



The FCO Cockpit Global Bubble Status Report May 2019



A collaboration of the Chair of Entrepreneurial Risks,
ETH Zurich and Systematic Investment Management AG

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ETH FCO and SIMAG Join Forces

The Financial Crisis Observatory (FCO) is...

- **Part of** the Chair of Entrepreneurial Risks at the Department of Management, Technology and Economics at the **ETH Zurich**
- A **scientific platform** aimed at quantifying in a systematic way the hypothesis that financial markets exhibit a degree of inefficiency and a **potential for predictability**, especially during regimes when **bubbles** develop
- Aiming to **provide warnings** at different time scales (week, month, quarter) on the development of future financial instabilities

Systematic Investment Management AG (SIMAG) is ...

- A **Joint Venture** between **Credit Suisse Asset Management** and an **ETH Zurich spin off**
- A **FINMA-licensed Investment Manager** for collective investment schemes.
- Relying on a **proprietary machine learning engine** specifically designed for **financial markets**
- The first and only investment manager globally which can **systematically leverage ETH's Financial Crisis Observatory (FCO) research insights**

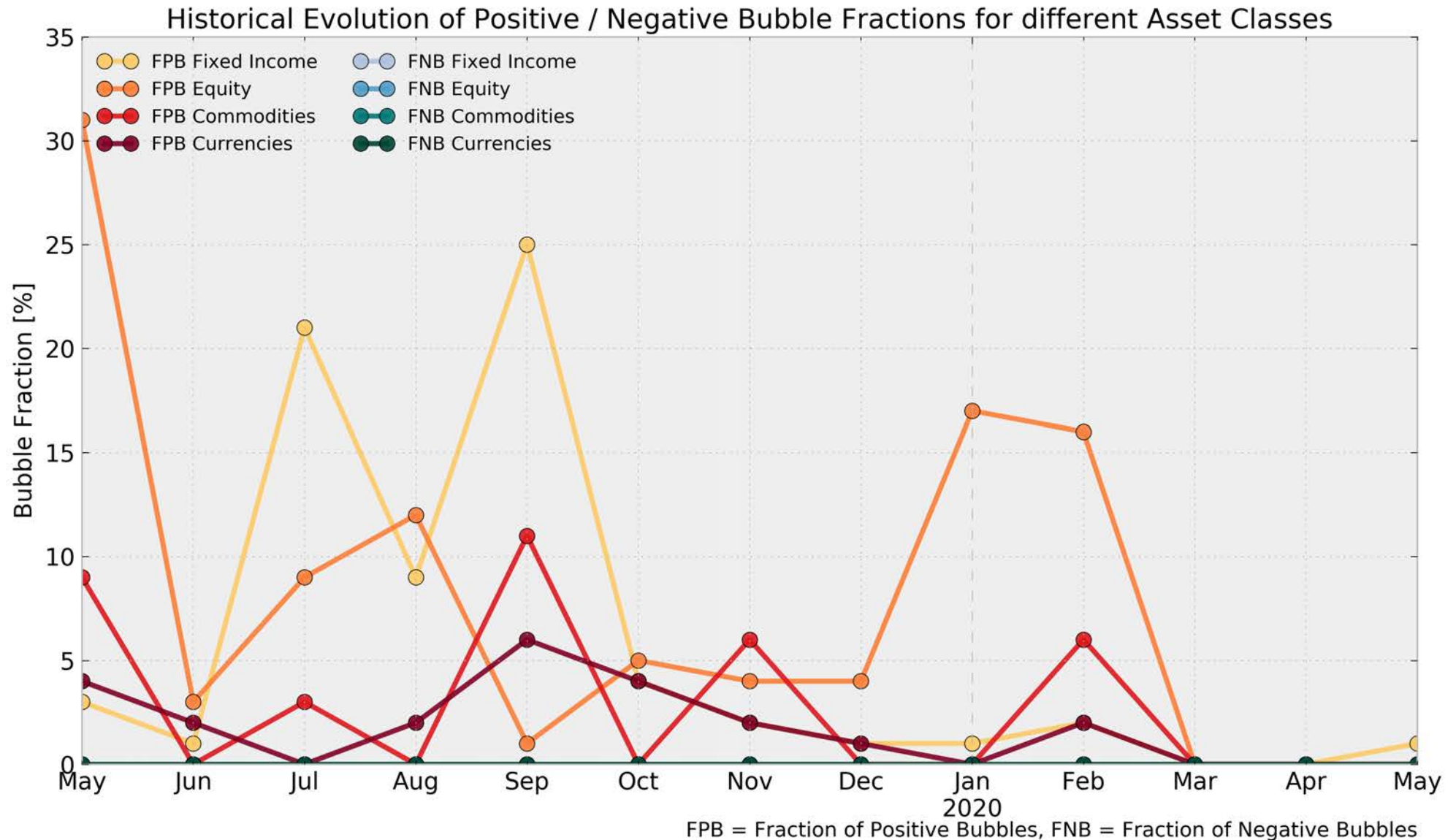
Together we are able to provide you with richer investment content and deeper research insights

Purpose and Benefits

- ▶ The **Financial Crisis Observatory (FCO)** monthly report discusses the historical evolution of bubbles in and between different asset classes and geographies. The purpose of the FCO report is to ascertain which asset classes and sectors are deemed to be **crowded** and to what degree they can develop contagion risks.
- ▶ Today, the report is **used by 600+ institutions world-wide**, including universities, think tanks, sovereign wealth funds, hedge funds, family offices, private banks and pension funds.
- ▶ It delivers the big picture in terms of growing bubbles and instabilities in today's financial markets for **Chief Investment Officers, Senior Researchers, Fund Managers**, and **Independent Financial Advisors**, and all parties with **investment performance responsibility** or **managing financial risks**.
- ▶ The report 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.
- ▶ To new readers, we recommend proceeding to the appendix for more detailed information about the methodology and procedures applied in this report.

