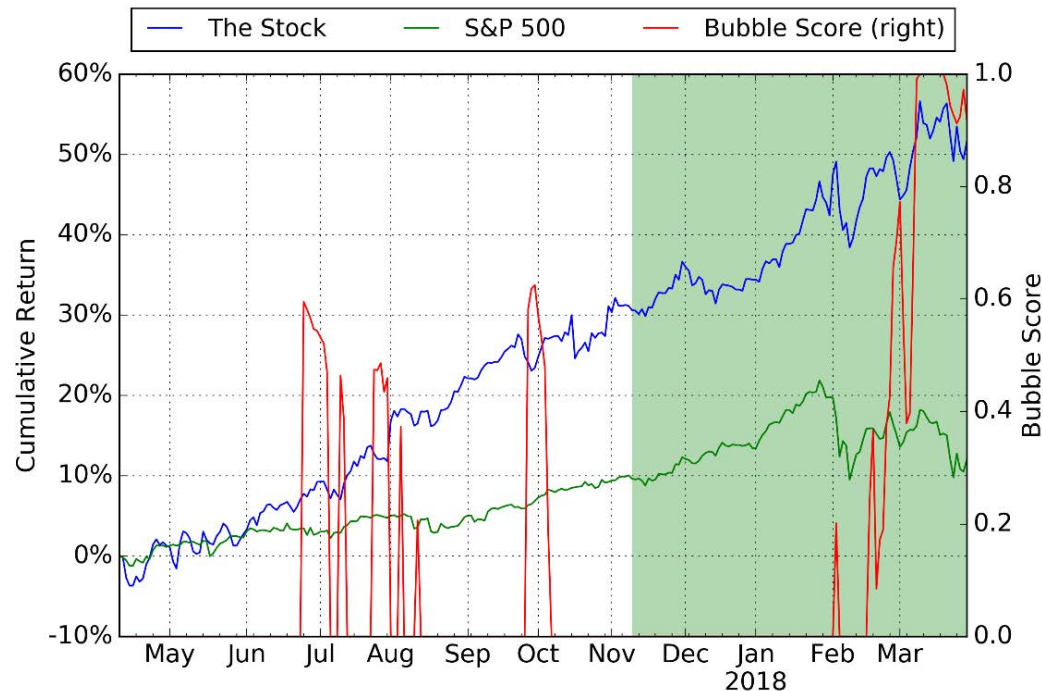
**Quadrant 2 stocks:** strong positive bubble signals with weak fundamentals

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	67.0%	25.8%	Oct-17	84.0%	5.3%	58.6%
Amazon.com Inc	United States of America	Retailing	61.5%	54.0%	Sep-17	4.3%	0.4%	68.7%
ASML Holding NV	Netherlands	Semiconductors & Semiconductor Equipment	53.9%	30.2%	Jul-17	19.1%	11.8%	26.2%
Fiserv Inc	United States of America	Software & Services	23.2%	22.5%	Apr-17	27.4%	10.9%	66.6%
Illumina Inc	United States of America	Pharmaceuticals, Biotechnology & Life Sciences	36.7%	19.5%	Aug-17	8.7%	2.0%	49.6%
NVIDIA Corp	United States of America	Semiconductors & Semiconductor Equipment	138.0%	44.2%	Jul-17	7.3%	30.9%	29.1%
Dassault Systemes SE	France	Software & Services	35.0%	35.0%	Apr-17	18.4%	12.9%	34.3%
Anadarko Petroleum Corp	United States of America	Energy	-3.4%	31.0%	Jun-17	25.2%	13.3%	13.4%
Salesforce.com Inc	United States of America	Software & Services	39.5%	22.0%	Oct-17	16.8%	1.9%	64.9%
Estee Lauder Companies Inc	United States of America	Household & Personal Products	76.3%	76.3%	Apr-17	25.2%	13.7%	54.8%
Motorola Solutions Inc	United States of America	Technology Hardware & Equipment	27.1%	25.0%	May-17	23.0%	27.8%	35.4%
Northrop Grumman Corp	United States of America	Capital Goods	45.9%	45.9%	Apr-17	14.0%	39.5%	37.5%
Resmed Inc	United States of America	Health Care Equipment & Services	43.9%	26.9%	Aug-17	26.1%	37.0%	62.4%
Roper Technologies Inc	United States of America	Capital Goods	36.6%	21.5%	Aug-17	17.6%	20.0%	62.8%
TJX Companies Inc	United States of America	Retailing	5.8%	18.8%	Jul-17	43.8%	23.9%	57.6%
Varian Medical Systems Inc	United States of America	Health Care Equipment & Services	37.1%	17.9%	Sep-17	7.1%	30.3%	89.6%
Xylem Inc	United States of America	Capital Goods	55.8%	16.1%	Nov-17	91.9%	28.9%	68.9%
Zoetis Inc	United States of America	Pharmaceuticals, Biotechnology & Life Sciences	56.9%	24.1%	43040	23.6%	11.9%	55.2%
Swedish Orphan Biovitrum AB (publ)	Sweden	Pharmaceuticals, Biotechnology & Life Sciences	13.3%	23.9%	43009	33.1%	5.7%	81.5%

