

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.

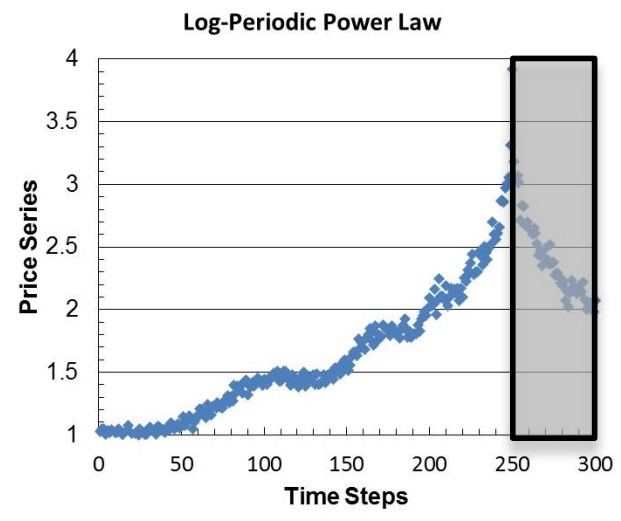
In the first part of this report, we present the state of the world, based on the analysis of the systemic assets. In the second part, we zoom in on the bubble behavior of single stocks and discuss some specific cases.

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>

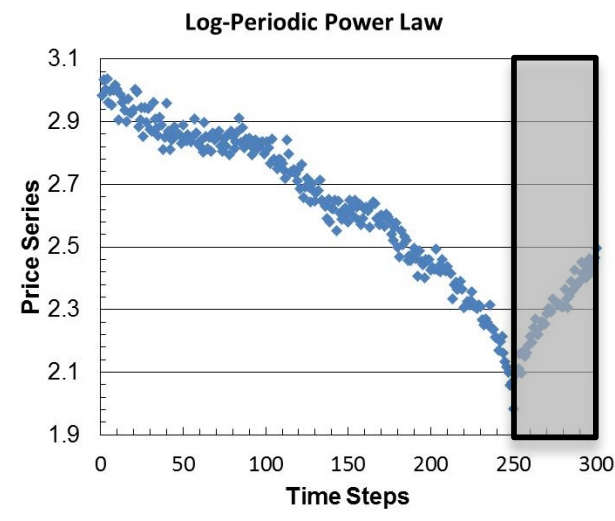
We use the Log-Periodic Power Law Singularity (LPPLS) model to hunt for the distinct fingerprint of **Bubbles**:

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.

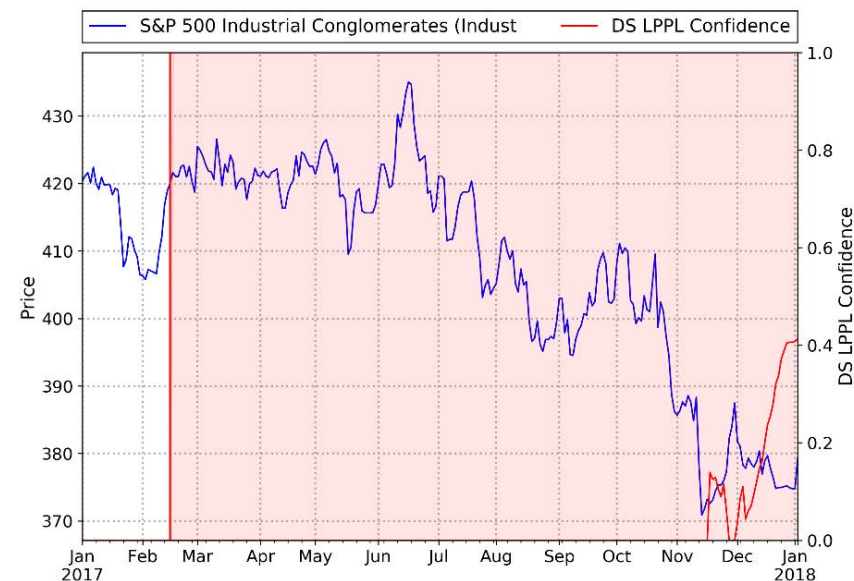
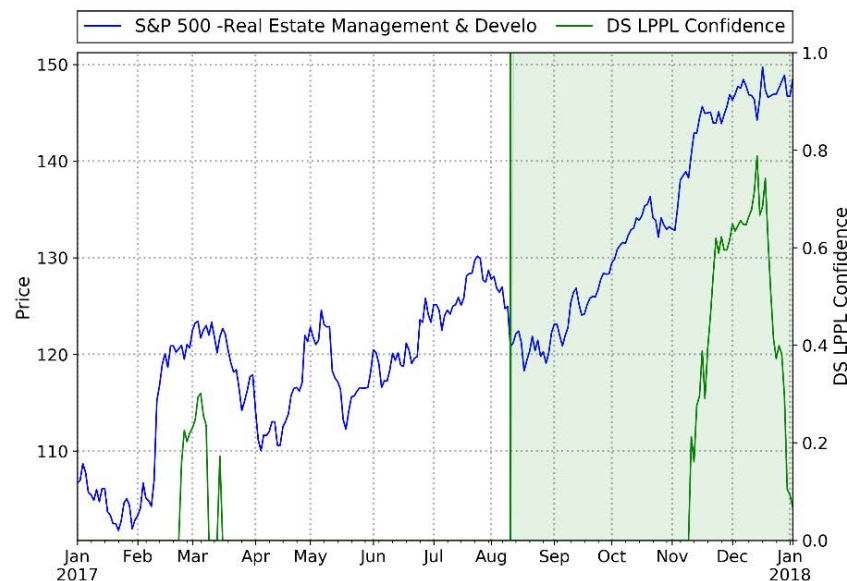


Positive bubble: imitation in buying



Negative bubble: imitation in selling

Announcement

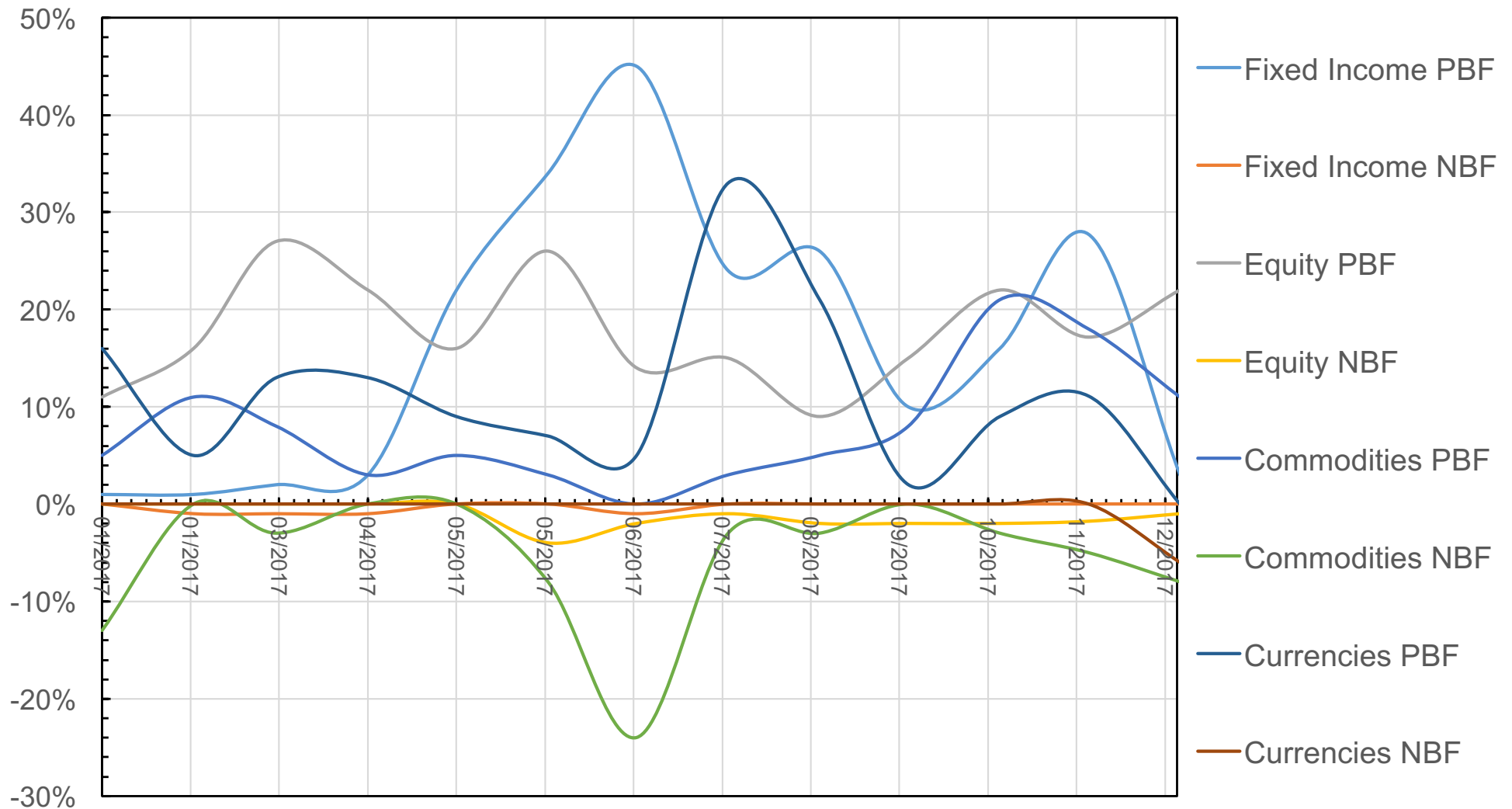


In this report, we reintroduce a revised version of our indicator time series plots. Above, two example plots for a positive, respectively, negative bubble are depicted. The plots always show the price of an asset in blue, as well as the duration of the most recent identified bubble, if there is one, as represented by the green/red shaded regions. Furthermore, the value of the DS LPPL Confidence indicator, ranging between 0-1, is depicted. The color of the indicator series changes according to the type of the associated bubble (positive = green, negative = red).

In addition to providing new indicator plots, we introduce a slight change to the filtering methodology of bubble signals. We impose the additional constraint that besides exhibiting bubble signals, the associated identified bubble size of an asset needs to be at least 5% in magnitude. This measure prevents noisy and too small price movements from being identified as significant bubbles, although they might exhibit super-exponential characteristics (which is the behavior that drives the intensity of the indicator values).

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	Subtype	Analyzed Assets	FPB	FNB
Fixed Income		155	3%	0%
	Government Bonds	55	7%	0%
	Finance and Insurance	21	0%	0%
	Corporate Bonds	79	0%	0%
Equity		169	22%	1%
	Country Indices	73	21%	0%
	Europe	36	6%	0%
	United States	60	35%	2%
Commodities		38	11%	8%
Forex		108	0%	6%

FPB – Fraction of assets in asset class showing positive bubble signals









FNB – Fraction of assets in asset class showing negative bubble signals

Due to the new constraint of counting bubble signals only when the associated bubble size is larger than 5% in magnitude, we can observe declines in most sector bubble fractions this month, for instance in the fixed income sector.

In the equity sector however, we can even observe an increase in positive bubble signals to 22%, compared to 18% the month before. This suggests strong positive bubble activity in this sector, since the fraction has increased, although in the previous report even smaller bubbles had been counted for the calculation of bubble fractions.

Except in the commodities sector where we have a slight increase in negative bubble activity, we observe, as during the last couple of months, consistently low negative bubble activity in the other sectors.

Fixed Income - Government Bonds

Name	YOY-Return	Bubble size		DS LPPL Confidence
iBoxx Asia Indonesia Index	15%		8%	 75%
iBoxx Asia Indonesia Government Index	15%		8%	 74%
iBoxx GEMX Hungary Index	7%		7%	 16%
iBoxx GEMX Nigeria Index	27%		18%	 13%

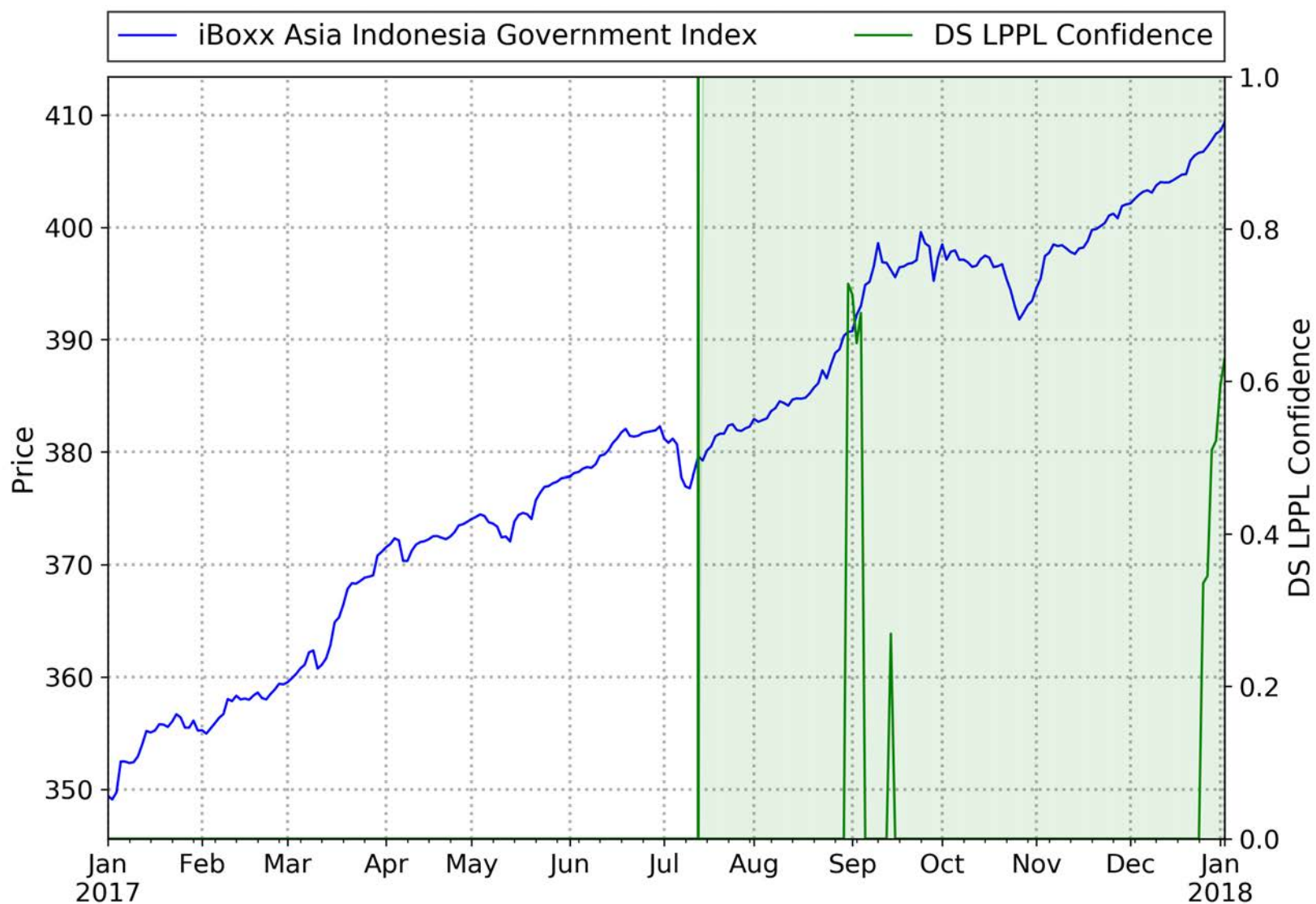
During the previous month, a slight decline in positive bubble activity could be observed in the government bond sector while negative bubble signals remain near a level of zero activity.

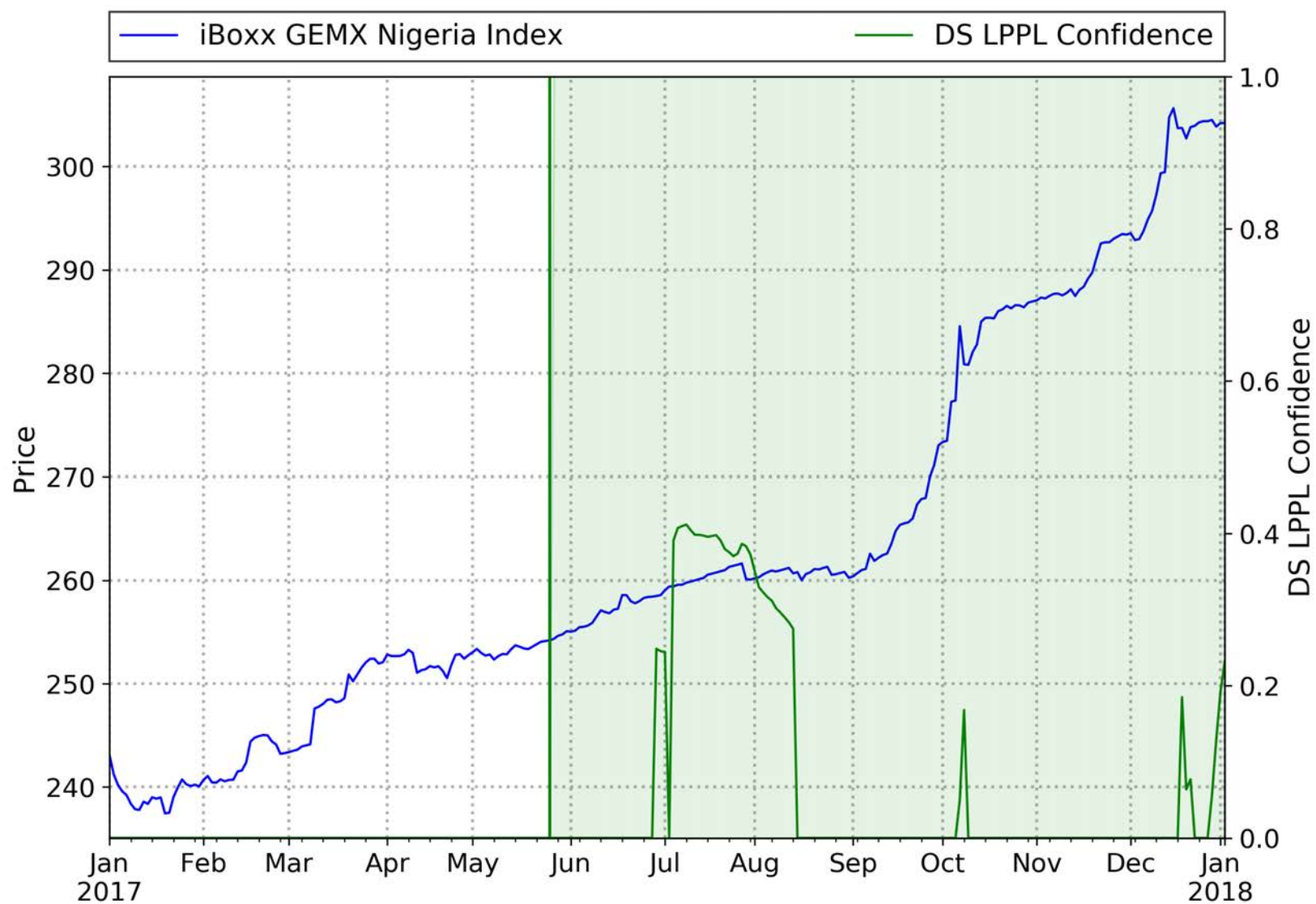
As, at the beginning of 2018, government bonds are the only assets within the fixed income sector exhibiting bubble activity with significant bubble sizes above five percent, the positive bubble fraction within the complete fixed income sector has dropped by about 25%.