Access to the FCO analysis data can be granted upon request. Please contact info@simag.com or visit <https://www.simag.com/insights/fco-cockpit/>

General Results – The Big Picture



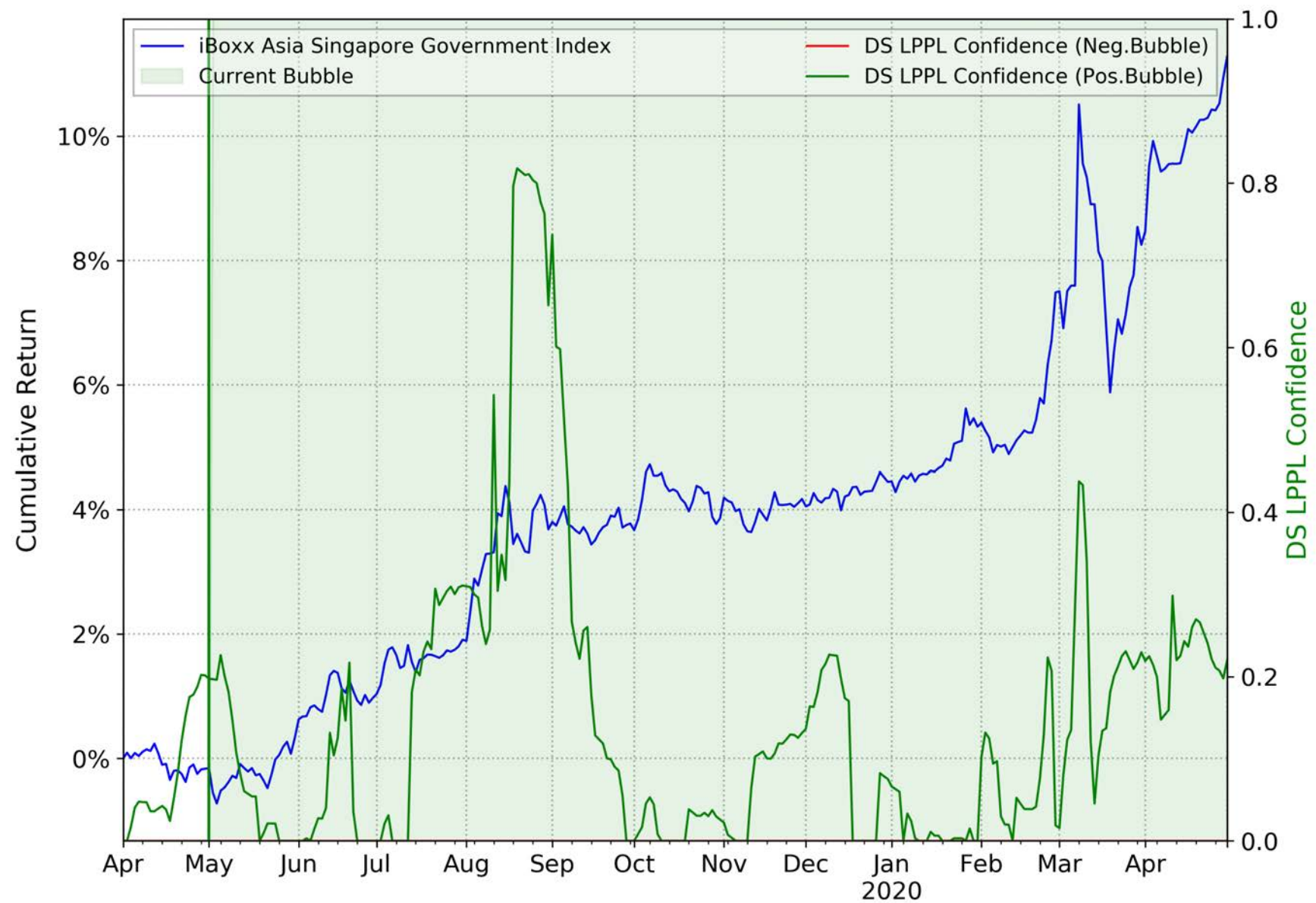
General Results – This Month's Overview

| Category | Analyzed Assets | Fraction of Pos. Bubbles [%] | Fraction of Neg. Bubbles [%] |
|-----------------------|-----------------|------------------------------|------------------------------|
| Fixed Income | 142 | 1 | 0 |
| Government Bonds | 54 | 2 | 0 |
| Finance and Insurance | 20 | 0 | 0 |
| Corporate Bonds | 68 | 0 | 0 |
| Equity | 119 | 0 | 0 |
| Country Indices | 26 | 0 | 0 |
| Europe | 10 | 0 | 0 |
| United States | 83 | 0 | 0 |
| Commodities | 20 | 0 | 0 |
| Forex | 83 | 0 | 0 |

Fixed Income – Government Bonds

| | | | | | Bubble Data | Cluster Analysis | | |
|------------------|---------------------------------------|-------------------------|--------------------|-----------------------------------|---|---|--------------------------|--------------------------------|
| | Name | Bubble Size bs [%] | Duration [days] | DS LPPL Confidence ci [%] | Geometric Average $\sqrt{bs \cdot ci}$ [%] | Critical Time Prediction μ_{t_c} | σ_{t_c} [days] | Scenario Probability [%] |
| Positive Bubbles | | | | | | | | |
| 1 | iBoxx Asia Singapore Government Index | 11 | 365 | 22 | 16 | 2020-10-26 | 2 | 49 |

- ▶ We detect a single positive bubble signal for the iBoxx Asia Singapore Government Bond Index. The value of the Confidence Indicator is in the lower range and the mean predicted critical time is about 6 months in the future, which is at the upper end of our prediction range.
- ▶ The indicator time series is given on the following page.



