The FCO Cockpit
Global Bubble Status Report
February 2022
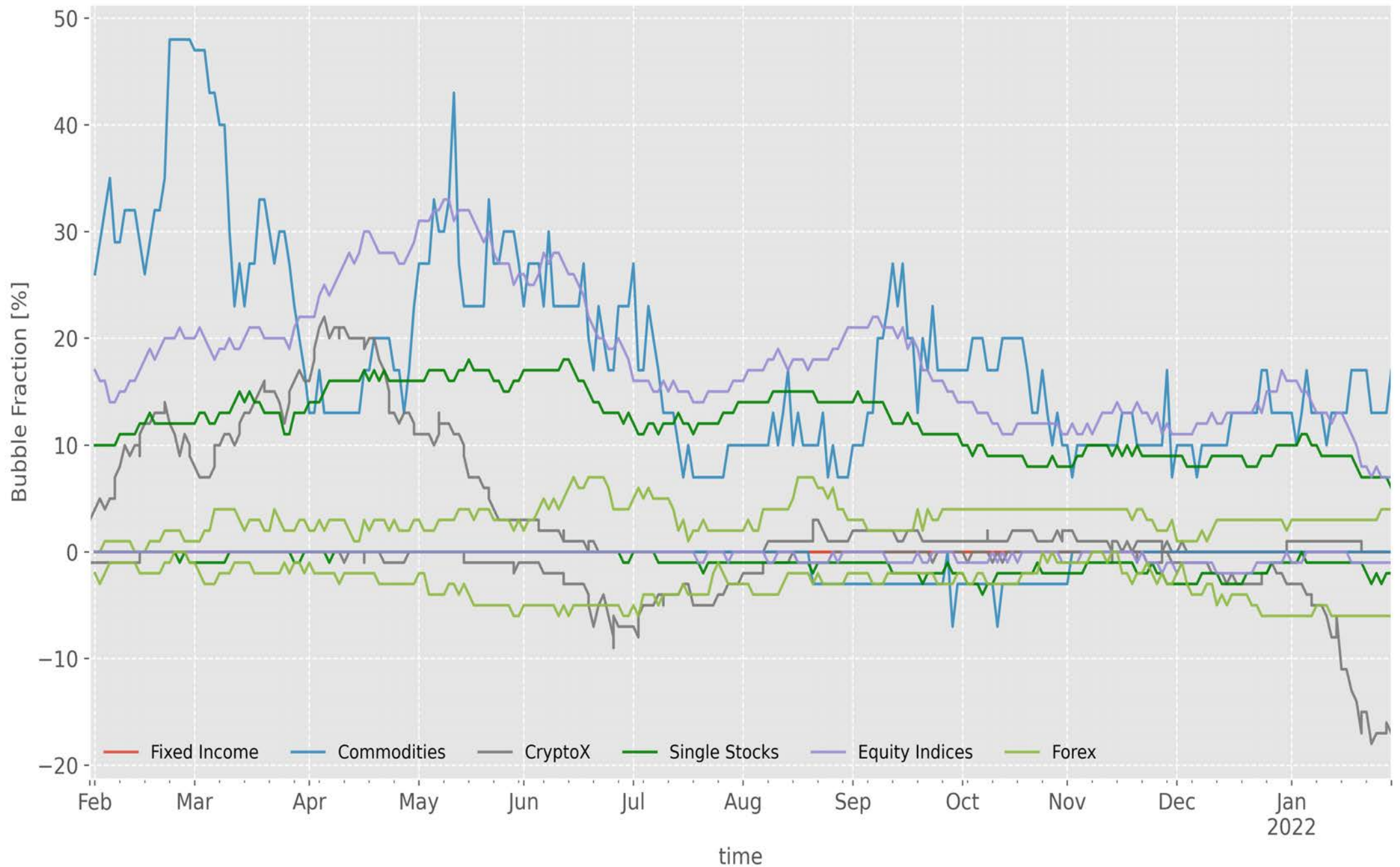
Entrepreneurial Risks

ETH zürich

SUSTech Southern University of Science and Technology

Contents

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 **crowded** and to what degree they 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 applied to 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.

▶ The appendix shows bubbles indicators of other major assets of possible interest.

Fraction of Positive / Negative Bubble Signals for different Asset Classes

Legend: Fixed Income, Commodities, CryptoX, Single Stocks, Equity Indices, Forex

Y-axis: Bubble Fraction [%]

X-axis: time (Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec, Jan 2022)

General Results as of 2022-01-31

Region	Analyzed Assets	Fraction of Pos. Bubbles [%]	Fraction of Neg. Bubbles [%]
Fixed Income	33	0	0
Commodities	30	17	0
Single Stocks	1611	6	2
Europe	938	6	2
United States	660	8	2
Equity Indices	858	7	1
Europe	53	4	0
United States	376	7	1
Global	383	7	1
Forex	99	4	6
CryptoX	462	0	17

- ▸ This month, the fixed income sector remains with no bubble signals.

- ▸ In the commodities sector, the positive bubble signal continues to rise and reached 17%.

- ▸ The positive bubble fraction in the single stocks and equity indices sectors have decreased by 4 and 9 percent to 6% and 7%.

- ▸ Both positive and negative bubble activity remain low in the Forex sector at 4% and 6%, respectively.

- ▸ In the CryptoX sector, the positive bubble signal remains zero, while the negative signal has increased substantially from 3% to 17%.

FCO Market Outlook

Where are we now, and where are we heading?

The option-adjusted spread (OAS) of the U.S. Investment Grade Corporate Bond Index and the U.S. High Yield Corporate Bond Index measure the credit and liquidity condition of the market. With the Fed vowing to support the market and being the buyer of last resort, credit spread has tightened since March 2020. The spread between the 10-year and 2-year bond yields gives an idea of the steepness of the yield curve. We use a 500-day (two-year) average to show the general market trend. According to the graph quantifying the Credit/liquidity Spread and Yield curve, we are in the mid-to-late economic expansion.

However, with the Fed's quantitative tightening (QT) and expected interest-rate hikes, the liquidity situation will worsen (the OAS spread will increase). On the other hand, if the economy slows down in the second half of 2022 or early 2023, then the 10Y-2Y spread will narrow. Under such circumstances, the combination of a wider OAS spread with a narrower yield spread indicates that the economy will go into recession.

What will trigger the economic slowdown in late 2022 or early 2023?

(1) Inventory issue: notice that inventory growth has been the main driver of the last U.S. Q4 GDP growth. One can suspect that the bullwhip effect in the supply chain will later draw down the U.S. potential GDP growth (also Chinese export). (2) Inflation due to the geopolitical risks and/or COVID: if the Russia-Ukraine or China-Taiwan tension escalate, the price of energy and (industrial and agriculture) commodities will soar, leading to higher inflation globally. (3) US-Sino economic coupling: if the Chinese economy does not recover as expected, the U.S. economy will also be impacted.

Sources: Federal Reserve Bank of St. Louis, The Financial Crisis Observatory

Fix income: The Reserve Bank of Autralia announced a few days ago that it will end the bond-buying program on 10 February. The German 10-year bond yield reached 0% from negative territory for the first time since three years ago. The majority of developed countries' central banks are slowly taking measures to fight the inflation problems, signaling their intentions to exit progressively out of the unconventional monetary policies to go back to a normal policy framework. Meanwhile, the U.S. national debt has passed $30 trillion. What will happen after many interest rate hikes will be interesting to witness.

U.S. equities: The combination of (1) U.S. option "gamma squeeze" (more than $3 trillion options expired on 21 January); (2). Netflix's earnings miss (investors are punishing the growth stocks that missed the earning target); (3) Powell's hawkish attitude (due to the labor market recovery and elevated inflation) led to a clear correction of the market indexes in January. However, after the positive earning announcements of MSFT, APPLE, and GOOGLE, the market's panic eased, and the market bounced up back suddenly. However, in line with our long-time analysis, a market bifurcation has occurred with a regime change of the global monetary policies. Some may argue that the good earnings of the big tech giants suggest that the music is still on. At the same time, the good earning news only makes companies attractive (like a catalyst to accelerate the chemical process). It is liquidity (the most critical element) that pushes up the market (e.g., abundant liquidity pushed up poor quality MEME stocks to the sky last year). Thus, if liquidity is taken away by central banks, "gravity" may take its toll on market indexes.

Emerging Market: China's zero-tolerance Covid-19 policy (especially during the Beijing Winter Olympics) has exacerbated its economic slowdown. In line with our previous report, the coming supporting monetary policies (as well as fiscal stimulus) will narrow the interest rate gap between China and U.S. Thus, we hold a pessimistic view about the RMB. Traditionally, a weak RMB does not support a strong stock market growth.

Commodities: Notice that Russia's CDS is rising, reflecting the geopolitical tensions, which might further increase commodity prices. Russia is a major producer of industrial metals and energy, such as palladium, oil, nickel, natural gas (Russia supplies 31% of Europe's gas ex Turkey), aluminum, and copper. The Russia-Ukraine tension is deteriorating Europe's ongoing power crunch. In addition, the U.S. is experiencing a harsh cold winter, significantly shrinking gas inventories. In line with our previous report, high electrical prices, as major fertilizer costs, will push food price (soft agriculture cost) up for the coming years.

Real Estate: Property prices in the U.S. are still increasing with substantial building activities. With an inflation at 7%, and a nominal mortgage rate at around 2%, the real mortgage rate is -5%, which means that banks are rewarding people who borrow a lot, while those who do not borrow are punished. This is called the euthanasia of the rentier and is also a driving force for bubbles to develop.
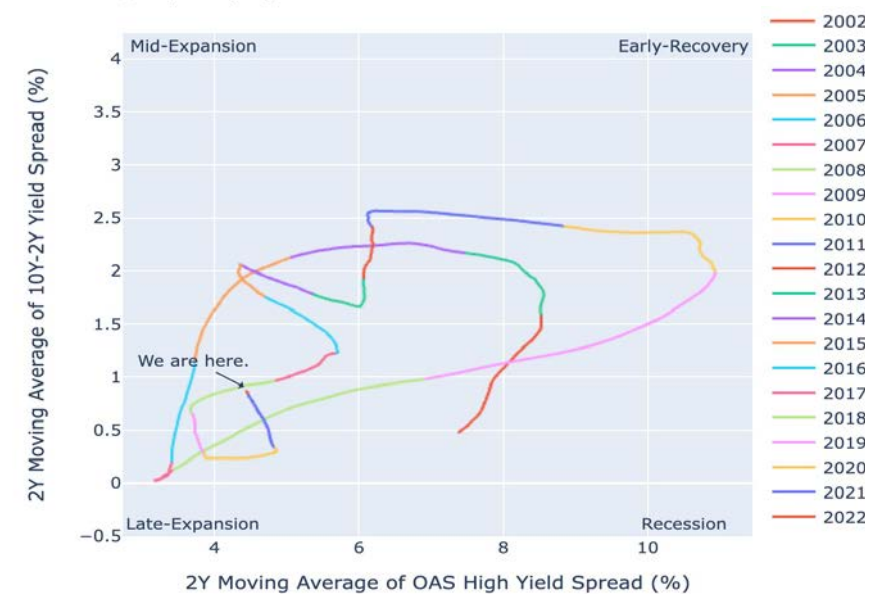
How to read the graphs and tables

DS LPPLS Multi-Scale Confidence Indicators:

▶ The graphs below use our extended methodology of the DS LPPLS Confidence Indicator to the so-called Multi-Scale Confidence Indicators (MCI). The MCI are finer version of the Confidence Indicator, computed in the same way, however based on different, sets of fit windows that describe different "timescales of thinking" of investors. More specifically, we base the computation of the MCI on the following window sets:

— Super-Short (SS) Scale: [40,183] days

— Short (S) Scale: [40,365] days

— Medium (M) Scale: [365,730] days

— Long (L) Scale: [730,1460] days

▶ These different sets range from few months up to several years. For each range, LPPLS signals are computed over all contained fit windows in steps of 1 day. The resulting signals are aggregated into four corresponding versions of the Confidence Indicator. These MCI range from very reactive (SS,S) to more stable (M,L) versions. Observing them simultaneously allows understanding the formation and evolution of speculative bubbles in more detail.