A positive bubble at small size is identified in Indonesian government bonds with a high level of 75% for the confidence indicator. The time evolution of the index and associated confidence indicator are shown on the next slide.

Moreover, a medium-sized bubble is identified in the Nigerian government bond index at a low level of the DS LPPL Confidence indicator. The Nigerian index will therefore be monitored in future reports, in order to show the development of the indicator value. A snapshot of previous year's index development is already given in one of the following slides.

Most other bond indices that had been mentioned in the previous report have vanished from the list due to their insignificant bubble size.





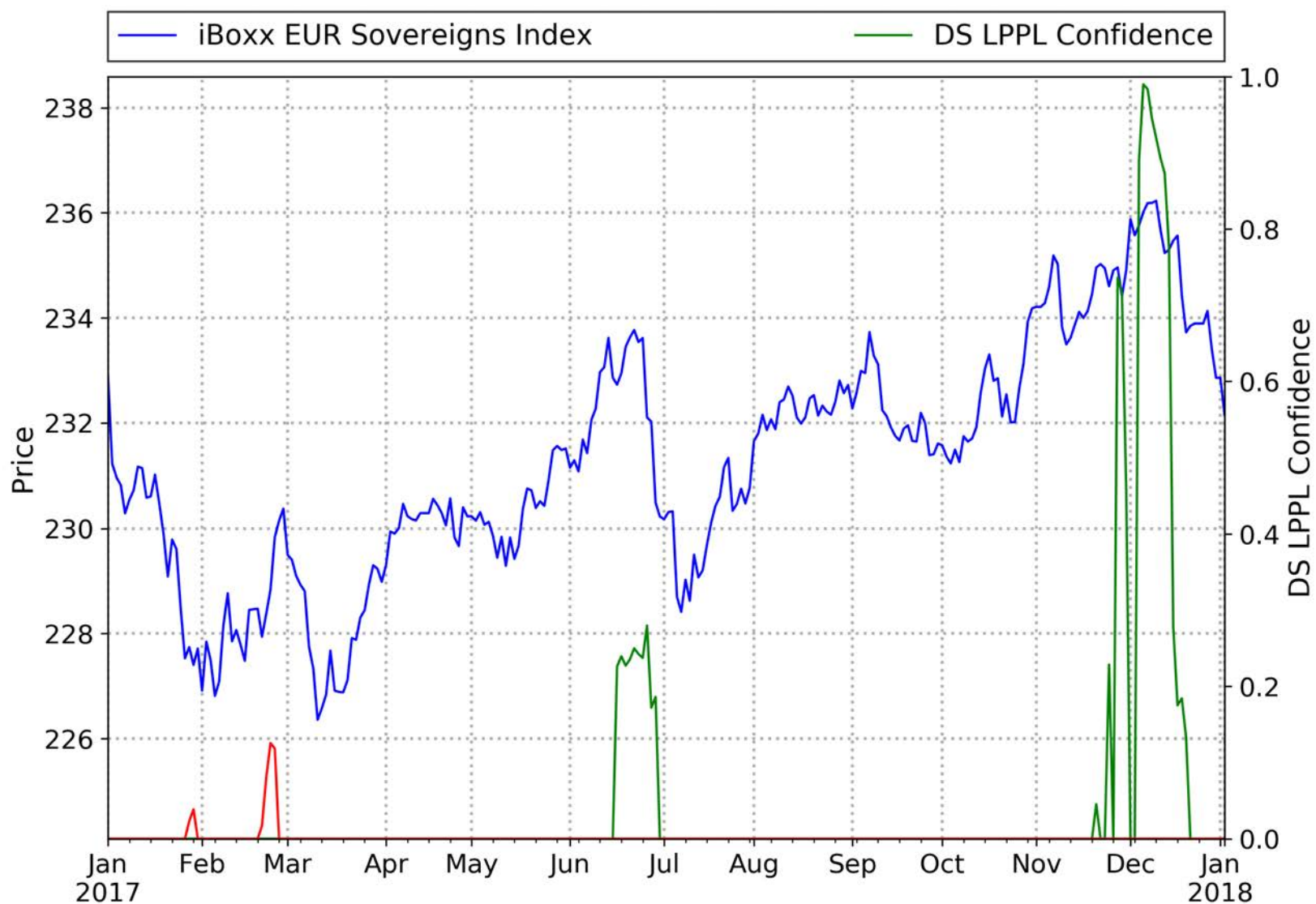
Fixed Income - Corporate Bonds, F&I Bonds

In this month's analysis, no bubbles at bubble sizes above five percent are identified in both the corporate bond general, as well as the financial and insurance sectors.

All assets put in focus in last month's report were identified at low bubble sizes, which is why they disappeared from our present list now including a minimum bubble size of 5%.

An exception from this might be the iBoxx Euro Sovereigns index, which was identified to be in a 3% positive bubble at a confidence level of 99% one month ago. Meanwhile, it has undergone a minor correction, as visible on the following slide. As a result, the indicator value dropped. From the corresponding plot, it can also be seen that previously, in mid 2017, bubble-typical super-exponential behavior followed by a crash had been correctly identified in advance.

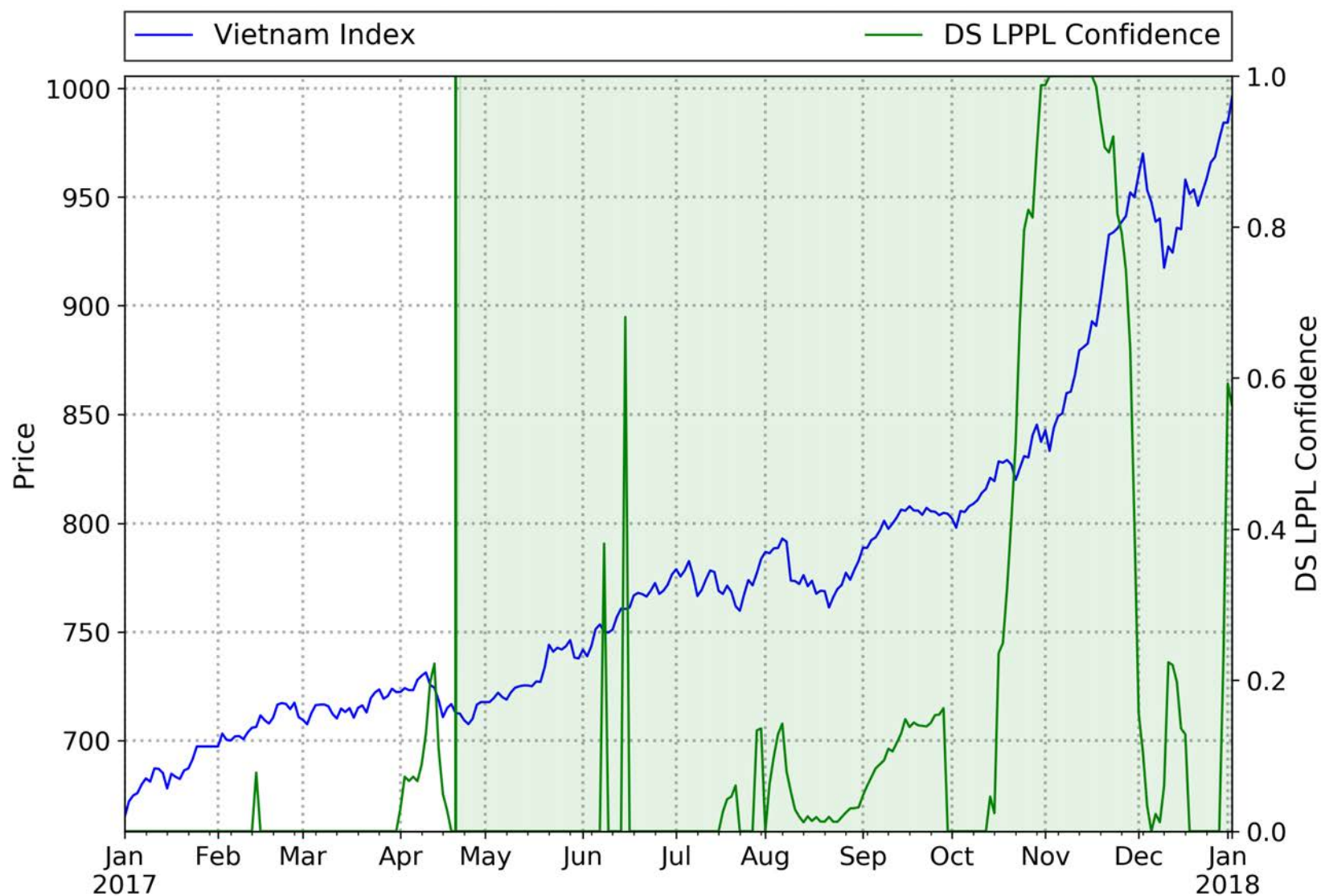
All in all, we conclude our fixed income part with the positive news, that only few bubble signals worth mentioning have been detected at the end of 2017. This suggests a relaxation of the bond sector, which had been much more tumultuous (in terms of positive bubble formation) during mid 2017, for example, as can be seen from the bubble fraction overview plot, in the beginning of the report.



Equities - Country Performance

Name	YOY-Return	Bubblesize	DS LPPL Confidence
Vietnam Index	47%	41%	53%
S&P BSE Sensex Index	24%	15%	41%
Dow Jones Composite Index	21%	15%	36%
Dow Jones Industrial Average Index	25%	17%	30%
New Zealand Se Top50 Free Index	19%	7%	26%
PX Prague SE Index	18%	13%	25%
Jakarta SE Composite Index	19%	9%	23%
TOPIX Stock Price Index	20%	20%	20%
ASX All Ordinaries Index	7%	8%	15%
NASDAQ Composite Index	27%	14%	12%

In the equity country indices section, at the top of our list of positive bubble candidates, we identify the Vietnam index with a detected bubble size of more than 40% at a medium-level indicator value. The year-over-year trend of the Vietnam Index is shown on the next slide, where it can be seen that we consistently identified periods of super-exponential price behaviour during the previous half year. In the beginning of December, we could observe an intermediate crash of the index, which was correctly forecasted in our November report. This correction on the one hand led to a temporary decline of the indicator value, but on the other hand through the now again increasing value of the confidence indicator, we can see that the price trajectory of the Vietnam Index is entering a super-exponential phase, again, which presumably is why it jumped back to the top of our list. Therefore, we suggest to keep in mind the increasing risk of a crash of possibly significant size occurring in the Vietnamese Markets in the near future.



Equities - United States and Europe

Name	YOY-Return	Bubblesize	DS LPPL Confidence
Positive Bubbles			
S&P 500 Health Care Providers & Services (Industry)	25%	12%	85%
S&P 500 Machinery (Industry)	37%	26%	64%
S&P 500 Air Freight & Logistics (Industry)	20%	25%	63%
S&P 500 Consumer Finance (Industry)	18%	28%	52%
S&P 500 Trading Companies & Distributors (Industry)	20%	41%	51%
S&P 500 Banks (Industry)	24%	23%	36%
S&P 500 Technology Hardware, Storage & Peripherals (Industry)	41%	29%	35%
S&P 500 Distributors (Industry)	12%	22%	31%
S&P 500 Capital Markets (Industry)	25%	16%	30%
S&P 500 Road & Rail (Industry)	34%	25%	30%
Negative Bubbles			
S&P 500 Industrial Conglomerates (Industry)	-9%	-11%	36%

Name	YOY-Return	Bubblesize	DS LPPL Confidence
STOXX Europe 600 Travel & Leisure EUR Price Index	15%	6%	95%
STOXX Europe 600 Insurance EUR Price Index	8%	8%	2%

Equities - United States and Europe

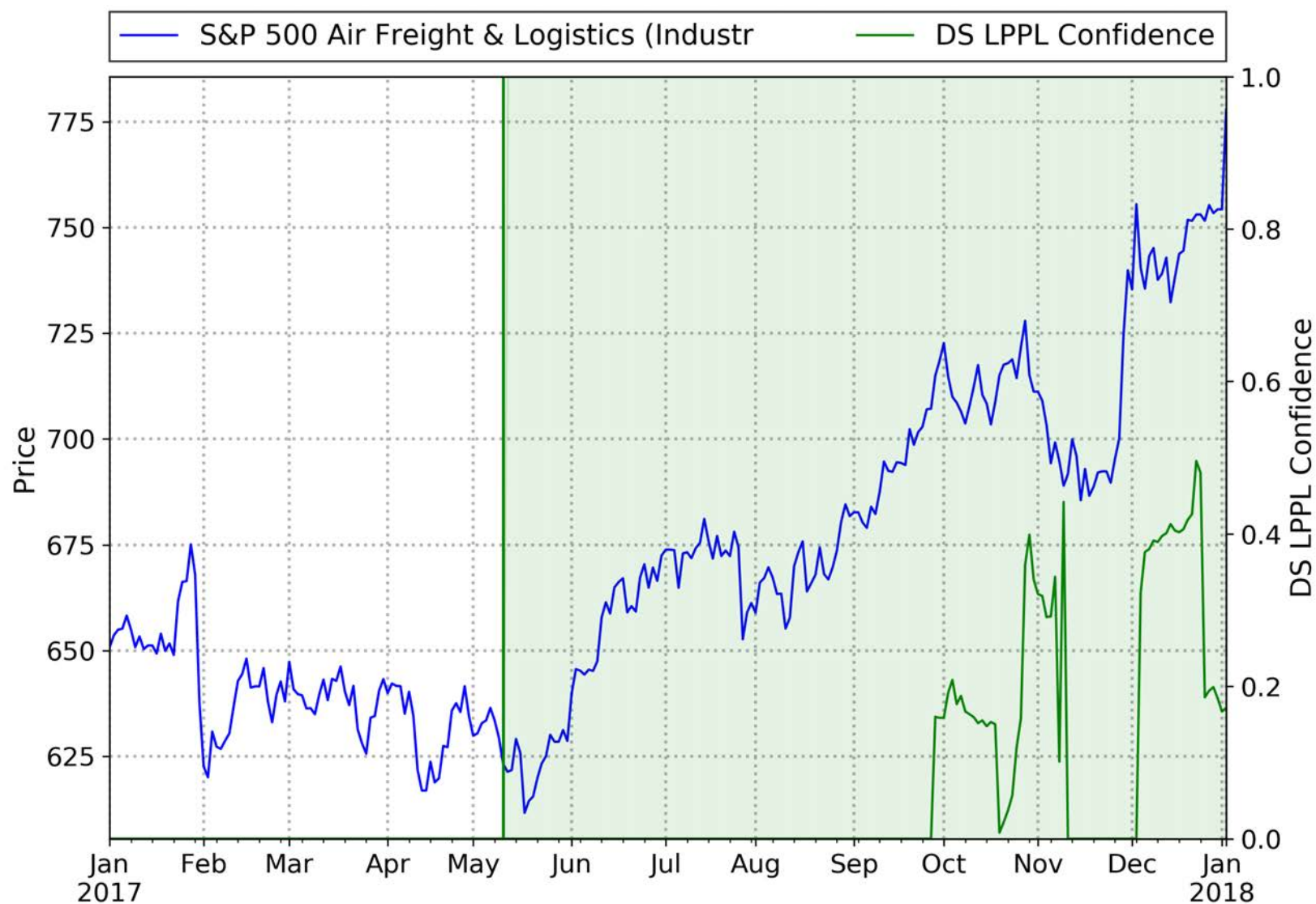
This month, increased positive bubble activity could be observed in both the US and European Equity markets, with the latter however with smaller bubble sizes than the US market.