# Single Stocks - Quadrant 2 stocks

**Quadrant 2 stocks:** strong positive bubble signals with weak fundamentals

Example: Xylem Inc.

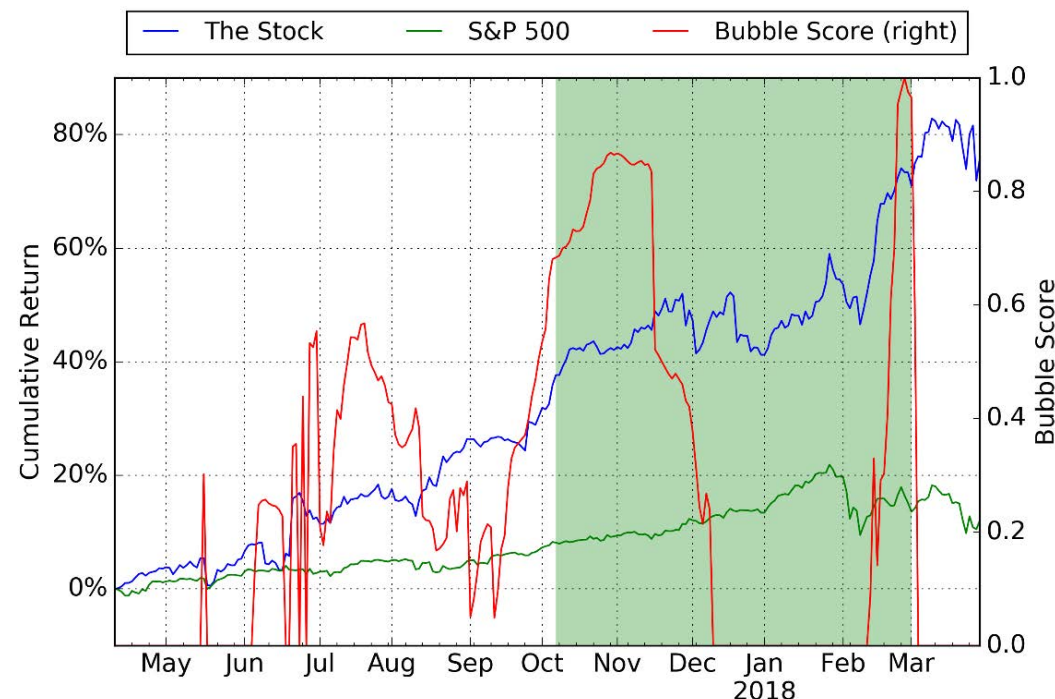


The above graph shows the one year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period is the strong positive bubble we identified. The Bubble Score of this five month bubble has reached 91.9% with a bubble size 16.1%. 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, Red Hat 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 went into a volatile plateau recently, in agreement with our DS LPPLS indicator and the weak fundamentals.



