

The FCO Cockpit – Global Bubble Status Report

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Chair of Entrepreneurial Risk

January 1st, 2017

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What is this?

This 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 431 systemic assets and 858 single stocks. The systemic assets are bond, equity and commodity indices and 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>)

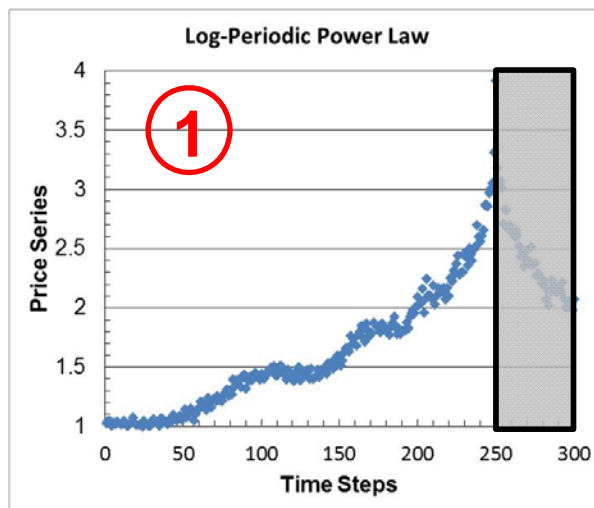
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How does it work?

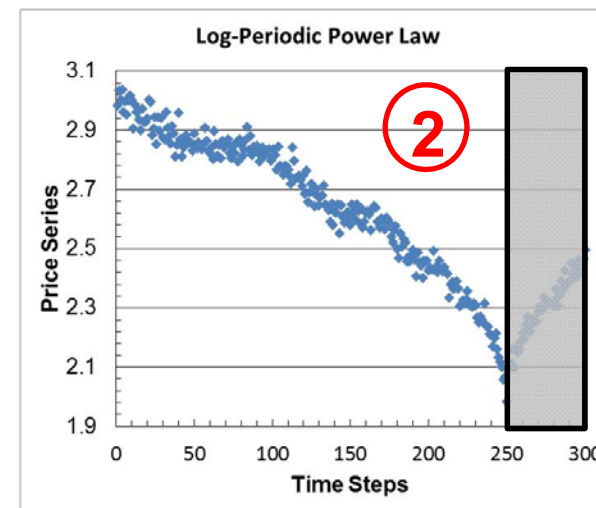
We use the Log-Periodic Power Law Singular (LPPLS) model to hunt for the distinct fingerprint of **Bubbles**:

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

A bubble signal is identified if both of our bubble indicators, LPPL-Confidence and LPPL-Trust, are larger than 5%.



A **positive bubble** when
there is imitation in **buying**

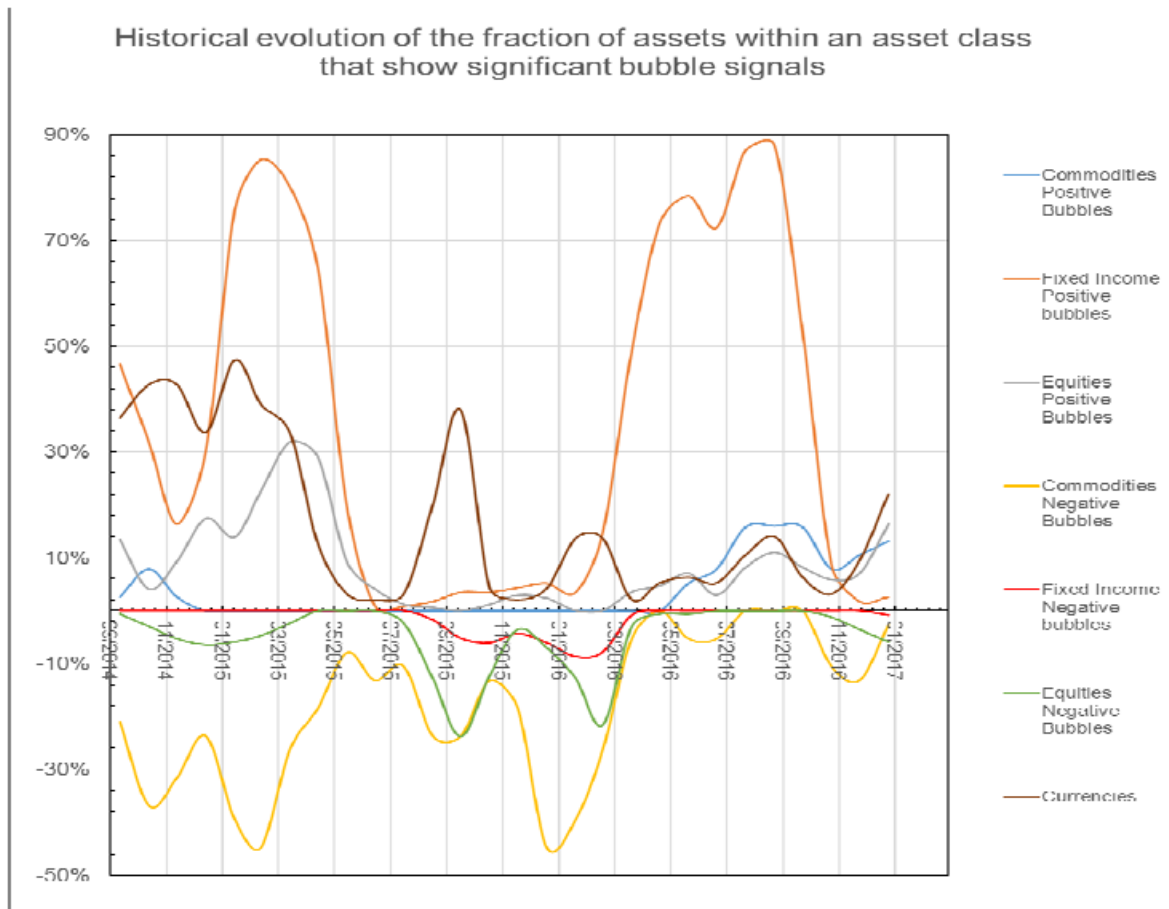


A **negative bubble** when
there is imitation in **selling**

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General Result

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A positive bubble signal is an indication of herding when people start buying because prices go up.
A negative bubble signal is an indication of herding when people start selling because prices go down.

The big picture

For the third month and after nearly eight consecutive months, bonds prices across the majority of sectors and regions STOPPED feeling a strong tail wind. The very strong momentum that has lifted the entire asset class faded away, and the fixed income sector ended showing a bubble-like behavior.

One can observe the beginning of a trend in the growth of positive equity bubbles.

There is no current general trend in commodities after nearly two years of strong negative bubble signals in the asset class and in its related stocks and currencies. Mixed bubble signals are now seen in few commodities indices.

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Other interesting highlights from this report

- A surge in bubble signals in currencies, specifically in USD crosses, on the back of the global USD strengthening;
- Over the last two months we reported that the strong rally in the governments and corporate bonds that was observed globally over the last year, cooled down and did not show a bubble signal anymore. This is confirmed in this report;
- For the third consecutive month, we see mixed bubble signals among a few commodities indices. Five out of the six indices that are showing bubble signals this month are positive ones. It is interesting that all of these five indices are metal indices;
- There is a small increase in the number of positive bubbles in equities. The most interesting result was found in Latvia stock market index which is still showing signs of a positive bubble for the third consecutive month. It is worth mentioning that around 70% of the stock market indices that are showing signs of bubbles are emerging markets;
- In our analysis of single stocks, we find a very strong positive bubble in the sector *Semiconductors & Semiconductor Equipment*, which we already reported in Oct 2016. Due to the high growth rate of this industry, and the accelerated momentum in emerging technology such as Artificial Intelligence, deep learning, etc., this sector is one of the best performers in the S&P500 index in 2016. We also see a strong positive bubble in the sector *Energy*, due to the rebound of energy prices such as Oil prices.

A positive bubble signal is an indication of herding when people start buying because prices go up.

A negative bubble signal is an indication of herding when people start selling because prices go down.

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Results per Asset Class

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Government bonds

Country Indices	Yearly Return	DS LPPL Trust	DS LPPL Confidence
Positive Bubbles			
iBoxx Asia India Government Index	15.04%	47.5%	48.8%
iBoxx EUR Luxembourg Index	1.88%	8.7%	5.3%
iBoxx EUR Germany Index	3.72%	5.8%	6.7%
Negative Bubbles			
iBoxx Asia Taiwan Government Index	-0.86%	5.2%	6.3%

Over the last two months we reported that the positive bubble signals in the government bonds are cooling down, this is confirmed in this report. Of the 34 government bond indices that were analyzed, only three are showing positive bubble signals, that is only 9% of the set, slightly up from 6% last month. As shown in the table above, one is in Asia and two are in Europe;

The global bonds selloff, that was reported over the last three months, accelerated this month. This is triggered by the interest rate raise and a faster pace of hikes expected in 2017 by the U.S. Federal Reserve, in addition to the bond buying tapering by the ECB;

For the first month nearly in more than two years, we see negative bubble signal among government bonds indices. The figure on the next page shows that the excessive selloff of Taiwanese sovereign bonds over the last four months started to show a negative bubble signal;

Finally, the figure on the page after shows the remarkable bubble in the Indian sovereign bonds, whose anticipated correction was further amplified last month by the cash-draining move by the Indian government.

Daily .IBBAS00F3

1/1/2016 - 1/14/2017 (GMT)

Line, .IBBAS00F3, Last Quote(Last)
12/26/2016, 134.37790, N/A, N/A

Source: Thomson Reuters

Taiwan Government Bond Index

Price
TWD

142
141.5
141
140.5
140
139.5
139
138.5
138
137.5
137
136.5
136
135.5
135
134.5
Auto

04 11 18 25 01 08 15 22 29 07 14 21 28 04 11 18 25 02 09 16 23 30 06 13 20 27 04 11 18 25 01 08 15 22 29 05 12 19 26 03 10 17 24 31 07 14 21 28 05 12 19 26 02 09
Jan 16 Feb 16 Mar 16 Apr 16 May 16 Jun 16 Jul 16 Aug 16 Sep 16 Oct 16 Nov 16 Dec 16 Jan 17

Daily .IBBAS0049

1/1/2016 - 1/14/2017 (GMT)

Line, .IBBAS0049, Last Quote(Last)
12/26/2016, 252.35780, N/A, N/A

Source: Thomson Reuters

Indian Government Bond Index

Price
INR
256
254
252
250
248
246
244
242
240
238
236
234
232
230
228
226
224
222
220
Auto

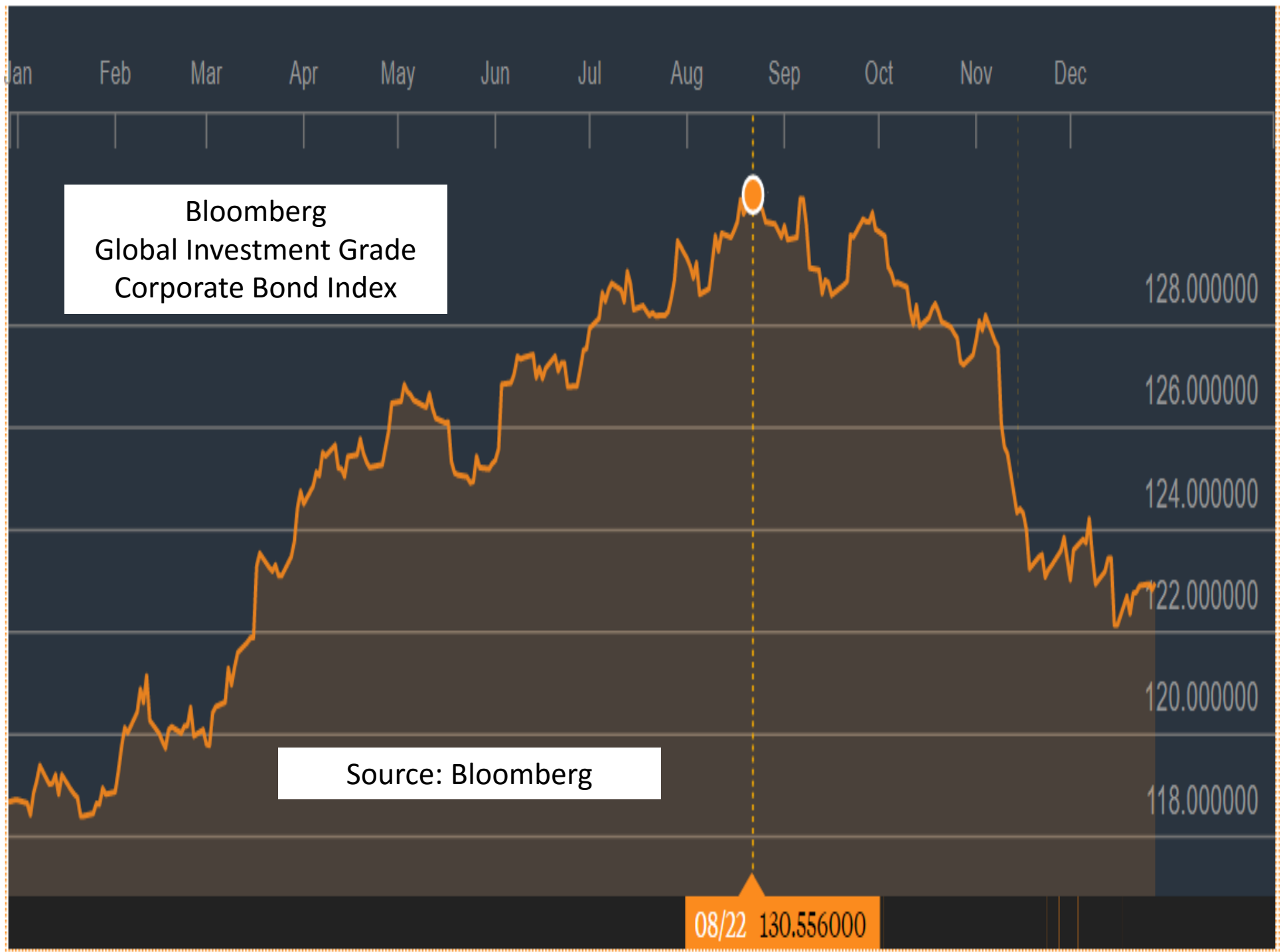
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Jan 16 Feb 16 Mar 16 Apr 16 May 16 Jun 16 Jul 16 Aug 16 Sep 16 Oct 16 Nov 16 Dec 16 Jan 17

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Corporate bonds

The positive bubble signals are not only fading away across government bonds, but also across sector indices. For the second consecutive month, no single index of the 82 corporate bond indices that were analyzed is showing bubble signals.

The Bloomberg Global Investment Grade Corporate Bond Index (next page) shows the remarkable bubble that started last year in the global corporate bonds, stopped and started to take an opposite direction over the last three months.