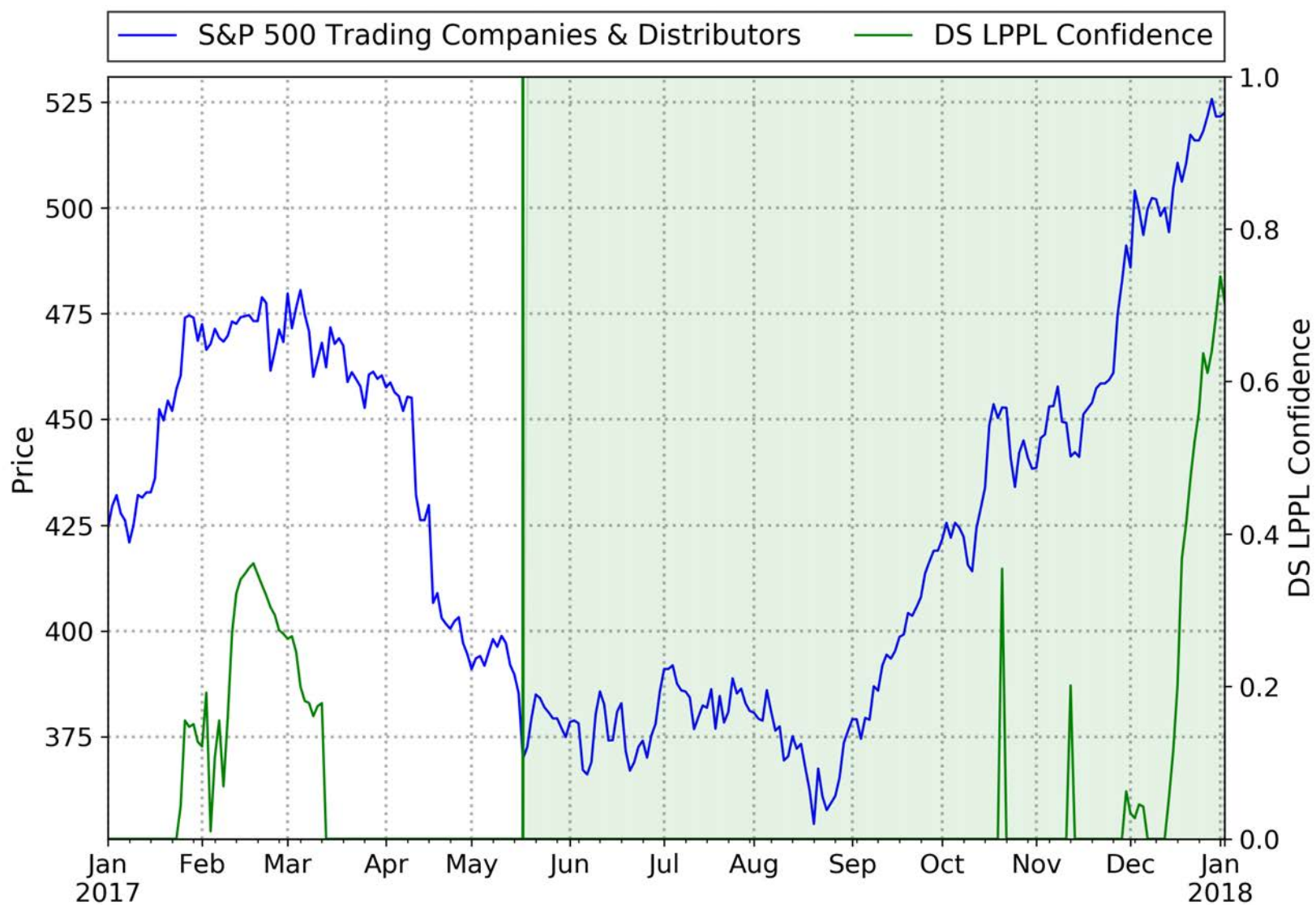
The strongest signal has been identified in the Health care sector, however at medium bubble size. The air freight and logistics branch of the S&P 500 is on the list for the second month now with larger bubble size (from 16% to 25%), as well as an increased indicator value (from 38% to 63%), compared to the beginning of December 17. The corresponding indicator time series is shown on the next page.

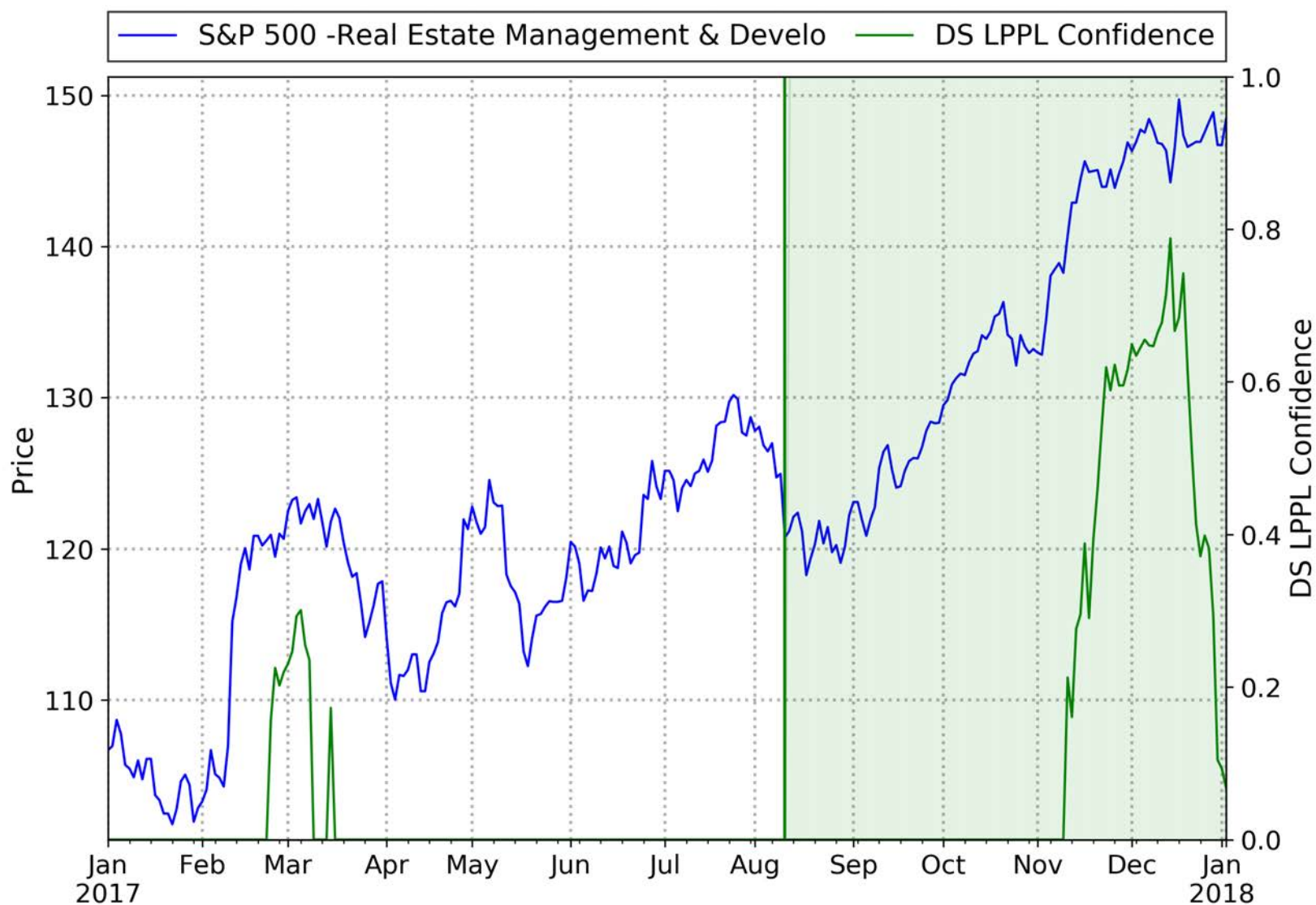
We can furthermore observe that a fairly large bubble (41%), having its beginning about six months ago, has been identified in the American Trading Companies & Distributors Index.

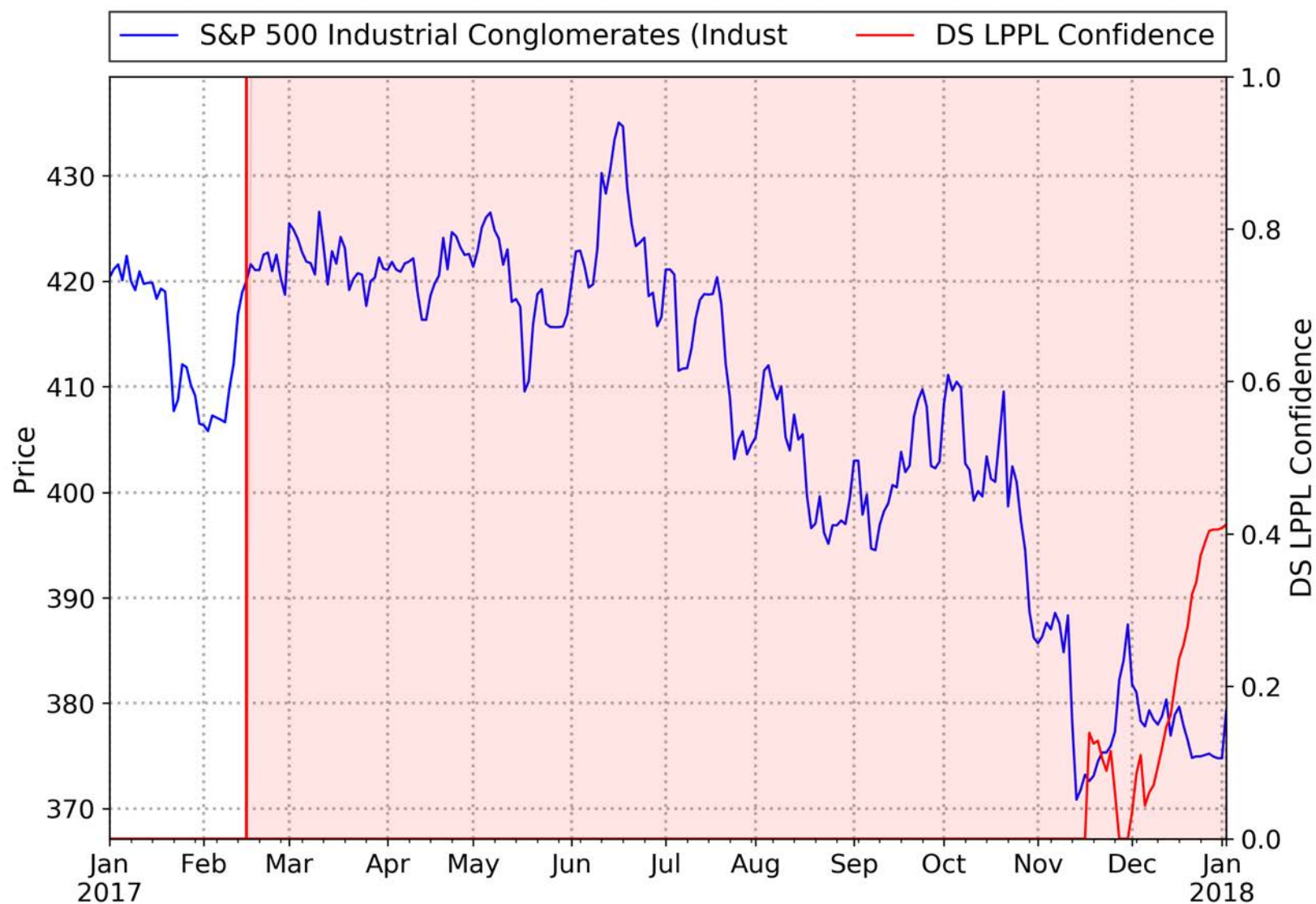
Strong signals in the real estate sector identified one month ago, have cooled down again, possibly due to the sideward movement of the index during December (see two pages ahead).

In the US markets, we detect one negative bubble asset this month, and none in the analyzed European equities.