# Single Stocks - Quadrant 3 stocks

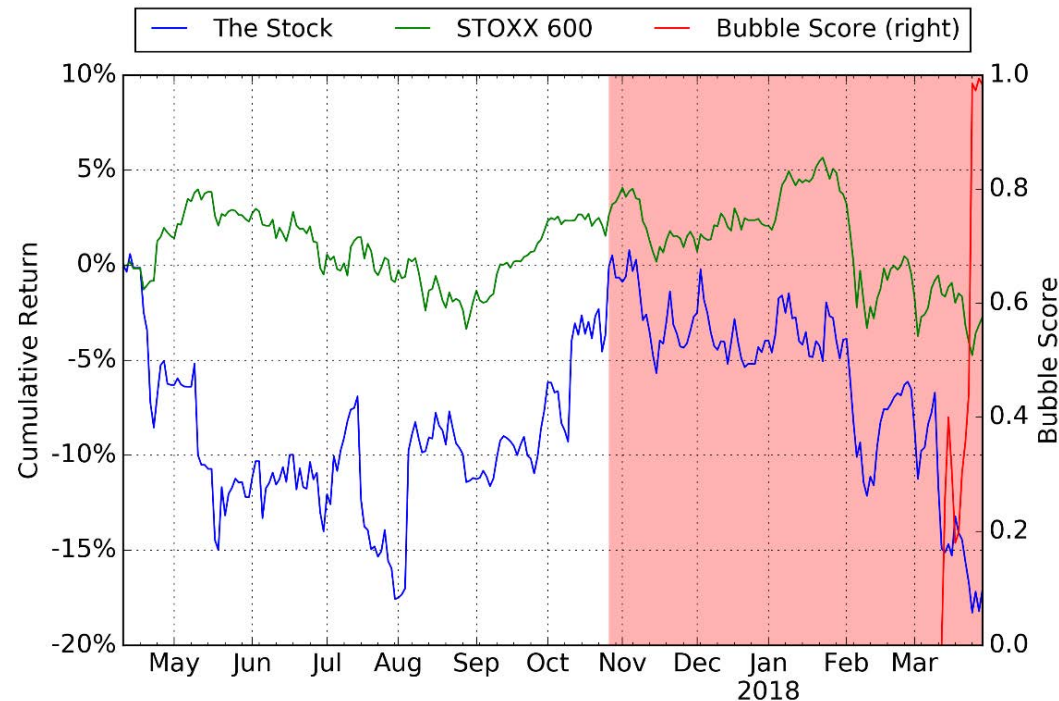
## Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Cerner Corp	United States of America	Health Care Equipment & Services	-1.3%	-18.4%	Sep-17	-34.2%	16.7%	77.5%
DISH Network Corp	United States of America	Media	-40.8%	-25.4%	Nov-17	-62.0%	26.1%	25.1%
Expedia Group Inc	United States of America	Retailing	-14.6%	-16.3%	Apr-17	-36.9%	17.3%	91.6%
Associated British Foods PLC	United Kingdom	Food, Beverage & Tobacco	-4.7%	-19.8%	Nov-17	-73.5%	27.6%	38.5%
Proximus NV	Belgium	Telecommunication Services	-13.9%	-13.0%	Sep-17	-72.0%	23.5%	91.9%
GEA Group AG	Germany	Capital Goods	-17.6%	-17.0%	Oct-17	-98.3%	28.0%	79.0%
Telefonica Deutschland Holding AG	Germany	Telecommunication Services	-16.2%	-15.5%	Jul-17	-44.0%	14.6%	98.0%
Thyssenkrupp AG	Germany	Materials	-3.8%	-18.6%	Sep-17	-26.2%	25.3%	1.6%
Air Liquide SA	France	Materials	1.8%	-8.9%	Oct-17	-6.1%	26.5%	17.1%
Societe BIC SA	France	Commercial & Professional Services	-31.7%	-9.0%	Oct-17	-24.9%	37.5%	8.9%
HomeServe PLC	United Kingdom	Commercial & Professional Services	16.4%	-7.9%	Sep-17	-17.9%	19.9%	45.4%
Orion Oyj	Finland	Pharmaceuticals, Biotechnology & Life Sciences	-50.1%	-38.8%	Aug-17	-41.2%	14.4%	33.3%
Relx PLC	United Kingdom	Commercial & Professional Services	-8.0%	-12.7%	Aug-17	-10.8%	3.8%	48.7%
Rentokil Initial PLC	United Kingdom	Commercial & Professional Services	7.8%	-15.5%	Oct-17	-91.6%	21.6%	60.1%
Dormakaba Holding AG	Switzerland	Capital Goods	-8.6%	-24.1%	Sep-17	-96.8%	27.1%	15.6%
Roche Holding AG	Switzerland	Pharmaceuticals, Biotechnology & Life Sciences	-15.0%	-17.3%	Jun-17	-43.0%	39.0%	85.7%
Sage Group PLC	United Kingdom	Software & Services	-1.7%	-11.6%	Oct-17	-24.8%	14.9%	22.4%
Albemarle Corp	United States of America	Materials	-10.9%	-35.2%	Nov-17	-73.2%	34.9%	28.6%
Acuity Brands Inc	United States of America	Capital Goods	-20.4%	-29.9%	Jun-17	-22.6%	9.0%	68.2%
Fortune Brands Home & Security Inc	United States of America	Capital Goods	-4.6%	-11.3%	Sep-17	-44.5%	27.5%	66.7%
General Electric Co	United States of America	Capital Goods	-54.7%	-45.5%	Aug-17	-29.4%	21.3%	72.3%
Coca-Cola Co	United States of America	Food, Beverage & Tobacco	1.1%	-6.8%	Oct-17	-58.8%	19.7%	68.5%
Nielsen Holdings PLC	United States of America	Commercial & Professional Services	-22.5%	-15.6%	Oct-17	-34.8%	32.8%	9.7%
United Utilities Group PLC	United Kingdom	Utilities	-29.4%	-23.7%	42887	-11.7%	39.2%	27.0%