▶ Based on these four new indicators, the indicator plots show the detailed positive and negative bubble indicator timeseries for all four of them. In the asset tables, we report only the strongest of the four in the column "DS LPPLS Confidence". The new column "strongest signal" indicates which of the four indicator this corresponds to.

How to read the graphs and tables

Additional Bubble Metrics:

▸ We show the top positive and negative bubble signals, as well as the corresponding bubble characteristics.

▸ The "**bubble CAGR**" (bg) measures the annualized compound bubble growth (bg) of the price during a bubble phase, as implied by the size (bs) and duration (bd) of a bubble.

$$bg = \exp\left(\frac{\ln(bs+1)}{bd}\right)$$

▸ The **bubble size** since the bubble start t1 is $bs = \frac{p_t}{p_1} - 1$ and the bubble duration is $bd = t - t_1$

▸ By estimation of the start time t1 and the predicted end time tc of a bubble, the **progress of the bubble** at the current time t is computed as:

$$bp = \frac{t - t_1}{t_c - t_1}$$

▸ Thus, the bubble progress measures the percentage of time until the predicted end of the bubble that has passed so far (i.e. until t) since the beginning of the bubble. The numerator is the **current bubble duration** and the divisor $t_c - t_1$ is the "**implied bubble duration**", implied by the LPPLS model.

New Ranking Methodology:

▸ We rank top positive and negative bubble signals from our database according to the **geometric average** of the confidence indicator, the bubble CAGR and the bubble progress:

$$ga = (ci \cdot bg \cdot bp)^{1/3}$$

▸ This geometric average considers the strength of the bubble signal, the intensity of the bubble (compound growth), as well as the maturity of the bubble. These three metrics characterize the most relevant "dimensions" of a bubble and thus, the geometric average is a reasonable choice to rank bubble signals.
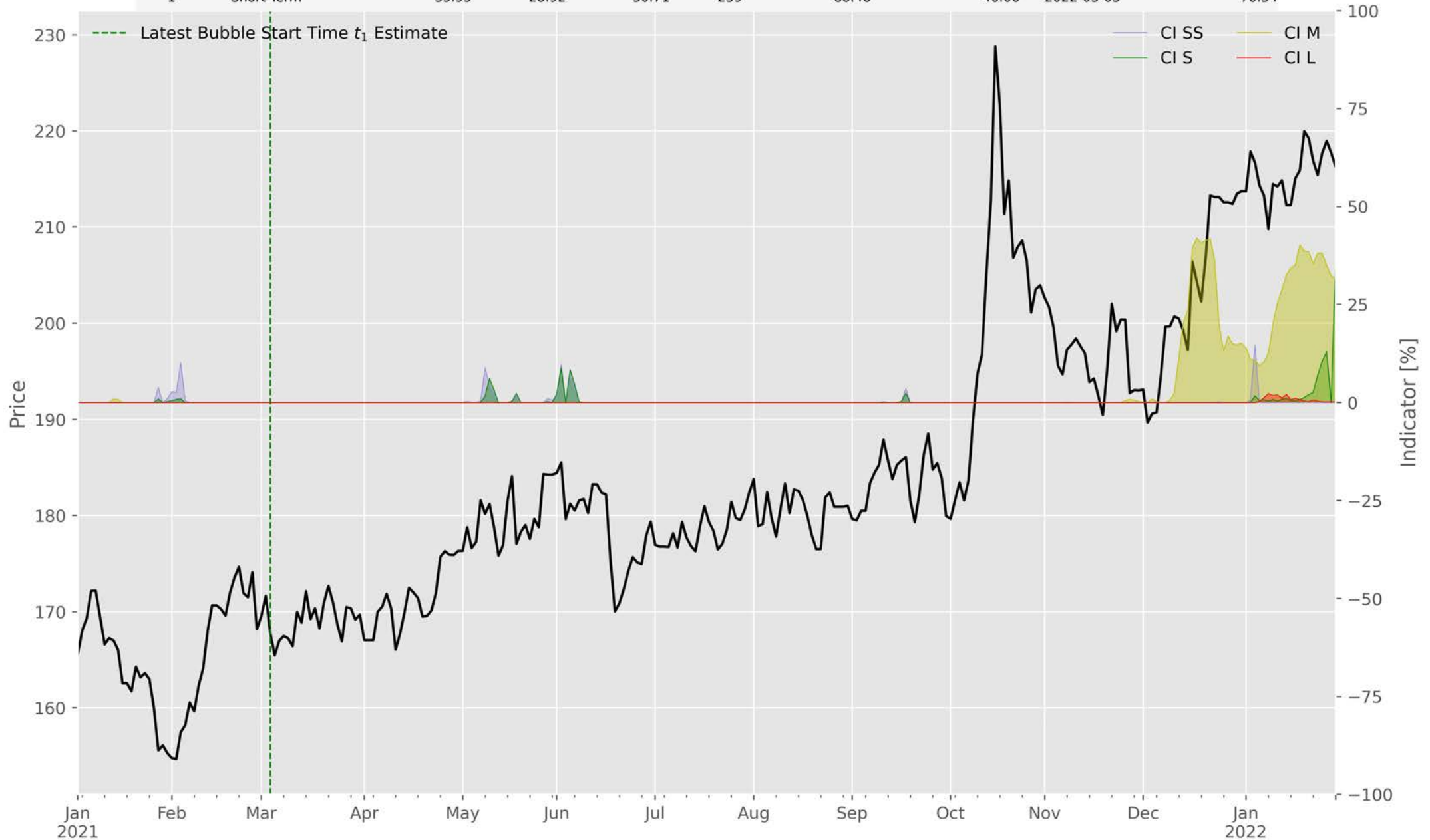
Fixed Income

No bubbles to report

Commodities

Mlcx Zinc Spot Index

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Short Term	35.95	28.92	30.71	239	88.48	46.06	2022-03-03	70.54

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Single Stocks

Erste Group Bank

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Medium Term	99.08	77.49	58.02	316	84.32	78.55	2022-03-31	66.61

Cez

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Medium Term	100	56.84	48.67	286	74.22	71.22	2022-05-10	96.41
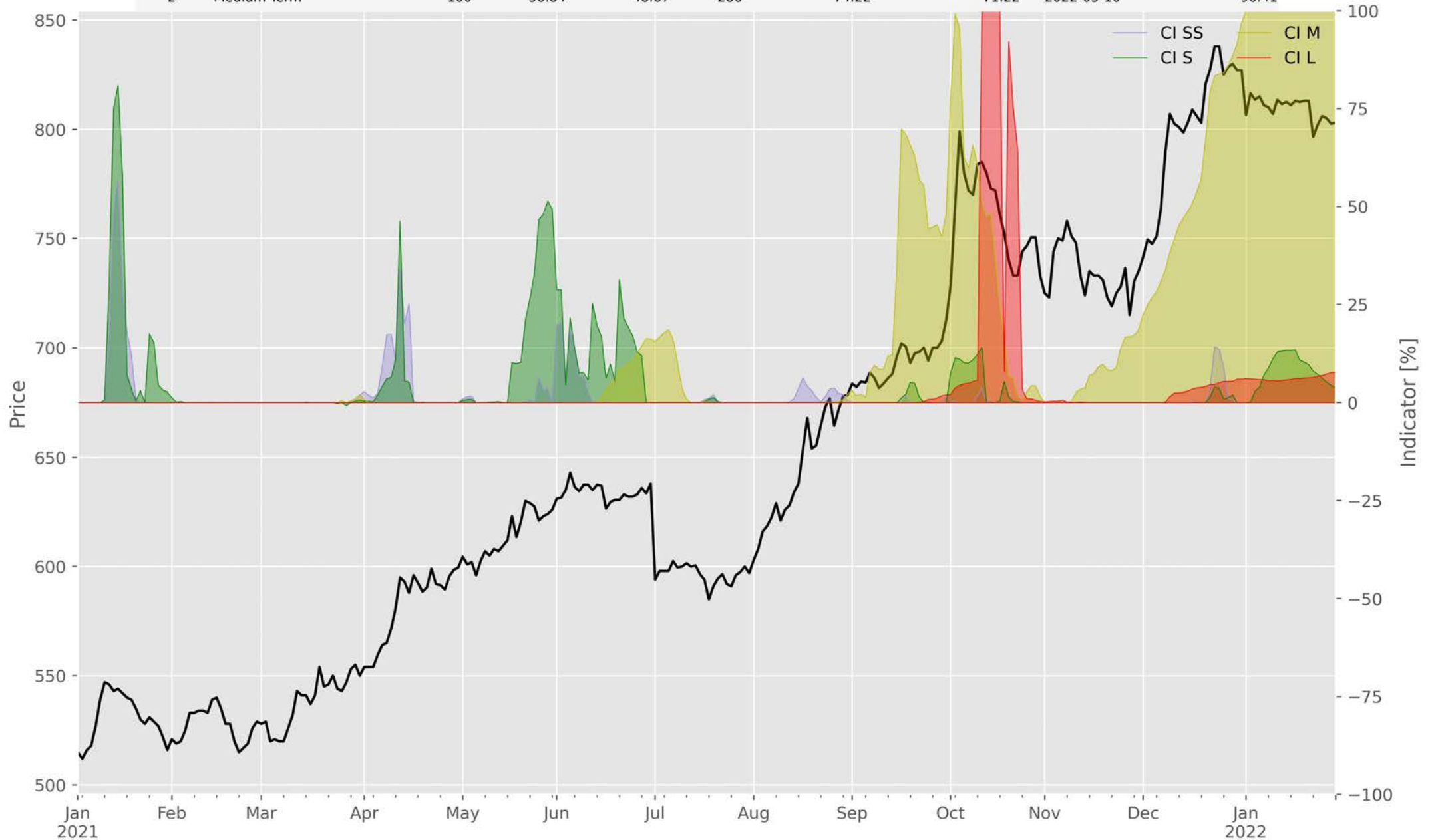
Glencore