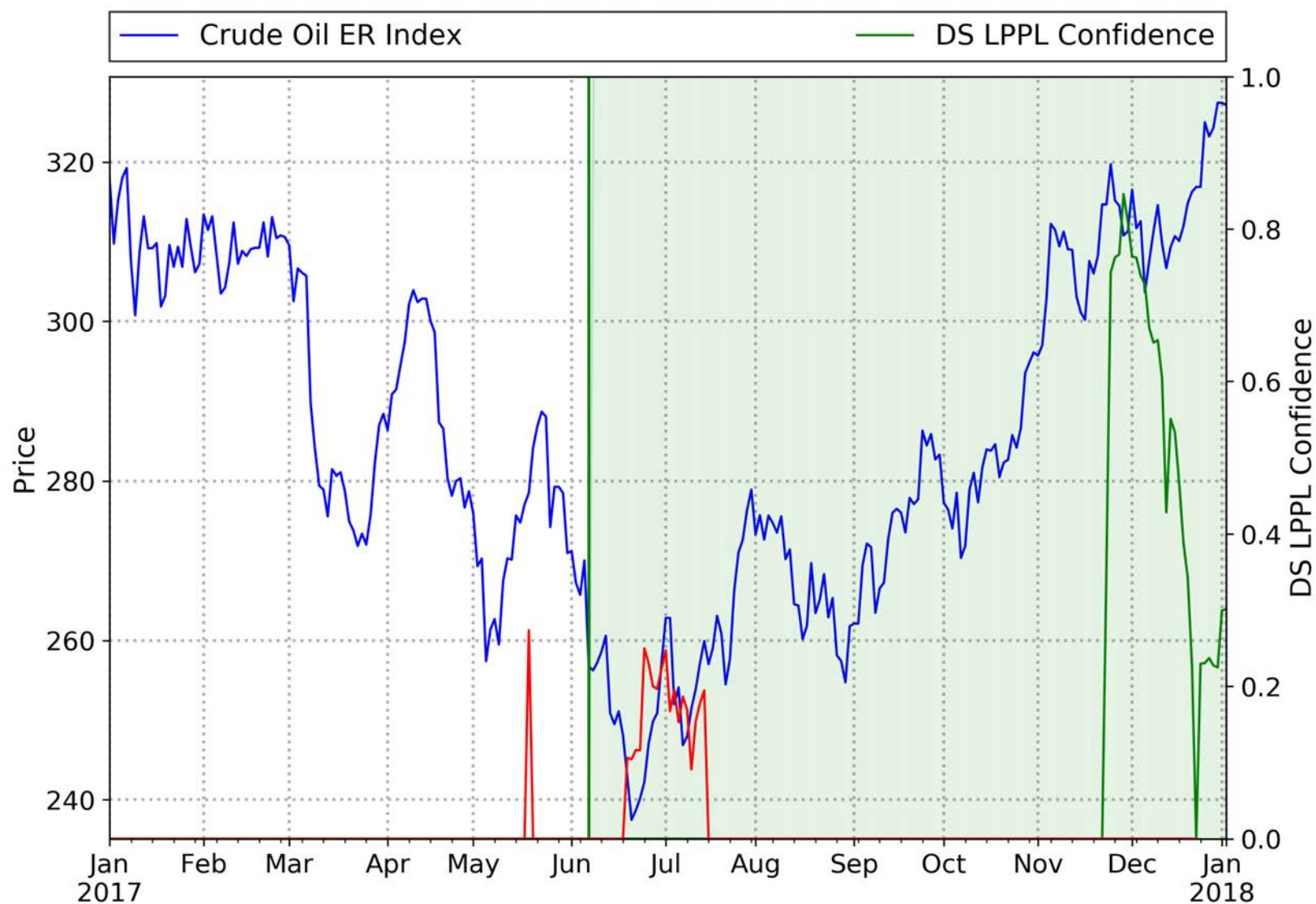


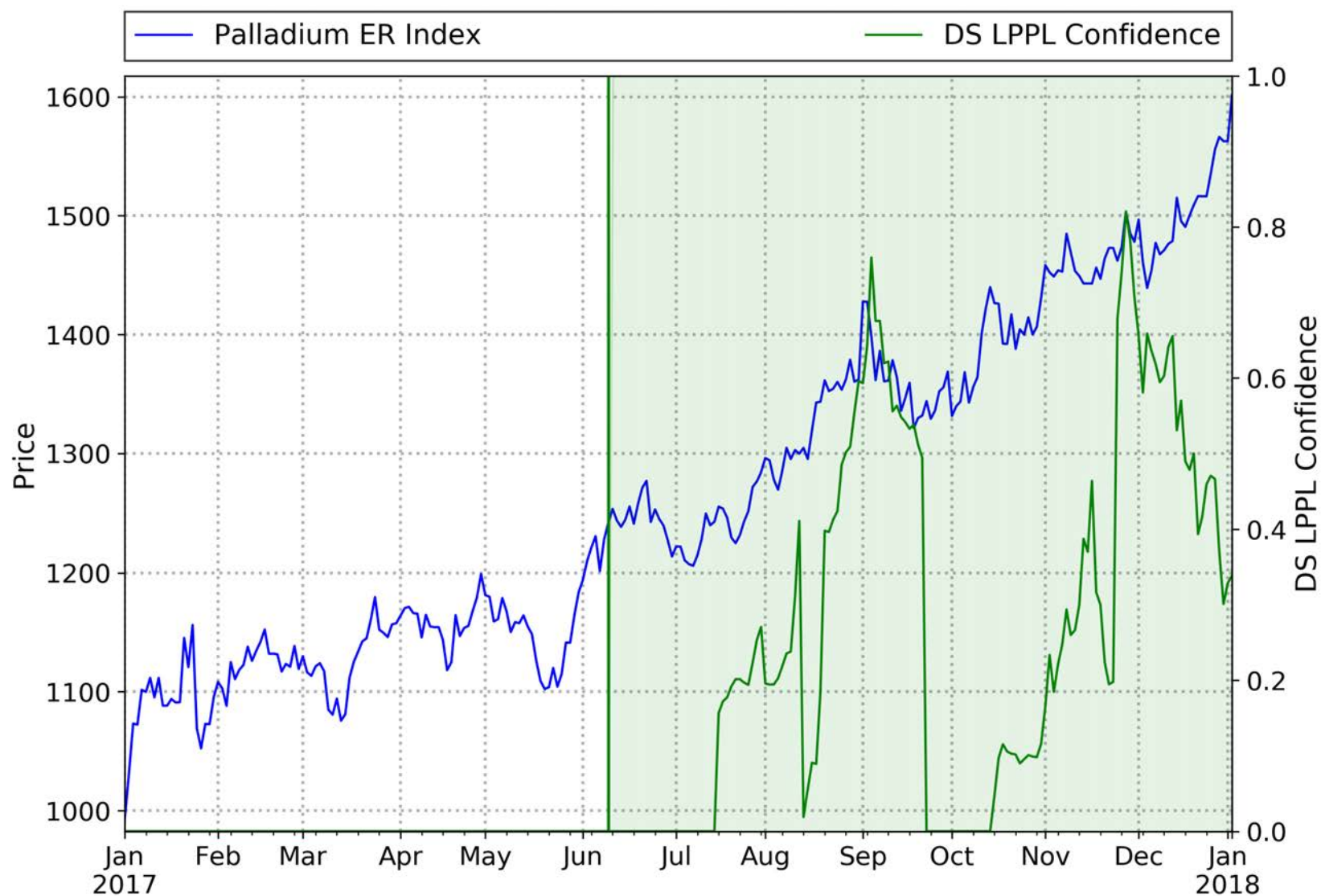


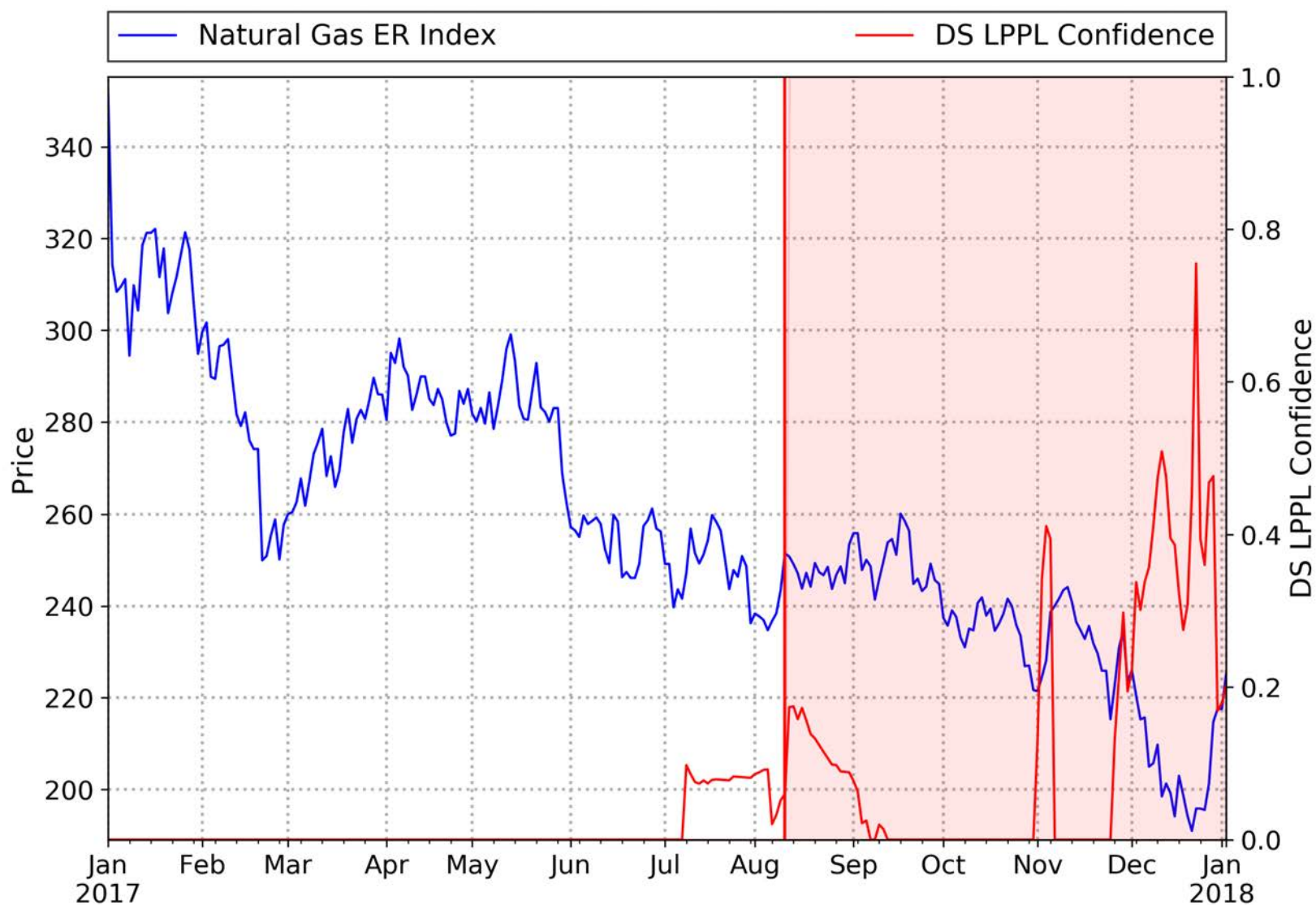
Commodities

Name	YOY-Return	Bubblesize	DS LPPL Confidence
Positive Bubbles			
Crude Oil ER Index	6%	28%	37%
Palladium ER Index	45%	29%	36%
Heating Oil ER Index	21%	30%	11%
Gasoil ER Index	21%	30%	9%
Negative Bubbles			
Natural Gas ER Index	-31%	-12%	17%
Robsta Coffee ER Index	-23%	-14%	17%
Coffee ER Index	-22%	-22%	15%

Commodities show slightly lower positive bubble activity and increased negative bubble activity. On the following few slides, the indicator time series for this month's top candidates are shown. From the plots of Crude Oil and Palladium, which both continue to be in a positive bubble state for about half a year now, one can observe that recently indicator values declined at intermediate correction points. Nevertheless, prices for both goods continue to surge, which is why no all-clear can be given on these commodities and they will be analyzed and discussed in the coming reports as well. Interestingly, this month, the Robsta coffee index has been joined by the coffee index on the list of negative bubble assets, which confirms the negative bubble trend that seems to be evolving in this branch.







Currencies – Real Effective Exchange Rates

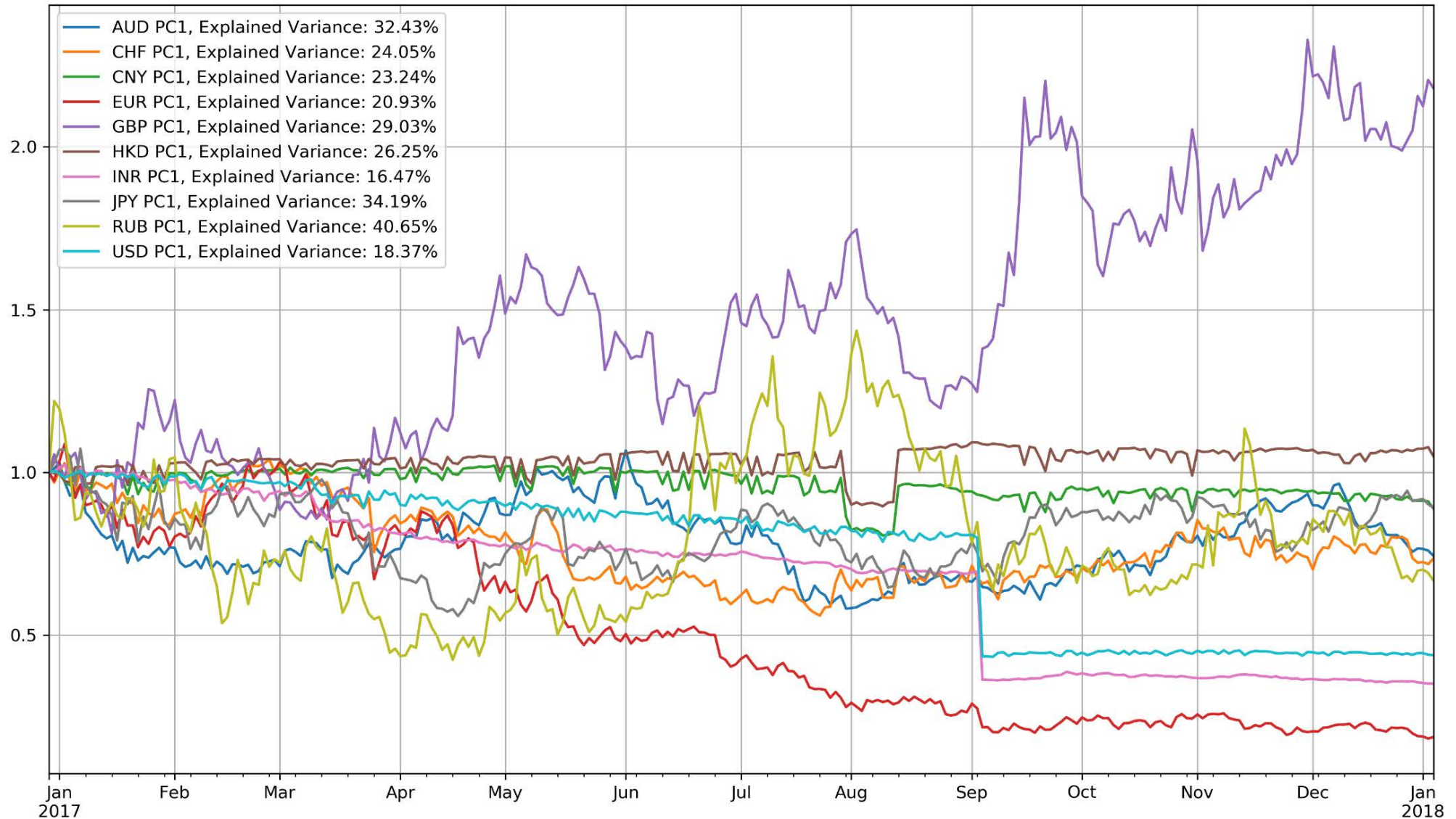
Name	YOY-Return	Bubblesize	DS LPPL Confidence
REER Index Hong Kong	-15%	-6%	98%
REER Index Brazil	-7%	-5%	48%
REER Index Ecuador	-7%	-6%	37%
REER Index Vietnam	-8%	-5%	22%
REER Index Japan	-6%	-6%	7%
REER Index Panama	-7%	-5%	4%

As introduced in the previous report, we start our currency market analysis by providing results on REER currency indices, which are good representatives for the collective value of a country's currency. It can be seen that this month, we only identify significant negative bubbles. At the top of our list is the Hong Kong Dollar REER Index, which is identified to be in a small negative bubble with a large confidence indicator value. This month, the Vietnam REER Index appears in our list like in the previous report. This result should be put in correspondence with the positive bubble identified in the Vietnamese Country Equity index, as discussed earlier in this report. The devaluation of the currency compared to other currencies (which is represented by a lower REER index value) could in fact be one of the drivers of the uptrend in the Vietnamese country index, as an anticipation of the increased economic competitiveness resulting from its weakening currency. On the next slide, our currency analysis is continued with the Principal Component Analysis (PCA) part, which was also introduced in the previous report. In the legend of the shown plot, the explained variances of the depicted first principal components are provided. On none of the PCA's, however, any signal was detected, which is why no additional table is given.

REER: real effective exchange rate

Currencies – PCA

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



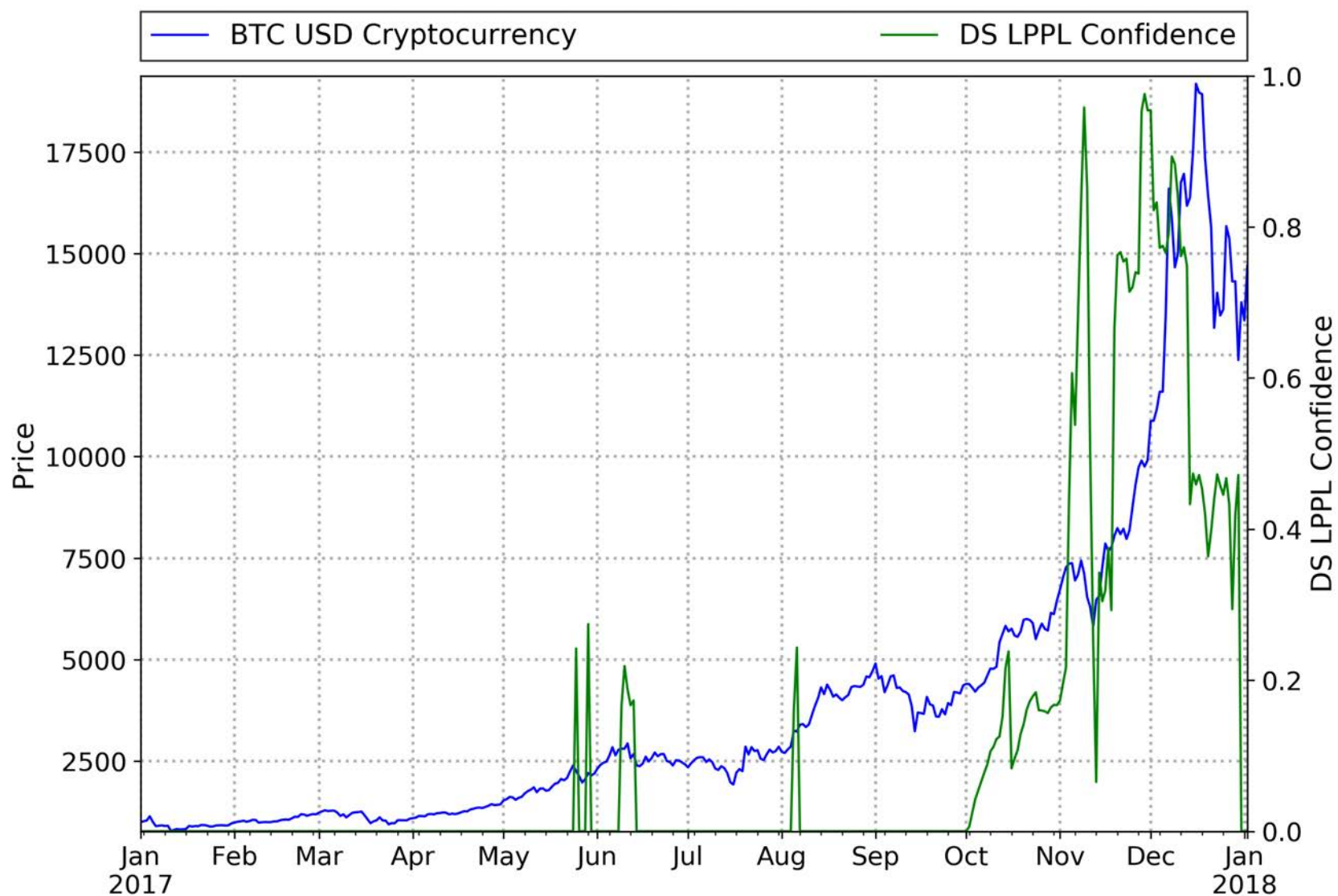
Currencies – Cryptocurrencies

We conclude our currency section with the new section on cryptocurrencies. In comparison to the previous report, we extend the list of analyzed cryptocurrency pairs to Bitcoin, Bitcoin Cash, Ethereum and Ripple Coin (all against the US Dollar). These four cryptocurrencies account for more than 70% of the total capitalization of the cryptocurrency market [coinmarketcap.com].

This month, we do not detect any bubble signals on any of the analyzed currencies. To frequent observers of the cryptocurrency markets, this should not be much of a surprise, as the cryptocurrency markets recently experienced a wave of large crashes. This correction naturally led to a decline in values of the DS LPPL confidence indicator.

As mentioned earlier, again, a decline in indicator values must not be understood as the definitive end of a bubble, even when a correction occurs. Much more, we can view bubbly assets as evolving periodically in waves of strong price growth followed by intermediate crashes. This view leaves open the possibility of regarding the cryptocurrency as still very prone to crashes.

When we take a look at the Bitcoin time series on the next slide, we can see that our model has reliably generated warning signals in advance for the majority of significant crashes occurring during the previous year.



For 804 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:

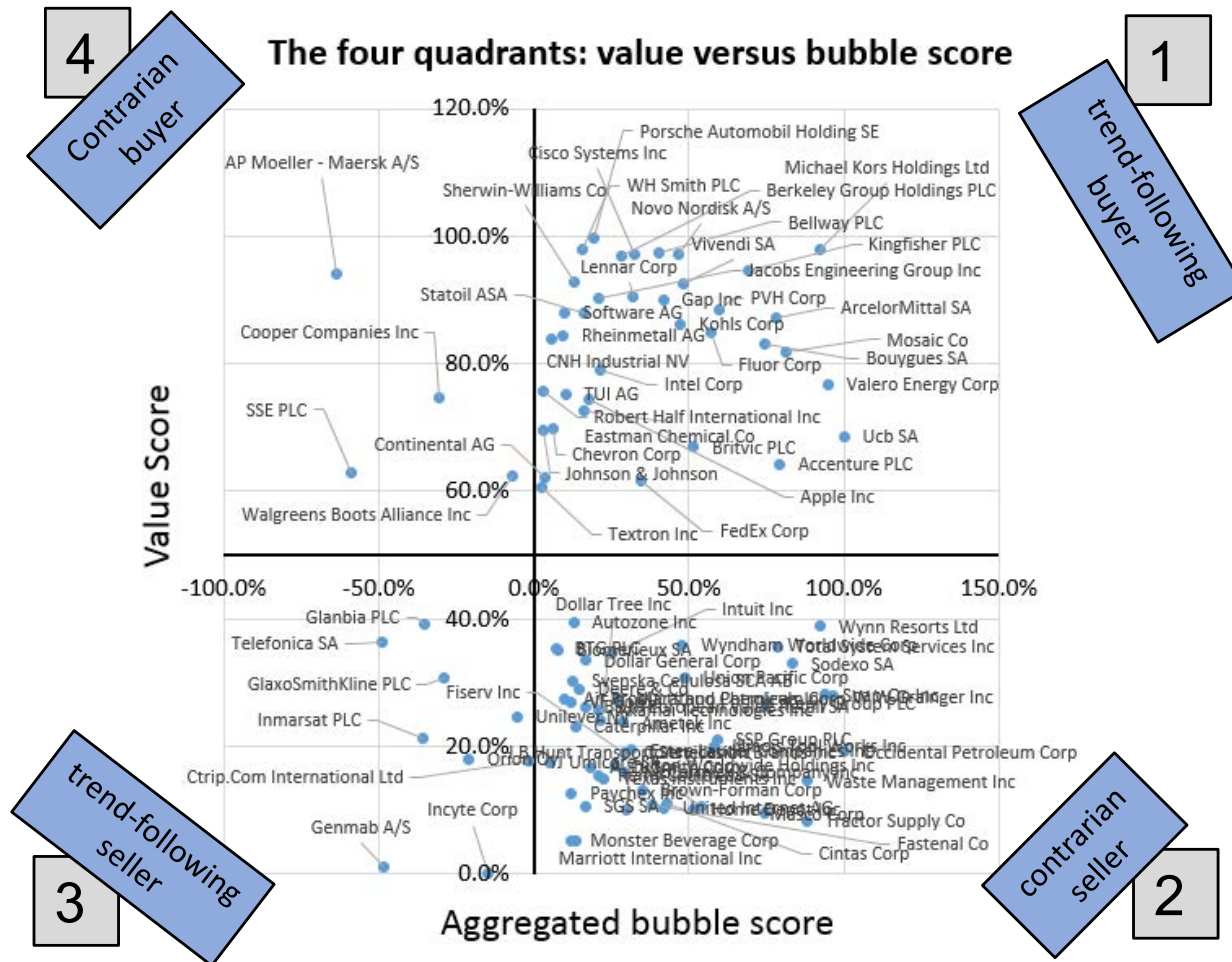
A value score that is based on the ROIC (Return on Invested Capital) taking into account the EV (Enterprise Value) to normalize for high/low market valuations and/or high/low debt;

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.