Sectors

| GICS Industry Group Name | Yearly Return | | Bubble Size | | Bubble Score | | Value Score | | Growth Score | |
|--|---------------|---------|-------------|---------|--------------|---------|-------------|---------|--------------|---------|
| | May 1st | Apr 1st | May 1st | Apr 1st | May 1st | Apr 1st | May 1st | Apr 1st | May 1st | Apr 1st |
| Pharmaceuticals, Biotechnology & Life Sciences | 17.0% | 2.0% | 0.0% | 0.0% | 0.0% | 0.0% | 69.0% | 67.6% | 50.5% | 50.5% |
| Consumer Services | -16.7% | -29.4% | 0.0% | 0.0% | 0.0% | 0.0% | 32.0% | 31.5% | 44.9% | 44.2% |
| Retailing | 13.3% | -8.9% | 0.0% | 0.0% | 0.0% | 0.0% | 22.3% | 22.5% | 47.4% | 45.9% |
| Transportation | -12.8% | -20.9% | 0.0% | 0.0% | 0.0% | 0.0% | 55.3% | 55.2% | 46.5% | 49.8% |
| Consumer Durables & Apparel | -6.3% | -14.8% | 0.0% | 0.0% | 0.0% | 0.0% | 31.0% | 32.0% | 59.4% | 59.2% |
| Semiconductors & Semiconductor Equipment | 21.8% | 1.5% | 0.0% | 0.0% | 0.0% | 0.0% | 61.4% | 62.8% | 38.8% | 38.0% |
| Technology Hardware & Equipment | 22.0% | 2.0% | 0.0% | 0.0% | 0.0% | 0.0% | 66.3% | 67.9% | 42.9% | 41.8% |
| Automobiles & Components | -10.7% | -27.2% | 0.0% | 0.0% | 0.0% | 0.0% | 70.1% | 69.8% | 53.2% | 54.9% |
| Telecommunication Services | -3.7% | -11.1% | 0.0% | 0.0% | 0.0% | 0.0% | 64.3% | 59.7% | 45.0% | 45.1% |
| Energy | -38.3% | -49.3% | 0.0% | 0.0% | 0.0% | 0.0% | 51.7% | 52.5% | 63.2% | 62.8% |
| Software & Services | 15.7% | 2.9% | 0.0% | 0.0% | 0.0% | 0.0% | 34.0% | 35.0% | 49.3% | 48.7% |
| Materials | -7.4% | -24.6% | 0.0% | 0.0% | 0.0% | 0.0% | 52.0% | 51.9% | 51.5% | 51.5% |
| Health Care Equipment & Services | 14.0% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 56.2% | 57.0% | 52.3% | 52.8% |
| Capital Goods | -14.9% | -23.4% | 0.0% | 0.0% | 0.0% | 0.0% | 46.7% | 46.3% | 49.4% | 50.0% |
| Media & Entertainment | 2.9% | -10.7% | 0.0% | 0.0% | 0.0% | 0.0% | 30.5% | 30.6% | 37.3% | 35.8% |
| Commercial & Professional Services | -0.6% | -9.0% | 0.0% | 0.0% | 0.0% | 0.0% | 28.1% | 28.7% | 56.6% | 55.4% |
| Food & Staples Retailing | 7.2% | 0.2% | 0.0% | 0.0% | 0.0% | 0.0% | 46.9% | 49.2% | 58.1% | 60.3% |
| Household & Personal Products | 1.0% | -2.5% | 0.0% | 0.0% | 0.0% | 0.0% | 30.3% | 31.1% | 46.4% | 46.9% |
| Food, Beverage & Tobacco | -6.6% | -11.1% | 0.0% | 0.0% | 0.0% | 0.0% | 48.5% | 49.7% | 55.8% | 56.4% |
| Utilities | -2.4% | -6.2% | 0.0% | 0.0% | 0.0% | 0.0% | 49.6% | 50.3% | 43.8% | 45.6% |
| Insurance | -18.8% | -22.4% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - | - |
| Real Estate | -13.2% | -20.6% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - | - |
| Diversified Financials | -5.7% | -17.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - | - |
| Banks | -27.2% | -34.0% | 0.0% | 0.0% | 0.0% | 0.0% | - | - | - | - |

Sectors

- ▶ We use the MSCI World Industry Group Indices to calculate bubble size and bubble score of the corresponding sectors. To determine the value scores and growth scores of the sectors, we average over the corresponding values for each stock of a given sector, weighted by market cap.
- ▶ This month, we find 0 industry groups with a positive bubble score, as the market is in a volatile after-crash mode due to the COVID-19 pandemic.

Portfolio Construction & Performance

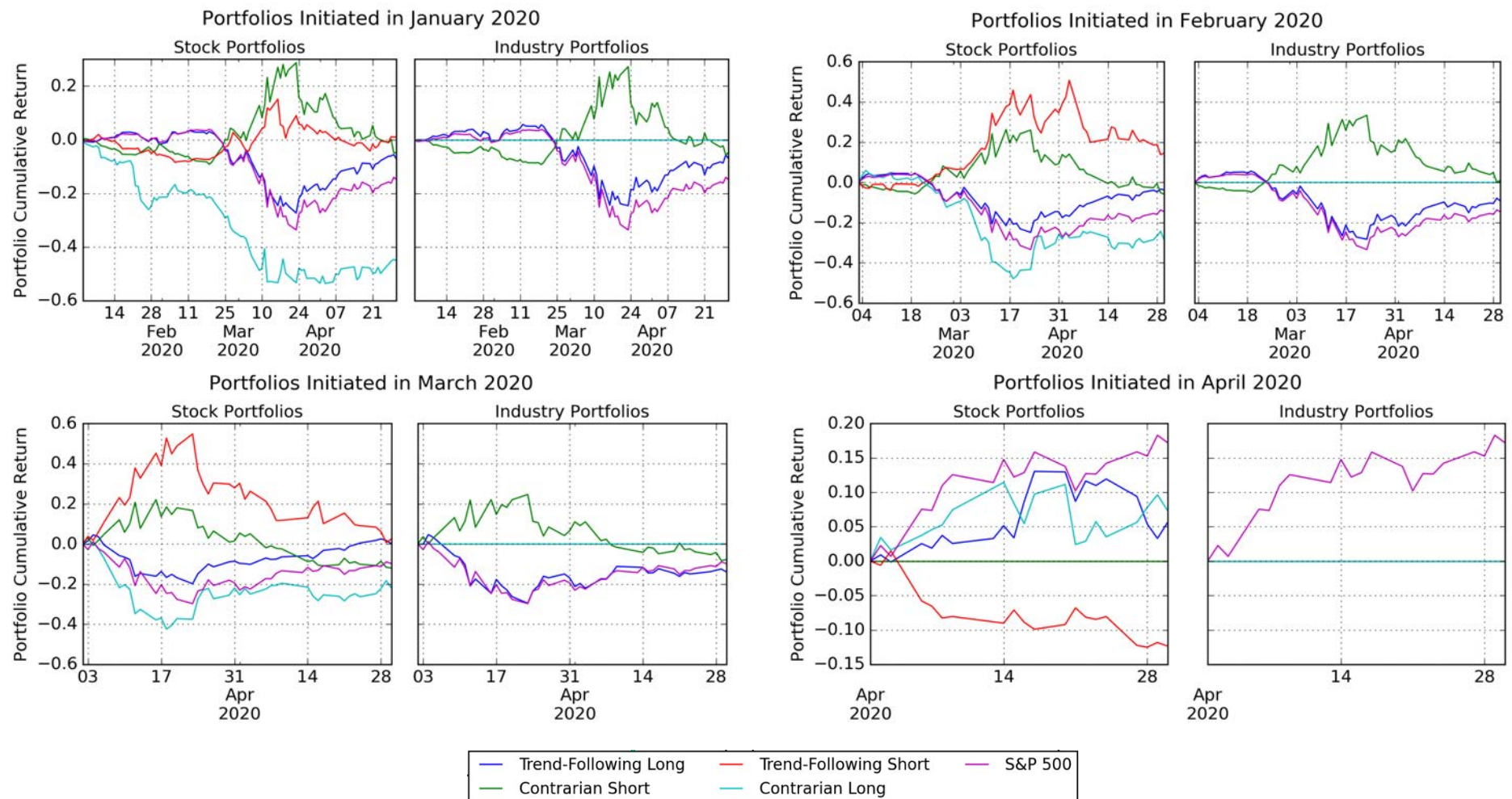
- ▶ Here we illustrate the methodology of the portfolio construction process based on the results of our previous analyses.
- ▶ For individual stocks that we identified in the 4 quadrants, we constructed 4 portfolios based on the 4 quadrants defined in the last report. Each portfolio consists of all the stocks listed in the corresponding quadrant.
 1. **Trend-Following Long Stock Portfolio (TFLSP)** is made of the stocks that have a **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. **Contrarian Short Stock Portfolio (CSSP)** is made of the stocks that have a **positive** bubble signal as well as a **weak** value score.