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
3	Medium Term	100	50.73	44.67	280	76.77	69.99	2022-04-26	98.12
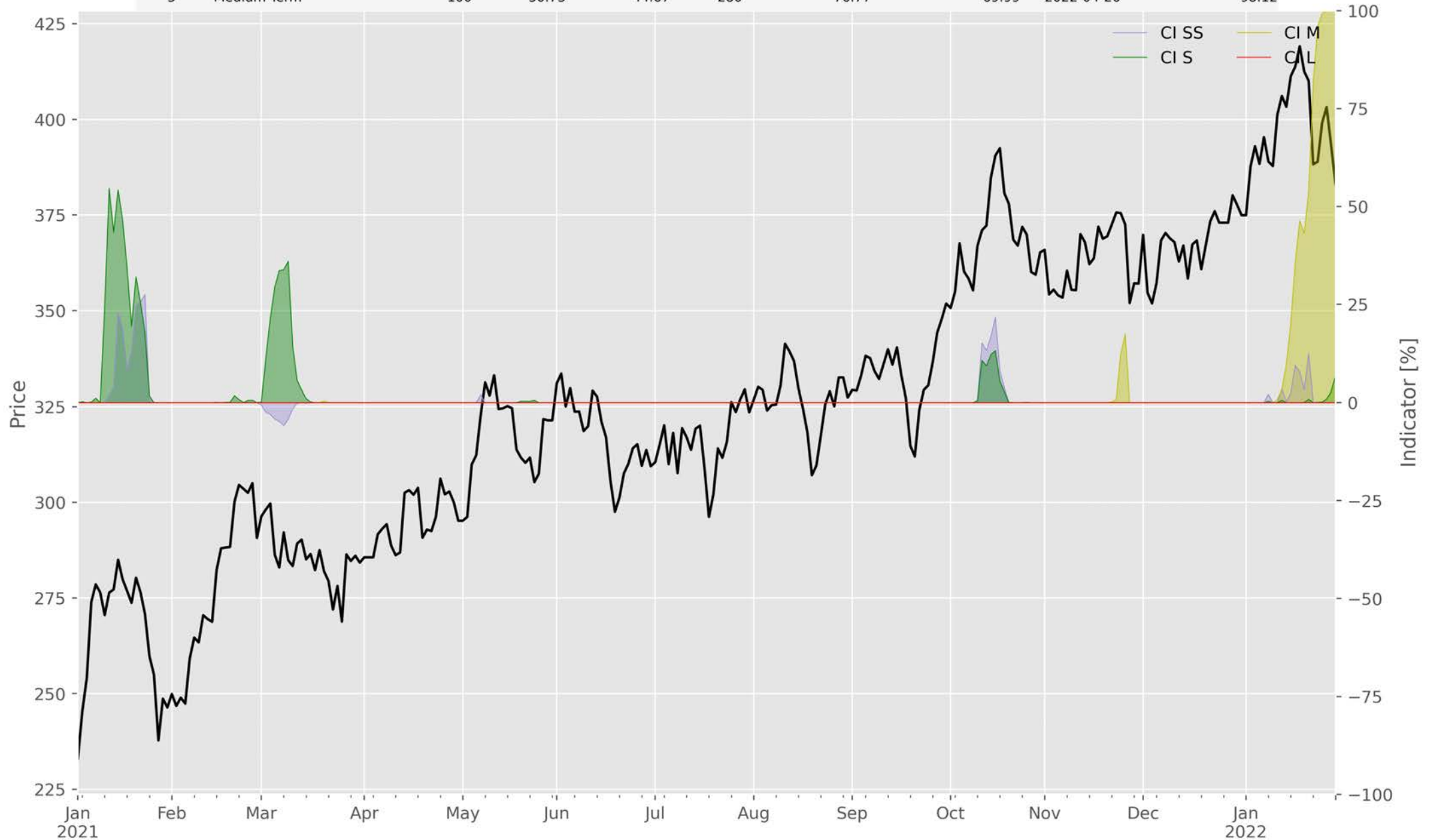
Koninklijke Vopak

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Long Term	94.04	-36.74	-17.45	602	92.32	53.31	2022-03-22	91.86
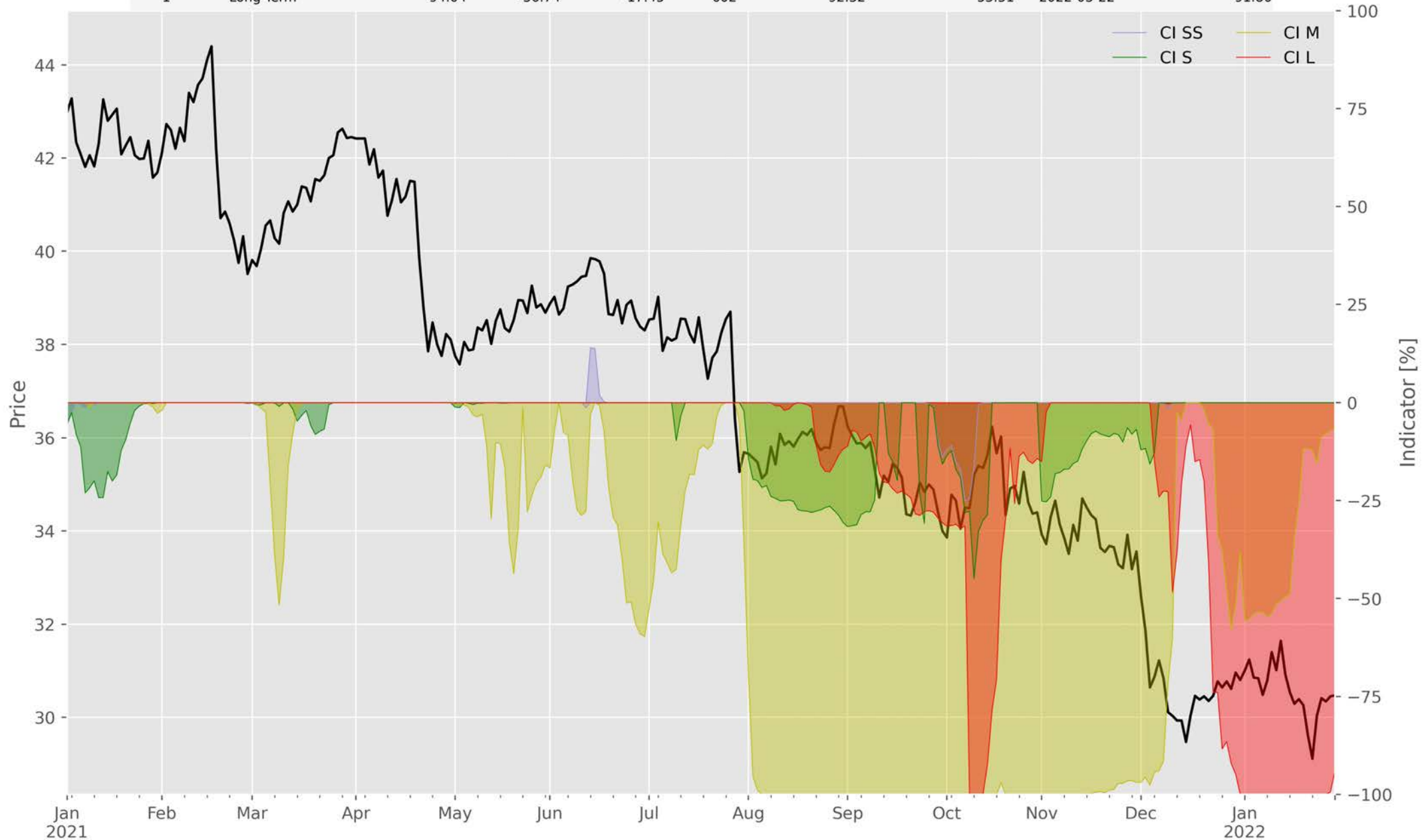
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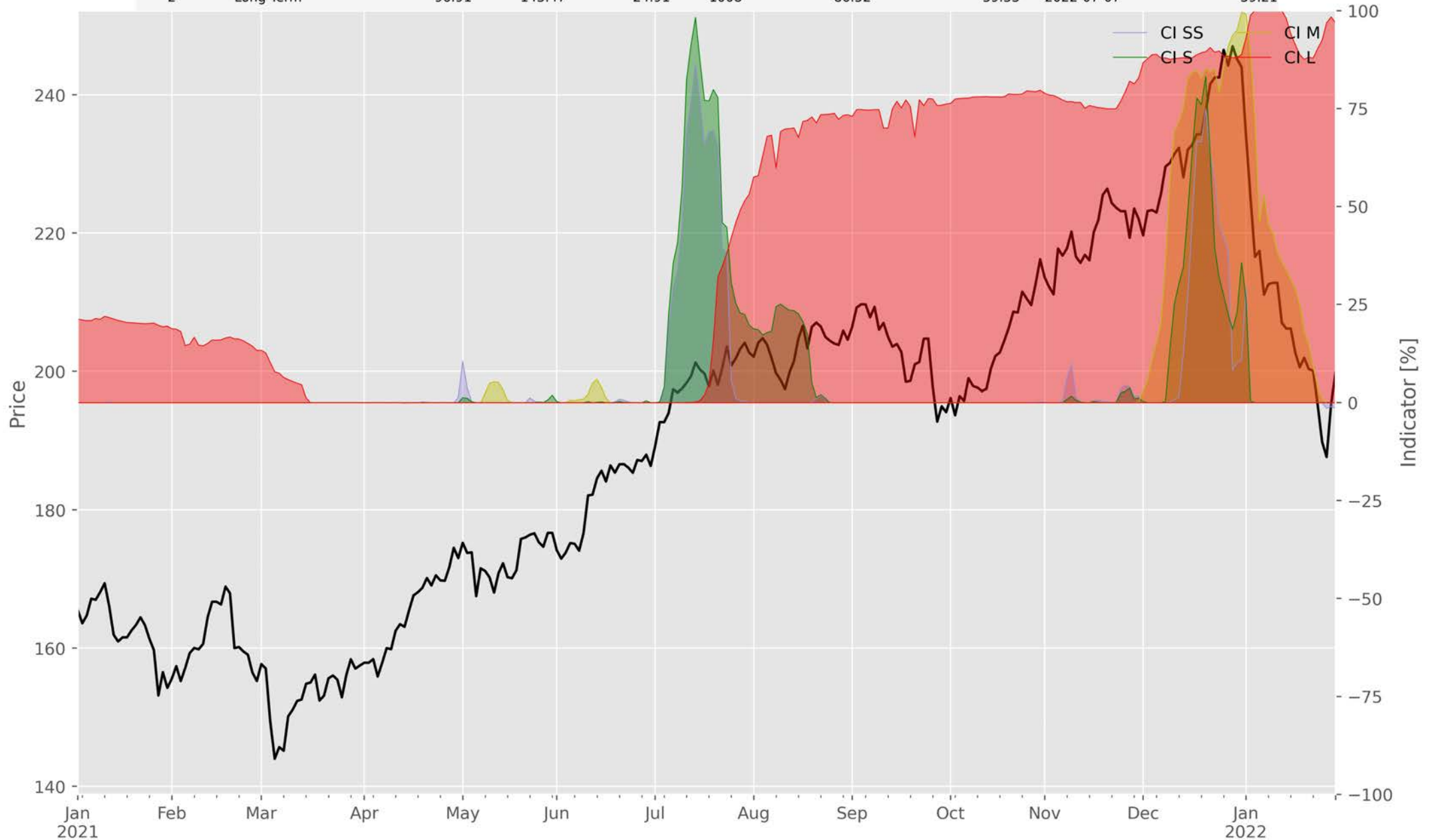| Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\tilde{t}_c$	Scenario Probability [%]
2	Short Term	34.46	-23.9	-36.6	151	66.82	43.85	2022-04-16	92.71