We upgrade the calculation method of the value score, which takes into account the ROIC heterogeneity among different industries.

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. Apple Inc);
2. [Quadrant 2](#): Stocks with a strong positive bubble score and a weak value score (e.g. Cintas Corp);
3. [Quadrant 3](#): Stocks with a strong negative bubble score and a weak value score (e.g. Incyte Corp);
4. [Quadrant 4](#): Stocks with strong negative bubble score and a strong financial strength (e.g. SSE PLC)

*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%.

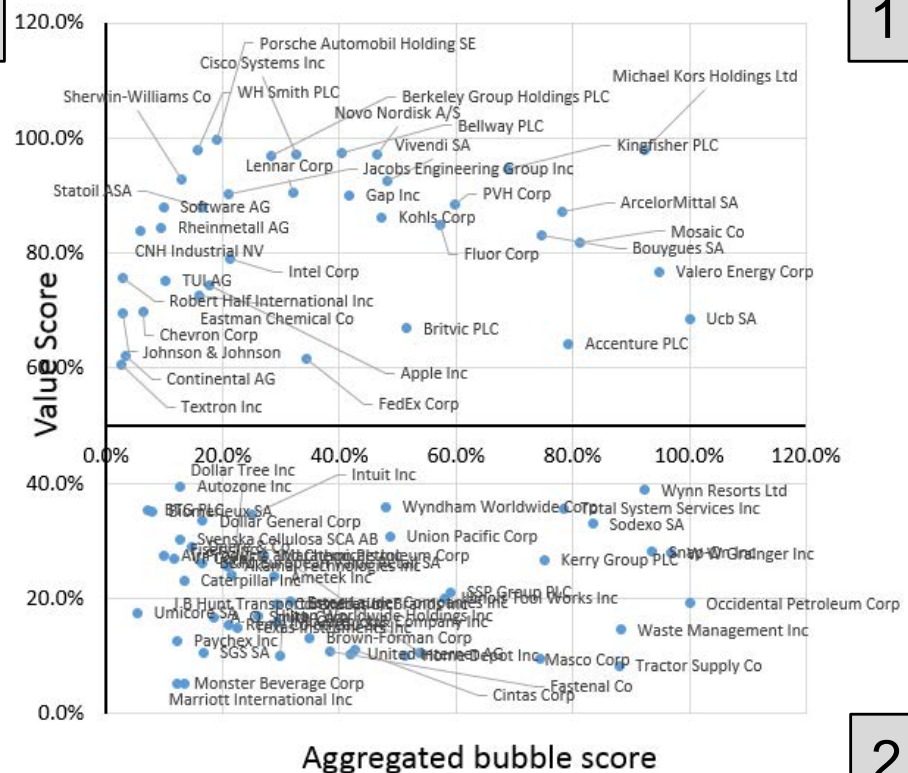
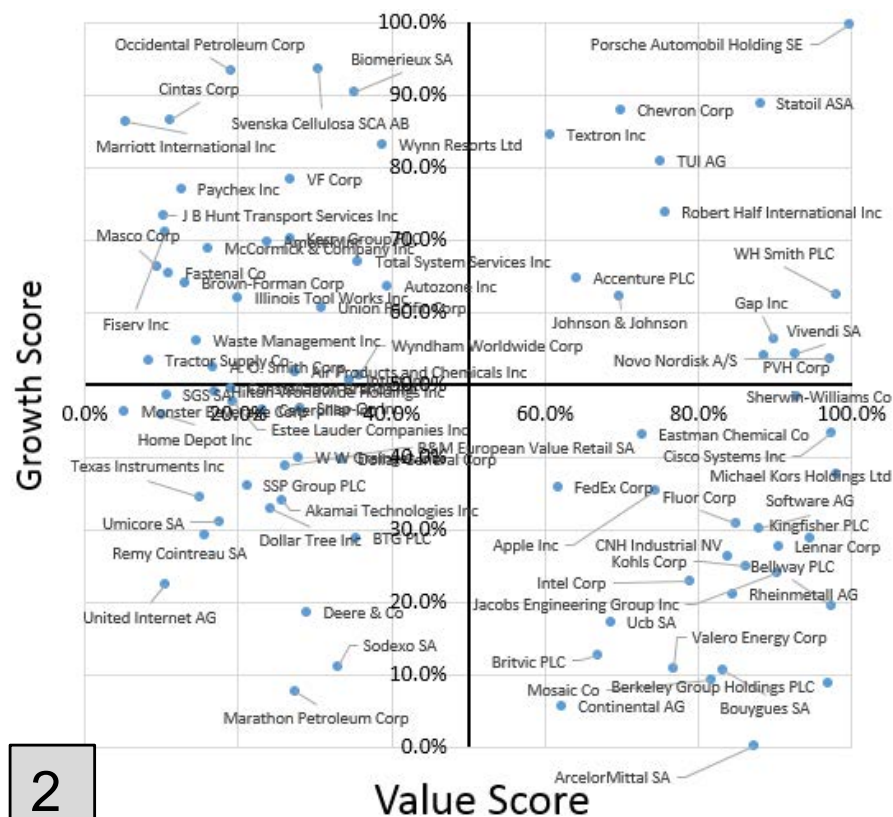
Each quadrant has its own specs:

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

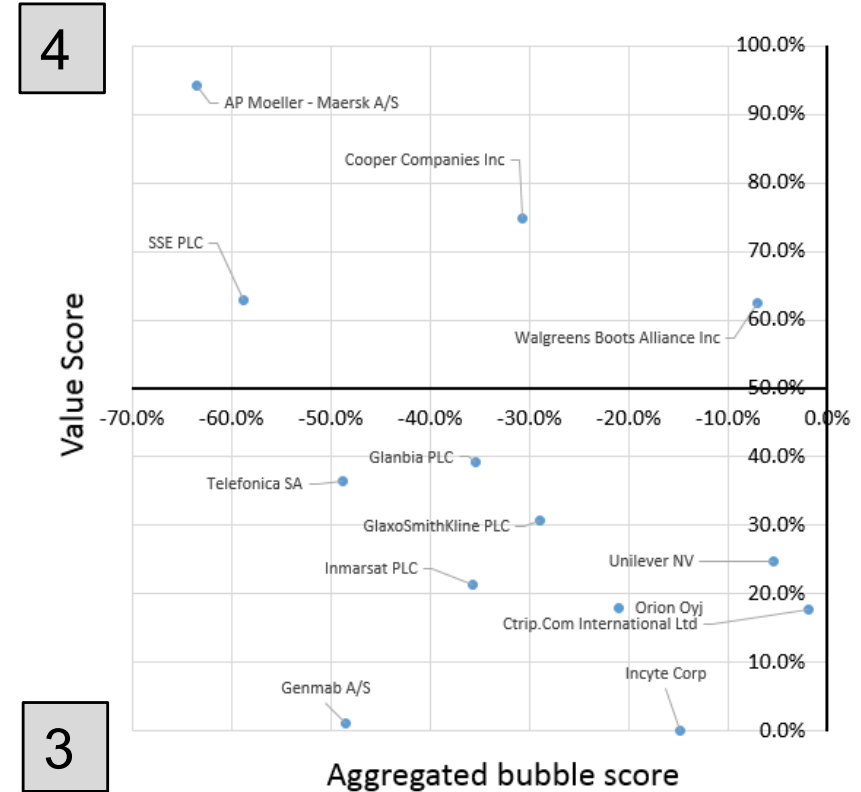
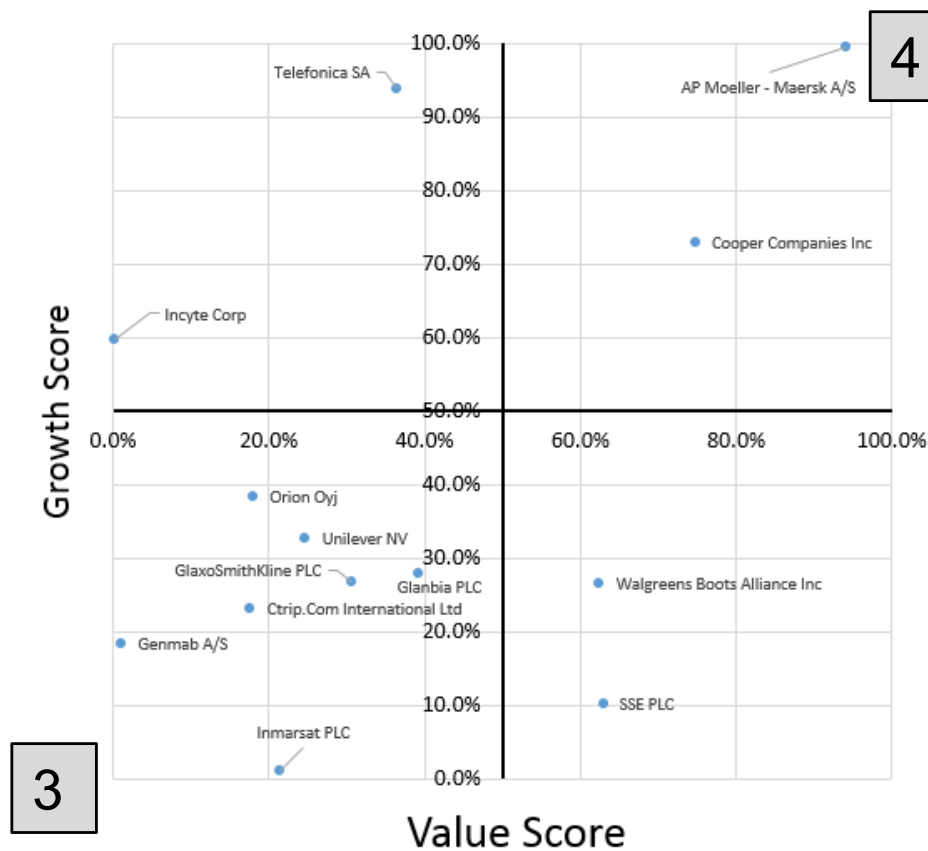
Strong positive bubble signals with strong (respectively weak) fundamentals



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
Apple Inc	United States of America	Technology Hardware & Equipment	41.9%	18.1%	Apr-17	17.8%	74.4%	35.3%
Cisco Systems Inc	United States of America	Technology Hardware & Equipment	27.5%	21.9%	Jun-17	32.6%	97.3%	43.3%
Intel Corp	United States of America	Semiconductors & Semiconductor Equipment	25.7%	28.5%	Mar-17	21.3%	79.0%	22.9%
Ucb SA	Belgium	Pharmaceuticals, Biotechnology & Life Sciences	2.7%	15.1%	Aug-17	100.0%	68.5%	17.3%
Berkeley Group Holdings PLC	United Kingdom	Consumer Durables & Apparel	45.6%	33.0%	Apr-17	28.4%	97.0%	8.8%
Britvic PLC	United Kingdom	Food, Beverage & Tobacco	40.3%	13.1%	May-17	51.5%	66.9%	12.7%
Bellway PLC	United Kingdom	Consumer Durables & Apparel	38.0%	39.9%	Jan-17	40.3%	97.4%	19.4%
Continental AG	Germany	Automobiles & Components	18.9%	11.2%	May-17	3.5%	62.2%	5.6%
Porsche Automobil Holding SE	Germany	Automobiles & Components	25.3%	43.7%	Aug-17	19.1%	99.8%	99.8%
Rheinmetall AG	Germany	Capital Goods	62.0%	36.2%	Mar-17	9.4%	84.5%	21.1%
Software AG	Germany	Software & Services	42.4%	23.2%	Jun-17	9.9%	87.9%	30.2%
Novo Nordisk A/S	Denmark	Pharmaceuticals, Biotechnology & Life Sciences	36.5%	40.3%	Mar-17	46.3%	97.1%	53.5%
Bouygues SA	France	Capital Goods	27.8%	18.3%	Jul-17	74.6%	83.2%	10.7%
Vivendi SA	France	Media	26.1%	23.1%	Apr-17	48.3%	92.7%	54.2%
ArcelorMittal SA	Luxembourg	Materials	21.3%	44.0%	Jun-17	78.3%	87.3%	0.2%
CNH Industrial NV	United Kingdom	Capital Goods	34.2%	13.1%	May-17	5.8%	83.8%	26.4%
Kingfisher PLC	United Kingdom	Retailing	-1.9%	11.8%	Jul-17	68.9%	94.5%	28.7%

Single Stocks

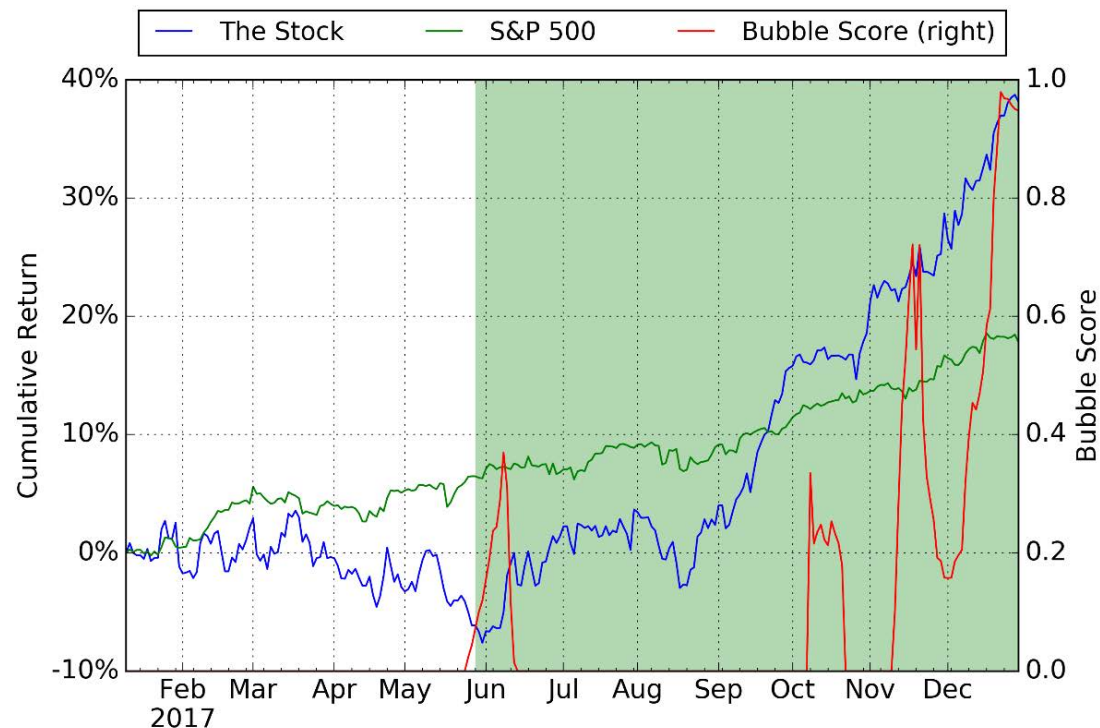
Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Statoil ASA	Norway	Energy	9.0%	15.5%	Feb-17	16.3%	88.1%	88.8%
WH Smith PLC	United Kingdom	Retailing	48.5%	36.6%	Jun-17	15.6%	98.0%	62.6%
TUI AG	Germany	Consumer Services	37.0%	32.3%	May-17	10.2%	75.1%	81.0%
Accenture PLC	Ireland; Republic of	Software & Services	32.2%	25.4%	Jun-17	79.2%	64.2%	64.7%
Chevron Corp	United States of America	Energy	7.8%	12.0%	Mar-17	6.3%	69.9%	87.9%
Eastman Chemical Co	United States of America	Materials	18.3%	16.0%	Mar-17	15.9%	72.6%	43.2%
FedEx Corp	United States of America	Transportation	33.2%	33.9%	Apr-17	34.4%	61.7%	35.8%
Fluor Corp	United States of America	Capital Goods	-3.6%	31.8%	Aug-17	57.2%	84.8%	30.8%
Gap Inc	United States of America	Retailing	41.9%	41.9%	Jan-17	41.7%	89.9%	56.3%
Jacobs Engineering Group Inc	United States of America	Capital Goods	14.9%	22.6%	Jun-17	21.1%	90.3%	24.0%
Johnson & Johnson	United States of America	Pharmaceuticals, Biotechnology & Life Sciences	21.9%	14.7%	Apr-17	2.8%	69.7%	62.3%
Michael Kors Holdings Ltd	United Kingdom	Consumer Durables & Apparel	47.6%	89.7%	May-17	92.3%	97.9%	37.6%
Kohls Corp	United States of America	Retailing	31.3%	37.6%	Mar-17	47.3%	86.2%	24.9%
Lennar Corp	United States of America	Consumer Durables & Apparel	44.8%	21.7%	Jul-17	32.1%	90.4%	27.6%
Mosaic Co	United States of America	Materials	-18.3%	24.5%	Aug-17	81.2%	81.7%	9.2%
PVH Corp	United States of America	Consumer Durables & Apparel	47.3%	35.9%	Mar-17	59.7%	88.6%	54.1%
Robert Half International Inc	United States of America	Commercial & Professional Services	12.5%	21.9%	May-17	2.9%	75.6%	73.9%
Sherwin-Williams Co	United States of America	Materials	44.6%	18.7%	Jul-17	13.0%	92.8%	48.4%
Textron Inc	United States of America	Capital Goods	13.7%	14.3%	Jan-17	2.6%	60.7%	84.6%
Valero Energy Corp	United States of America	Energy	38.2%	47.2%	May-17	94.8%	76.7%	10.9%

Single Stocks - Quadrant 1 stocks

Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

Example Valero Energy Corp:

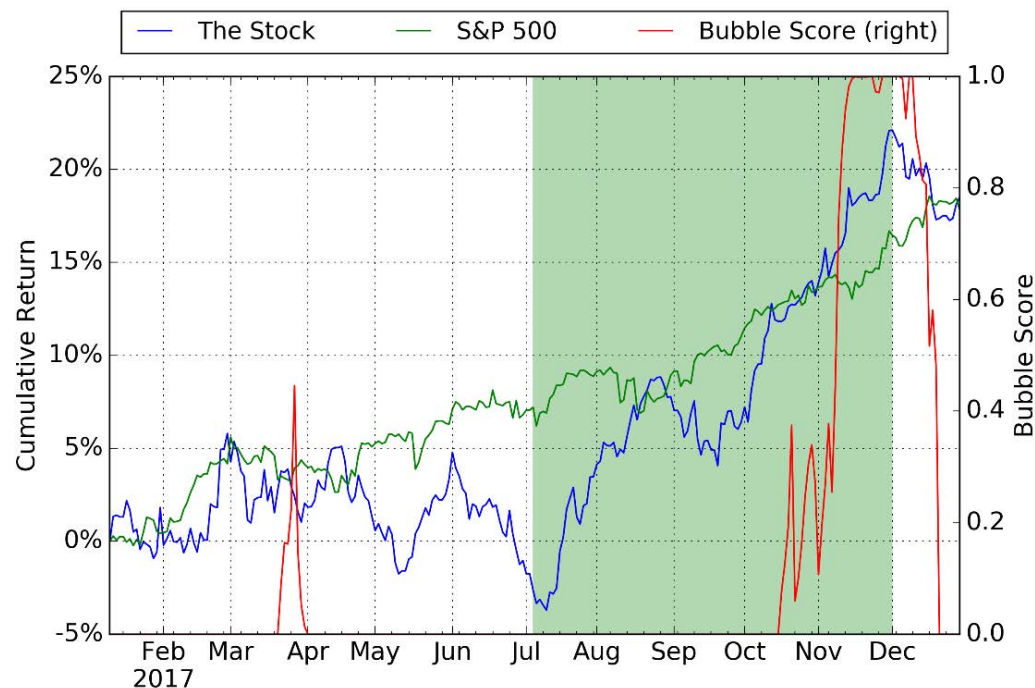


The above graph shows the one year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period is the strong positive bubble we identified. The Bubble Score of this seven month bubble has reached 94.8% with a bubble size 47.2%.