# Single Stocks - Quadrant 3 stocks

**Quadrant 3 stocks:** strong negative bubble signals with weak fundamentals

Example: GEA Group AG.



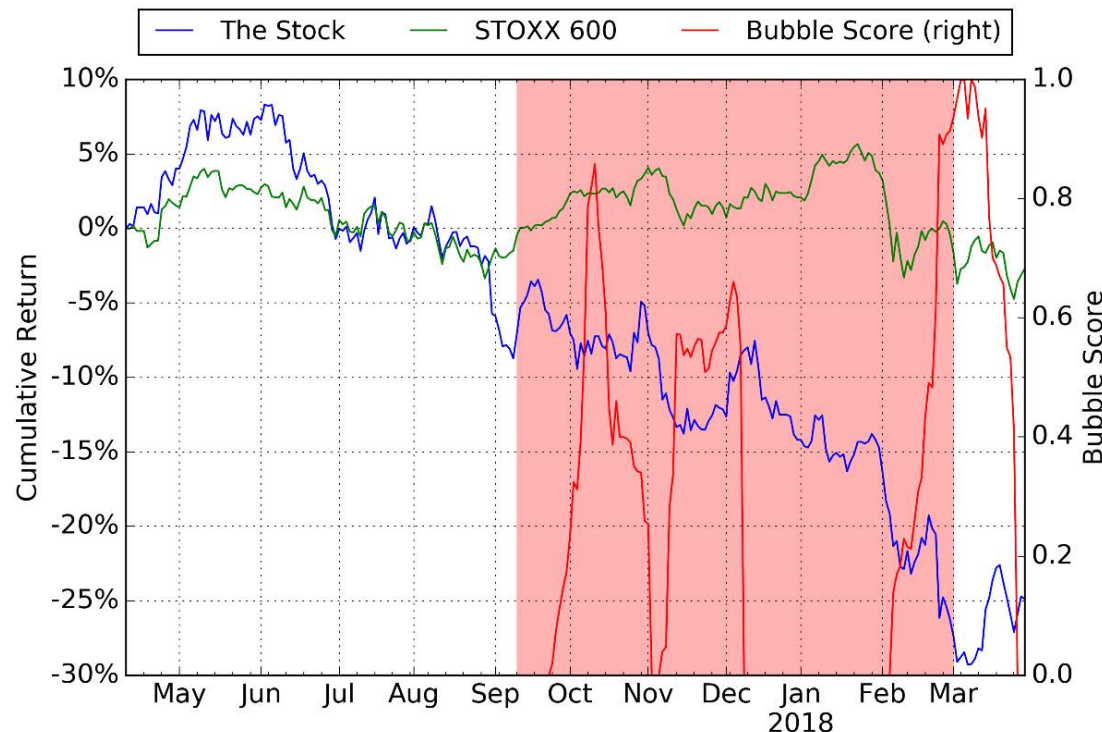
The above graph shows the one year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period is the strong negative bubble we identified. The Bubble Score of this five month bubble has reached 98.3% with a bubble size -17.0%.