Oxurion Nv

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
3	Medium Term	32.81	-39.71	-24.16	461	97.84	42.65	2022-02-10	98.55

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Avis Budget Group

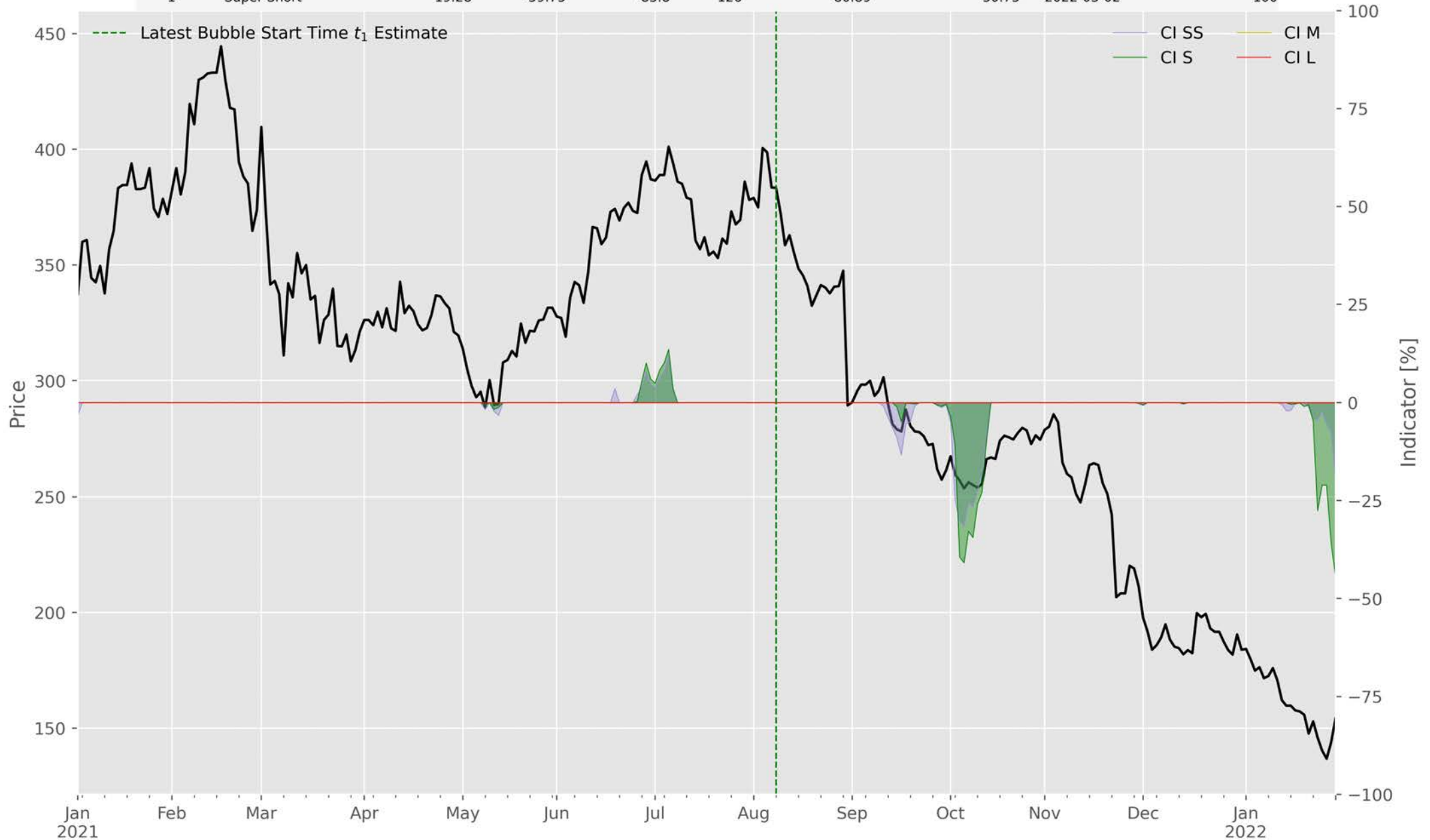| Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Medium Term	14.13	1034.45	246.07	493	66.67	61.43	2022-10-04	nan

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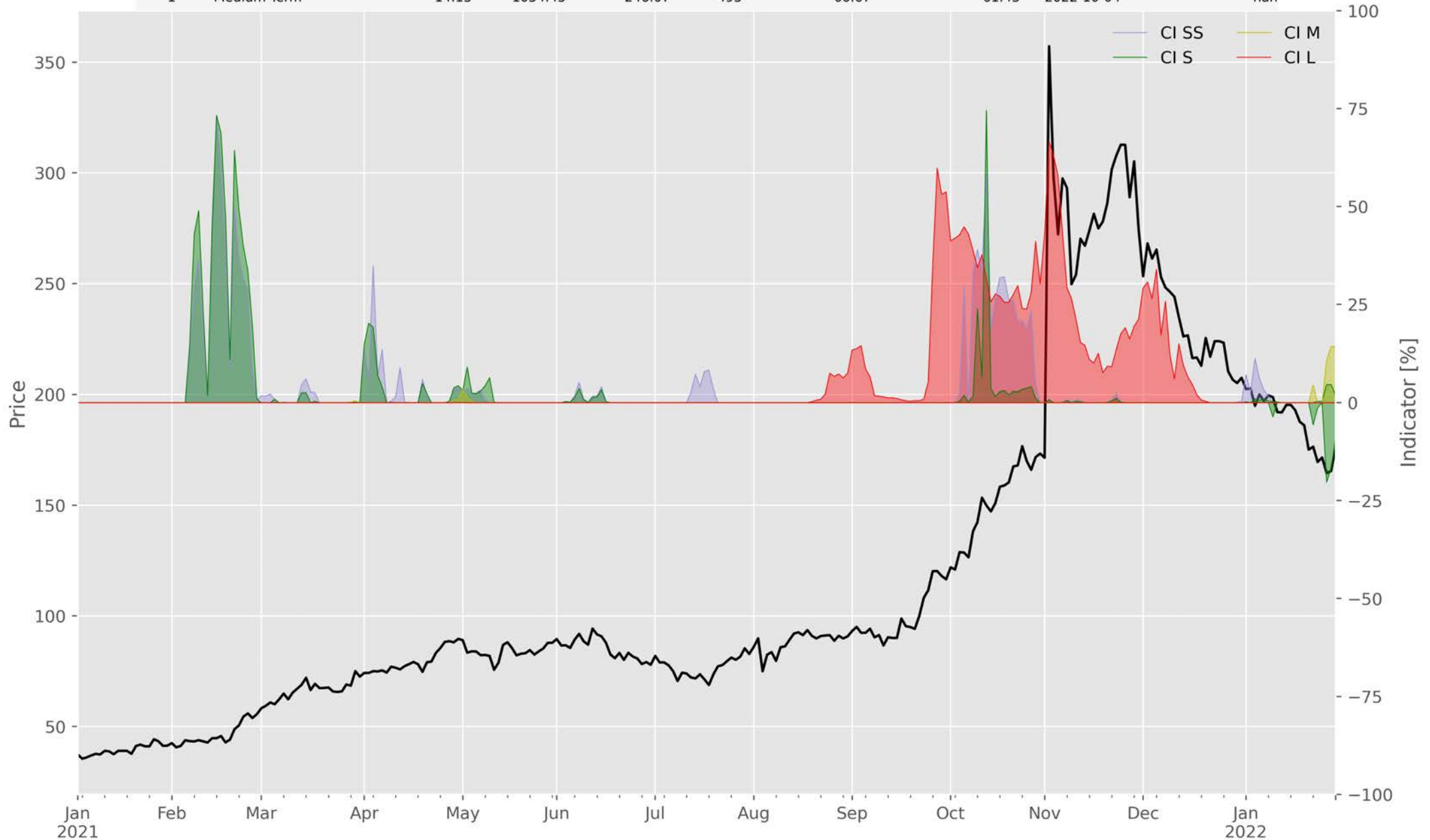
Zoetis A

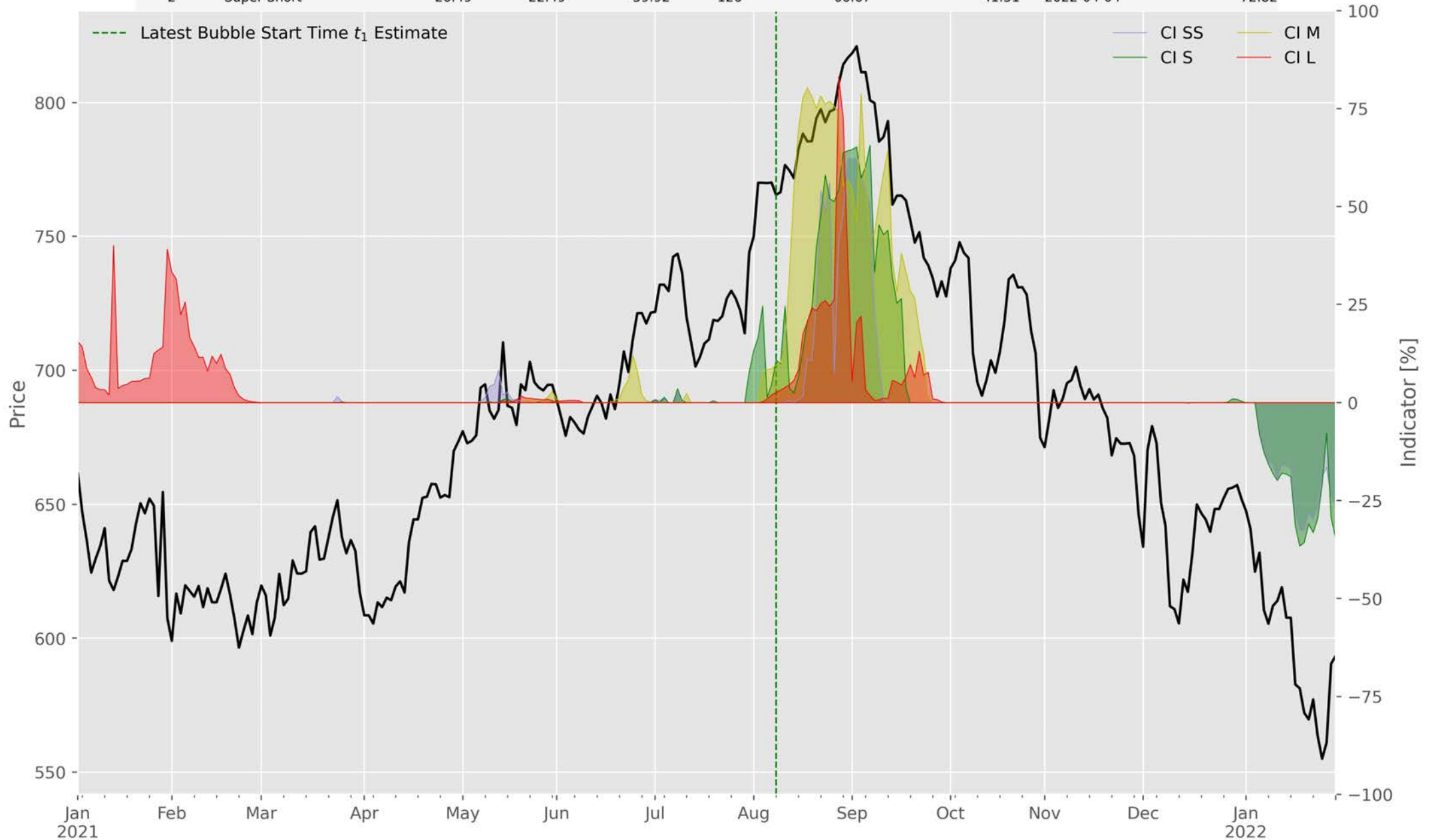| Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Long Term	96.91	143.47	24.91	1008	86.52	59.33	2022-07-07	59.21