Single Stocks - Quadrant 1 stocks

Last month example: strong positive bubble signals with strong fundamentals, Public Service Enterprise Group 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 last month. Note that the stock went into a strong correction this month, 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

This month we again observe an abnormally large number of stocks in this Quadrant.

This suggests that the fundamentals are still dominantly weak while there is a general positive investment sentiment, possibly in denial of the weakness of the existing recovery.

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
Akamai Technologies Inc	United States of America	Software & Services	-7.0%	29.6%	May-17	20.8%	25.6%	34.0%
Cintas Corp	United States of America	Commercial & Professional Services	36.2%	36.2%	Jan-17	42.7%	11.1%	86.6%
Dollar Tree Inc	United States of America	Retailing	38.4%	39.9%	Feb-17	21.4%	24.1%	32.8%
Fastenal Co	United States of America	Capital Goods	13.9%	26.6%	Jun-17	38.3%	10.9%	65.4%
Fiserv Inc	United States of America	Software & Services	19.8%	14.1%	Feb-17	53.8%	10.6%	71.0%
Intuit Inc	United States of America	Software & Services	34.8%	18.8%	Jun-17	25.0%	34.6%	50.7%
J B Hunt Transport Services Inc	United States of America	Transportation	16.1%	30.8%	Jun-17	29.9%	10.2%	73.4%
Marriott International Inc	United States of America	Consumer Services	65.7%	56.0%	Feb-17	13.3%	5.3%	86.3%
Monster Beverage Corp	United States of America	Food, Beverage & Tobacco	46.8%	34.7%	Mar-17	12.2%	5.2%	46.3%
Paychex Inc	United States of America	Software & Services	11.0%	18.1%	Jun-17	12.2%	12.6%	77.1%
Tractor Supply Co	United States of America	Retailing	-1.6%	40.5%	Aug-17	87.9%	8.3%	53.4%
Texas Instruments Inc	United States of America	Semiconductors & Semiconductor Equipment	39.5%	38.3%	Jan-17	22.6%	14.9%	34.5%
Wynn Resorts Ltd	United States of America	Consumer Services	83.4%	31.7%	Jul-17	92.3%	38.8%	83.2%
Umicore SA	Belgium	Materials	43.6%	48.6%	Jan-17	5.3%	17.5%	31.0%
B&M European Value Retail SA	Luxembourg	Retailing	40.8%	25.0%	Jun-17	16.5%	26.1%	38.8%
BTG PLC	United Kingdom	Pharmaceuticals, Biotechnology & Life Sciences	28.5%	12.9%	Apr-17	7.1%	35.4%	28.9%
United Internet AG	Germany	Software & Services	47.3%	19.7%	Jun-17	41.9%	10.4%	22.5%
Biomerieux SA	France	Health Care Equipment & Services	53.4%	30.1%	Apr-17	7.8%	35.1%	90.5%
Remy Cointreau SA	France	Food, Beverage & Tobacco	45.5%	26.5%	Apr-17	21.1%	15.5%	29.2%
Sodexo SA	France	Consumer Services	7.3%	7.7%	Jul-17	83.4%	33.0%	11.1%
Kerry Group PLC	Ireland; Republic of	Food, Beverage & Tobacco	34.5%	21.4%	Aug-17	75.1%	26.7%	70.1%
SGS SA	Switzerland	Commercial & Professional Services	19.8%	20.7%	Mar-17	16.6%	10.7%	48.5%
SSP Group PLC	United Kingdom	Consumer Services	74.3%	40.1%	Jul-17	59.0%	21.1%	36.1%
Ametek Inc	United States of America	Capital Goods	43.7%	19.8%	Jun-17	28.7%	23.8%	69.7%

Single Stocks - Quadrant 2 stocks

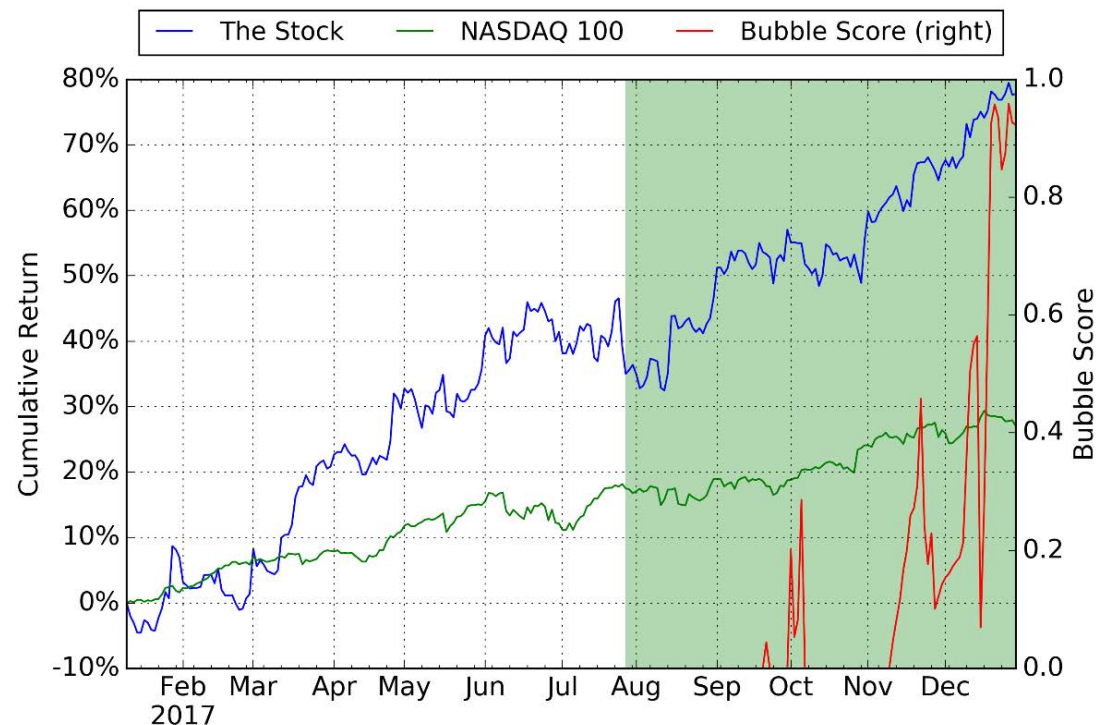
Quadrant 2 stocks: strong positive bubble signals with weak fundamentals (cont'd)

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
A. O. Smith Corp	United States of America	Capital Goods	28.1%	21.4%	Apr-17	18.5%	16.8%	52.5%
Air Products and Chemicals Inc	United States of America	Materials	12.5%	16.4%	Jan-17	10.0%	27.4%	51.7%
Autozone Inc	United States of America	Retailing	-10.0%	37.6%	Jul-17	12.8%	39.6%	63.7%
Brown-Forman Corp	United States of America	Food, Beverage & Tobacco	55.5%	46.7%	Mar-17	34.9%	13.1%	64.1%
Caterpillar Inc	United States of America	Capital Goods	67.7%	64.7%	Jan-17	13.3%	23.1%	46.6%
Deere & Co	United States of America	Capital Goods	48.8%	46.6%	Jan-17	14.6%	29.0%	18.5%
Dollar General Corp	United States of America	Retailing	26.4%	26.4%	Jul-17	16.5%	33.5%	39.7%
Estee Lauder Companies Inc	United States of America	Household & Personal Products	60.8%	39.4%	May-17	31.6%	19.4%	47.6%
W W Grainger Inc	United States of America	Capital Goods	0.0%	40.0%	Jul-17	96.7%	27.9%	40.0%
Home Depot Inc	United States of America	Retailing	40.3%	25.2%	Jun-17	51.3%	10.1%	45.8%
Hilton Worldwide Holdings Inc	United States of America	Consumer Services	44.2%	28.3%	Jun-17	26.0%	16.9%	49.1%
Illinois Tool Works Inc	United States of America	Capital Goods	36.1%	20.6%	May-17	58.0%	20.0%	61.9%
Masco Corp	United States of America	Capital Goods	37.1%	18.1%	Aug-17	74.3%	9.5%	66.3%
McCormick & Company Inc	United States of America	Food, Beverage & Tobacco	12.4%	6.9%	Jun-17	29.3%	16.0%	68.8%
Marathon Petroleum Corp	United States of America	Energy	34.0%	33.9%	Mar-17	27.0%	27.5%	7.7%
Occidental Petroleum Corp	United States of America	Energy	6.7%	25.1%	Jul-17	100.0%	19.2%	93.3%
Snap-On Inc	United States of America	Capital Goods	-1.8%	15.9%	Jul-17	93.6%	28.1%	46.8%
Constellation Brands Inc	United States of America	Food, Beverage & Tobacco	54.9%	17.9%	Jul-17	29.4%	19.0%	49.5%
Total System Services Inc	United States of America	Software & Services	48.5%	35.2%	May-17	78.4%	35.7%	66.9%
Union Pacific Corp	United States of America	Transportation	28.1%	23.8%	Jun-17	48.6%	30.8%	60.7%
VF Corp	United States of America	Consumer Durables & Apparel	42.8%	26.2%	Jul-17	11.8%	26.9%	78.4%
Waste Management Inc	United States of America	Commercial & Professional Services	23.5%	15.4%	Jul-17	88.2%	14.6%	56.1%
Wyndham Worldwide Corp	United States of America	Consumer Services	51.0%	18.7%	Aug-17	47.9%	35.8%	51.4%
Svenska Cellulosa SCA AB	Sweden	Materials	87.1%	33.1%	Jun-17	12.7%	30.3%	93.7%

Single Stocks - Quadrant 2 stocks

Quadrant 2 stocks: strong positive bubble signals with weak fundamentals

Example: Wynn Resorts Ltd.

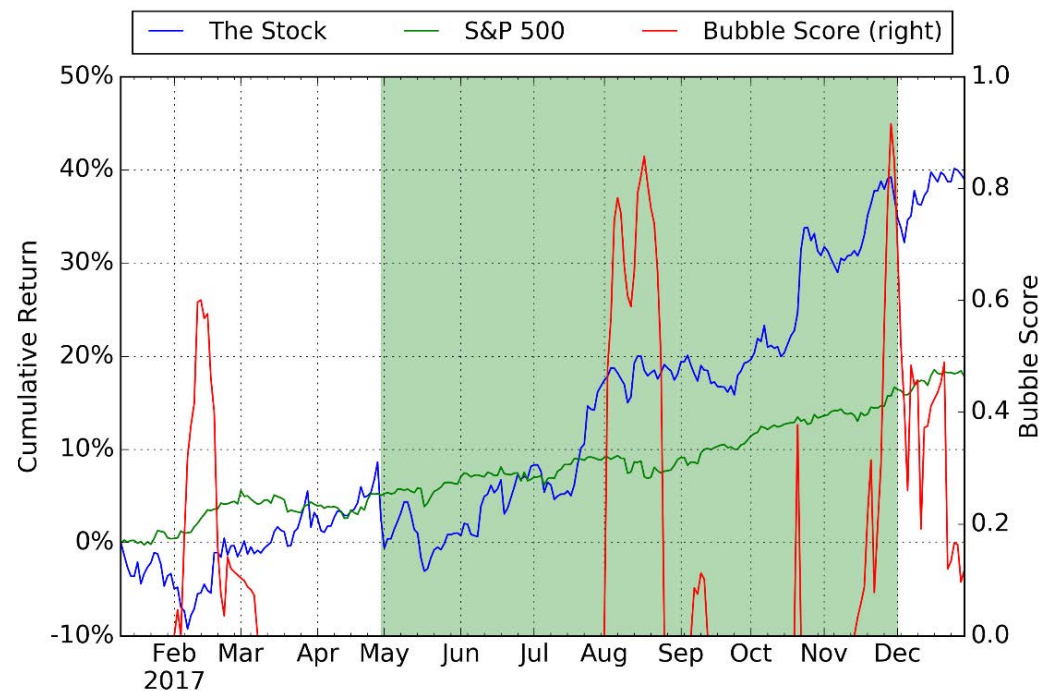


The above graph shows the one year cumulative return of the stock in blue (left hand scale), NASDAQ 100 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period is the strong positive bubble we identified. The Bubble Score of this five month bubble has reached 92.3% with a bubble size 31.7%. 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, VF Corp.

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 continued to appreciate after a quick correction, in agreement with our DS LPPLS indicator, but contradiction with the weak fundamentals. We expect this stock to have a future correction due to the strong bubble and weak fundamentals.



Single Stocks - Quadrant 3 stocks

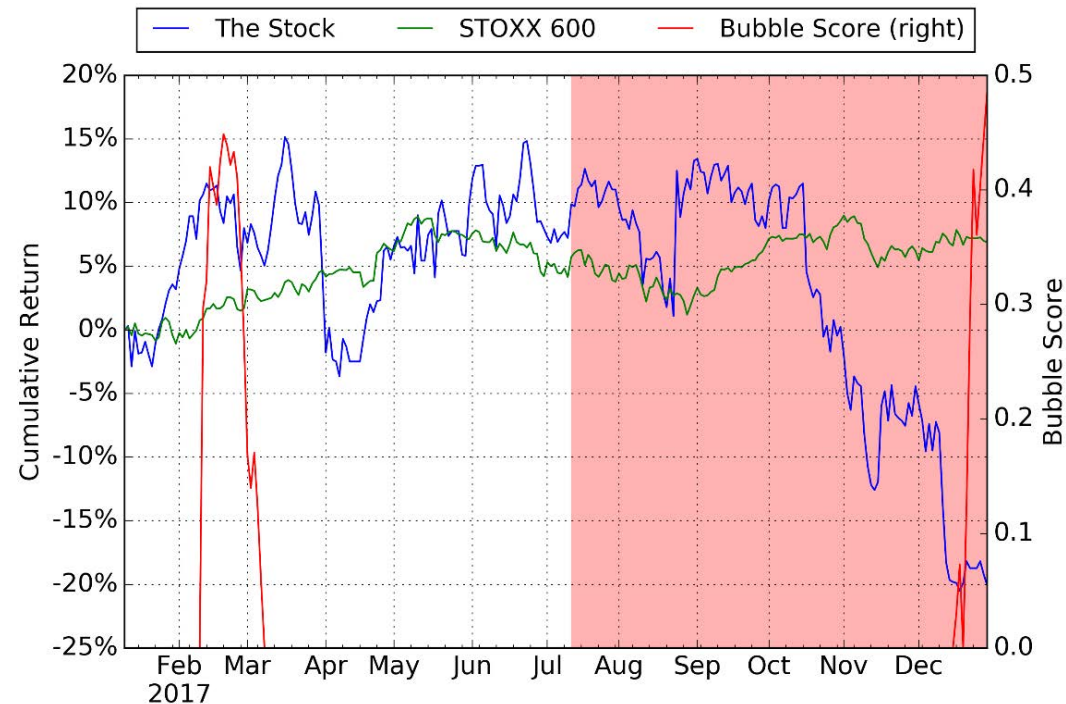
Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Ctrip.Com International Ltd	China	Retailing	1.7%	-26.2%	Jul-17	-1.9%	17.7%	23.1%
Incyte Corp	United States of America	Pharmaceuticals, Biotechnology & Life Sciences	-19.4%	-29.4%	Jul-17	-14.9%	0.1%	59.8%
Genmab A/S	Denmark	Pharmaceuticals, Biotechnology & Life Sciences	-17.7%	-27.2%	Jul-17	-48.4%	1.1%	18.4%
Telefonica SA	Spain	Telecommunication Services	-11.3%	-21.5%	Apr-17	-48.9%	36.4%	93.9%
Glanbia PLC	Ireland; Republic of	Food, Beverage & Tobacco	-7.9%	-18.5%	Apr-17	-35.5%	39.2%	28.0%
GlaxoSmithKline PLC	United Kingdom	Pharmaceuticals, Biotechnology & Life Sciences	-15.5%	-20.6%	Mar-17	-29.0%	30.7%	26.7%
Unilever NV	Netherlands	Household & Personal Products	20.8%	-4.3%	Jul-17	-5.5%	24.8%	32.6%
Inmarsat PLC	United Kingdom	Telecommunication Services	-31.0%	-38.9%	May-17	-35.6%	21.4%	1.1%
Orion Oyj	Finland	Pharmaceuticals, Biotechnology & Life Sciences	-27.0%	-35.2%	Mar-17	-21.0%	18.0%	38.3%

Single Stocks - Quadrant 3 stocks

Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

Example: Genmab A/S.