# Single Stocks - Quadrant 3 stocks

**Last month example:** strong negative bubble signals with weak fundamentals, Industria de Diseno Textil SA.

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 an increase in volatility recently, which is in synchrony with our DS LPPLS indicator. One should remain cautious due to the weak fundamentals we diagnosed.



# Single Stocks - Quadrant 4 stocks

## Quadrant 4 stocks: strong negative bubble signals with strong fundamentals

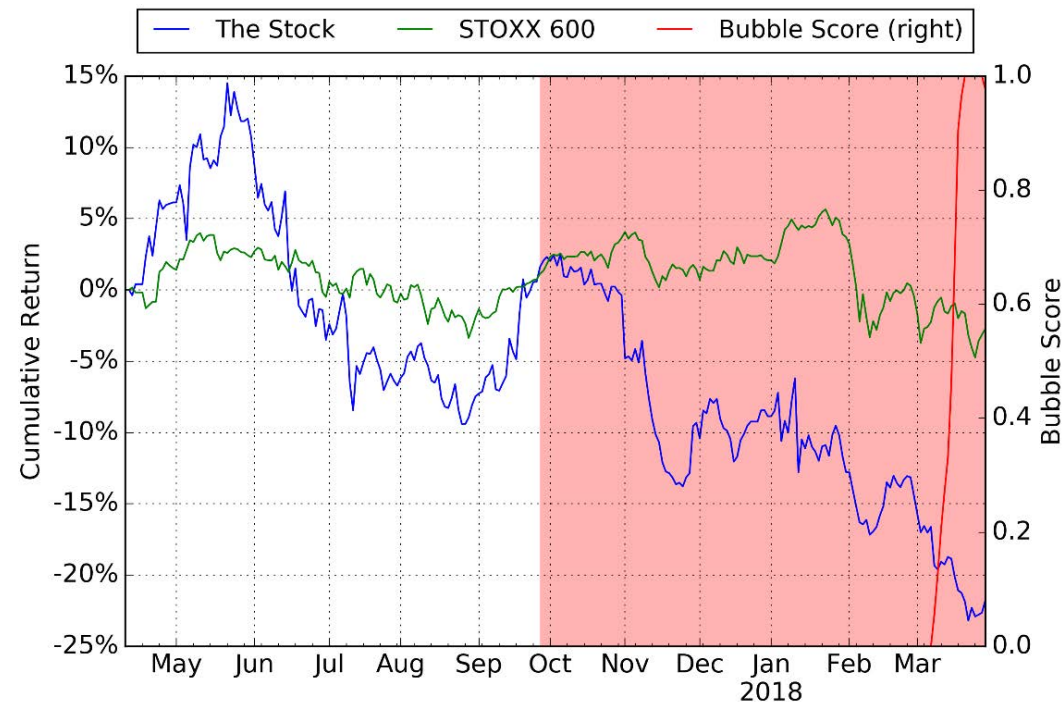
Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Goodyear Tire & Rubber Co	United States of America	Automobiles & Components	-22.7%	-19.5%	Sep-17	-47.4%	85.1%	5.1%
Babcock International Group PLC	United Kingdom	Commercial & Professional Services	-24.3%	-24.3%	Apr-17	-32.6%	81.0%	67.6%
Britvic PLC	United Kingdom	Food, Beverage & Tobacco	0.7%	-11.5%	Oct-17	-6.4%	61.5%	11.8%
Carnival PLC	United Kingdom	Consumer Services	1.2%	-8.9%	Oct-17	-72.8%	72.7%	17.8%
BASF SE	Germany	Materials	-9.8%	-14.1%	Nov-17	-46.9%	66.1%	42.2%
Bayer AG	Germany	Pharmaceuticals, Biotechnology & Life Sciences	-13.6%	-22.0%	Oct-17	-47.4%	81.8%	39.2%
Merck KGaA	Germany	Pharmaceuticals, Biotechnology & Life Sciences	-26.1%	-20.9%	Sep-17	-88.5%	98.9%	83.9%
Siemens AG	Germany	Capital Goods	-18.7%	-13.7%	Oct-17	-38.9%	70.4%	95.7%
Iberdrola SA	Spain	Utilities	-7.3%	-11.0%	Oct-17	-36.2%	74.9%	25.7%
Grifols SA	Spain	Pharmaceuticals, Biotechnology & Life Sciences	-1.6%	-13.9%	Nov-17	-10.0%	62.2%	92.3%
Casino Guichard Perrachon SA	France	Food & Staples Retailing	-24.3%	-20.7%	Sep-17	-62.0%	77.5%	4.6%
Eurofins Scientific SE	Luxembourg	Pharmaceuticals, Biotechnology & Life Sciences	1.9%	-19.7%	Sep-17	-13.9%	70.0%	3.0%
Sanofi SA	France	Pharmaceuticals, Biotechnology & Life Sciences	-23.4%	-19.5%	Aug-17	-21.0%	93.9%	57.8%
Air France KLM SA	France	Transportation	19.9%	-33.8%	Oct-17	-16.4%	98.7%	12.9%
Marks and Spencer Group PLC	United Kingdom	Retailing	-21.5%	-23.0%	Sep-17	-97.7%	79.5%	14.7%
Yara International ASA	Norway	Materials	-6.7%	-14.8%	Oct-17	-89.8%	73.4%	94.7%
Polymetal International PLC	United Kingdom	Materials	-31.7%	-17.8%	Oct-17	-6.5%	78.9%	98.2%
Playtech PLC	Isle of Man	Consumer Services	-21.5%	-22.2%	Aug-17	-29.8%	77.7%	97.8%
Lonza Group AG	Switzerland	Pharmaceuticals, Biotechnology & Life Sciences	24.9%	-15.7%	Oct-17	-51.0%	82.3%	6.1%
Kinder Morgan Inc	United States of America	Energy	-30.5%	-23.0%	Sep-17	-87.3%	61.4%	46.3%
Gesteira AB	Sweden	Health Care Equipment & Services	-26.0%	-20.6%	42917	-8.4%	83.8%	0.6%
Intrum Justitia AB	Sweden	Commercial & Professional Services	-32.7%	-18.7%	43009	-12.5%	73.7%	1.3%