Devon Energy

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
3	Super Short	10.48	44.49	177.07	91	98.05	56.67	2022-02-02	100
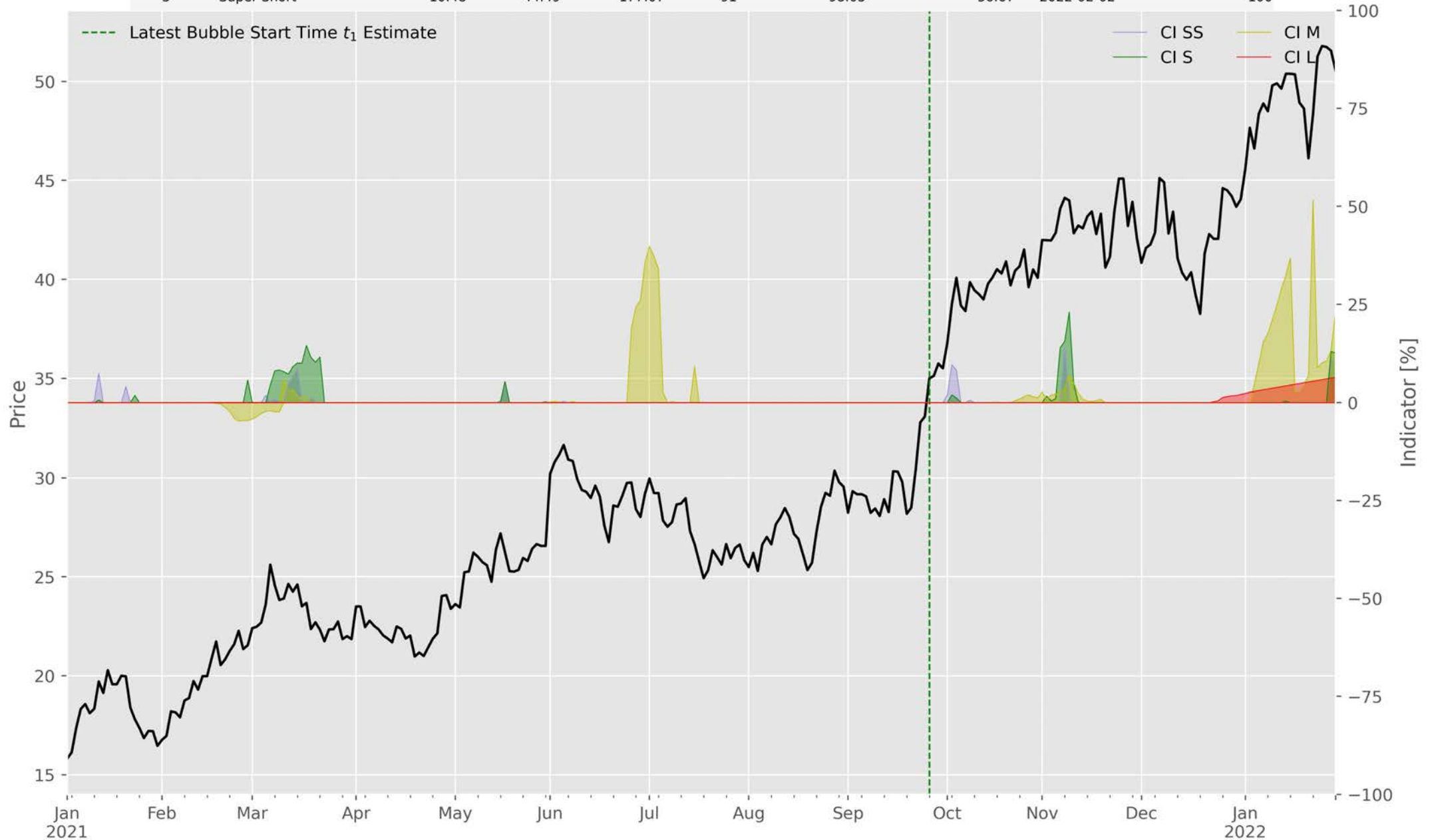
# Zoom Video Communications A

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Super Short	19.28	-59.75	-83.8	126	80.89	50.75	2022-03-02	100

Charter Comms.Cl.A
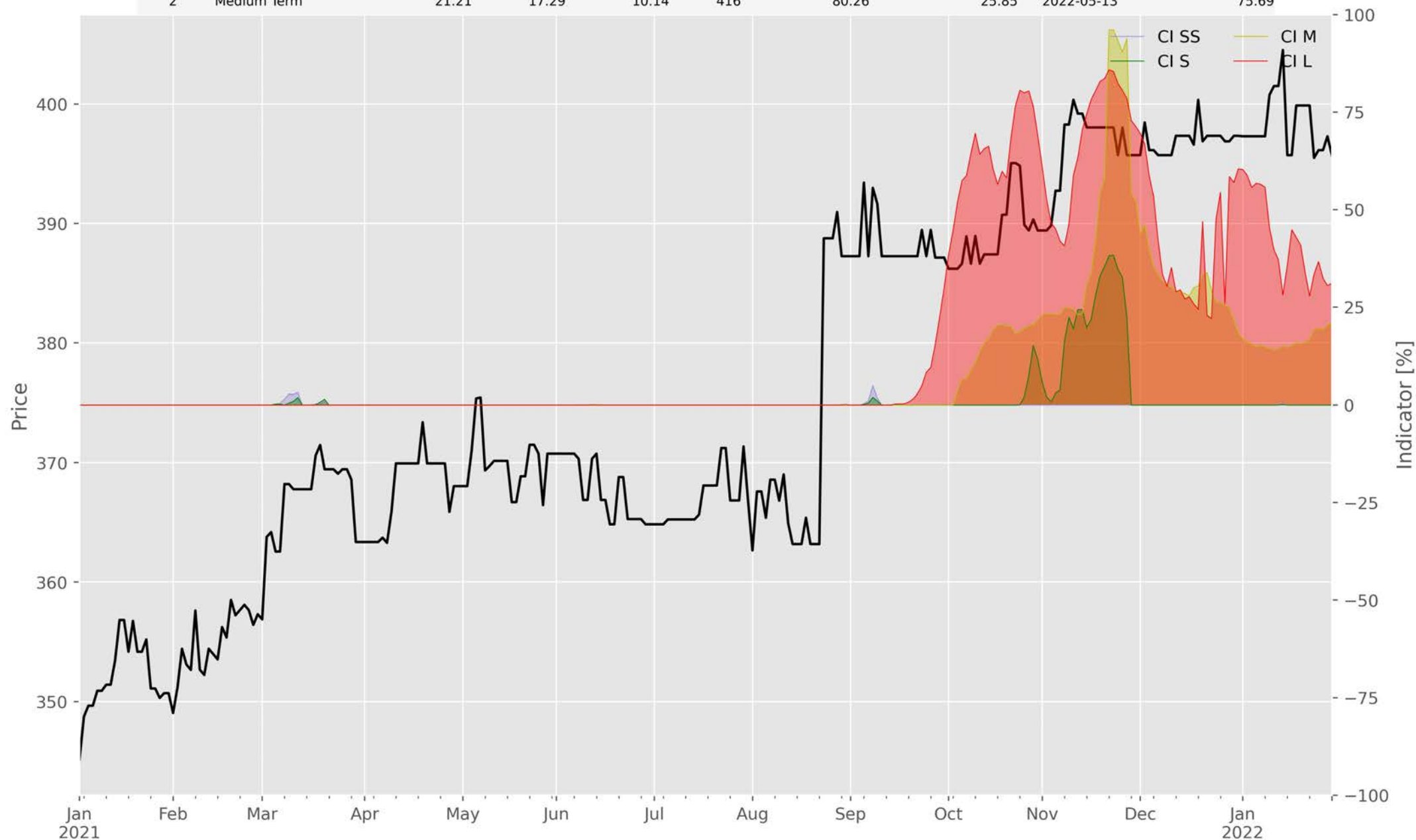
Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Super Short	26.49	-22.49	-39.92	126	66.67	41.31	2022-04-04	72.82