Portfolio Construction & Performance

- ▶ At the same time, we also classified 20 industries into 4 quadrants, and constructed 4 type of industry portfolios based on the 4 industry quadrants. Each portfolio consists of all the stocks in the industries listed in the corresponding quadrant. Following the same definitions as above, we have Trend-Following Long Industry Portfolio (TFLIP), Trend-Following Short Industry Portfolio (TFSIP), Contrarian Long Industry Portfolio (CLIP), and Contrarian Short Industry Portfolio (CSIP).
- ▶ In each month, we initiated 8 new portfolios based on the updated results. The performance of every 8 portfolios we initiated since November 2017 are presented in the next slide. All of the stocks in our portfolios are weighted by their market capitalizations and we don't consider transaction cost in the portfolio performance.

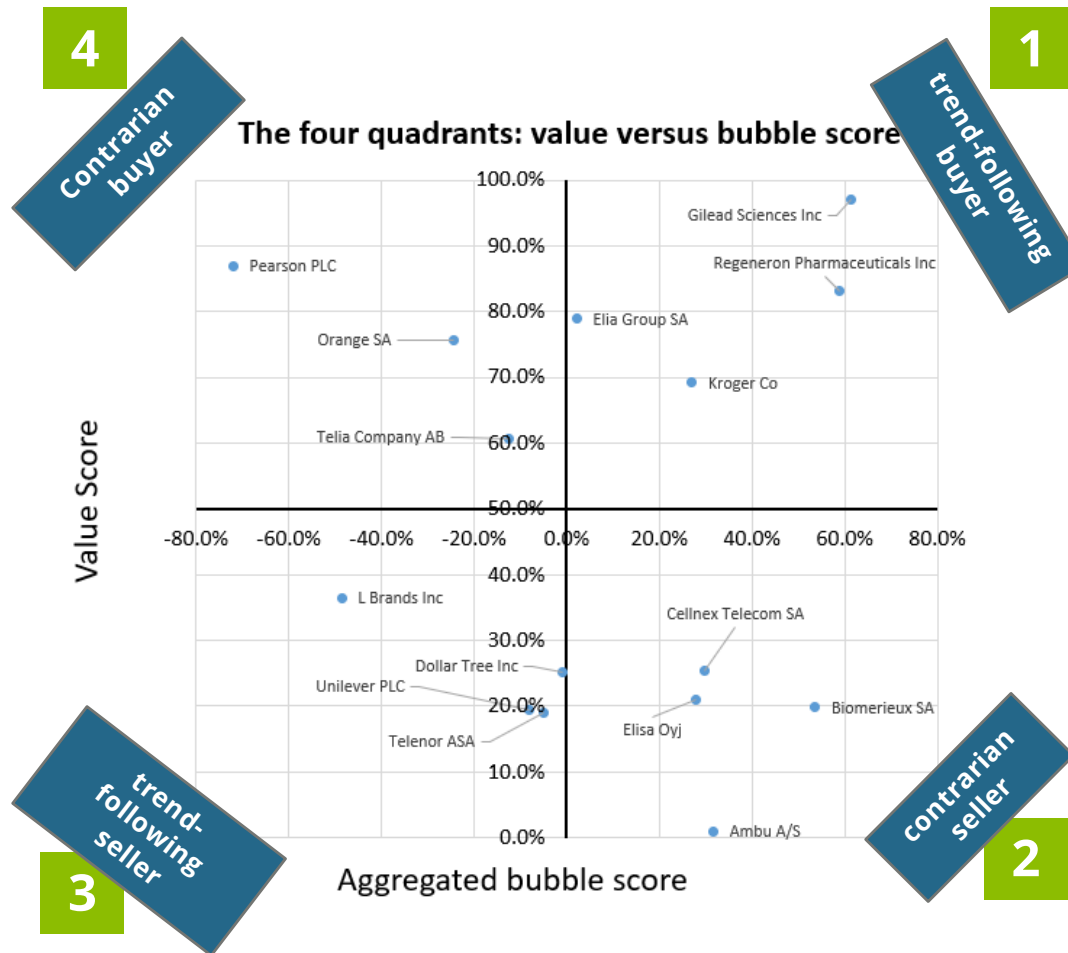
Portfolio Construction & Performance

- ▶ The market had a more than 10% rebound in the past month after experiencing a big drawdown due to the COVID-19 outbreaks, which almost remove the gains of the short portfolios in March. 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 over which the predicted corrections play out.



Single Stocks

We can divide the stocks into four quadrants¹⁾



- **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**. E.g. Kroger Co
- **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**. E.g. Kroger Co
- **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**. E.g. L Brands Inc
- **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**. E.g. Pearson PLC

¹⁾ A strong positive bubble signal is identified if bubble score is positive, and a strong negative bubble signal is identified if bubble score is negative.
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%.

Single Stocks

- ▶ For 768 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.
- ▶ To analyze the **financial strength of individual stocks**, we have two indicators. 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.
 - A **value score** that is based on the ROIC (Return on Invested Capital) taking into account the EV (Enterprise Value) to normalize for high/low market valuations and/or high/low debt; Value scores are calculated by comparing ROIC level versus EV/IC in each industry.
 - A **growth score** that has characteristics similar to the PEG ratio, which is the Price to Earnings ratio normalized by the expected growth of the EPS (Earnings per Share).
- ▶ 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.