# Single Stocks - Quadrant 4 stocks

**Quadrant 4 stocks:** strong negative bubble signals with strong fundamentals

Example: Marks and Spencer Group PLC.

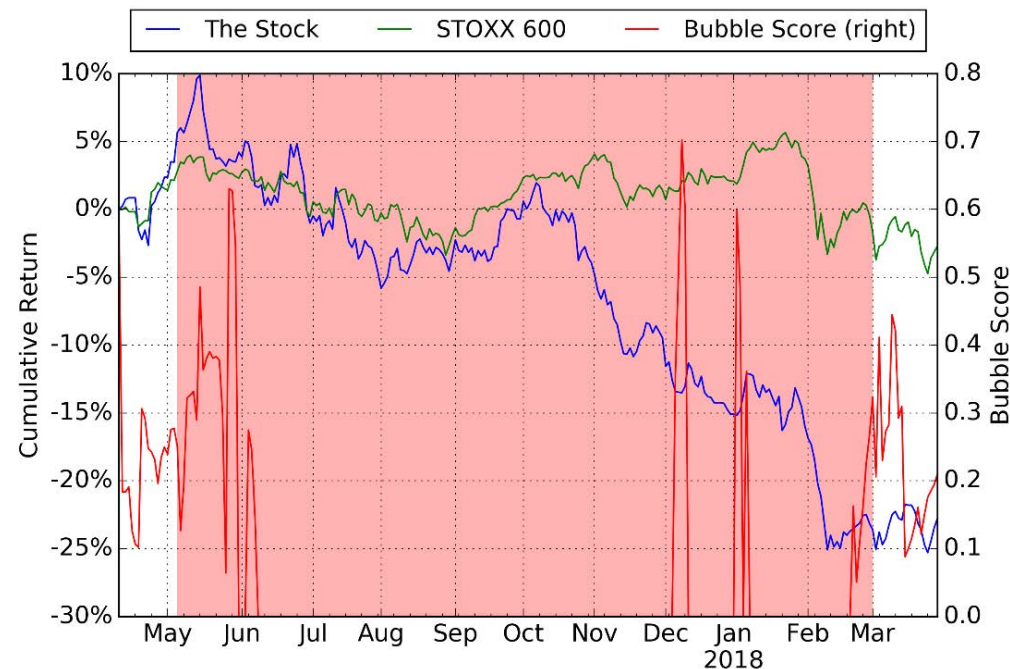


The above graph shows the one year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period is the strong negative bubble we identified. The Bubble Score of this six month bubble has reached 97.7% with a bubble size -23.0%. We expect a further rebound, 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, Sanofi SA.