Equity Indices

Msci Switzerland U$

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Long Term	72.38	43.55	9.46	1008	87.54	39.13	2022-06-23	98.14
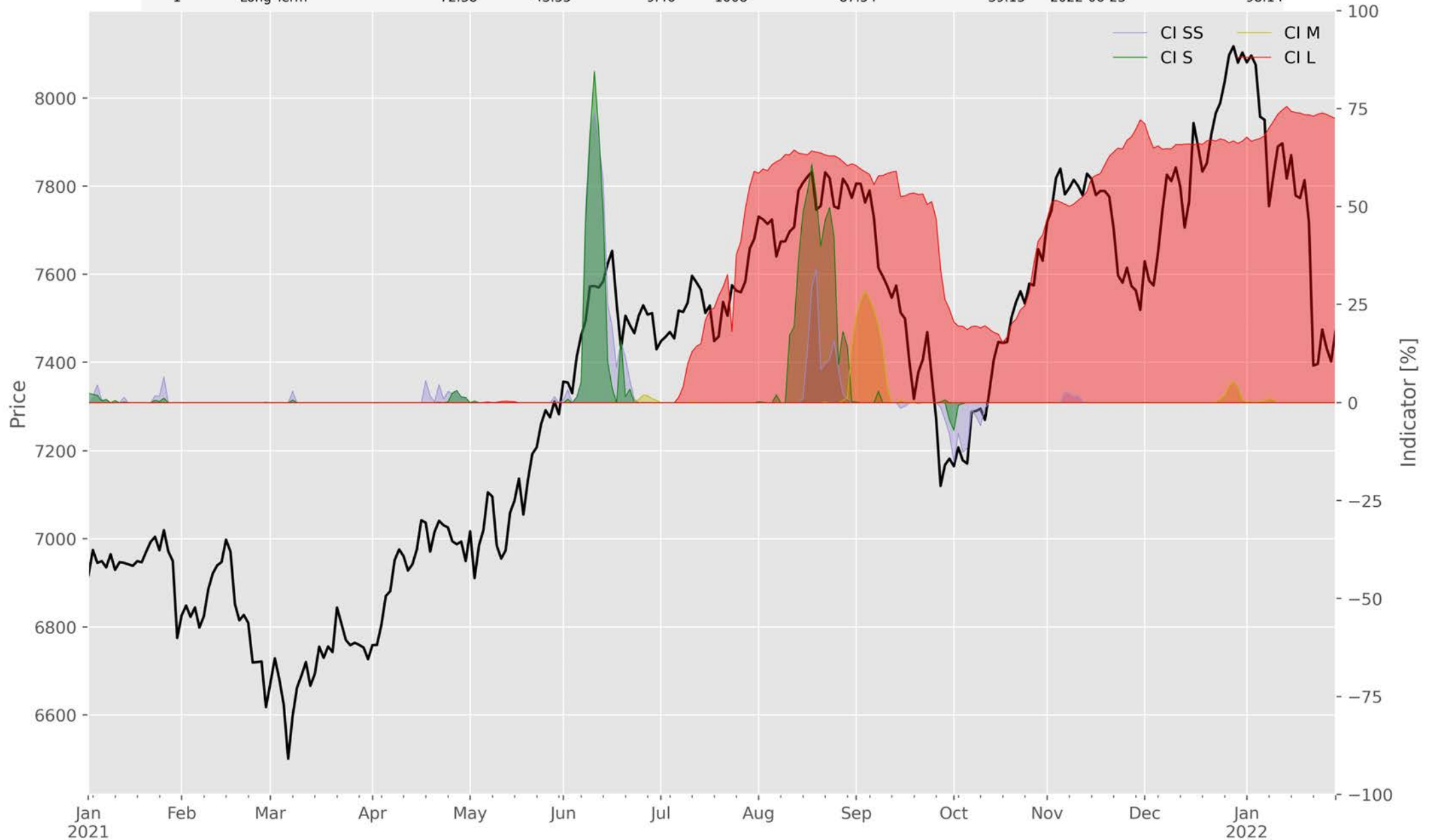
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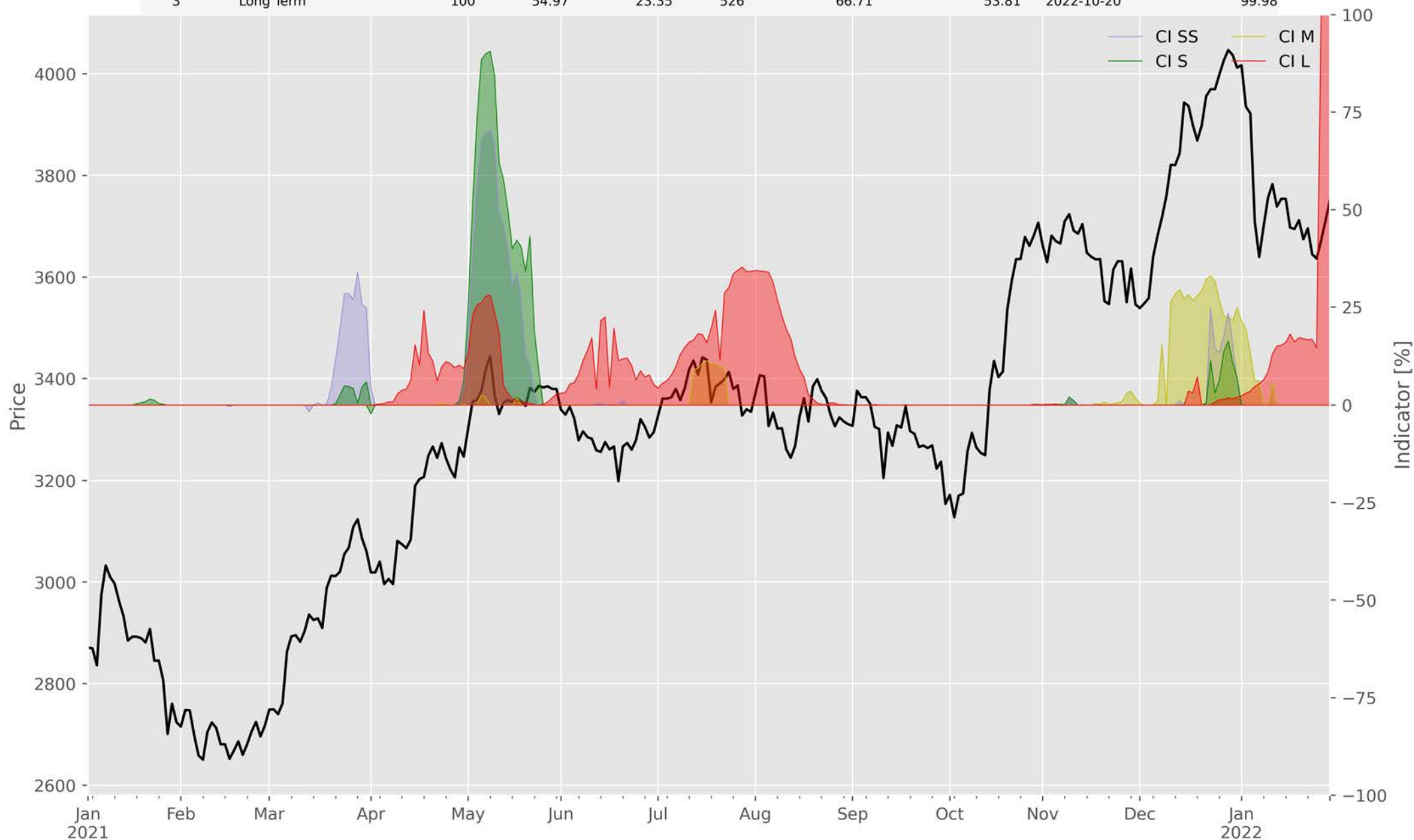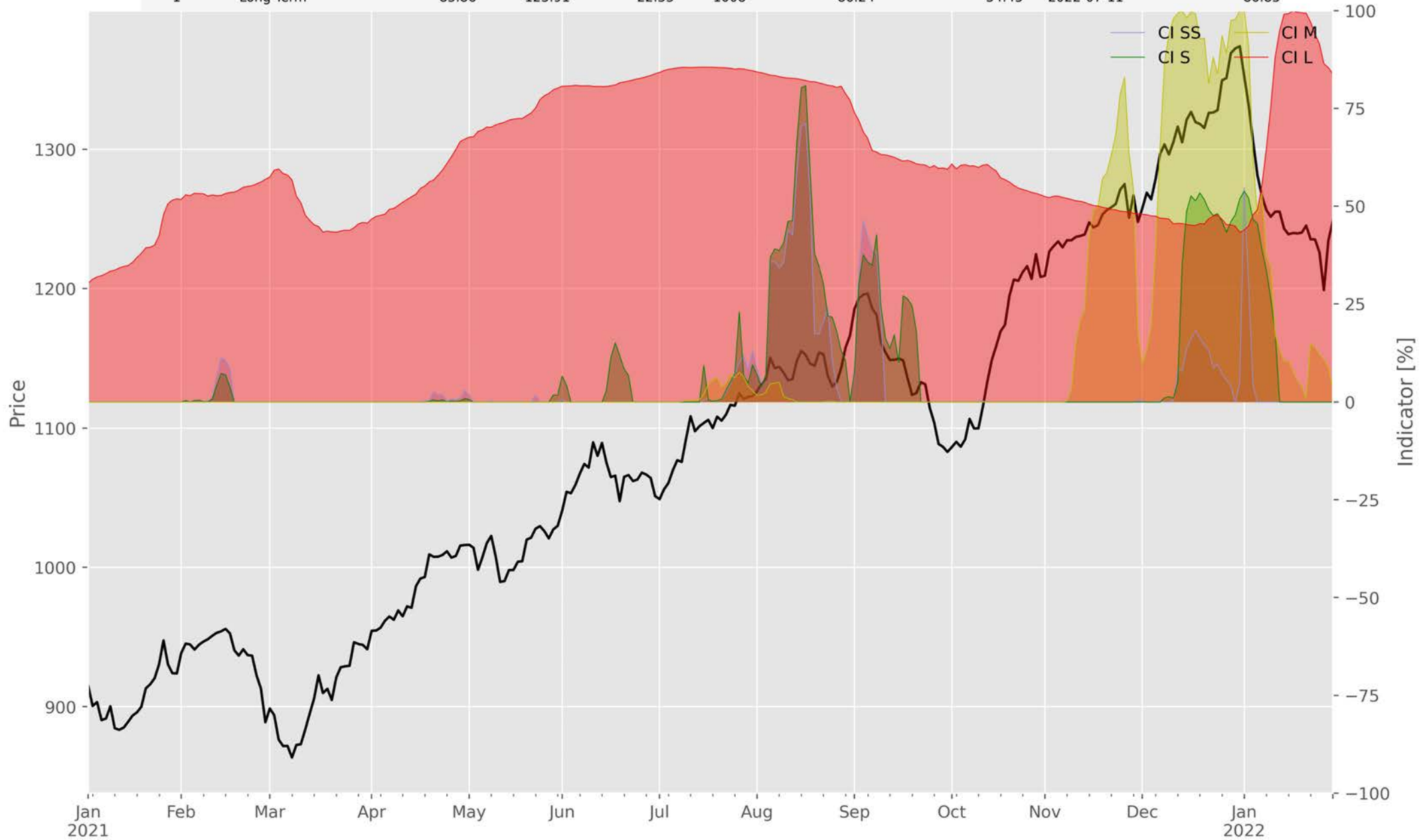| Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Medium Term	21.21	17.29	10.14	416	80.26	25.85	2022-05-13	75.69