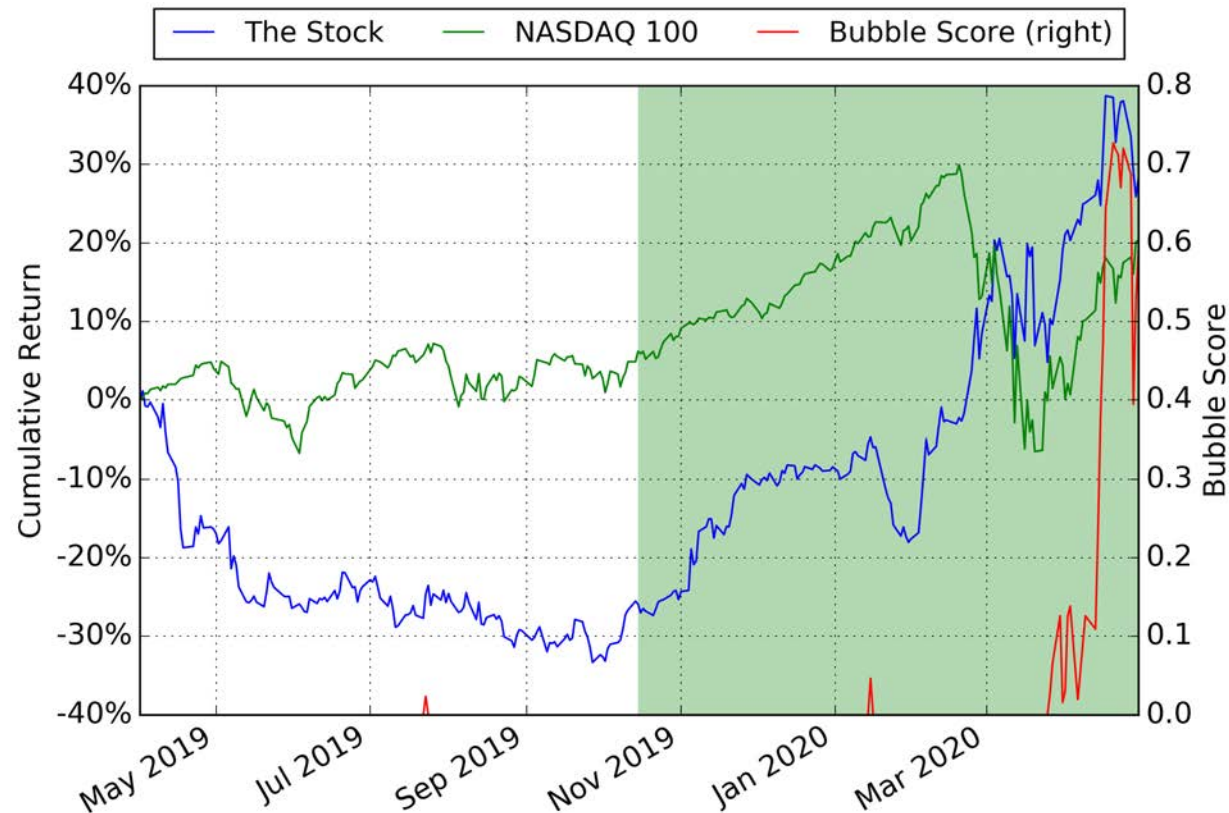
Single Stocks

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 |
|-------------------------------|--------------------------|--|---------------|-------------|--------------|--------------|-------------|--------------|
| Elia Group SA | Belgium | Utilities | 77.5% | 71.5% | May-19 | 2.1% | 78.9% | 15.1% |
| Gilead Sciences Inc | United States of America | Pharmaceuticals, Biotechnology & Life Sciences | 28.1% | 32.7% | Oct-19 | 61.4% | 97.1% | 90.7% |
| Kroger Co | United States of America | Food & Staples Retailing | 22.4% | 17.5% | Nov-19 | 26.9% | 69.2% | 84.6% |
| Regeneron Pharmaceuticals Inc | United States of America | Pharmaceuticals, Biotechnology & Life Sciences | 68.1% | 75.2% | Oct-19 | 59.0% | 83.0% | 25.9% |

Single Stocks

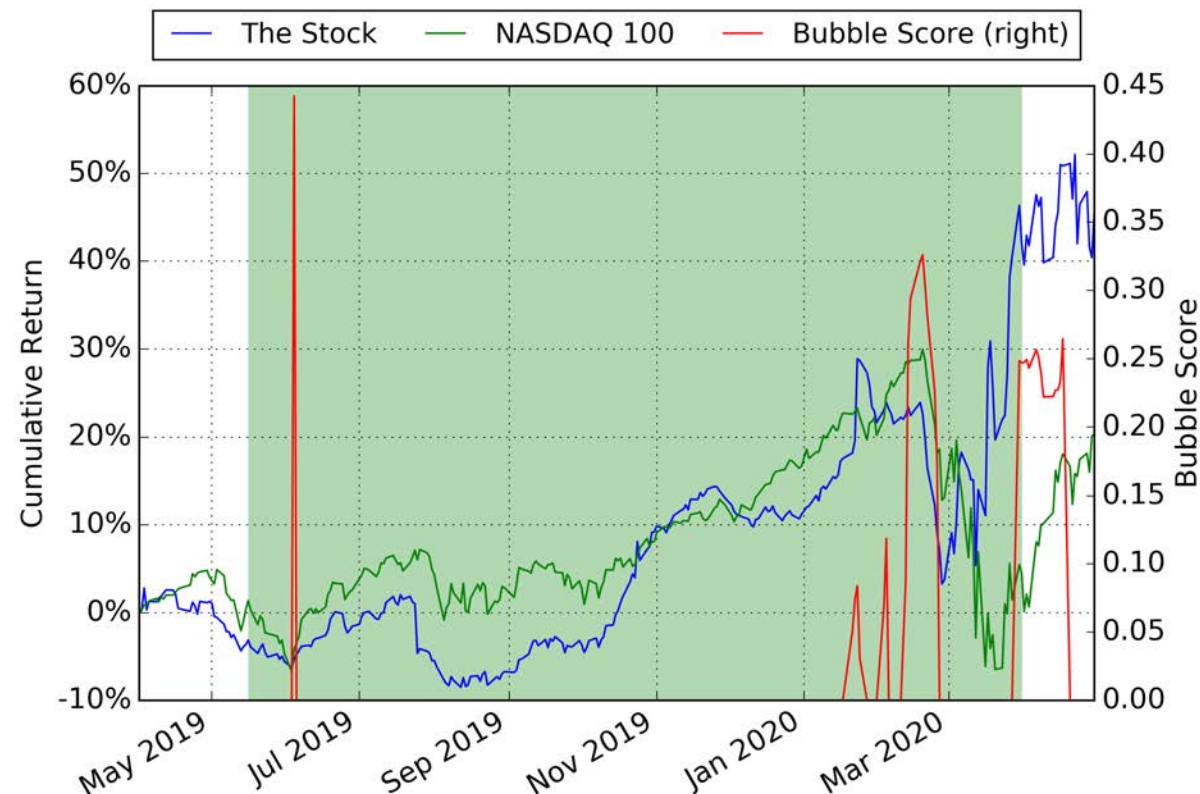
Quadrant 1 Stocks Current Month Example – Regeneron Pharmaceuticals Inc.



- The above graph shows the one year cumulative return of the stock in blue (left hand scale), NASDAQ 100 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period delineates the time interval within which the strong positive bubble is identified. The Bubble Score of this seven month bubble has reached 59% with a bubble size 75.2%. This bubble is amplified by the rally of pharmaceutical sector due to the global pandemic of COVID-19.

Single Stocks

Quadrant 1 Stocks Last Month Example – Citrix Systems Inc.



- The figure above plots the one year cumulative return of the stock (blue), NASDAQ 100 (green) and LPPLS Bubble Score (red lines on the right y-axis). The green shaded period delineates the time interval within which a strong positive bubble has been identified and reported last month. The bubble regime has finished, followed by a volatile plateau. This change of regime is in agreement with our DS LPPLS indicator, and is also supported by the strong fundamentals.