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Commodities

Commodities Indices	Yearly Return	DS LPPL Trust	DS LPPL Confidence
Positive Bubbles			
Tin ER Index	46.9%	25.6%	17.8%
Lead ER Index	16.9%	20.9%	42.4%
Zinc ER Index	64.1%	12.7%	16.7%
Prcs Mtls ER Index	5.6%	10.6%	18.3%
Indtr Mtls ER Index	19.1%	6.7%	16.4%
Negative Bubbles			
Cocoa ER Index	-24.1%	5.8%	18.4%

For the third consecutive month, we see mixed bubble signals among a few commodity indices. There are six indices showing bubble signals this month, five of them are showing positive bubble signals and one is showing a negative bubble signal. It is interesting to see that all the indices that are showing positive bubble signals are still metal indices, and the only index that is showing a negative bubble signal is still in the agriculture sector.

It is worth stressing that the Tin and Lead indices are showing positive bubble signals for the third consecutive month. In addition, the negative bubble signals that were seen in the Live stock, Lean Hogs, Live Cattle, and Feeder Cattle indices over the last two months disappeared.

The S&P Goldman Sachs Commodity Index (next page) shows the resumption of the remarkable rebound in commodities that was seen in the first two quarters of 2016 and that decelerated with increased volatility during the third quarter. Over the last month, the index reached a 18 months high.

1D

3D

1W

1M

6M

1Y

3Y

5Y

Comparisons >

Source: Financial Times

S&P GSCI Index Spot



DS Bubble Inspectors Viewer - "Bubble end flag - long time scale"

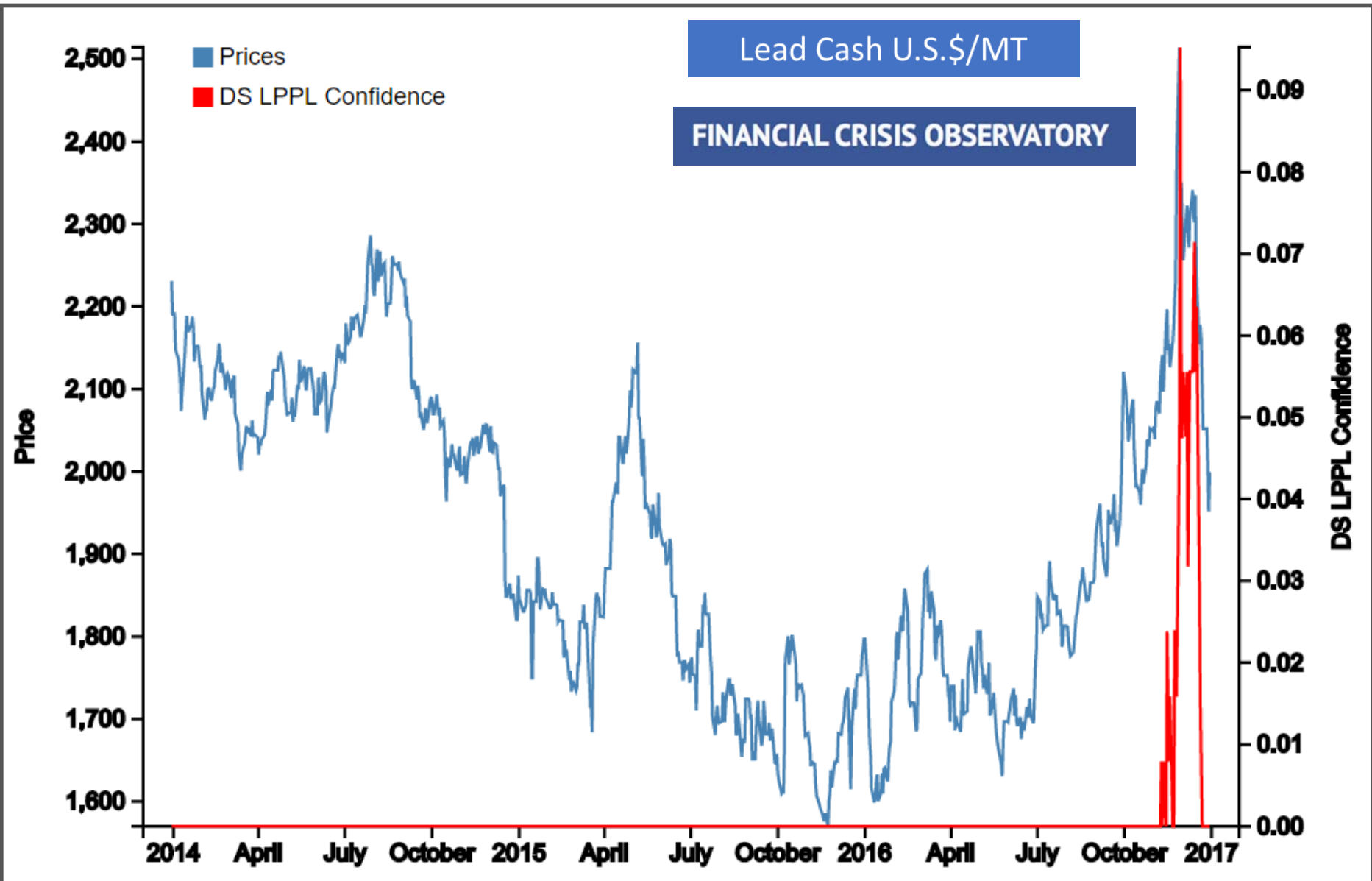


Date: 2016-12-30

Name: LME-Lead Cash U\$/MT

Indicator: DS LPPL Confidence ▼

Bubble end flag - long time scale ▼

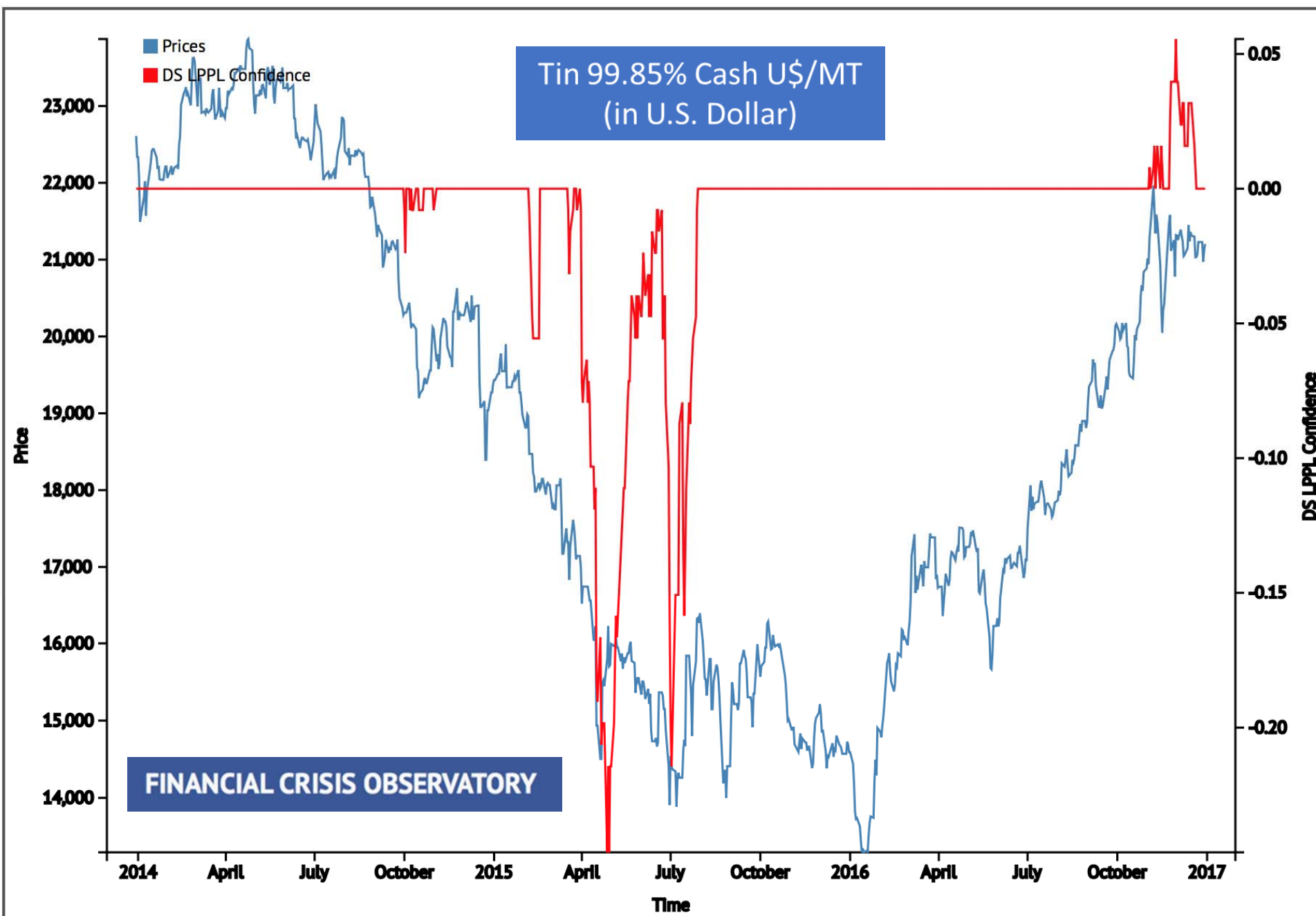


Date: 2016-12-30

Name: LME-Tin 99.85% Cash

Indicator: DS LPPL Confidence

Bubble end flag - long time scale



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Currencies

FX	Yearly Return	DS LPPL Trust	DS LPPL Confidence
Iceland Krona/Euro	19.3%	67.3%	54.4%
Iceland Krona/Swiss Franc	18.1%	58.7%	59.3%
US Dollar/Chinese Renminbi	7.3%	22.1%	36.7%
US Dollar/Swedish Krona	9.9%	22.0%	12.3%
US Dollar/Singapore Dollar	2.9%	21.5%	33.0%
US Dollar/Turkish Lira	20.3%	16.6%	24.5%
Turkish Lira/Euro	-12.7%	14.6%	27.4%
Swedish Krona/Swiss Franc	-5.4%	14.5%	11.7%
Swedish Krona/Euro	-4.4%	13.4%	5.3%
Turkish Lira/Swiss Franc	-13.6%	12.5%	24.3%
Taiwan Dollar/Euro	7.0%	12.3%	33.3%
US Dollar/Japanese Yen	-2.6%	10.8%	14.0%
Egyptian Pound/Euro	-56.6%	8.6%	5.1%
Japanese Yen/Swiss Franc	6.7%	7.1%	11.1%
US Dollar/Argentine Peso	17.1%	5.5%	14.8%
US Dollar/Danish Krone	4.6%	5.5%	24.5%
US Dollar/Czech Koruna	5.0%	5.4%	25.4%
Saudi Arabian Riyal/Euro	5.0%	5.3%	23.6%
Taiwan Dollar/Swiss Franc	5.9%	5.0%	21.0%
Hong Kong Dollar/Euro	4.9%	5.0%	24.1%
US Dollar/Bulgarian Lev	5.0%	5.0%	25.1%

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Currencies

The dollar rally, which has been the main theme of the currency market since the U.S. election November 2016, has accelerated this month after the Federal Reserve interest-rate increase, pushing the U.S. dollar index to a 14-year high and pointing to a possible reckoning in coming months for (especially emerging) economies around the globe;

The list of emerging markets currencies that have been battered and showed signs of a negative bubble signals became longer this month. In addition to the Turkish Lira and the Chinese Renminbi which were reported last month, the Egyptian Pound, Argentine Peso, Czech Koruna, and Bulgarian Lev joined them this month. In the case of the Egyptian Pound and the Argentine Peso, their depreciations have been more extreme as both countries' central banks floated their currencies during the last 12-month pushing them in a quasi free-fall behavior;

For the third consecutive month, there are signs of a negative bubble in the Swedish Krona. Three of the 21 pairs that are showing bubble signals are crosses with the Swedish Krona. On the other hand and for the ninth consecutive month, there are strong positive bubble signals in the Iceland Krona. Two of the 21 pairs that are showing bubble signals are crosses with the Iceland Krona;

Finally, there is a positive bubble signal on the US Dollar/Singapore Dollar for the second consecutive month. This can be mainly attributed to the increasing strength of the US dollar. As mentioned in the last report with respect specifically to the export-oriented country that Singapore is, there may also be the effect of the global trade uncertainty under the new U.S. administration.

Date: 2016-12-30

Name: SDR TO US \$ (WMR)