S&P500 Trucking

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Long Term	99.15	170.36	42.91	702	66.68	65.7	2023-01-17	55.63
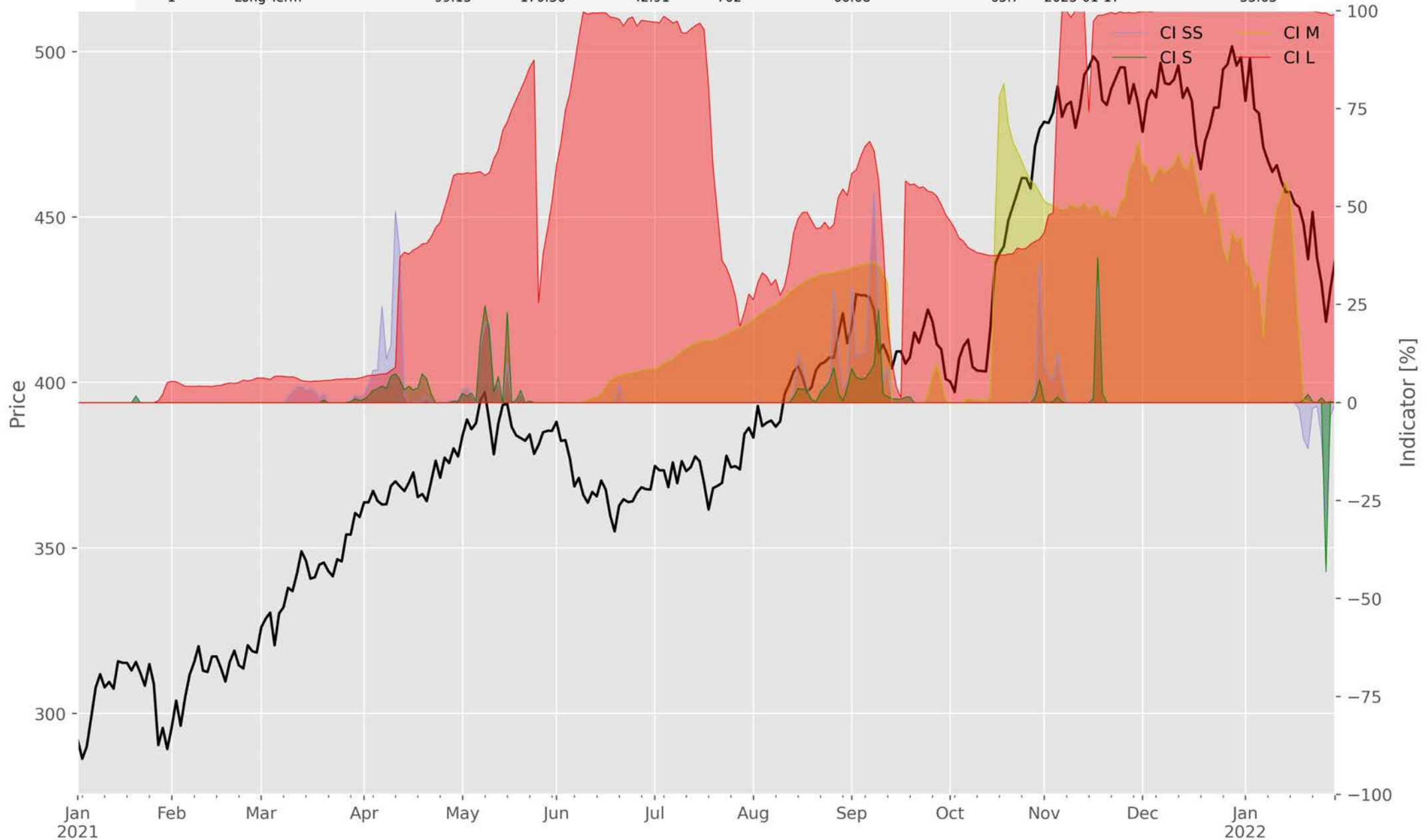
S&P1500 Trucking
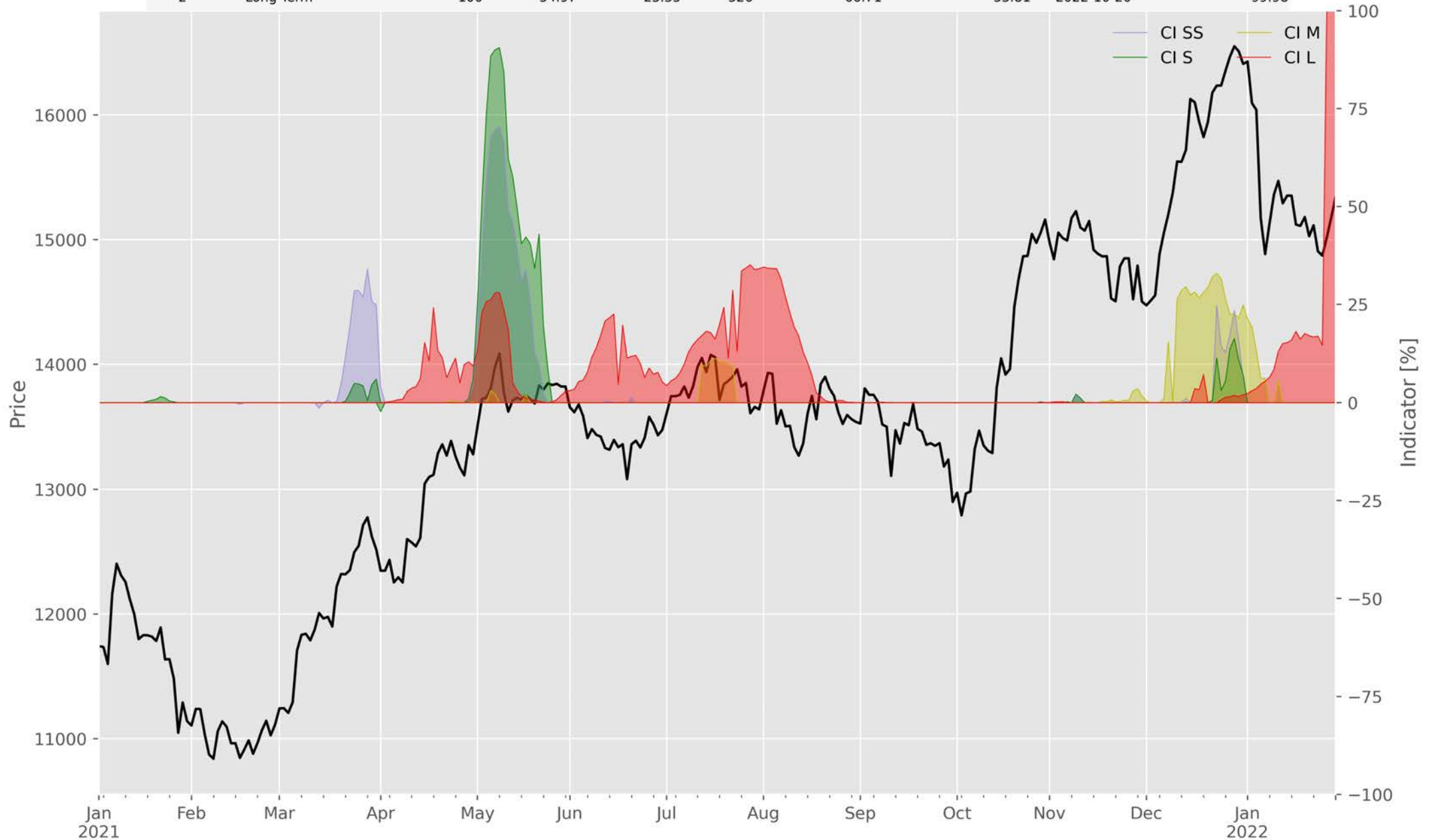
Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Long Term	74.02	140.95	37.12	702	66.68	56.79	2023-01-17	87.78
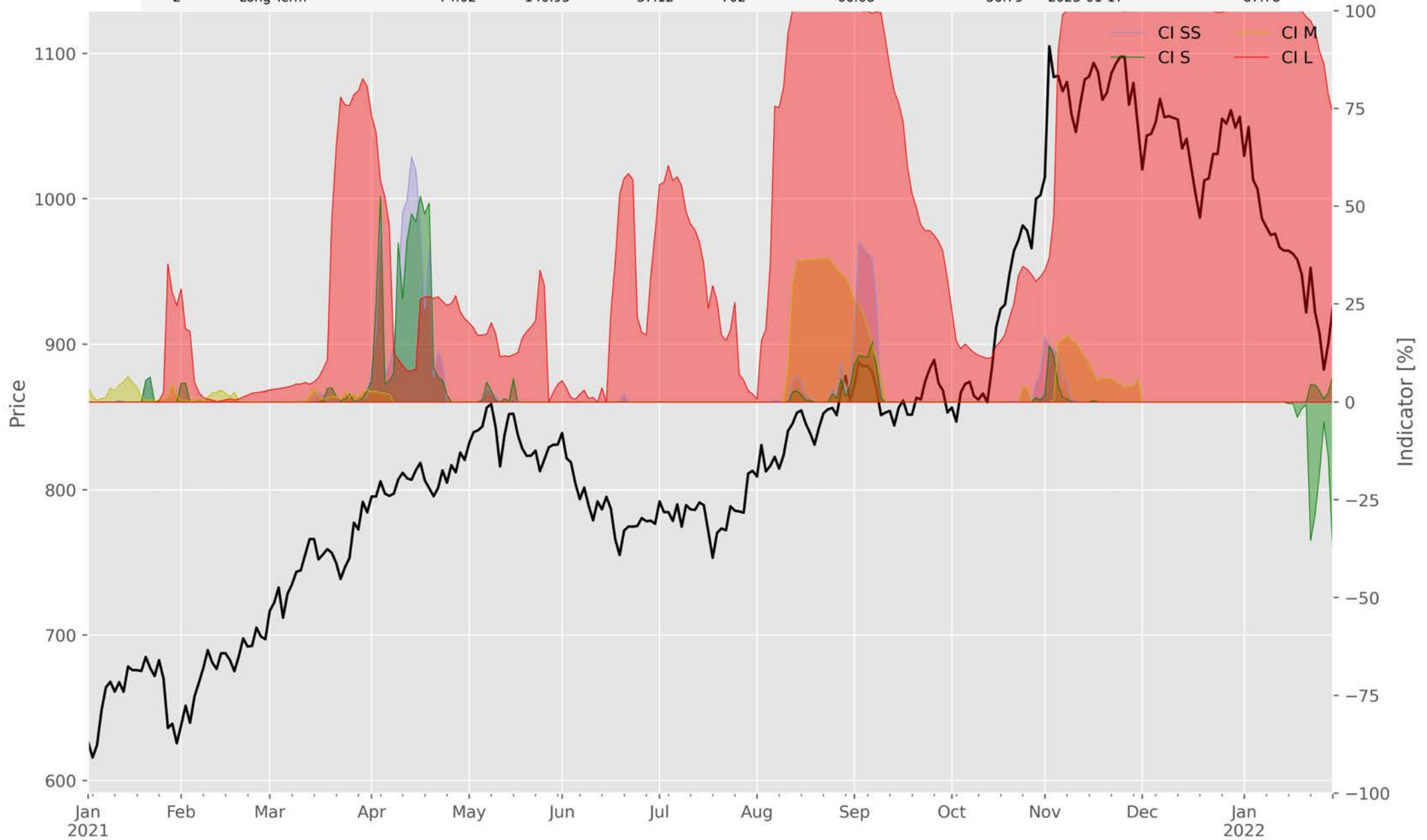
S&P500 Managed Health Care

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
3	Long Term	100	54.97	23.35	526	66.71	53.81	2022-10-20	99.98