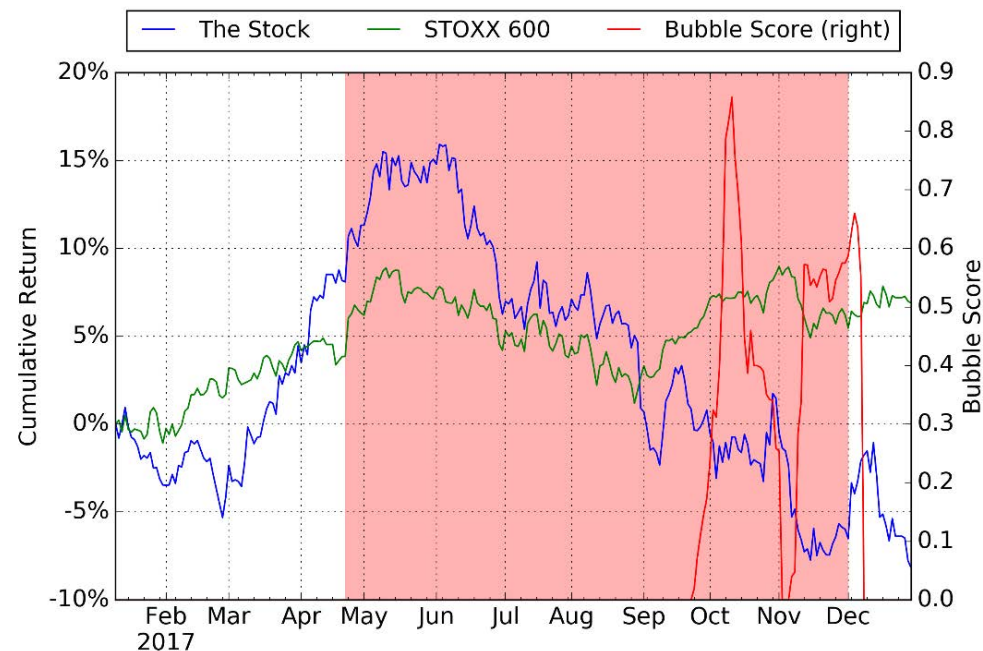


The above graph shows the one year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period is the strong negative bubble we identified. The Bubble Score of this six month bubble has reached 48.4% with a bubble size -27.2%.

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 went down again after a rebound at the beginning of this month, which is in synchrony with our DS LPPLS indicator and the weak fundamentals.



Single Stocks - Quadrant 4 stocks

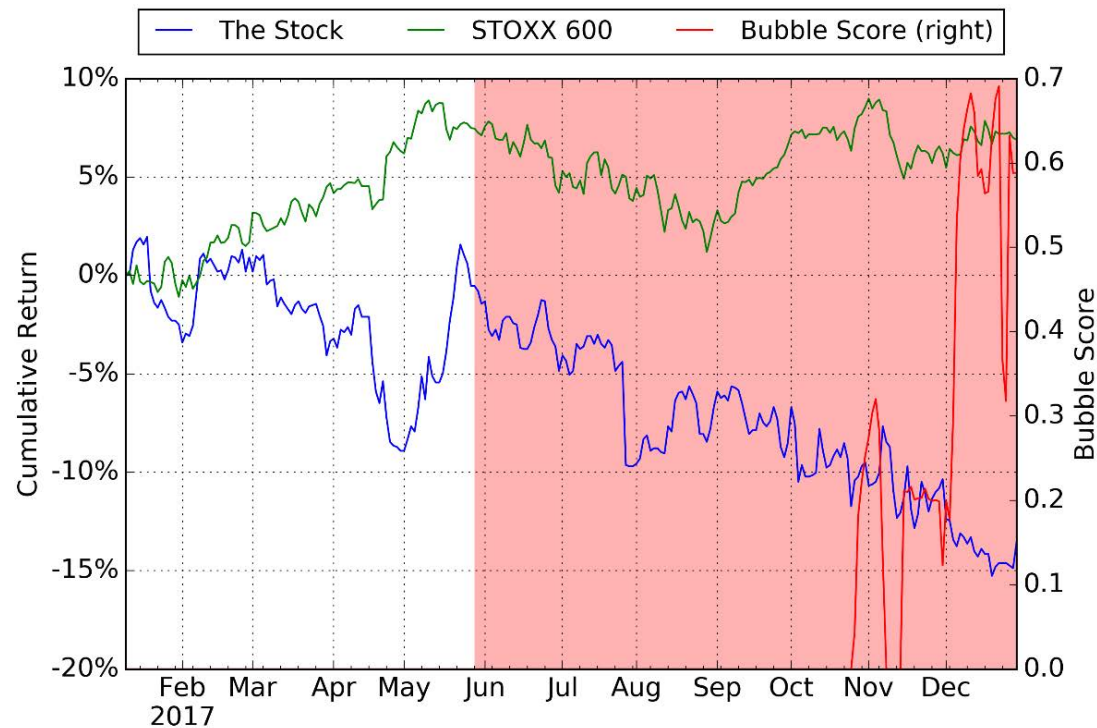
Quadrant 4 stocks: strong negative bubble signals with strong fundamentals

Company Name	Country of Headquarters	GICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Walgreens Boots Alliance Inc	United States of America	Food & Staples Retailing	-13.5%	-13.5%	Jan-17	-7.1%	62.4%	26.5%
AP Moeller - Maersk A/S	Denmark	Transportation	-9.4%	-11.0%	May-17	-63.6%	94.2%	99.5%
SSE PLC	United Kingdom	Utilities	-14.7%	-13.1%	May-17	-58.9%	62.9%	10.1%
Cooper Companies Inc	United States of America	Health Care Equipment & Services	22.8%	-8.6%	Jun-17	-30.7%	74.8%	73.0%

Single Stocks - Quadrant 4 stocks

Quadrant 4 stocks: strong negative bubble signals with strong fundamentals

Example: SSE PLC.

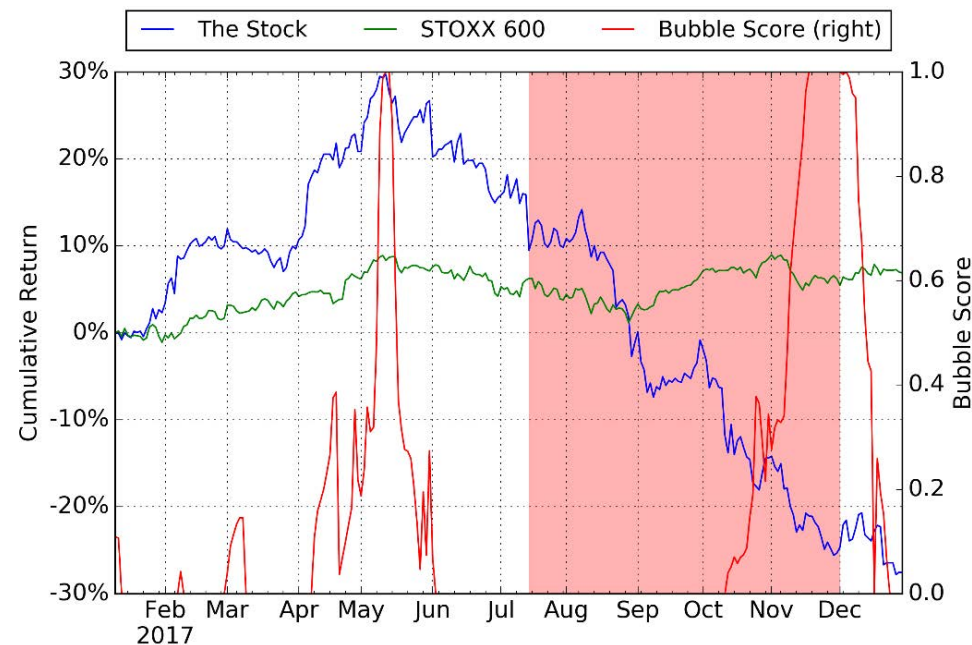


The above graph shows the one year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period is the strong negative bubble we identified. The Bubble Score of this seven month bubble has reached 58.9% with a bubble size -13.1%. We expect a future 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, JM AB.

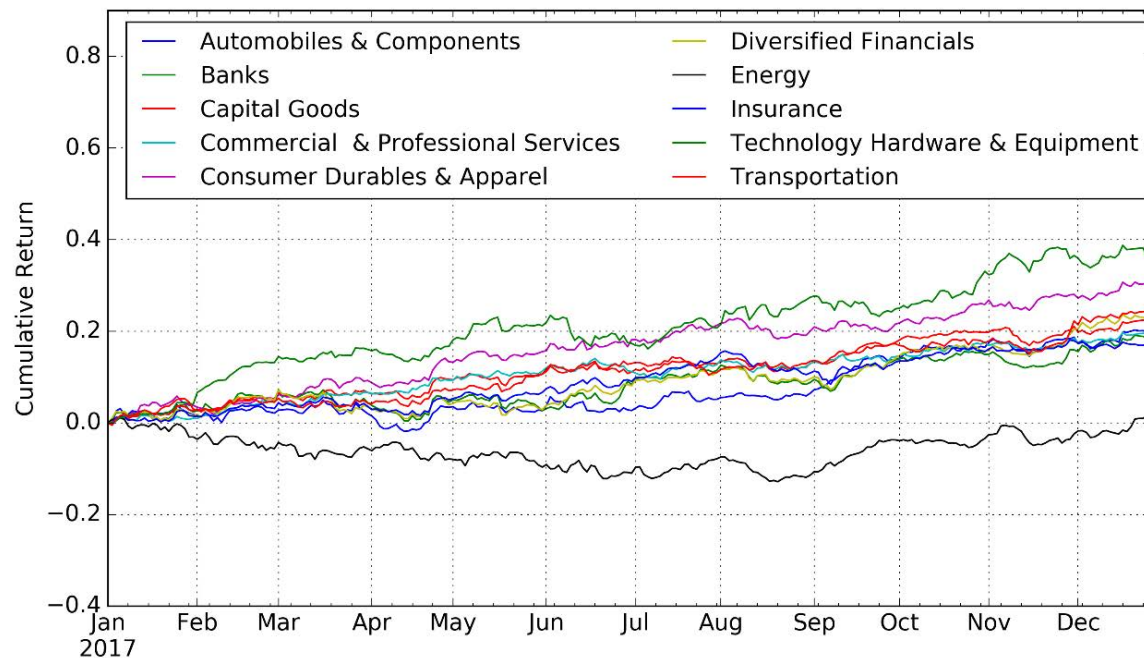
The figure below plots the one year cumulative return of the stock (blue), STOXX 600 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period is the strong negative bubble we identified and reported in last month. Note that the stock went down again after a small rebound at the beginning of this month, which is in synchrony with our DS LPPLS indicator, notwithstanding the strong fundamentals. We expect this stock to 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	
	Jan 1st	Dec 1st	Jan 1st	Dec 1st	Jan 1st	Dec 1st	Jan 1st	Dec 1st	Jan 1st	Dec 1st
Pharmaceuticals, Biotechnology & Life Sciences	12.2%	14.1%	0.0%	0.0%	0.0%	0.0%	61.2%	61.0%	61.1%	60.5%
Consumer Services	28.0%	26.4%	0.0%	8.2%	0.0%	100.0%	29.2%	29.3%	54.9%	54.8%
Retailing	22.7%	19.8%	0.0%	0.0%	0.0%	0.0%	18.7%	18.8%	53.5%	51.8%
Transportation	21.7%	21.0%	18.3%	0.0%	28.5%	0.0%	65.1%	63.1%	63.4%	62.7%
Consumer Durables & Apparel	25.7%	27.8%	15.8%	12.9%	80.4%	52.0%	39.5%	39.2%	59.1%	58.5%
Semiconductors & Semiconductor Equipment	36.7%	37.9%	0.0%	0.0%	0.0%	0.0%	62.5%	63.1%	30.4%	30.0%
Technology Hardware & Equipment	32.7%	35.5%	14.5%	13.7%	22.3%	22.2%	76.7%	73.8%	36.3%	36.9%
Automobiles & Components	16.8%	17.3%	16.8%	0.0%	10.3%	0.0%	76.2%	78.1%	48.8%	48.3%
Telecommunication Services	0.9%	3.0%	0.0%	0.0%	0.0%	0.0%	58.4%	59.6%	53.3%	52.8%
Energy	2.5%	-1.4%	6.3%	0.0%	26.8%	0.0%	51.4%	51.5%	58.2%	57.6%
Software & Services	31.9%	32.6%	0.0%	18.4%	0.0%	50.4%	34.9%	35.0%	45.9%	46.0%
Materials	21.7%	21.4%	0.0%	0.0%	0.0%	0.0%	50.2%	49.8%	52.5%	52.3%
Health Care Equipment & Services	22.8%	26.8%	0.0%	23.1%	0.0%	7.4%	64.5%	64.4%	60.9%	60.7%
Capital Goods	20.8%	19.9%	17.0%	0.0%	7.6%	0.0%	47.9%	46.6%	50.7%	50.7%
Media	2.9%	2.7%	0.0%	0.0%	0.0%	0.0%	43.0%	43.5%	59.5%	59.2%
Commercial & Professional Services	18.5%	19.8%	7.1%	0.0%	94.1%	0.0%	24.9%	26.2%	58.9%	58.6%
Food & Staples Retailing	8.6%	7.0%	0.0%	0.0%	0.0%	0.0%	59.9%	60.1%	51.4%	51.3%
Household & Personal Products	20.4%	19.7%	0.0%	0.0%	0.0%	0.0%	36.6%	37.2%	41.9%	41.8%
Food, Beverage & Tobacco	14.2%	13.2%	0.0%	0.0%	0.0%	0.0%	42.6%	41.7%	58.3%	57.7%
Utilities	10.4%	17.4%	0.0%	0.0%	0.0%	0.0%	52.8%	53.4%	52.3%	52.4%
Insurance	17.3%	17.3%	12.2%	11.7%	27.5%	8.0%	-	-	-	-
Real Estate	10.2%	13.3%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Diversified Financials	20.9%	18.3%	14.7%	15.4%	20.0%	5.9%	-	-	-	-
Banks	16.6%	14.4%	13.2%	14.4%	32.7%	24.9%	-	-	-	-