Indicator: DS LPPL Confidence

Bubble end flag - long time scale

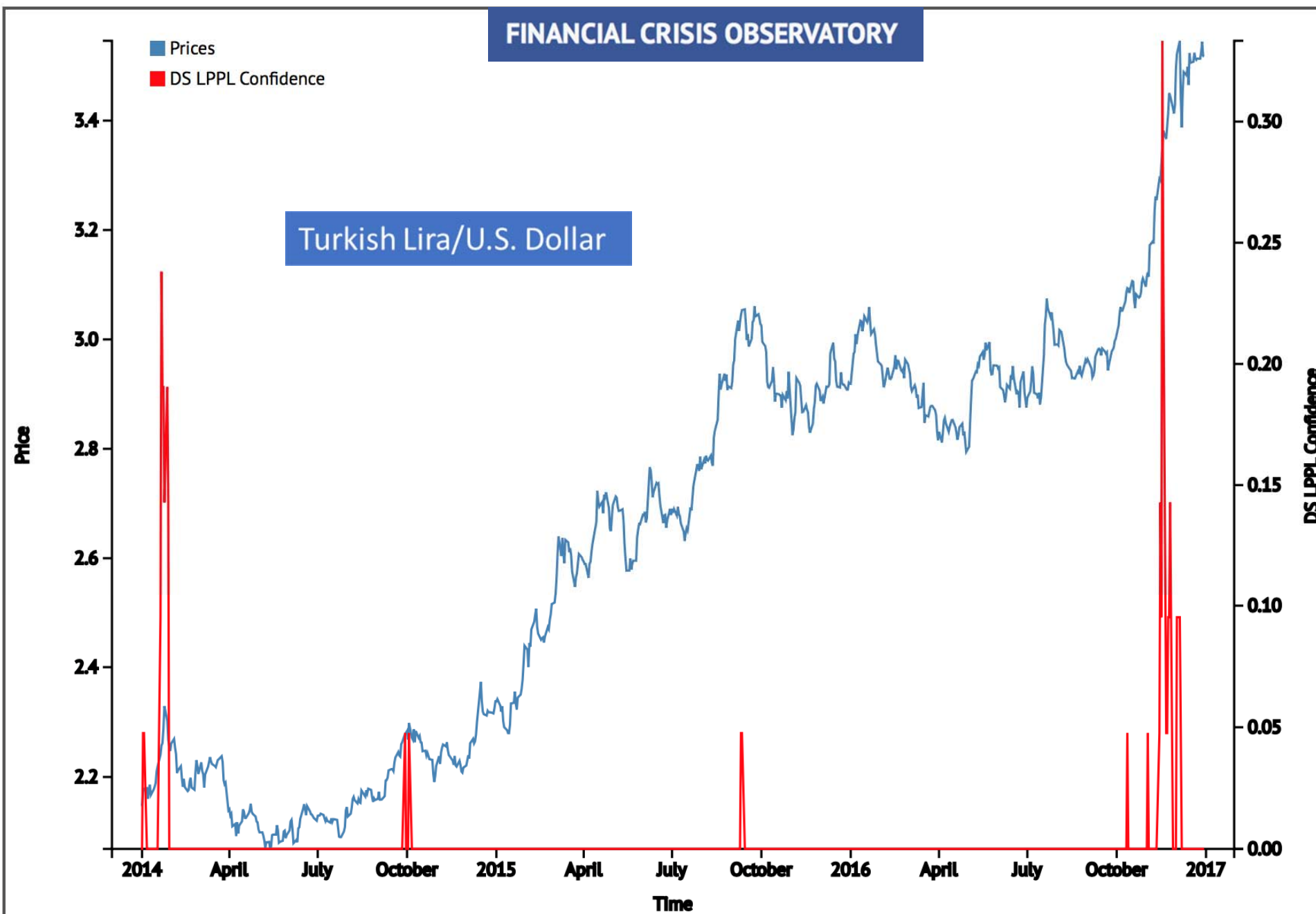


Date: 2016-12-31

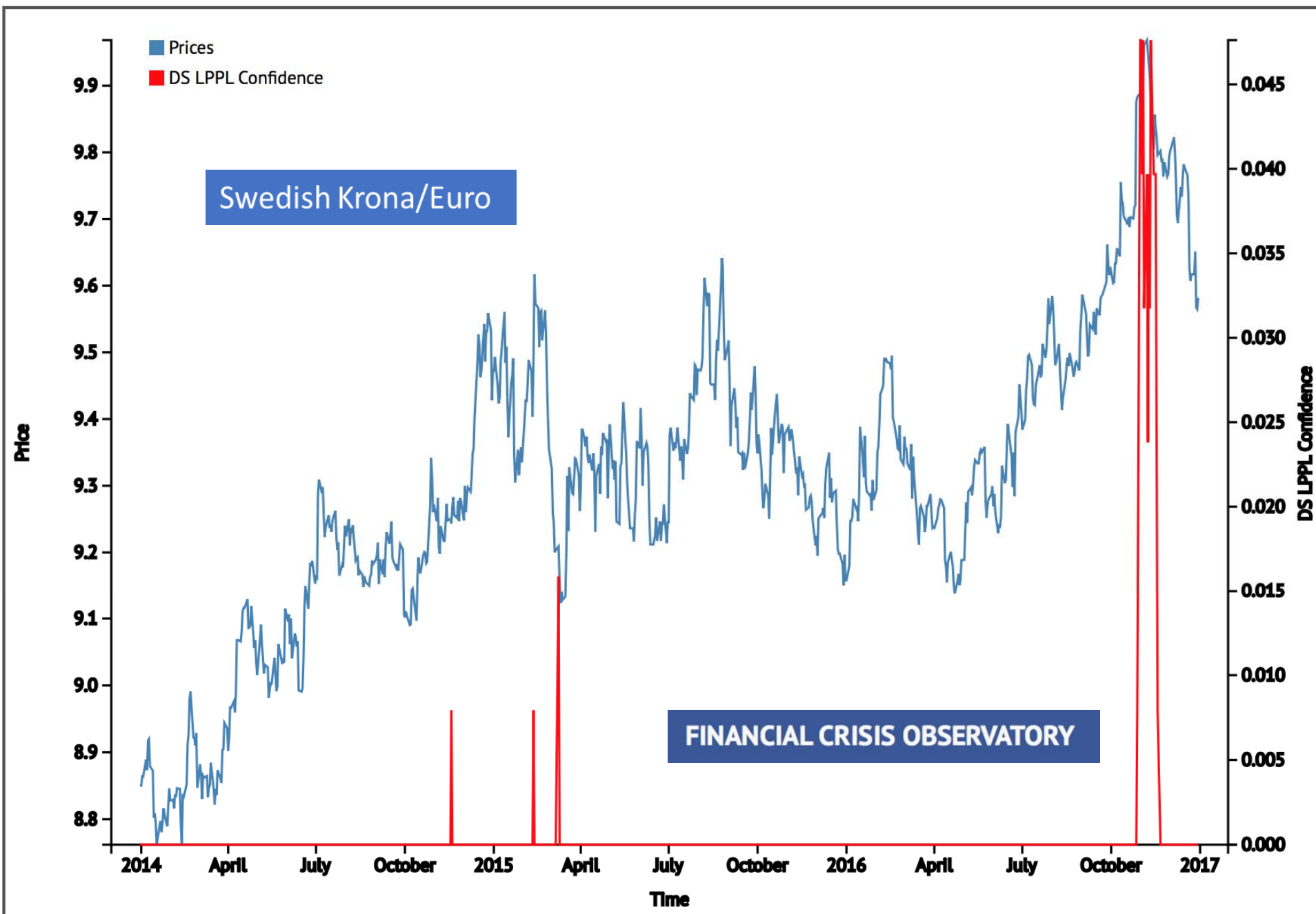
Name: NEW TURKISH LIRA 1

Indicator: DS LPPL Confidence

Bubble end flag - short time scale



Date: 2016-12-31 Name: SWEDISH KRONA TO Indicator: DS LPPL Confidence Bubble end flag - long time scale



DS Bubble Inspectors Viewer - "Bubble end flag - long time scale"

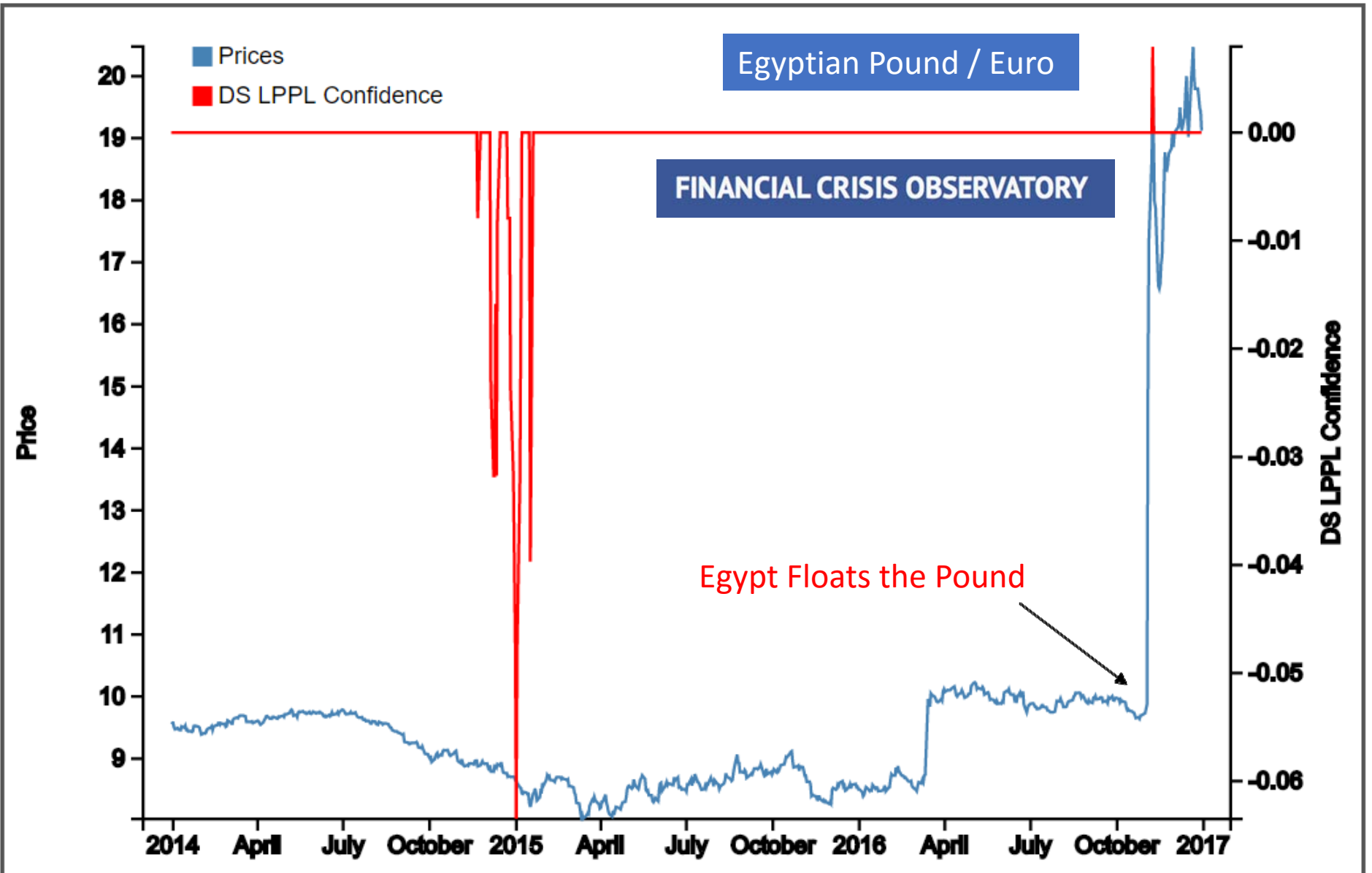


Date: 2016-12-30

Name: EGYPTIAN £ TO EURO (V)

Indicator: DS LPPL Confidence ▼

Bubble end flag - long time scale ▼

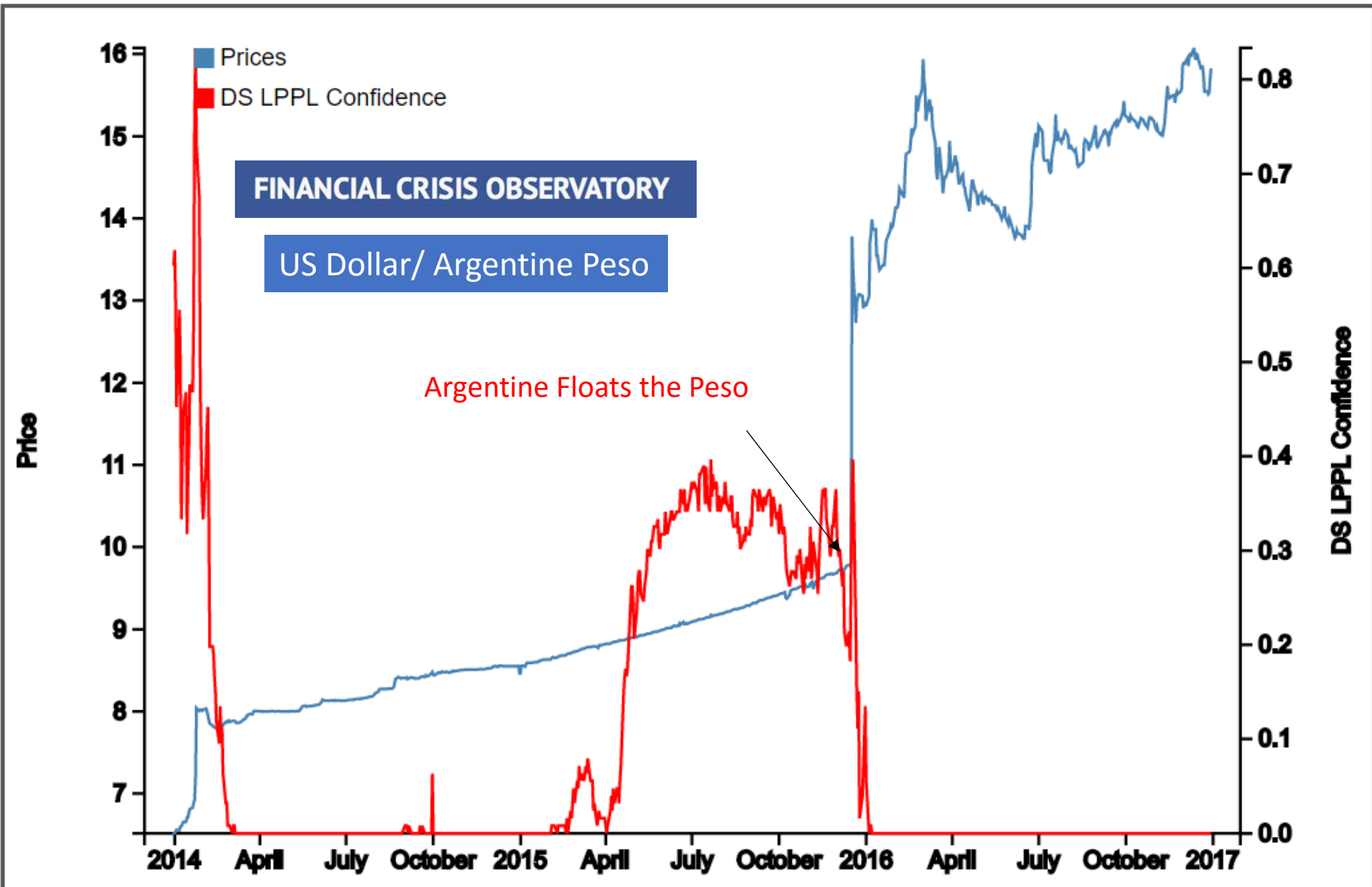


Date: 2016-12-30

Name: ARGENTINE PESO TO US

Indicator: DS LPPL Confidence ▼

Bubble end flag - long time scale ▼



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Stocks country indices

Equities Countires Indices	Yearly Return	DS LPPL Trust	DS LPPL Confidence	Country
Casablanca SE All Share Index	34.1%	22.8%	30.0%	Morocco
Karachi SE 100 Index	43.5%	20.5%	39.3%	Pakistan
Budapest SE Index	34.4%	19.4%	32.2%	Hungary
PFTS Index	11.0%	17.0%	13.8%	Ukraine
EGX 30 Index	82.3%	12.8%	32.7%	Egypt
OMX Riga_GI	26.4%	11.3%	8.9%	Latvia
TOPIX Stock Price Index	1.3%	10.9%	24.7%	Japan
IGPA Index	12.7%	6.8%	19.3%	Chile
Nikkei 225 Index	3.4%	6.8%	22.9%	Japan
OMX Tallinn_GI	19.4%	6.7%	37.5%	Estonia
Oslo Stock Exchange Equity Index	14.4%	6.0%	29.3%	Norway
RTS Index	43.1%	5.2%	19.5%	Russia
OMX Stockholm 30 Index	5.5%	5.2%	18.7%	Sweden
Negative Bubbles				
Philippine SE Composite Index	-6.3%	11.8%	17.0%	Philippine
Shanghai SE 50 Index	-8.2%	9.8%	24.9%	China
OMX Copenhagen 20 Index	-12.2%	8.4%	18.1%	Denmark
Equities Sector Indices				
Positive Bubbles				
Private Equity Total Return Index	15.1%	17.8%	36.4%	
S&P 500 Airlines (Industry)	8.6%	16.2%	17.2%	
STOXX Europe 600 Basic Resources EUR Price Index	54.0%	15.5%	36.1%	
Negative Bubbles				
S&P 500 Personal Products (Industry)	-15.3%	15.5%	37.5%	
STOXX Europe 600 Telecommunications EUR Price Index	-15.6%	6.6%	30.1%	
STOXX Europe 600 Financials EUR Price Index	-6.9%	6.5%	18.0%	

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Stocks country indices

There is no general trend in equities. The most interesting result was found in the Latvia stock market index which is still showing signs of a positive bubble for the third consecutive month, in Morocco, Pakistan, Hungary, , Ukraine, and Chile stock market indices which are showing signs of a positive bubble for the second consecutive month, in addition to Denmark and Philippine stock market indices which are showing signs of a negative bubble also for the second consecutive month. It is worth mentioning that all the 16 stock market indices that are showing signs of bubbles, except five, are emerging markets.