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 did not continue to decrease and went into a plateau this month, which is in synchrony with our DS LPPLS indicator. 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	
	Apr 1st	Mar 1st	Apr 1st	Mar 1st	Apr 1st	Mar 1st	Apr 1st	Mar 1st	Apr 1st	Mar 1st
Pharmaceuticals, Biotechnology & Life Sciences	3.7%	4.6%	0.0%	0.0%	0.0%	0.0%	63.2%	62.7%	57.1%	57.8%
Consumer Services	17.9%	24.8%	0.0%	0.0%	0.0%	0.0%	28.4%	28.6%	48.4%	46.9%
Retailing	28.6%	33.5%	0.0%	0.0%	0.0%	0.0%	18.6%	16.3%	54.6%	57.4%
Transportation	14.8%	17.0%	0.0%	0.0%	0.0%	0.0%	57.2%	55.7%	56.8%	57.8%
Consumer Durables & Apparel	20.5%	22.1%	0.0%	0.0%	0.0%	0.0%	40.7%	42.7%	52.0%	50.3%
Semiconductors & Semiconductor Equipment	39.6%	39.9%	0.0%	0.0%	0.0%	0.0%	66.0%	67.2%	29.7%	29.7%
Technology Hardware & Equipment	20.9%	27.0%	0.0%	20.8%	0.0%	8.4%	68.2%	69.8%	39.5%	39.9%
Automobiles & Components	19.5%	18.2%	0.0%	0.0%	0.0%	0.0%	77.8%	76.9%	51.2%	50.2%
Telecommunication Services	-3.9%	-2.8%	0.0%	0.0%	0.0%	0.0%	54.2%	57.3%	37.9%	39.4%
Energy	0.2%	2.9%	0.0%	0.0%	0.0%	0.0%	50.4%	49.5%	52.4%	47.1%
Software & Services	28.2%	32.9%	0.0%	17.2%	0.0%	1.4%	37.4%	37.3%	47.0%	47.3%
Materials	12.7%	19.6%	0.0%	0.0%	0.0%	0.0%	50.6%	50.0%	46.3%	49.1%
Health Care Equipment & Services	16.8%	19.9%	0.0%	0.0%	0.0%	0.0%	61.5%	61.2%	59.2%	58.7%
Capital Goods	13.9%	19.0%	0.0%	0.0%	0.0%	0.0%	45.1%	46.1%	54.4%	55.4%
Media	-7.5%	-2.4%	0.0%	0.0%	0.0%	0.0%	40.6%	42.6%	55.3%	56.1%
Commercial & Professional Services	10.1%	12.5%	0.0%	0.0%	0.0%	0.0%	27.0%	28.0%	52.1%	53.0%
Food & Staples Retailing	1.7%	6.1%	0.0%	0.0%	0.0%	0.0%	57.6%	56.0%	60.0%	58.1%
Household & Personal Products	3.6%	1.3%	0.0%	0.0%	0.0%	0.0%	36.4%	36.6%	51.0%	49.2%
Food, Beverage & Tobacco	-1.1%	1.5%	0.0%	0.0%	0.0%	0.0%	42.8%	43.2%	59.3%	55.5%
Utilities	1.2%	0.8%	0.0%	-8.5%	0.0%	-50.7%	52.4%	52.4%	43.2%	43.1%
Insurance	13.1%	12.7%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Real Estate	0.9%	4.1%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Diversified Financials	19.8%	19.7%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Banks	13.1%	14.7%	0.0%	0.0%	0.0%	0.0%	-	-	-	-

Since Dec 2017, we start to use MSCI World Industry Group Indices and 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 do not find any bubble in any of the industry groups. The market did not continue to crash after a major correction in February, and went into a volatile period recently. At this stage, all positive bubbles have disappeared, and there is no negative bubble yet.

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.