Sectors

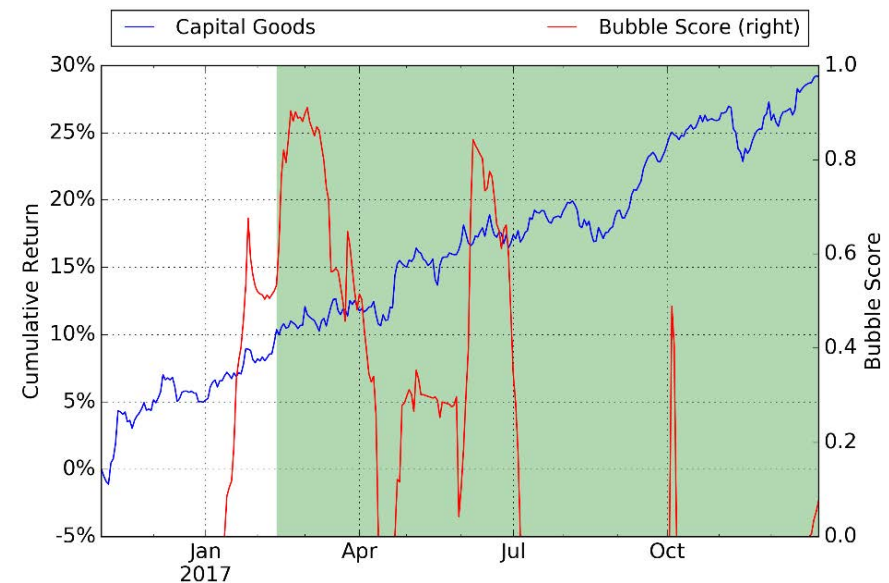
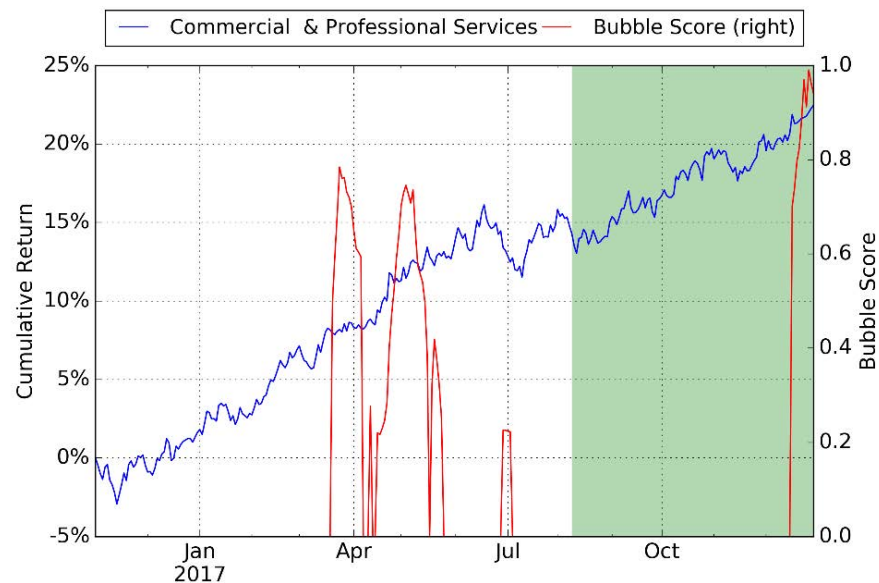
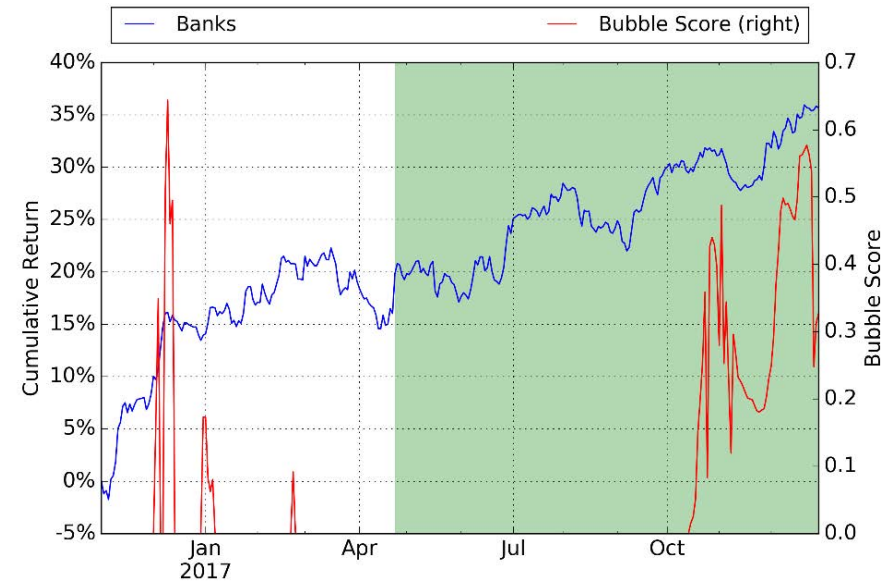
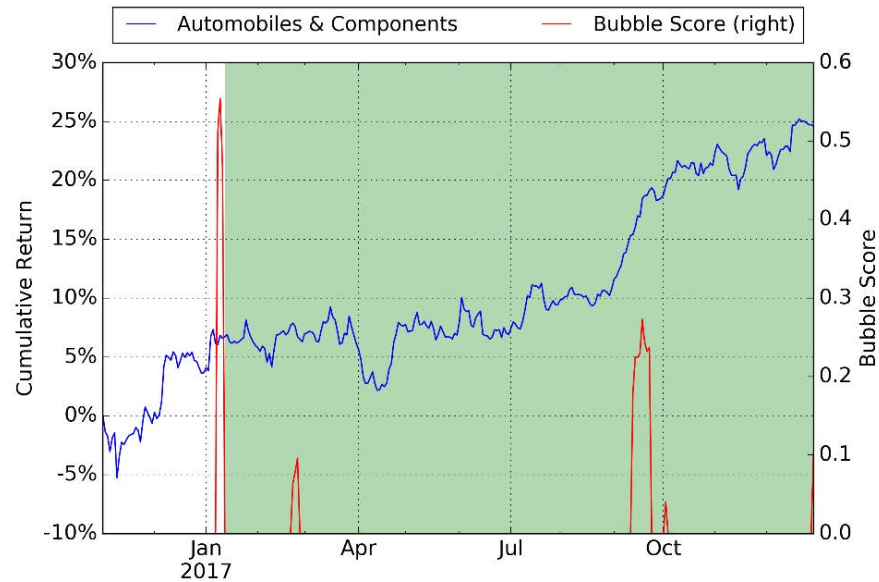


Since Dec 2017, we start to use MSCI World Industry Group Indices and to calculate bubble size and bubble score of the corresponding sectors. To determine the value scores and growth scores of the sectors, we average over the corresponding values for each stock of a given sector, weighted by market cap.

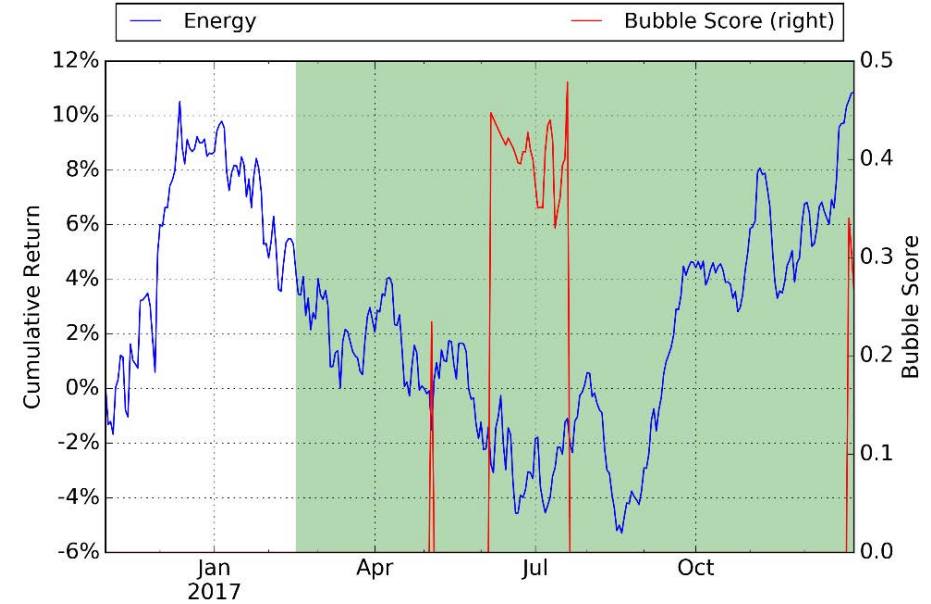
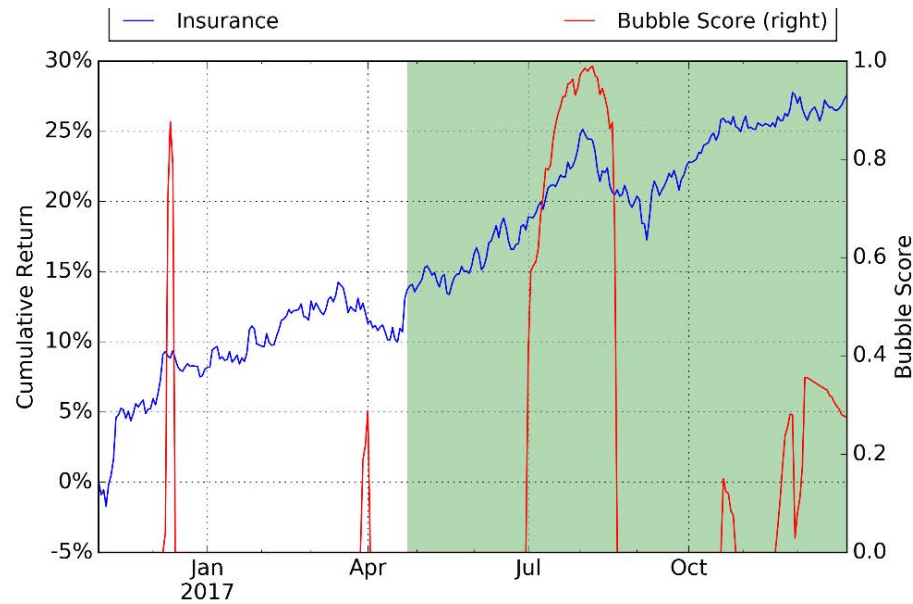
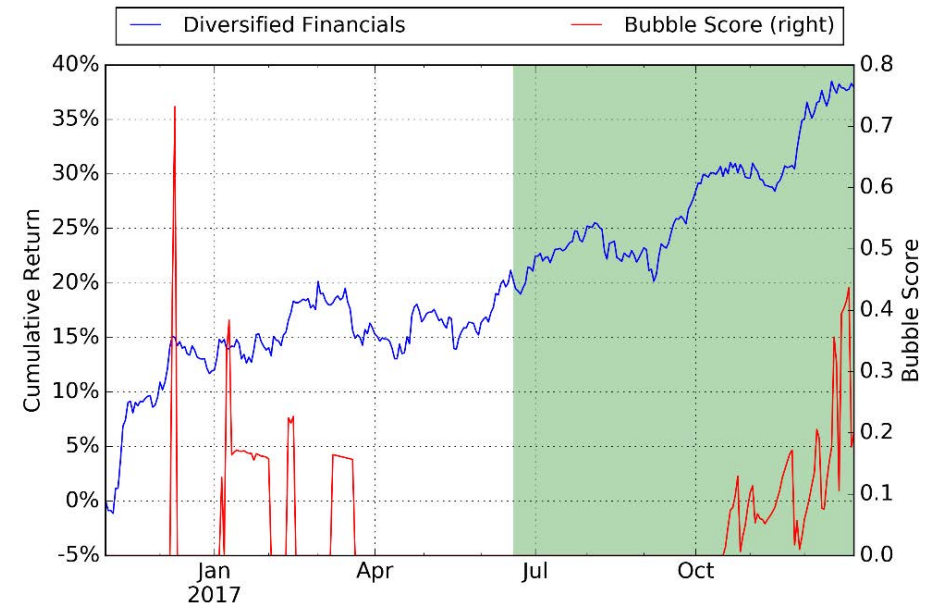
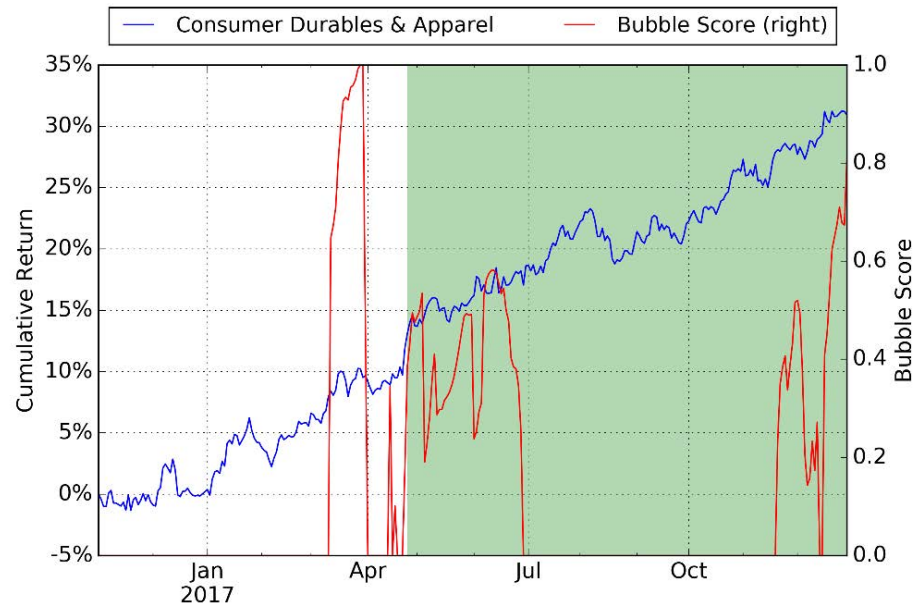
As we can see from the results showed in the previous slide, we found 10 industry groups with significant positive bubble scores: *Automobiles & Components, Banks, Capital Goods, Commercial & Professional Services, Consumer Durables & Apparel, Diversified Financials, Energy, Insurance, Technology Hardware & Equipment, Transportation.*

The figure above shows the cumulative return of these 10 industries. The figures in the next three slides show the one year cumulative return of each industry index in blue (left hand scale), and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period is the strong positive bubbles we identified.

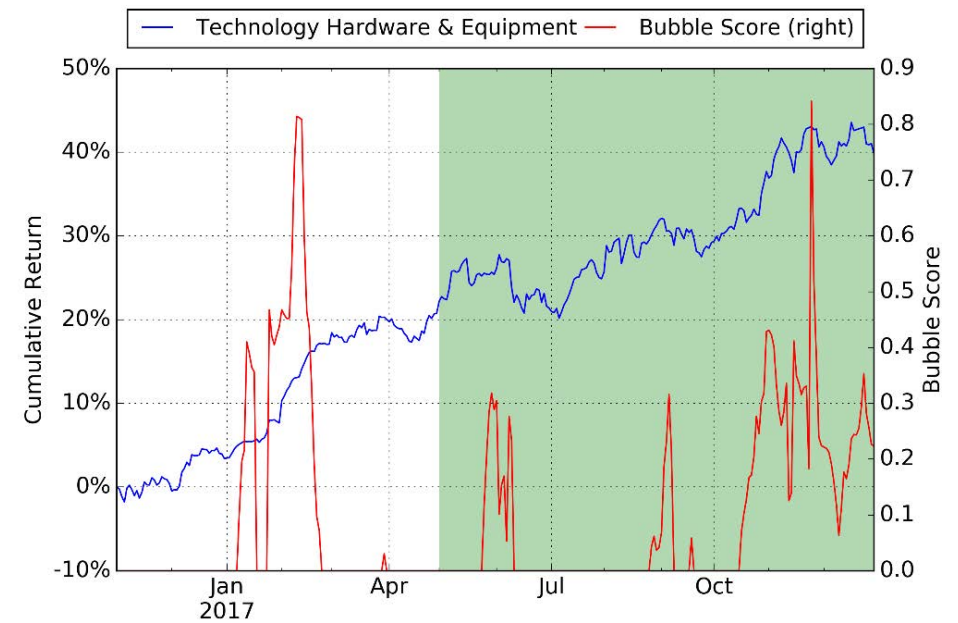
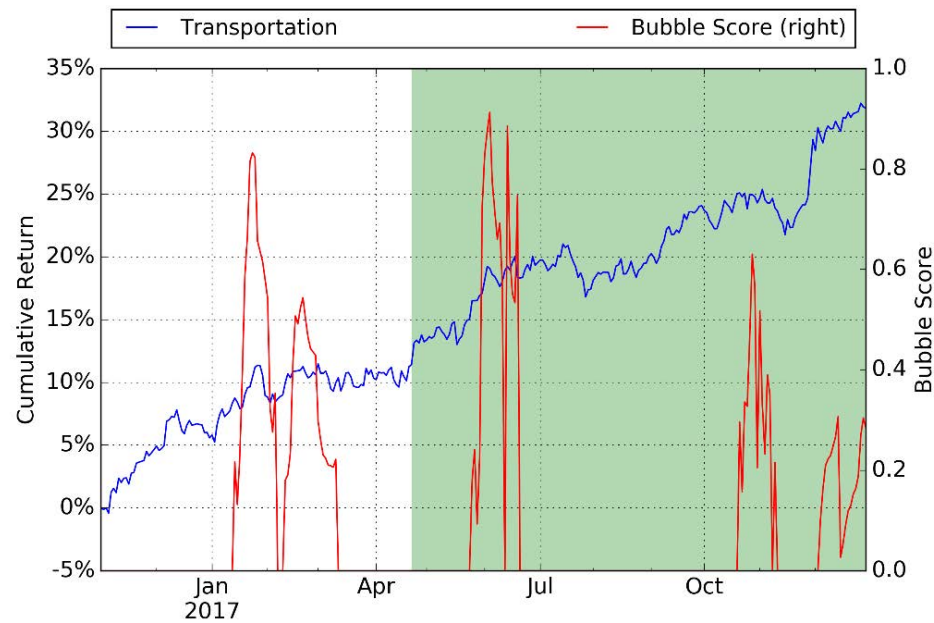
Sectors



Sectors



Sectors



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.

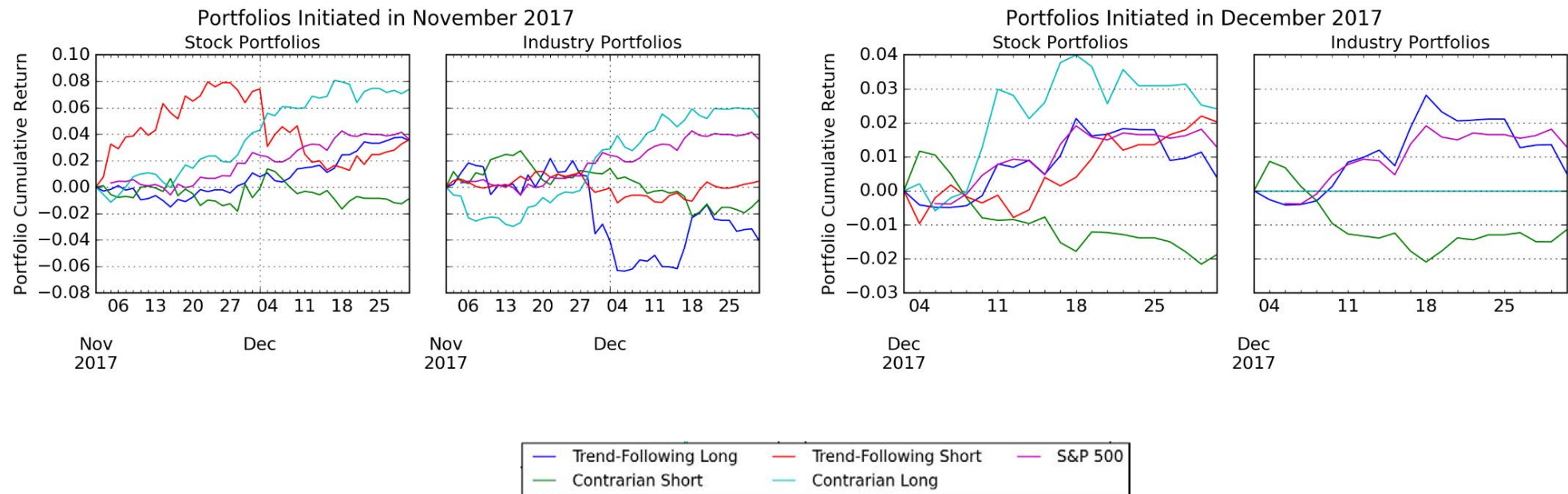
Portfolio Construction & Performance

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 in 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 last month, we only present the portfolios we initiated in November 2017.

Portfolio Construction & Performance



This month, we find that Contrarian Long Stock Portfolio initiated in November and December 2017 have good performances. We have seen some rebounds in the stocks (e.g. Discovery Communications Inc) of quadrant 4 identified in last month report, which contributes to the out-performance of the Contrarian Long Stock Portfolio. 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>