Finally, the positive bubble signals that were shown in the Croatia stock market index over the last two months, and in the Lithuania stock market index over the last month, disappeared.

Date: 2017-01-02

Name: MOROCCO ALL SHAF

Indicator: DS LPPL Confidence

Bubble end flag - long time scale

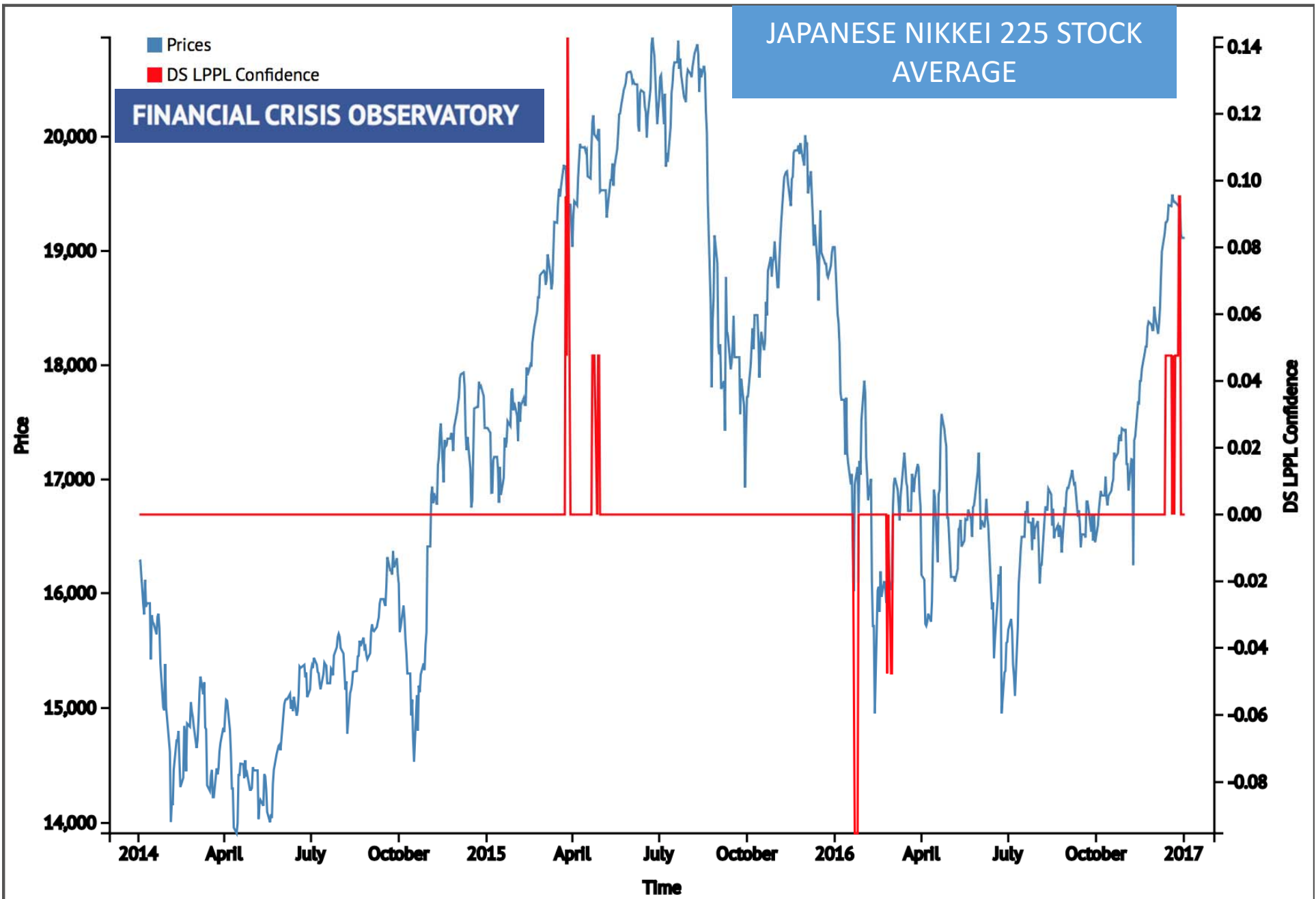


Date: 2017-01-02

Name: NIKKEI 25 STOCK A'

Indicator: DS LPPL Confidence

Bubble end flag - short time scale



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Single Stocks

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What is this?

For 858 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.

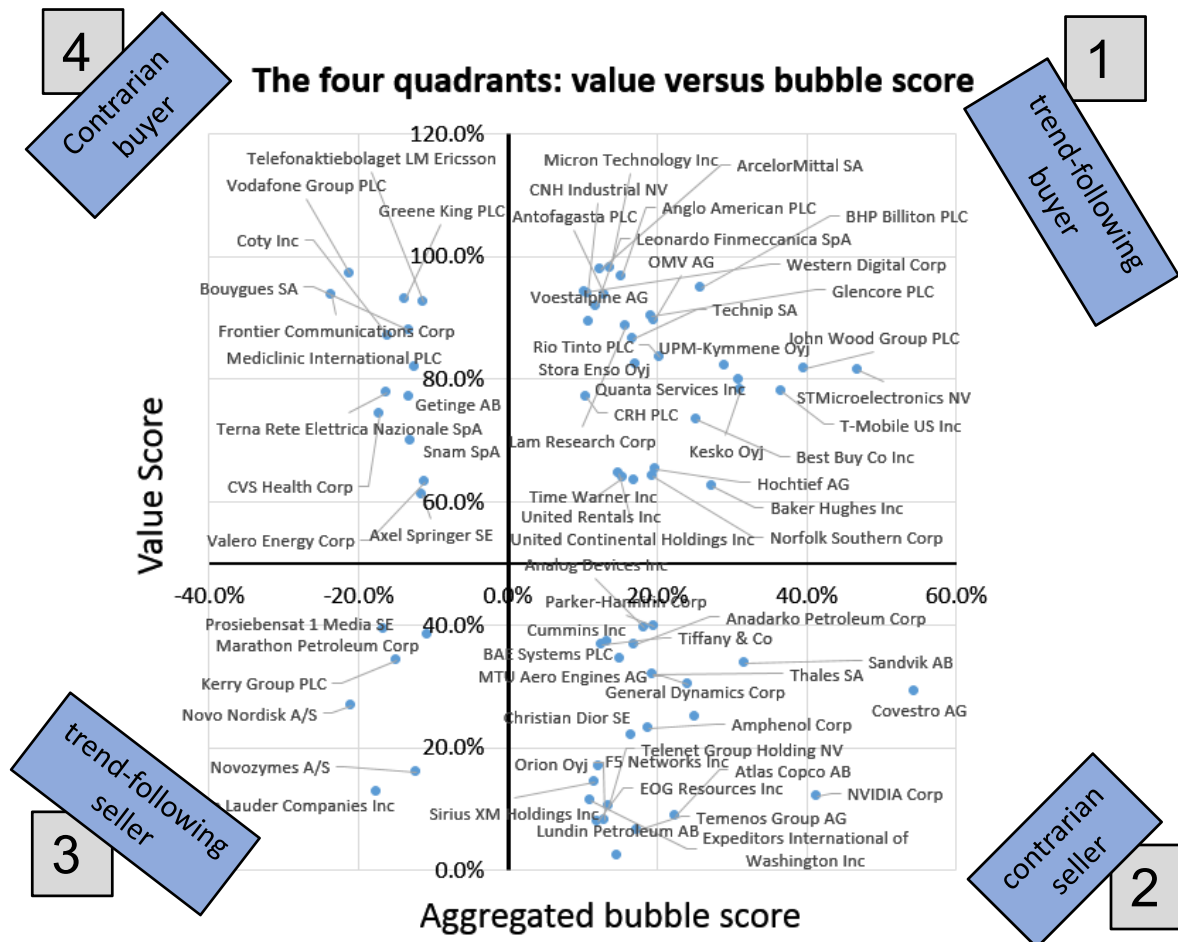
The stocks are the constituents of the Stoxx Europe 600, the S&P 500 and the Nasdaq 100 indices. From these, all doubles and stocks with incomplete data are removed. Because our financial strength indicators are specifically designed for corporates, all financial institutions are taken out of the set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

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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. Best Buy Co Inc);
2. [Quadrant 2](#): Stocks with a strong positive bubble score and a weak value score (e.g. Tiffany & Co);
3. [Quadrant 3](#): Stocks with a strong negative bubble score and a weak value score (e.g. Sirius XM);
4. [Quadrant 4](#): Stocks with strong negative bubble score and a strong financial strength (e.g. Coty 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%.

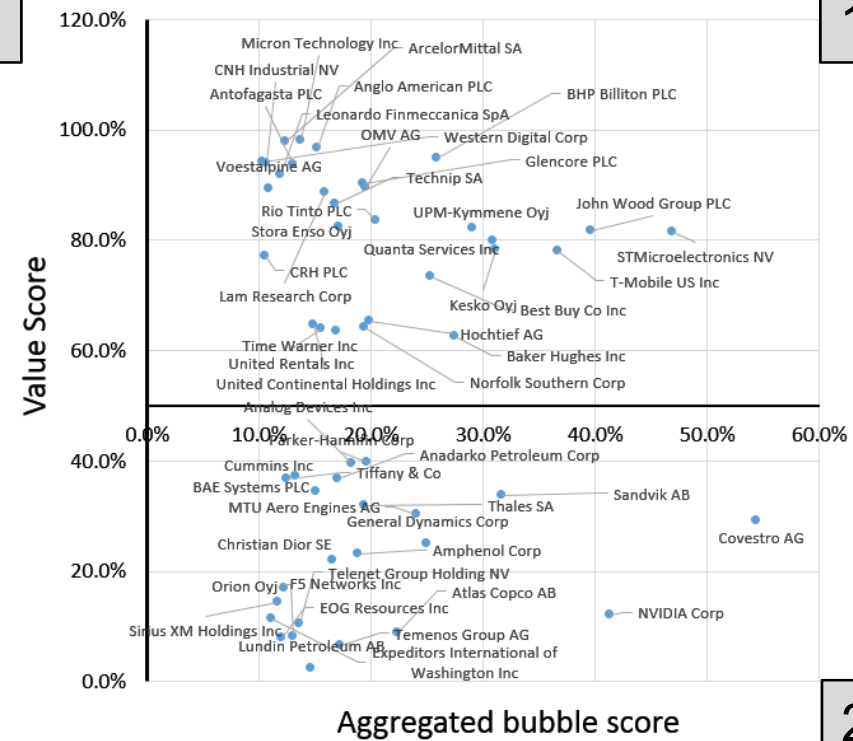
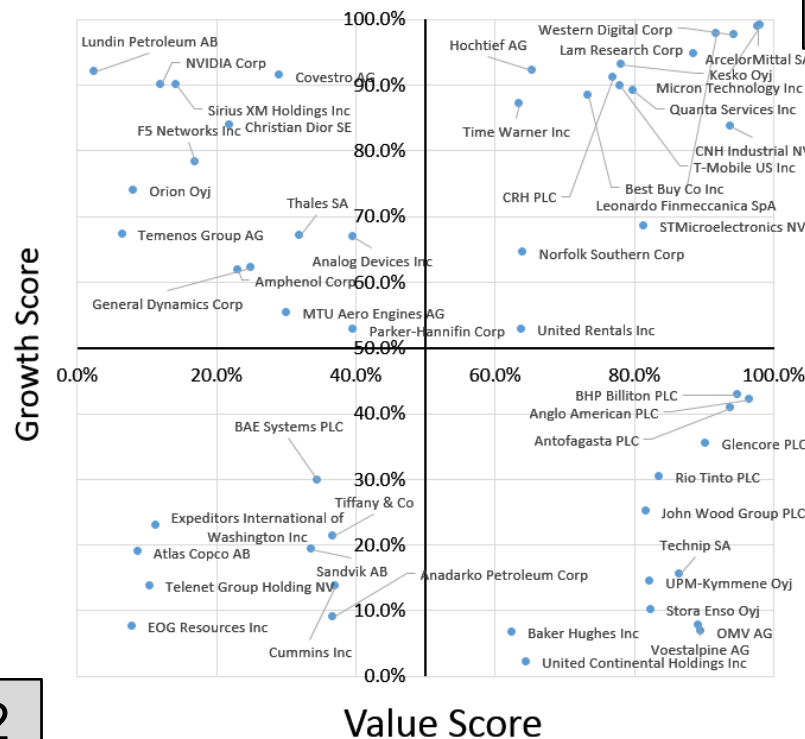
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Each quadrant has its own specs:

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.**

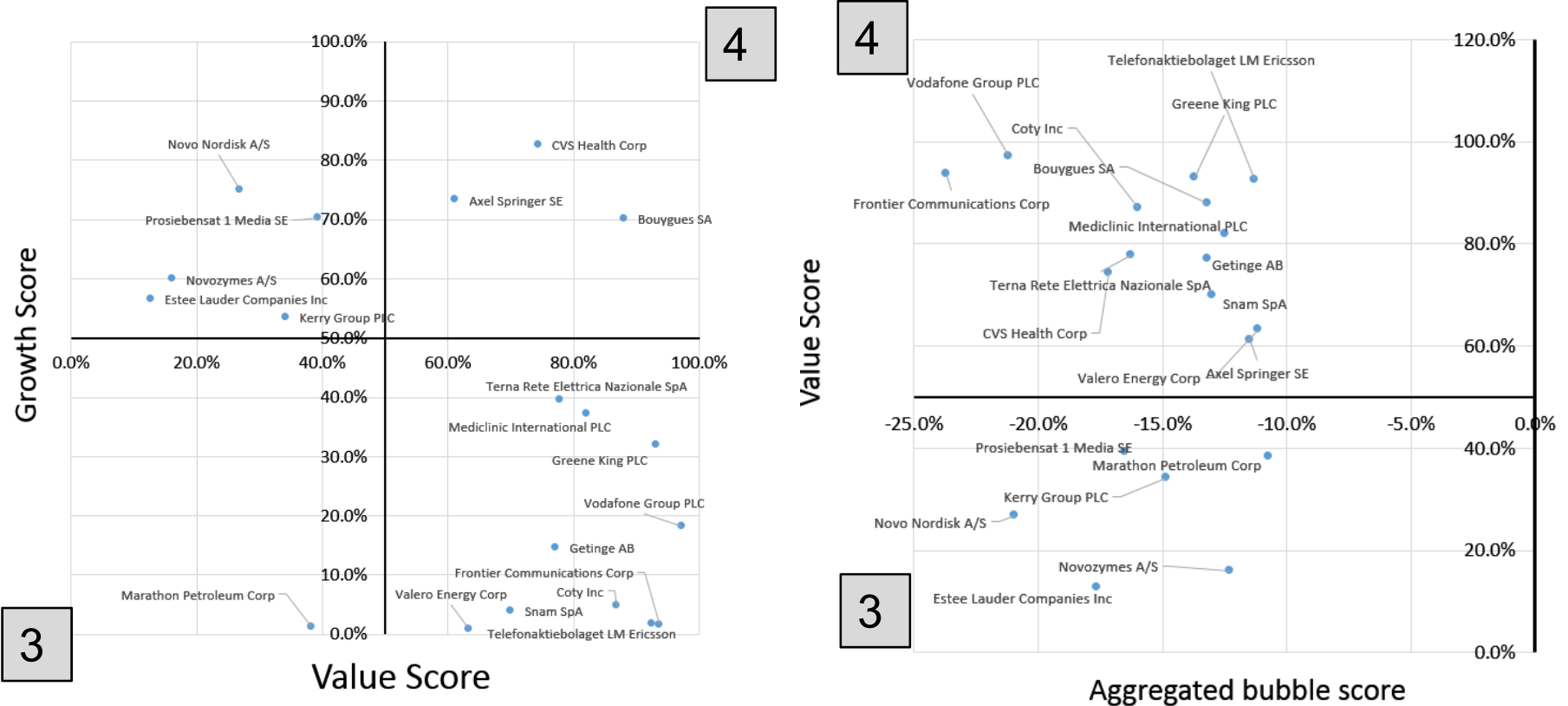
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Quadrant 1 and 2 stocks: strong positive bubble signals with strong (respectively weak) fundamentals



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Quadrant 3 and 4 stocks: strong negative bubble signals with weak respectively strong fundamentals



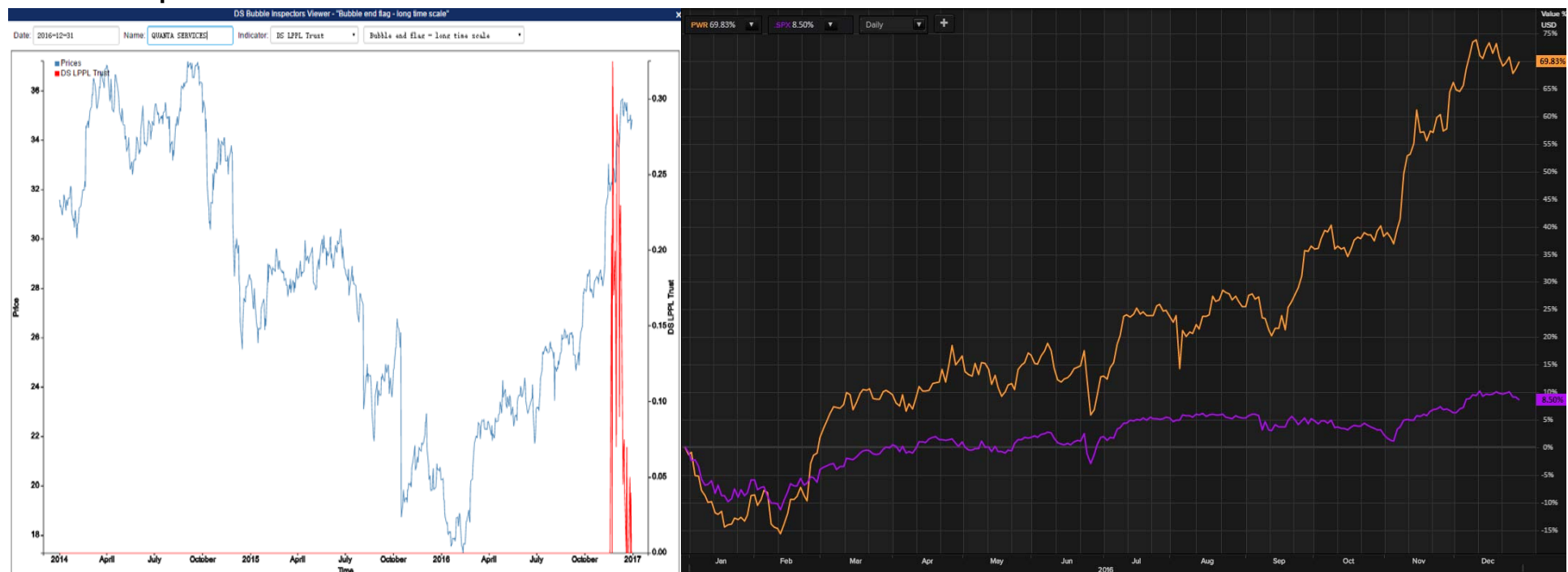
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Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

Company Name	Country of Headquarters	GICS Sector Name	GICS Industry Group Name	Yearly Return	Bubble Score	Value Score	Growth Score
Lam Research Corp	United States of America	Information Technology	Semiconductors & Semiconductor Equipment	33.1%	15.8%	88.6%	94.6%
Micron Technology Inc	United States of America	Information Technology	Semiconductors & Semiconductor Equipment	54.8%	13.7%	98.1%	99.1%
T-Mobile US Inc	United States of America	Telecommunication Services	Telecommunication Services	47.0%	36.6%	78.0%	89.7%
Western Digital Corp	United States of America	Information Technology	Technology Hardware & Equipment	13.2%	10.3%	94.3%	97.6%
Anglo American PLC	United Kingdom	Materials	Materials	287.4%	15.1%	96.6%	42.1%
Antofagasta PLC	United Kingdom	Materials	Materials	43.8%	13.0%	93.8%	40.9%
BHP Billiton PLC	United Kingdom	Materials	Materials	71.9%	25.8%	94.9%	42.9%
CRH PLC	Ireland; Republic of	Materials	Materials	23.4%	10.6%	77.0%	91.0%
Hochtief AG	Germany	Industrials	Capital Goods	54.9%	19.8%	65.4%	92.2%
Technip SA	France	Energy	Energy	48.3%	16.7%	86.5%	15.5%
Glencore PLC	Switzerland	Materials	Materials	206.5%	19.3%	90.3%	35.4%
ArcelorMittal SA	Luxembourg	Materials	Materials	132.2%	12.3%	97.8%	99.0%
CNH Industrial NV	United Kingdom	Industrials	Capital Goods	30.4%	10.6%	93.9%	83.7%
Leonardo Finmeccanica SpA	Italy	Industrials	Capital Goods	3.4%	11.9%	91.8%	97.8%
STMicroelectronics NV	Switzerland	Information Technology	Semiconductors & Semiconductor Equipment	72.4%	46.9%	81.5%	68.5%
Stora Enso Oyj	Finland	Materials	Materials	21.7%	17.1%	82.4%	10.1%
Kesko Oyj	Finland	Consumer Staples	Food & Staples Retailing	46.7%	31.1%	78.2%	93.1%
UPM-Kymmene Oyj	Finland	Materials	Materials	35.5%	29.1%	82.3%	14.3%
OMV AG	Austria	Energy	Energy	28.4%	19.5%	89.6%	6.8%
Voestalpine AG	Austria	Materials	Materials	31.5%	10.8%	89.3%	7.7%
Rio Tinto PLC	United Kingdom	Materials	Materials	59.6%	20.4%	83.7%	30.4%
Best Buy Co Inc	United States of America	Consumer Discretionary	Retailing	40.1%	25.3%	73.4%	88.3%
Baker Hughes Inc	United States of America	Energy	Energy	40.8%	27.4%	62.5%	6.6%
Norfolk Southern Corp	United States of America	Industrials	Transportation	27.8%	19.4%	64.1%	64.5%
Quanta Services Inc	United States of America	Industrials	Capital Goods	72.1%	30.9%	79.8%	89.2%
Time Warner Inc	United States of America	Consumer Discretionary	Media	49.3%	16.9%	63.5%	87.1%
United Continental Holdings Inc	United States of America	Industrials	Transportation	27.2%	14.9%	64.6%	2.2%
United Rentals Inc	United States of America	Industrials	Capital Goods	45.5%	15.5%	63.9%	52.8%
John Wood Group PLC	United Kingdom	Energy	Energy	43.0%	39.6%	81.7%	25.1%

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Quadrant 1 stocks: strong positive bubble signals with strong fundamentals,
example Quanta Services Inc.



Left graph is a standard output from the Financial Crisis Observatory. It shows the historical price evolution of the stock in blue (left hand scale) and the calculated bubble warning index DS LPPL Trust in red (right hand scale). We can see a clearly spiking warning, indicating the end of a bubble-like regime. The right graph shows the outperformance of the stock over the last year (orange) with respect to the S&P 500 benchmark (purple), it is almost 61%.

Last month example: strong positive bubble signals with strong fundamentals, Best Buy Co Inc.

Note that a correction has occurred, in synchrony with our DS LPPL trust indicator, notwithstanding the strong fundamentals. This suggests a tactical buy as the stock is expected to rebound after further correcting.

Last month signal (1st Dec. 2016)



This month signal (1st Jan. 2017)



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Quadrant 2 stocks: strong positive bubble signals with weak fundamentals

Company Name	Country of Headquarters	GICS Sector Name	GICS Industry Group Name	Yearly Return	Bubble Score	Value Score	Growth Score
Analog Devices Inc	United States of America	Information Technology	Semiconductors & Semiconductor Equipment	31.3%	18.2%	39.6%	66.8%
Expeditors International of Washington Inc	United States of America	Industrials	Transportation	17.4%	11.1%	11.3%	22.8%
F5 Networks Inc	United States of America	Information Technology	Technology Hardware & Equipment	49.3%	12.3%	17.0%	78.2%
NVIDIA Corp	United States of America	Information Technology	Semiconductors & Semiconductor Equipment	223.8%	41.3%	12.1%	90.0%
Sirius XM Holdings Inc	United States of America	Consumer Discretionary	Media	9.3%	11.7%	14.3%	90.1%
Telenet Group Holding NV	Belgium	Consumer Discretionary	Media	5.9%	13.6%	10.5%	13.8%
BAE Systems PLC	United Kingdom	Industrials	Capital Goods	18.4%	15.1%	34.5%	29.8%
Covestro AG	Germany	Materials	Materials	93.8%	54.4%	29.1%	91.4%
MTU Aero Engines AG	Germany	Industrials	Capital Goods	21.9%	24.1%	30.2%	55.4%
Christian Dior SE	France	Consumer Discretionary	Consumer Durables & Apparel	27.1%	16.5%	21.9%	83.8%
Thales SA	France	Industrials	Capital Goods	33.3%	19.3%	31.9%	67.1%
Orion Oyj	Finland	Health Care	Pharmaceuticals, Biotechnology & Life Sciences	32.3%	13.0%	8.2%	74.0%
Temenos Group AG	Switzerland	Information Technology	Software & Services	36.5%	17.3%	6.5%	67.2%
Anadarko Petroleum Corp	United States of America	Energy	Energy	43.5%	17.0%	36.7%	9.0%
Amphenol Corp	United States of America	Information Technology	Technology Hardware & Equipment	28.7%	18.8%	23.1%	61.9%
Cummins Inc	United States of America	Industrials	Capital Goods	55.3%	13.3%	37.2%	13.6%
EOG Resources Inc	United States of America	Energy	Energy	42.8%	12.0%	7.9%	7.6%
General Dynamics Corp	United States of America	Industrials	Capital Goods	25.7%	25.0%	24.9%	62.2%
Parker-Hannifin Corp	United States of America	Industrials	Capital Goods	44.4%	19.6%	39.7%	52.7%
Tiffany & Co	United States of America	Consumer Discretionary	Retailing	1.5%	12.5%	36.8%	21.3%
Lundin Petroleum AB	Sweden	Energy	Energy	61.6%	14.6%	2.4%	92.0%
Sandvik AB	Sweden	Industrials	Capital Goods	52.2%	31.7%	33.7%	19.3%
Atlas Copco AB	Sweden	Industrials	Capital Goods	33.2%	22.4%	8.7%	18.9%
Wolseley PLC	Switzerland	Industrials	Capital Goods	34.4%	13.5%	35.8%	37.2%

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Quadrant 2 stocks: strong positive bubble signals with weak fundamentals, example EOG Resources Inc.

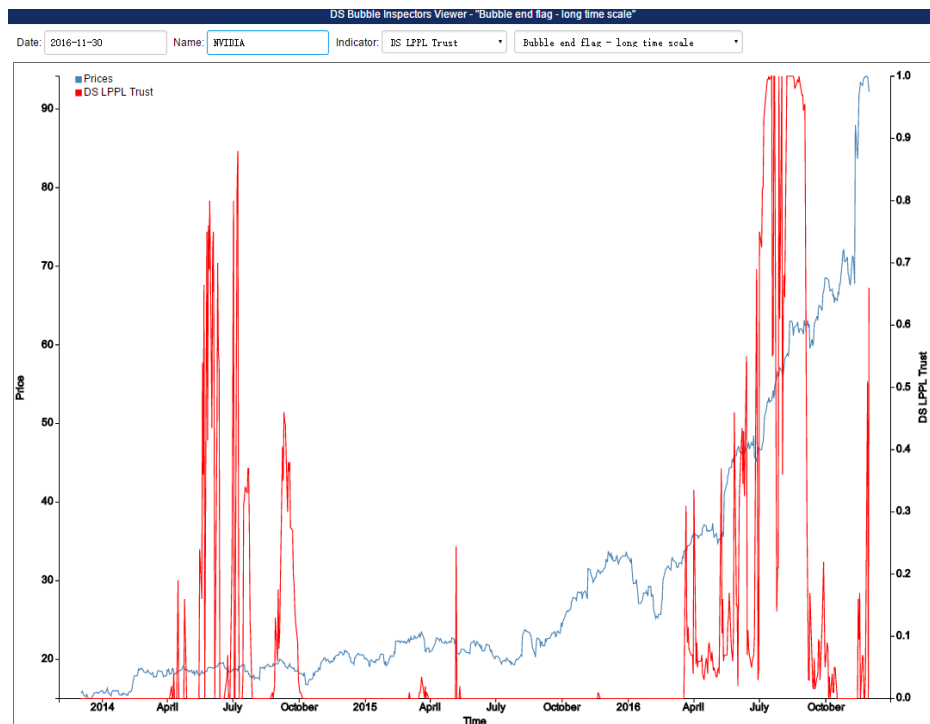


Left graph is a standard output from the Financial Crisis Observatory. It shows the historical price evolution of the stock in blue (left hand scale) and the calculated bubble warning index DS LPPL Trust in red (right hand scale). We can see a clearly spiking warning. The right graph shows the outperformance of the stock over the last year (orange) with respect to the S&P500 benchmark (purple), it is almost 35% up. The strong positive bubble signals and weak fundamentals indicate a high probability of correction, which has started recently.