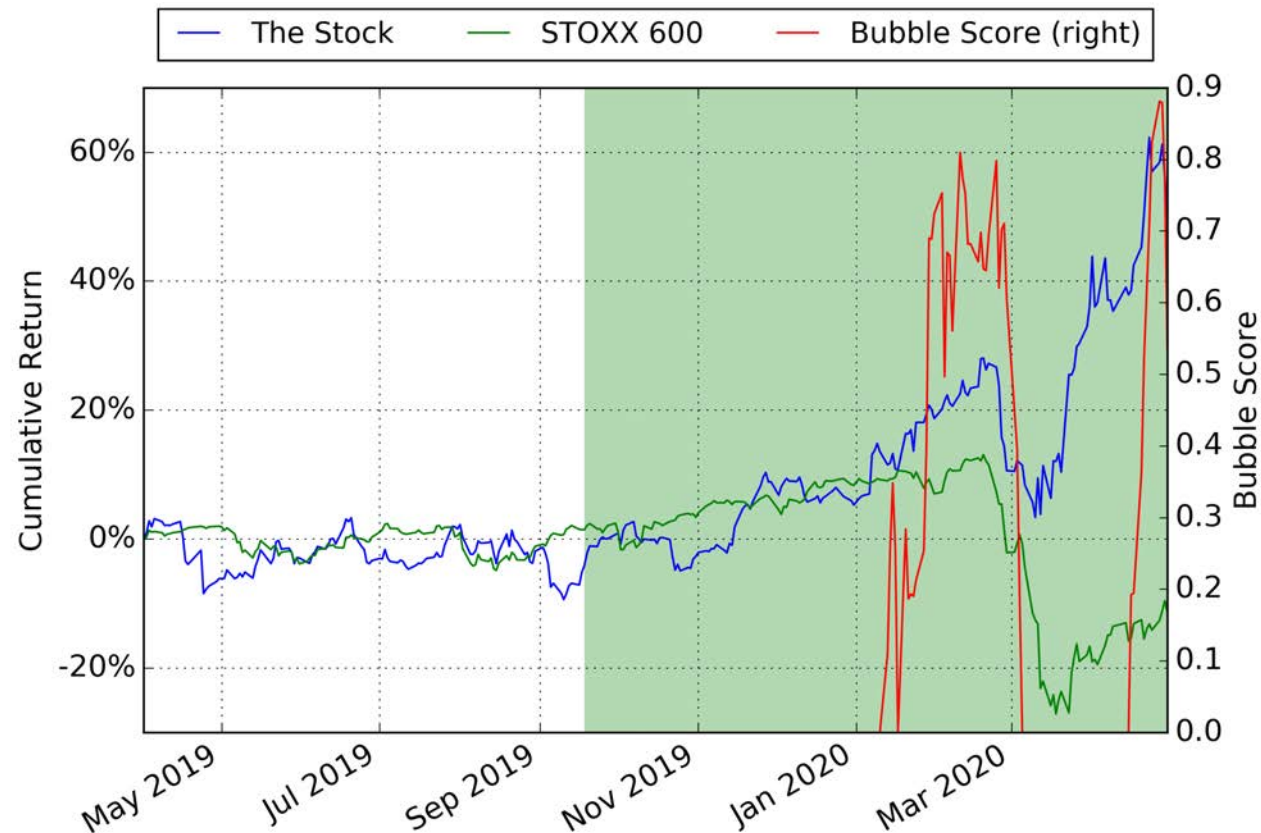
Single Stocks

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 |
|--------------------|-------------------------|----------------------------------|---------------|-------------|--------------|--------------|-------------|--------------|
| Ambu A/S | Denmark | Health Care Equipment & Services | 52.6% | 86.9% | Sep-19 | 31.6% | 0.9% | 76.8% |
| Cellnex Telecom SA | Spain | Telecommunication Services | 76.6% | 57.8% | Jun-19 | 29.7% | 25.4% | 76.3% |
| Elisa Oyj | Finland | Telecommunication Services | 44.1% | 33.1% | Jun-19 | 27.7% | 21.0% | 41.4% |
| Biomerieux SA | France | Health Care Equipment & Services | 58.5% | 52.0% | Sep-19 | 53.6% | 19.8% | 53.3% |

Single Stocks

Quadrant 2 Stocks Current Month Example – Biomerieux SA.



- The above graph shows the one year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period delineates the time interval within which the positive bubble is identified. The Bubble Score of this eight month bubble has reached 53.6% with a bubble size 52%. The strong positive bubble signals and weak fundamentals indicate a high probability of continuing correction in the future.