# Portfolio Construction & Performance

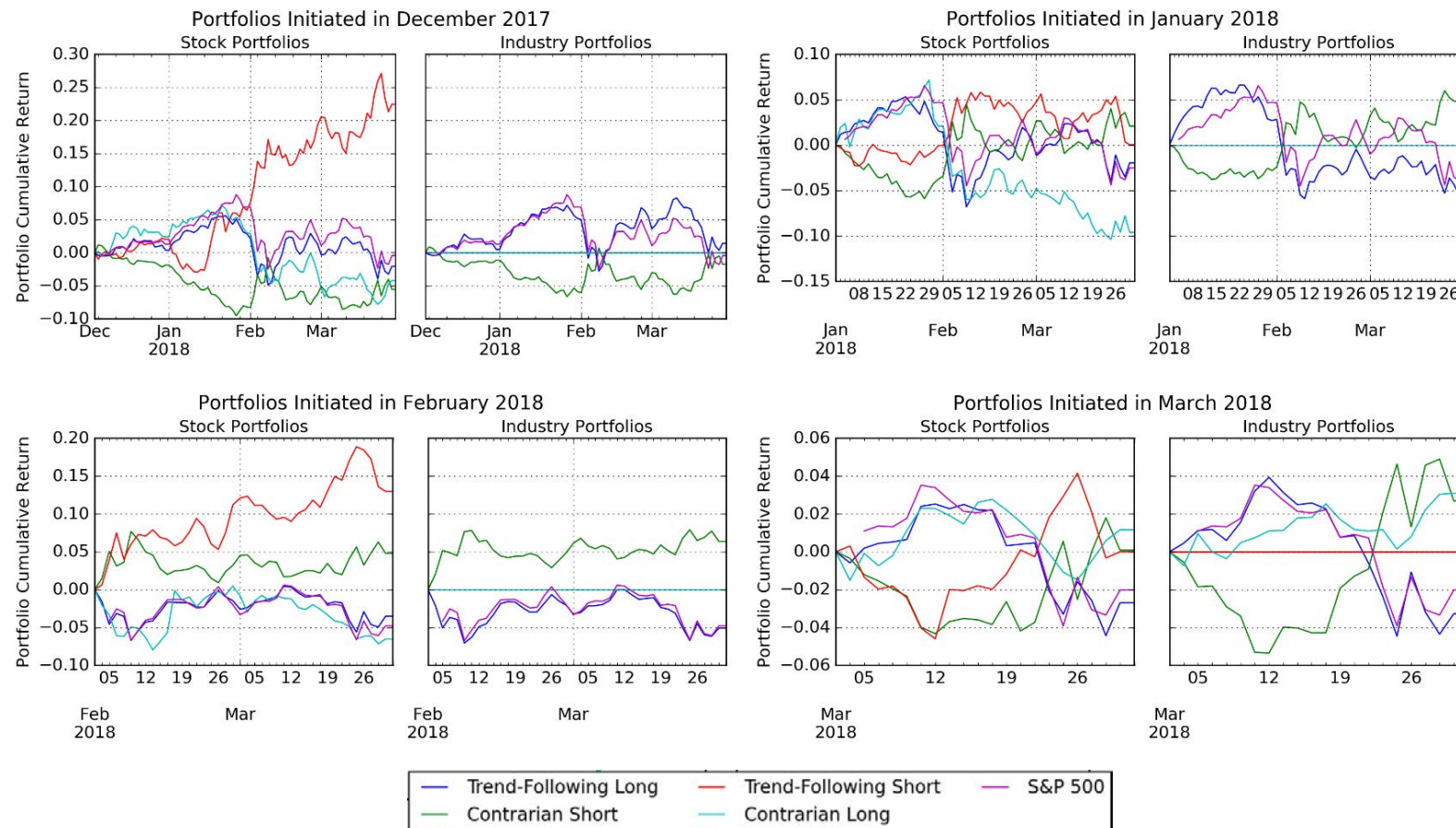
At the same time, we also classified 20 industries into 4 quadrants, and constructed 4 type of industry portfolios based on the 4 industry quadrants. Each portfolio consists of all the stocks in the industries listed in the corresponding quadrant. Following the same definitions as above, we have Trend-Following 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 Short Portfolios initiated in December 2017, January, February and March 2018 have good performances, due to the recent corrections in the market. 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.



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