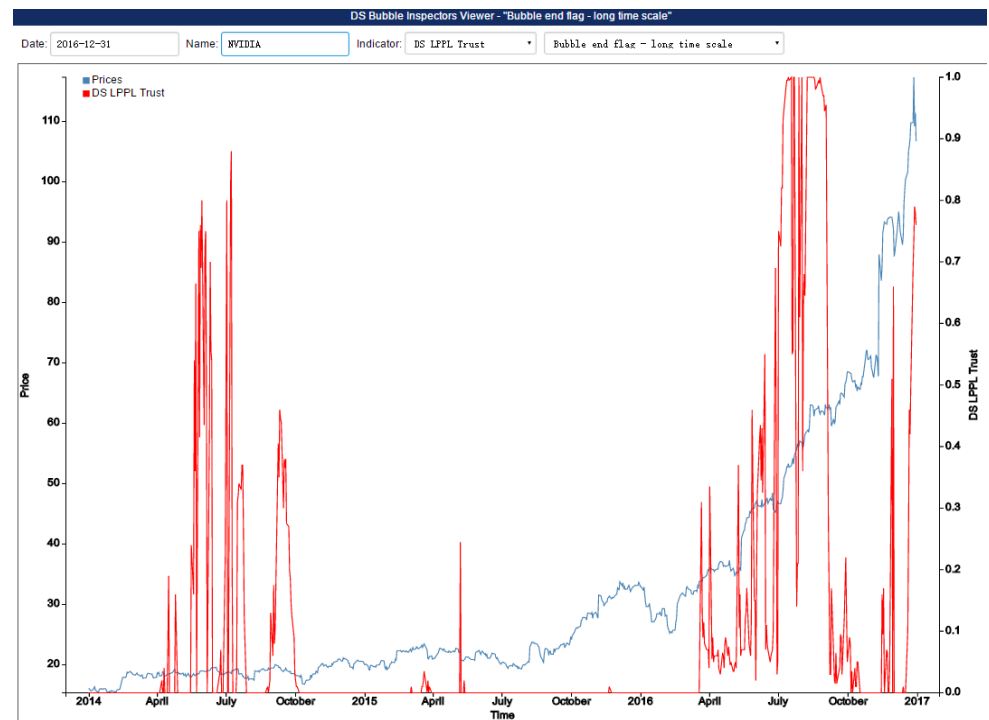
Last month example: strong positive bubble signals with weak fundamentals, NVIDIA Corp.

Note that the stock price went up again, which is in contradiction with our DS LPPL trust indicator and weak fundamentals. This stock is still identified with strong positive bubble signals and weak fundamentals this month, suggesting there is significant downward risks for this stock.

Last month signal (1st Dec. 2016)



This month signal (1st Jan. 2017)



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Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

Company Name	Country of Headquarters	GICS Sector Name	GICS Industry Group Name	Yearly Return	Bubble Score	Value Score	Growth Score
Prosiebensat 1 Media SE	Germany	Consumer Discretionary	Media	-21.7%	-16.5%	39.4%	70.3%
Novo Nordisk A/S	Denmark	Health Care	Pharmaceuticals, Biotechnology & Life Sciences	-36.3%	-20.9%	26.8%	75.1%
Novozymes A/S	Denmark	Materials	Materials	-26.3%	-12.3%	16.1%	59.9%
Kerry Group PLC	Ireland; Republic of	Consumer Staples	Food, Beverage & Tobacco	-11.0%	-14.8%	34.1%	53.5%
Estee Lauder Companies Inc	United States of America	Consumer Staples	Household & Personal Products	-13.1%	-17.6%	12.7%	56.6%
Marathon Petroleum Corp	United States of America	Energy	Energy	-2.9%	-10.7%	38.3%	1.2%

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Quadrant 3 stocks: strong negative bubble signals with weak fundamentals, example Prosiebensat 1 Media SE.



Left graph is a standard output from the Financial Crisis Observatory. It shows the historical price evolution of the stock in blue (left hand scale) and the calculated bubble warning index DS LPPL Trust in red (right hand scale). We can see a clearly spiking warning of the negative bubble. The right graph shows the performance of the stock over the last year (orange) with respect to the STOXX 600 benchmark (purple), it is roughly -20%. We can see that a clear correction started recently. However this correction may not be sustainable due to the weak fundamentals.

Last month example: strong negative bubble signals with weak fundamentals, Viscofan SA.

Note that the correction has started to occur, in synchrony with our DS LPPL trust indicator, but in contradiction with the weak fundamentals. This is an example illustrating the power of market psychology over fundamentals. However, one should remain cautious as there is still downward risk for this stock.

Last month signal (1st Dec. 2016)



This month signal (1st Jan. 2017)



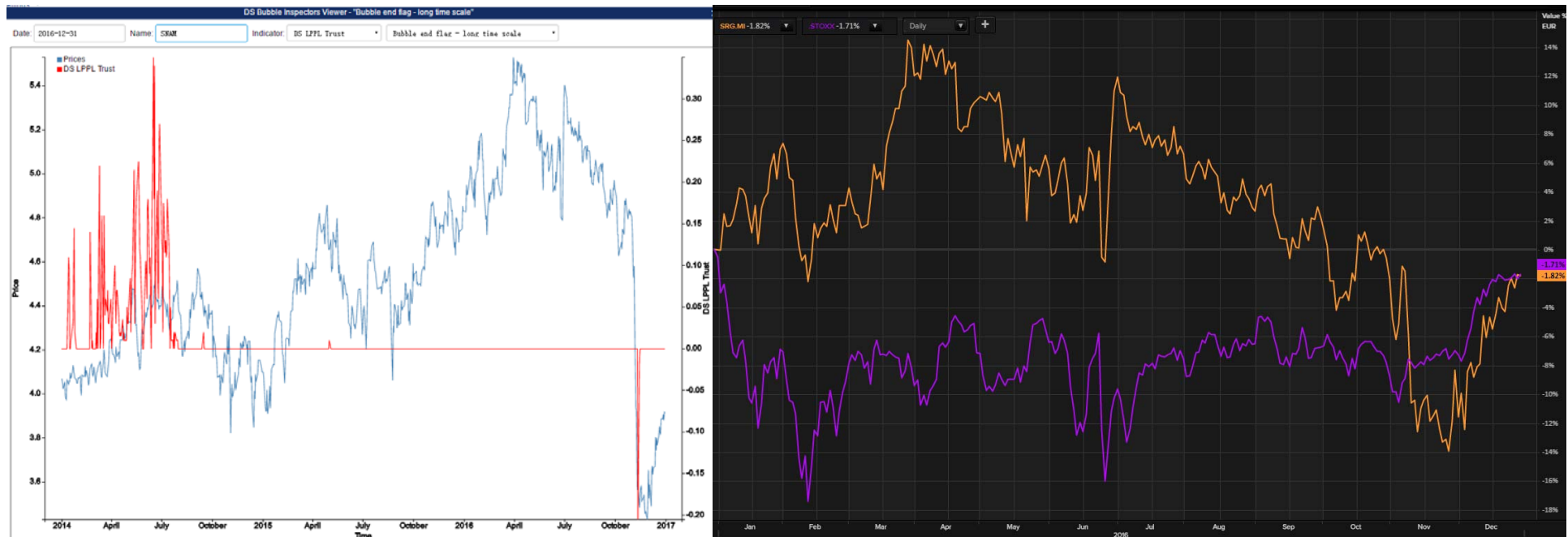
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Quadrant 4 stocks: strong negative bubble signals with strong fundamentals

Company Name	Country of Headquarters	GICS Sector Name	GICS Industry Group Name	Yearly Return	Bubble Score	Value Score	Growth Score
Frontier Communications Corp	United States of America	Telecommunication Services	Telecommunication Services	-27.6%	-23.7%	93.7%	1.6%
Vodafone Group PLC	United Kingdom	Telecommunication Services	Telecommunication Services	-24.3%	-21.2%	97.2%	18.3%
Axel Springer SE	Germany	Consumer Discretionary	Media	-10.1%	-11.5%	61.2%	73.3%
Bouygues SA	France	Industrials	Capital Goods	-6.8%	-13.2%	88.0%	70.2%
Greene King PLC	United Kingdom	Consumer Discretionary	Consumer Services	-24.9%	-13.7%	93.1%	31.9%
Snam SpA	Italy	Energy	Energy	-1.8%	-13.0%	70.0%	4.0%
Terna Rete Elettrica Nazionale SpA	Italy	Utilities	Utilities	-8.5%	-16.3%	77.9%	39.5%
Mediclinic International PLC	South Africa	Health Care	Health Care Equipment & Services	-3.2%	-12.5%	82.1%	37.3%
Coty Inc	United States of America	Consumer Staples	Household & Personal Products	-28.6%	-16.0%	86.9%	4.9%
CVS Health Corp	United States of America	Consumer Staples	Food & Staples Retailing	-19.3%	-17.1%	74.4%	82.6%
Valero Energy Corp	United States of America	Energy	Energy	-3.4%	-11.1%	63.3%	0.9%
Gefinge AB	Sweden	Health Care	Health Care Equipment & Services	-34.3%	-13.2%	77.2%	14.7%
Telefonaktiebolaget LM Ericsson	Sweden	Information Technology	Technology Hardware & Equipment	-35.0%	-11.3%	92.5%	1.7%

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Quadrant 4 stocks: strong negative bubble signals with strong fundamentals, example Snam SpA.



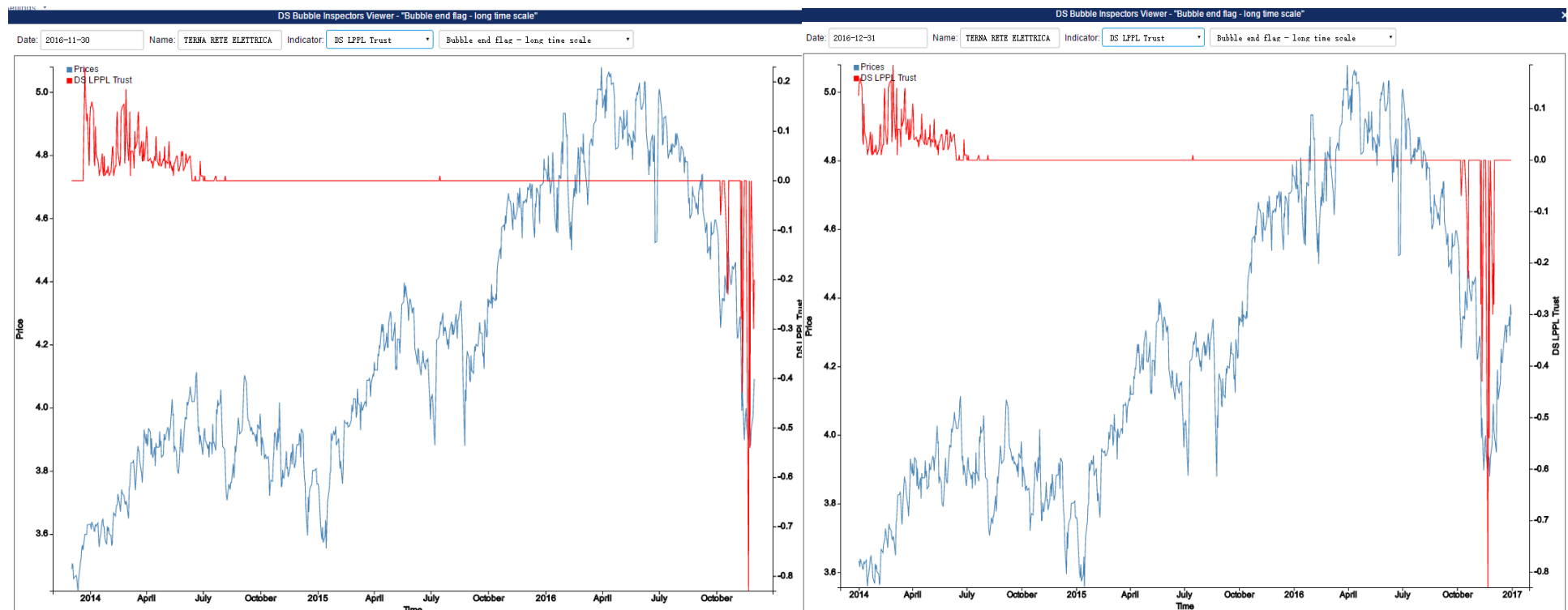
Left graph is a standard output from the Financial Crisis Observatory. It shows the historical price evolution of the stock in blue (left hand scale) and the calculated bubble warning index DS LPPL Trust in red (right hand scale). We can see a clearly spiking warning of the negative bubble. The right graph shows the performance of the stock over the last year (orange) with respect to the STOXX 600 benchmark (purple), it is roughly the same. We can see a clear rebound started recently, and 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.

Last month example: strong negative bubble signals with strong fundamentals, Terna Rete Elettrica Nazionale SpA.

Note that the rebound has started to occur, in synchrony with our DS LPPL trust indicator, and in agreement with the strong fundamentals. We expect this stock to continue appreciating. This suggests a strong buy opportunity.