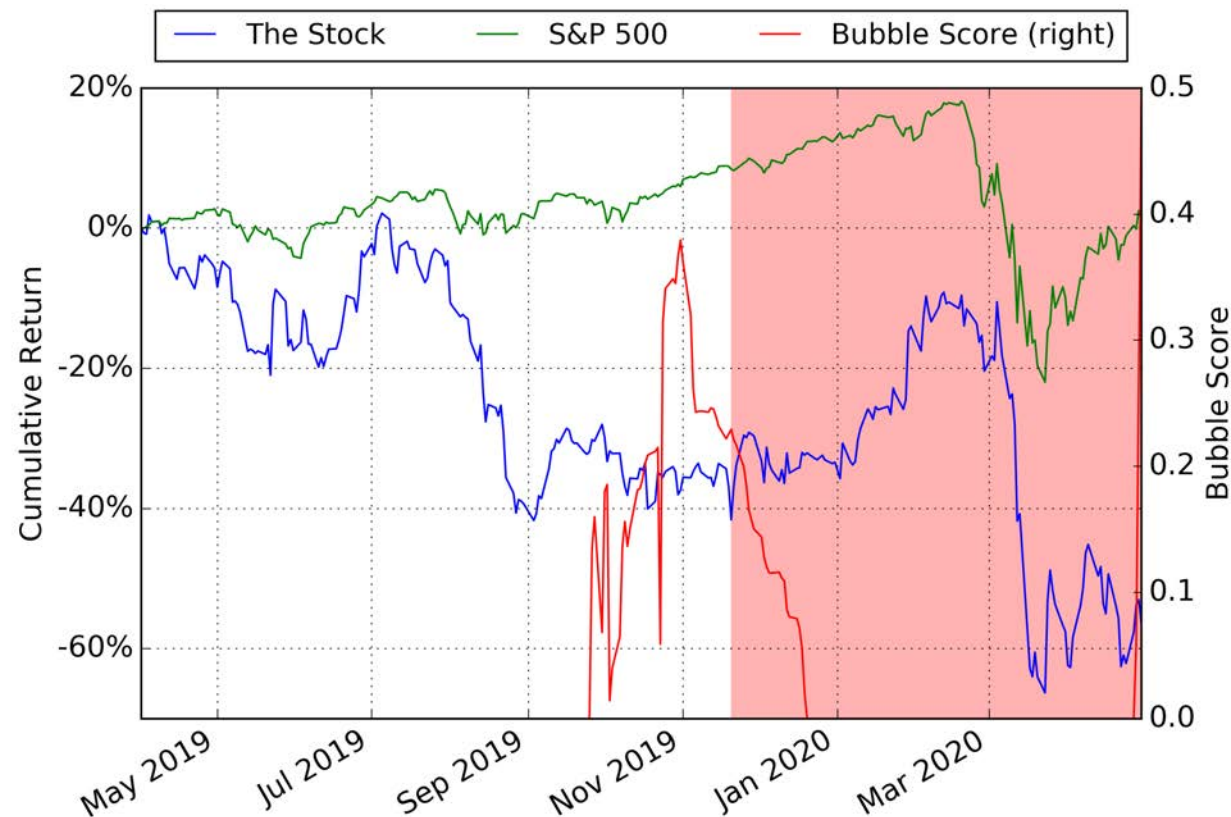
Single Stocks

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 |
|-----------------|--------------------------|-------------------------------|---------------|-------------|--------------|--------------|-------------|--------------|
| Unilever PLC | United Kingdom | Household & Personal Products | -11.0% | -12.5% | May-19 | -8.1% | 19.5% | 20.6% |
| Telenor ASA | Norway | Telecommunication Services | -9.3% | -9.8% | Jul-19 | -4.9% | 19.0% | 11.5% |
| Dollar Tree Inc | United States of America | Retailing | -23.4% | -24.1% | Sep-19 | -0.8% | 25.2% | 60.9% |
| L Brands Inc | United States of America | Retailing | -50.3% | -38.0% | Nov-19 | -48.7% | 36.4% | 12.9% |

Single Stocks

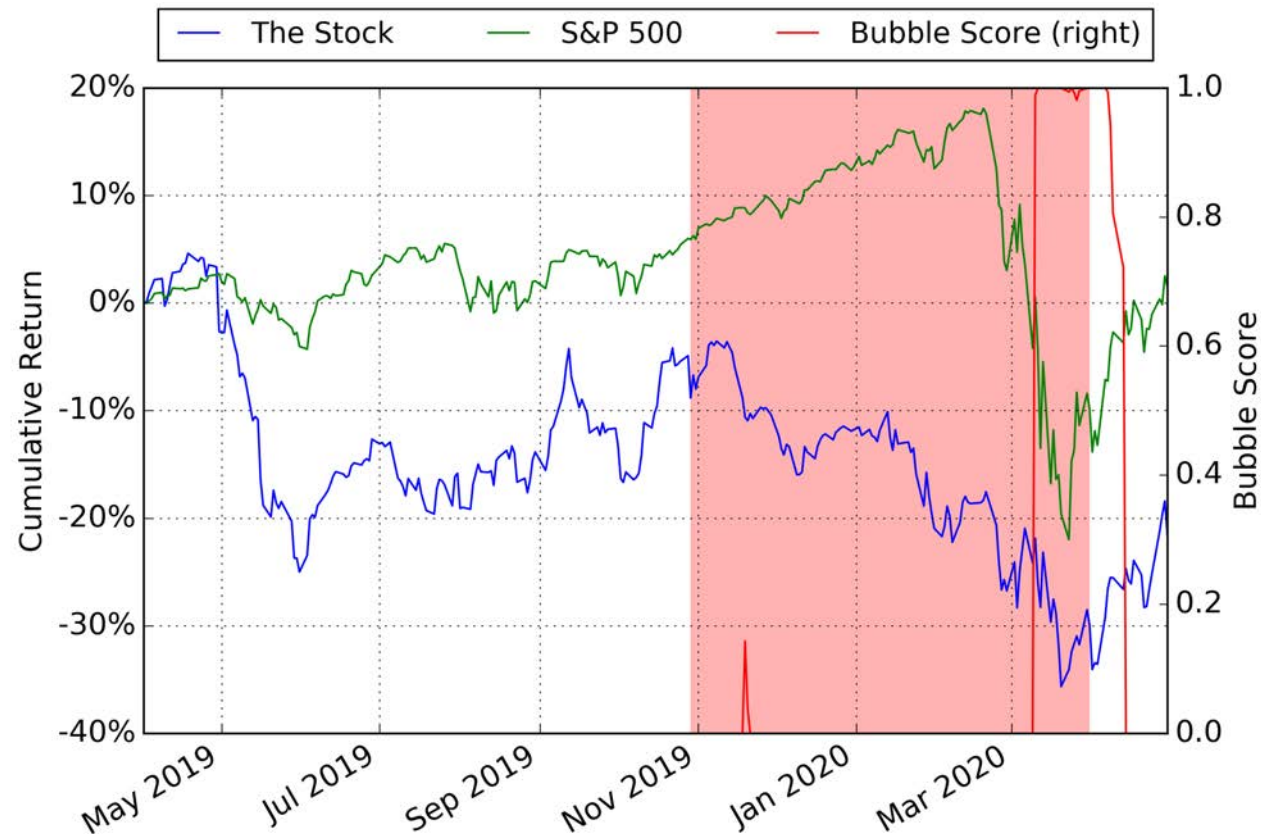
Quadrant 3 Stocks Current Month Example – L Brands Inc.



- The above graph shows the one year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period delineates the time interval within which the negative bubble is identified. The Bubble Score of this five month bubble has reached 48.7% with a bubble size -38%.

Single Stocks

Quadrant 3 Stocks Last Month Example – A. O. Smith Corp.



- The figure above plots the one year cumulative return of the stock (blue), S&P 500 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period delineates the time interval within which the strong negative bubble was identified and reported last month. The stock had a strong rebound in the past month, following the market's rebound after the big crash triggered by the COVID-19 pandemic. The weak fundamental of this company under the weak global industrial environment provides limited space for it to further rebound.