Last month signal (1st Dec. 2016)

This month signal (1st Jan. 2017)



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Sectors

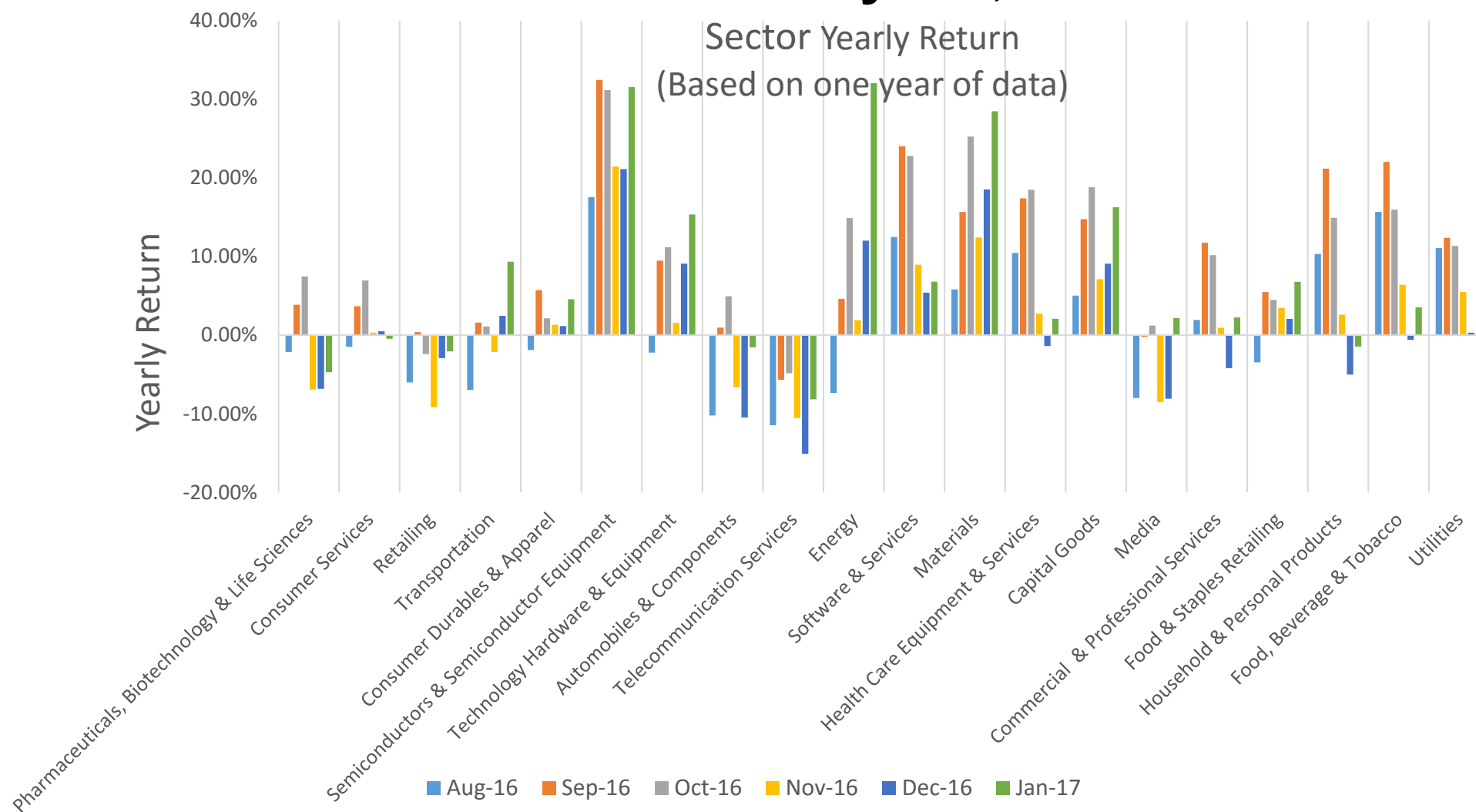
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GICS Industry Group Name	Yearly Return		Bubble Score		Value Score		Growth Score	
	Dec 1st	Nov 1st	Dec 1st	Nov 1st	Dec 1st	Nov 1st	Dec 1st	Nov 1st
Pharmaceuticals, Biotechnology & Life Sciences	-4.7%	-6.8%	-0.8%	-0.9%	40.9%	39.6%	57.0%	55.7%
Consumer Services	-0.5%	0.5%	-0.4%	-0.4%	41.5%	41.6%	48.7%	51.4%
Retailing	-2.1%	-2.9%	1.1%	0.0%	41.0%	38.2%	49.6%	49.3%
Transportation	9.3%	2.4%	3.5%	1.1%	55.9%	56.7%	44.1%	45.6%
Consumer Durables & Apparel	4.6%	1.1%	0.5%	-0.1%	47.8%	49.0%	58.2%	58.8%
Semiconductors & Semiconductor Equipment	31.6%	21.1%	6.5%	3.6%	51.3%	49.0%	64.4%	64.1%
Technology Hardware & Equipment	15.3%	9.1%	4.4%	0.9%	53.5%	53.0%	54.7%	54.5%
Automobiles & Components	-1.5%	-10.5%	1.0%	0.3%	70.7%	71.0%	70.2%	70.3%
Telecommunication Services	-8.2%	-15.1%	-2.4%	-2.5%	65.7%	64.2%	52.8%	52.8%
Energy	32.1%	12.0%	3.5%	1.5%	57.6%	58.7%	24.7%	24.9%
Software & Services	6.8%	5.4%	1.0%	1.4%	39.3%	39.2%	60.2%	60.9%
Materials	28.5%	18.5%	4.9%	2.6%	55.7%	55.5%	49.4%	49.3%
Health Care Equipment & Services	2.1%	-1.4%	-1.1%	-0.8%	43.5%	43.4%	61.4%	61.0%
Capital Goods	16.3%	9.1%	3.9%	2.1%	46.8%	46.8%	45.5%	45.0%
Media	2.2%	-8.1%	0.0%	-1.2%	53.5%	55.9%	49.9%	50.8%
Commercial & Professional Services	2.3%	-4.2%	-0.8%	-1.3%	40.3%	40.2%	42.7%	42.6%
Food & Staples Retailing	6.8%	2.1%	0.8%	0.0%	55.5%	55.6%	47.0%	45.1%
Household & Personal Products	-1.4%	-5.0%	-2.7%	-2.4%	24.7%	25.3%	46.2%	47.0%
Food, Beverage & Tobacco	3.5%	-0.6%	-1.6%	-1.3%	37.0%	37.7%	51.3%	51.5%
Utilities	6.4%	0.3%	-0.3%	-0.1%	78.8%	78.8%	47.8%	47.8%

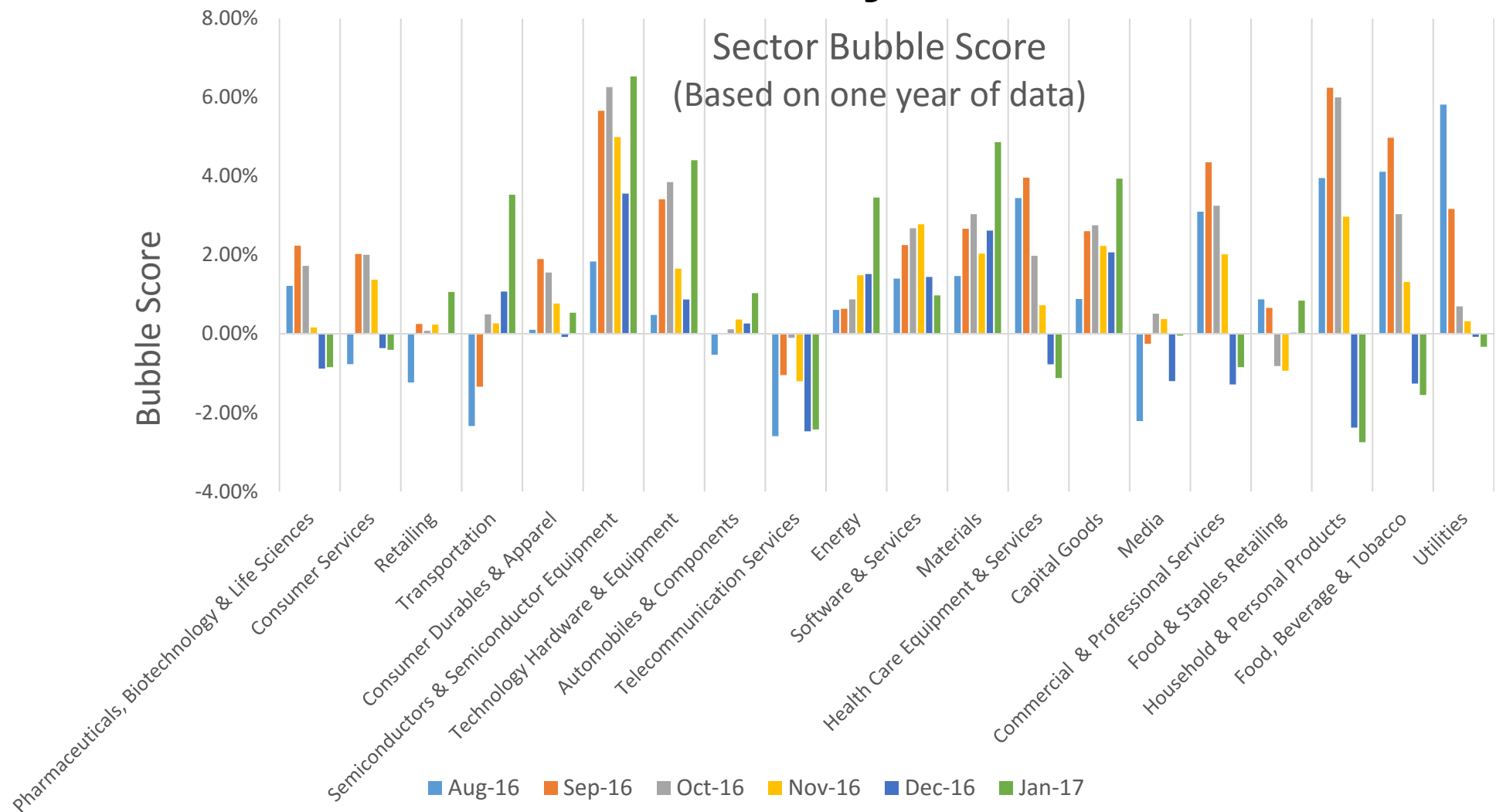
By aggregating the calculations that were done at the single stock level in the previous section, we can see the bubble, value and growth score at the sector level. The results in the previous report are also presented here for comparison.

- The sector *Semiconductors & Semiconductor Equipment* we reported in Oct 2016 report has been detected with a rather strong positive bubble signal again. Due to the high growth rate of this industry, and the accelerated momentum in emerging technology such as Artificial Intelligence, deep learning, etc., this sector is one of the best performers in S&P in 2016.
- The sector *Energy* shows a strong positive bubble this month, due to the rebound of energy price such as Oil.

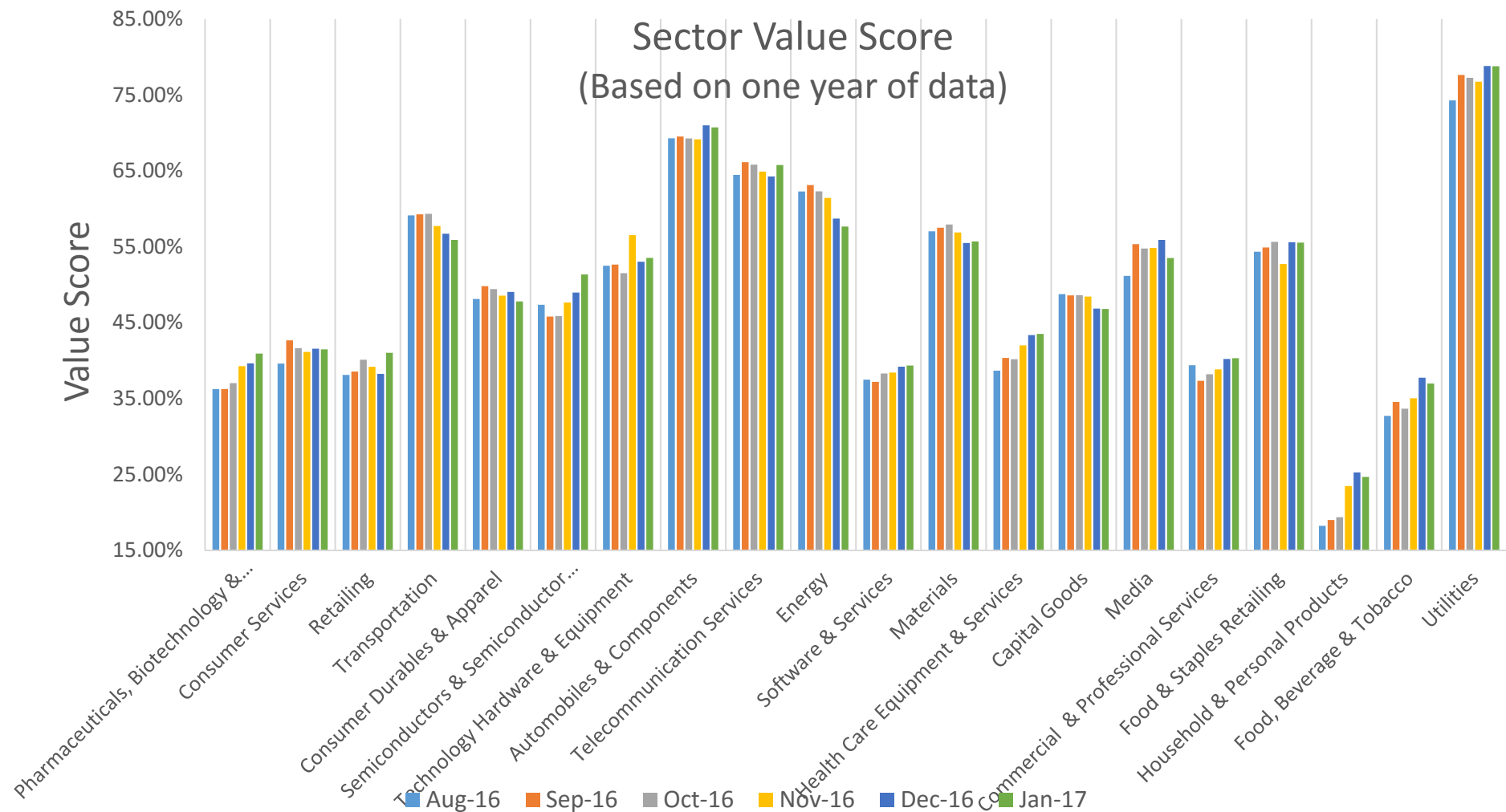
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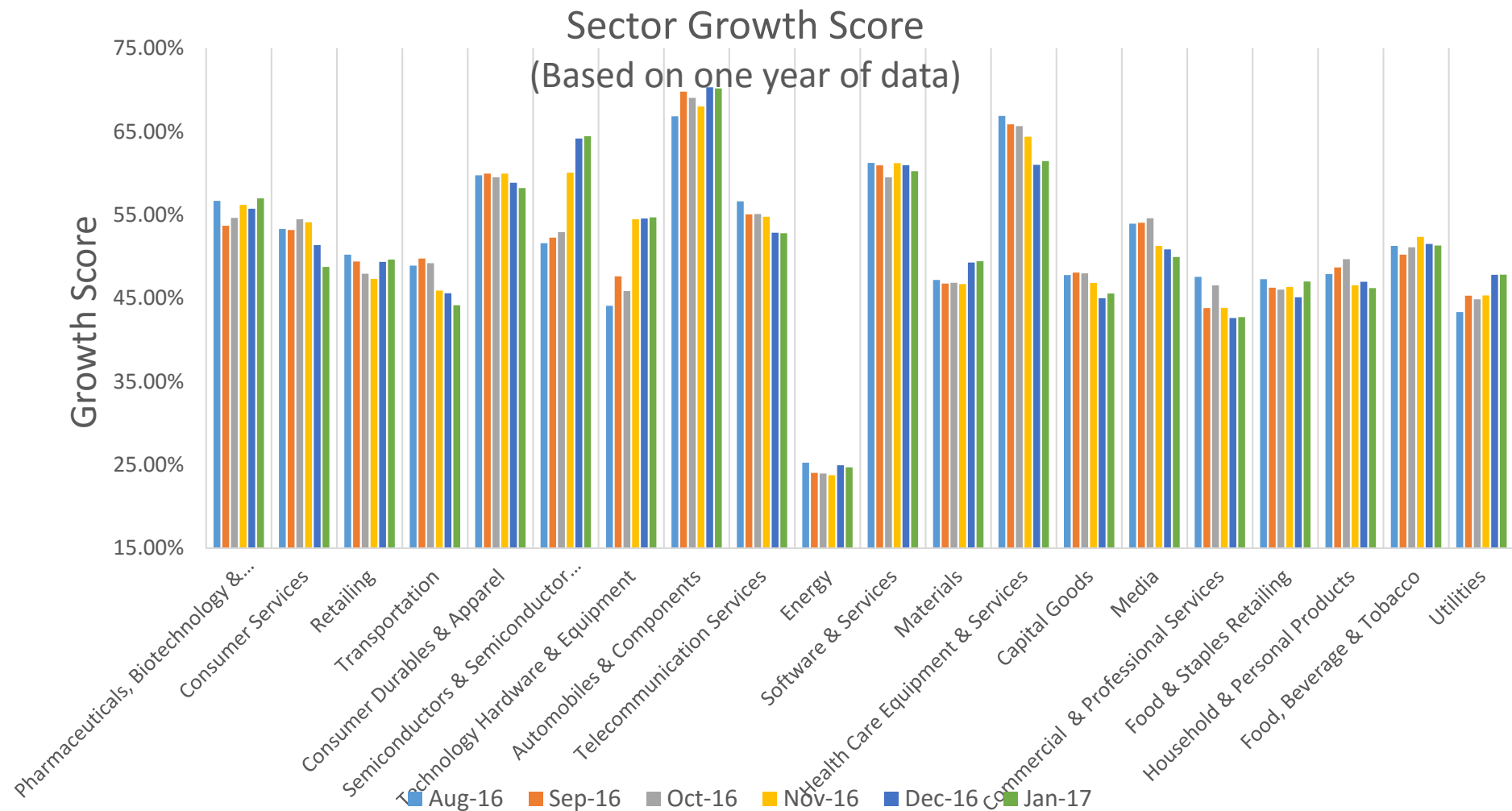
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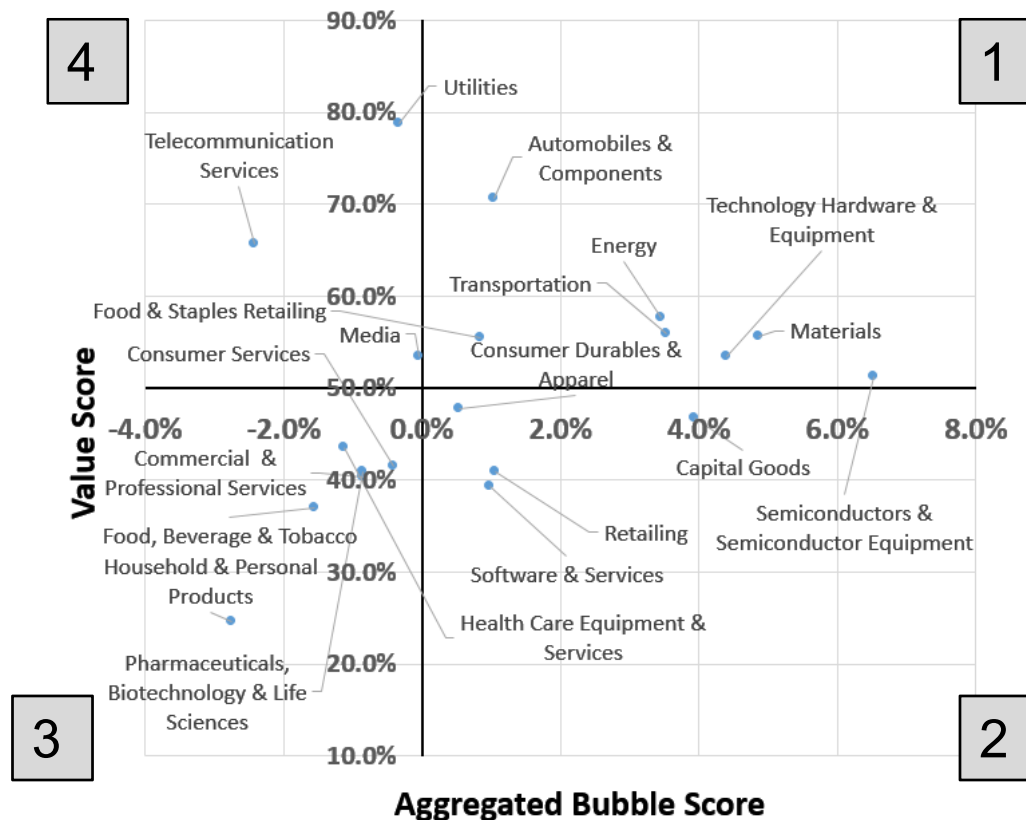
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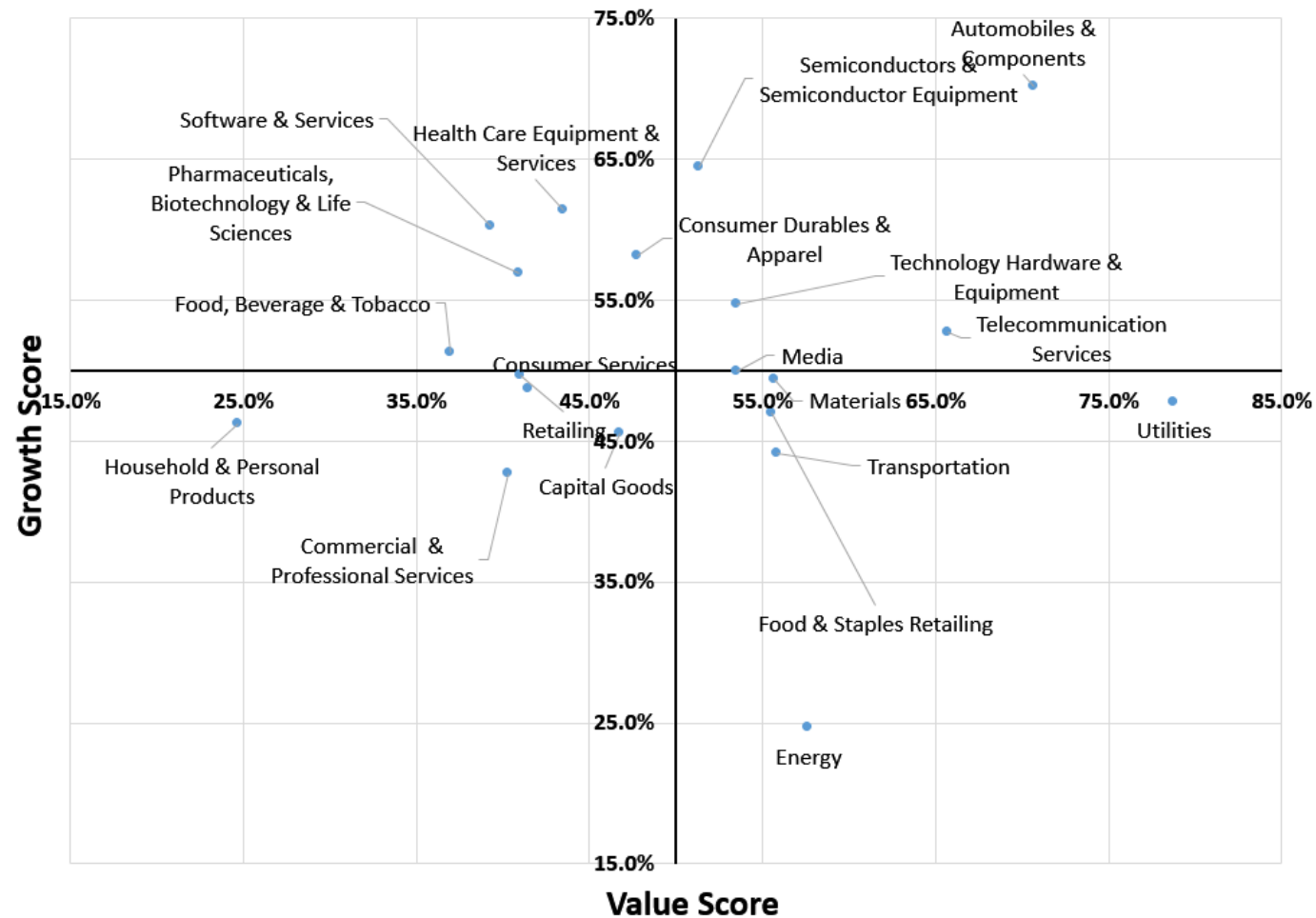


By plotting the value score versus the aggregated bubble score, we can also divide the sectors into four quadrants*:

1. [Quadrant 1](#): Sectors with an average positive bubble score and a strong value score;
2. [Quadrant 2](#): Sectors with an average positive bubble score and a weak value score;
3. [Quadrant 3](#): Sectors with an average negative bubble score and a weak value score;
4. [Quadrant 4](#): Sectors with an average negative bubble score and a strong value score.

*For sectors, a strong value score is identified if value score is larger than 50%, and a weak value score is identified if else.

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Portfolio Construction and Performance

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

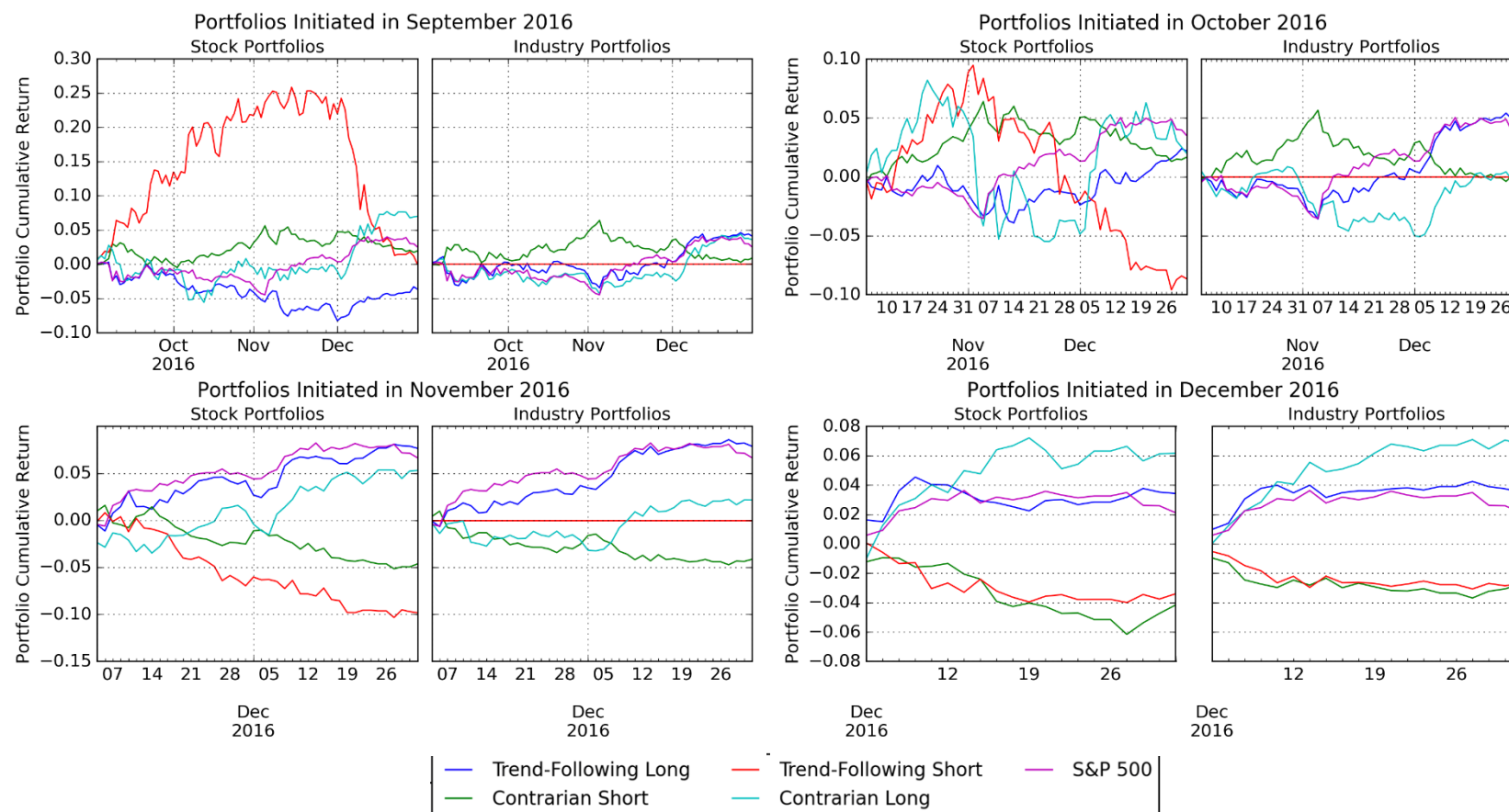
For individual stocks that we identified in the 4 quadrants, we constructed 4 portfolios based on the 4 quadrants defined in the last report. Each portfolio consists of all the stocks listed in the corresponding quadrant.

- (1) Trend-Following Long Stock Portfolio (TFLSP) is made of the stocks that have a **strong** bubble signal as well as a **strong** value score. For instance, TFLSP June consists of all the stocks listed in quadrant 1, identified in slide 25 of June FCO Report.
- (2) Trend-Following Short Stock Portfolio (TFSSP) is made of the stocks that have a **strong** bubble signal as well as a **weak** value score.
- (3) Contrarian Long Stock Portfolio (CLSP) is made of the stocks that have a **weak** bubble signal as well as a **strong** value score.
- (4) and Contrarian Short Stock Portfolio (CSSP) is made of the stocks that have a **weak** bubble signal as well as a **weak** value score.

At the same time, we also classified 20 industries into 4 quadrants. We also 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). For example, Trend-Following Long Industry Portfolio June consists of all the stocks in the industries listed in quadrant 1, identified in slide 39 of the June 2016 FCO Report.

In each month, we initiated 8 new portfolios based on the updated results. The performance of every 8 portfolios we initiated in each month since April 2016 are presented in the next slide. All of the stocks in our portfolios have the same weights and we don't consider transaction cost in the portfolio performance.

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This month, we find that Long portfolios play out and outperform the market in most portfolios initiated in September, October, November and December. This is due to the strong rallies of the market in December. 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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For information, see

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