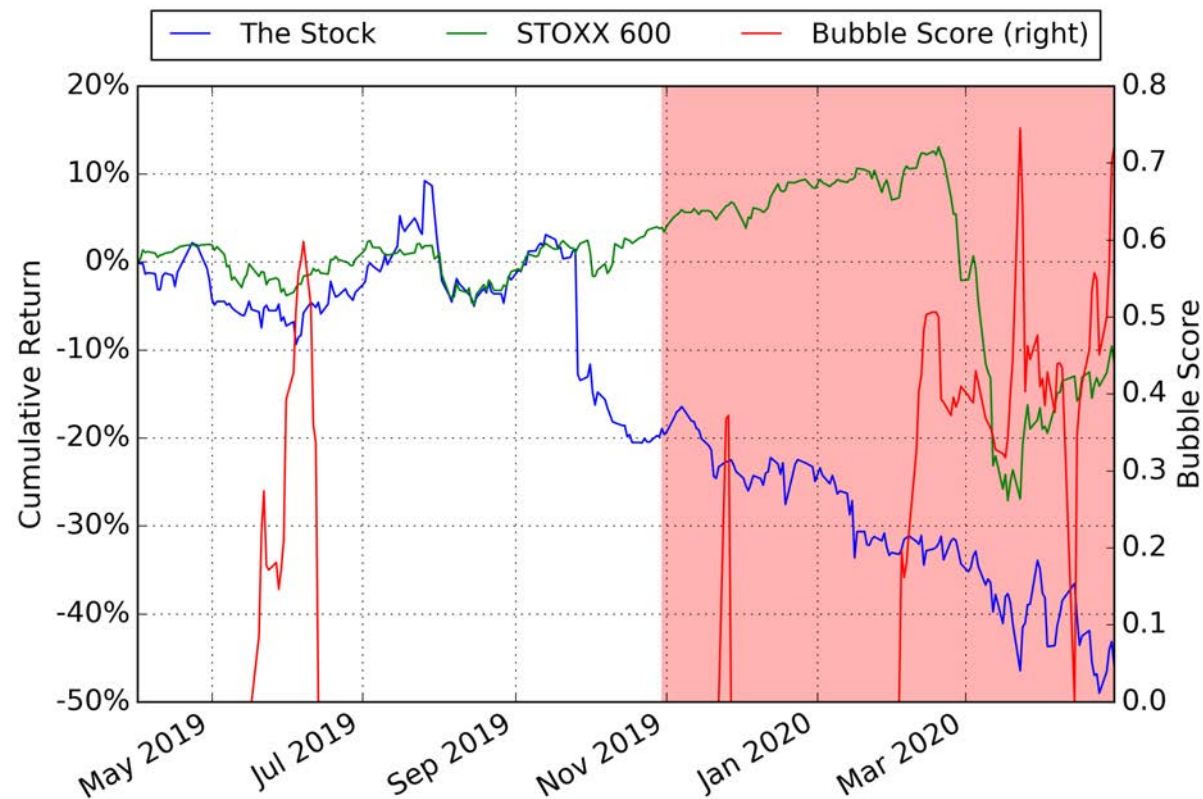
Single Stocks

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 |
|------------------|-------------------------|----------------------------|---------------|-------------|--------------|--------------|-------------|--------------|
| Orange SA | France | Telecommunication Services | -18.9% | -19.9% | Sep-19 | -24.4% | 75.7% | 4.8% |
| Pearson PLC | United Kingdom | Media & Entertainment | -42.7% | -32.9% | Nov-19 | -72.1% | 86.9% | 6.5% |
| Telia Company AB | Sweden | Telecommunication Services | -16.5% | -21.3% | Nov-19 | -12.5% | 60.7% | 88.7% |

Single Stocks

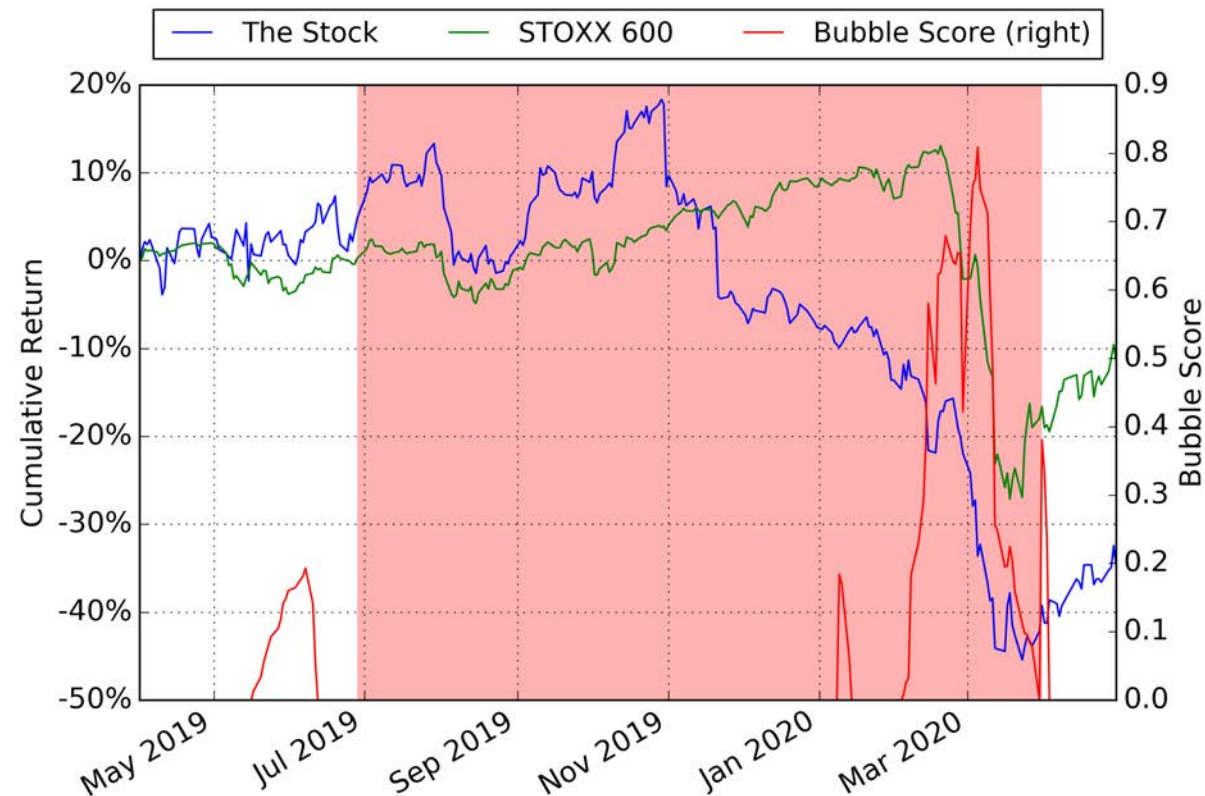
Quadrant 4 Stocks Current Month Example – Pearson PLC.



- 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 delineates the time interval within which the strong negative bubble is identified. The Bubble Score of this six month bubble has reached 72.1% with a bubble size -32.9%. We expect a rebound in the future, which is due to our diagnostic of a negative bubble signal with strong fundamentals, calling for a contrarian buyer position.

Single Stocks

Quadrant 4 Stocks Last Month Example – Eutelsat Communications SA.



- The figure above 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 delineates the time interval within which the strong negative bubble was identified and reported last month. The stock followed the market's rebound in the past month with a relatively weaker performance. We expect this stock to rebound in the future due to our diagnostic of a negative bubble signal with strong fundamentals, calling for a contrarian buyer position.

More Information

- ▶ Visit the **Financial Crisis Observatory** for more information

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

- ▶ **Contacts ETH Zurich**

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