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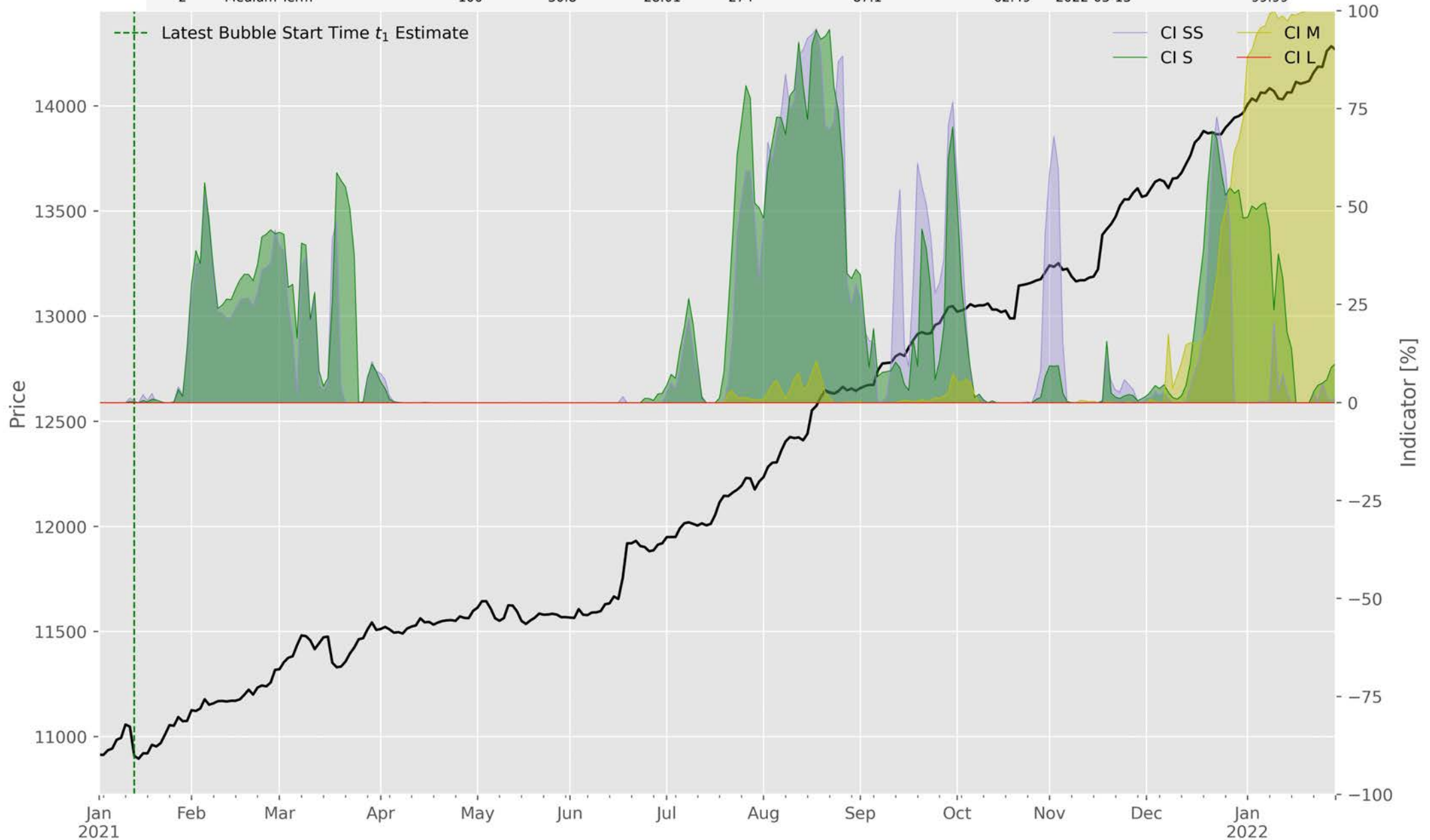| Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Long Term	83.86	123.91	22.33	1008	86.24	54.45	2022-07-11	86.85

S&P Global 1200 Managed H/C

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\tilde{t}_c$	Scenario Probability [%]
2	Long Term	100	54.97	23.35	526	66.71	53.81	2022-10-20	99.98

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S&P Global 1200 Industrial Reits

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
3	Long Term	69.64	143.62	25.02	1005	86.65	53.25	2022-07-05	75.09
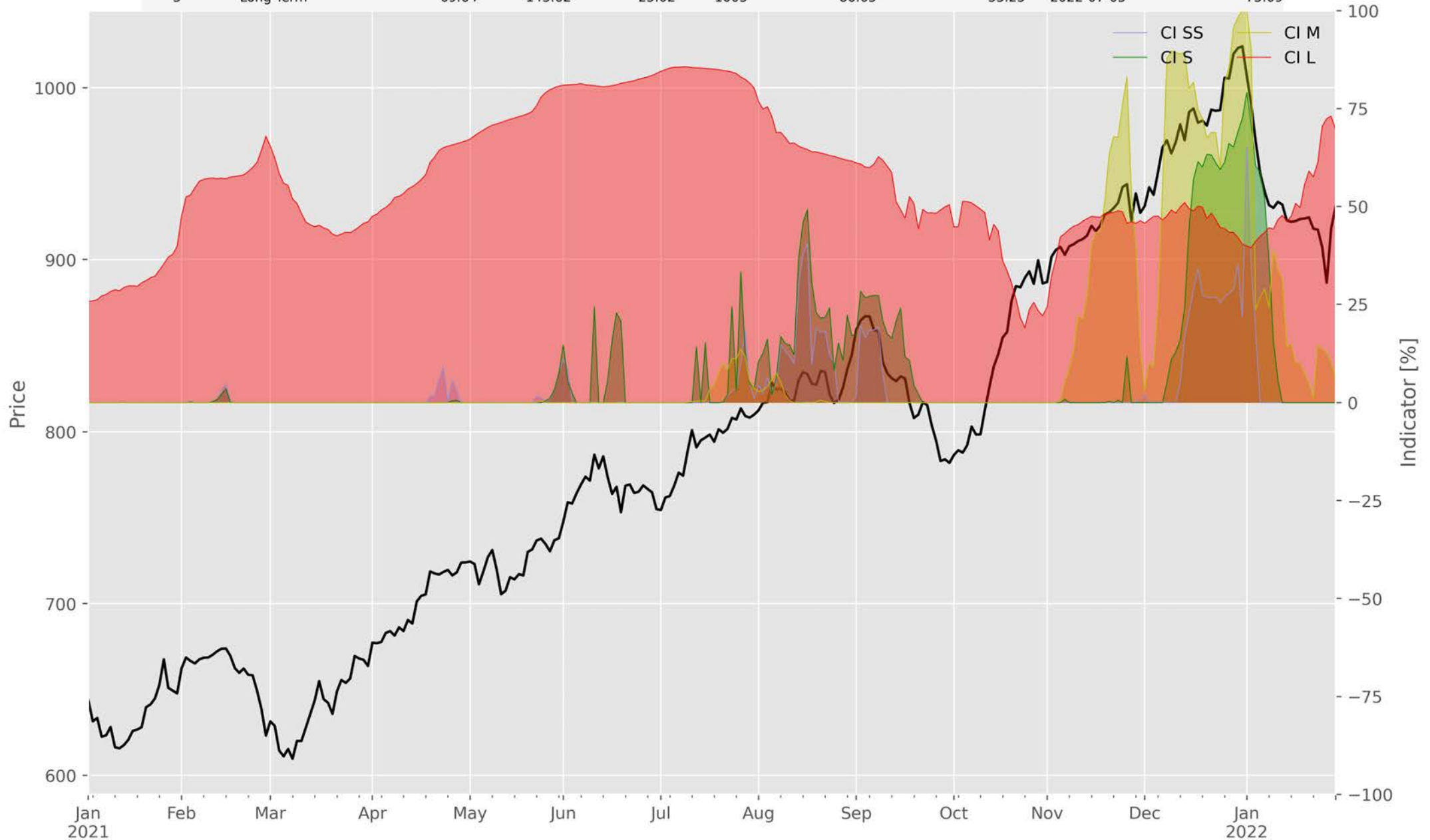
S&P Global 1200 Heavy Elec Eq

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Medium Term	43.59	-31.52	-28.04	290	98.33	49.35	2022-02-05	99.99

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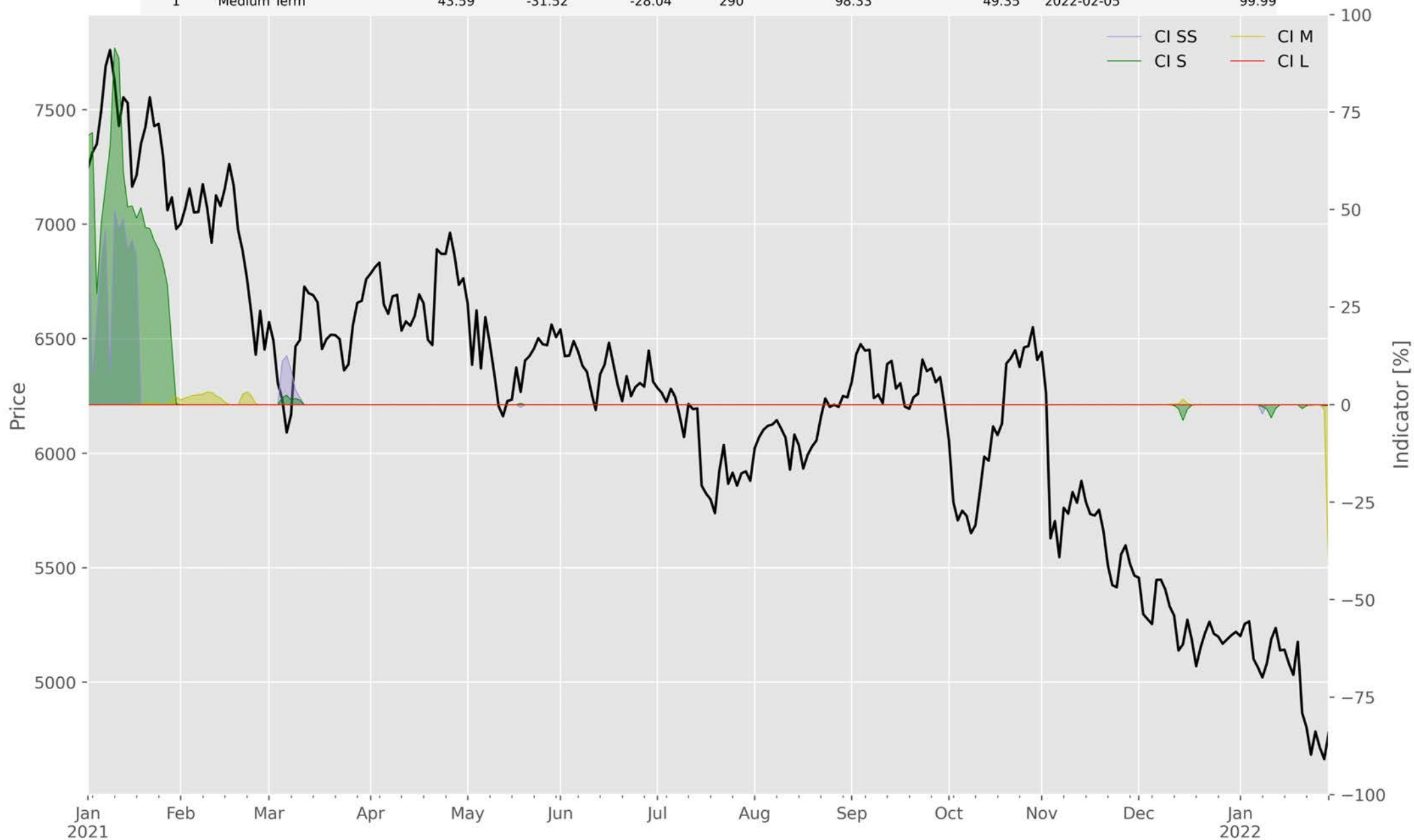
Forex

Jpm Venezuela Reer Ppi (2010=100)

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Medium Term	100	30.8	28.01	274	87.1	62.49	2022-03-13	99.99

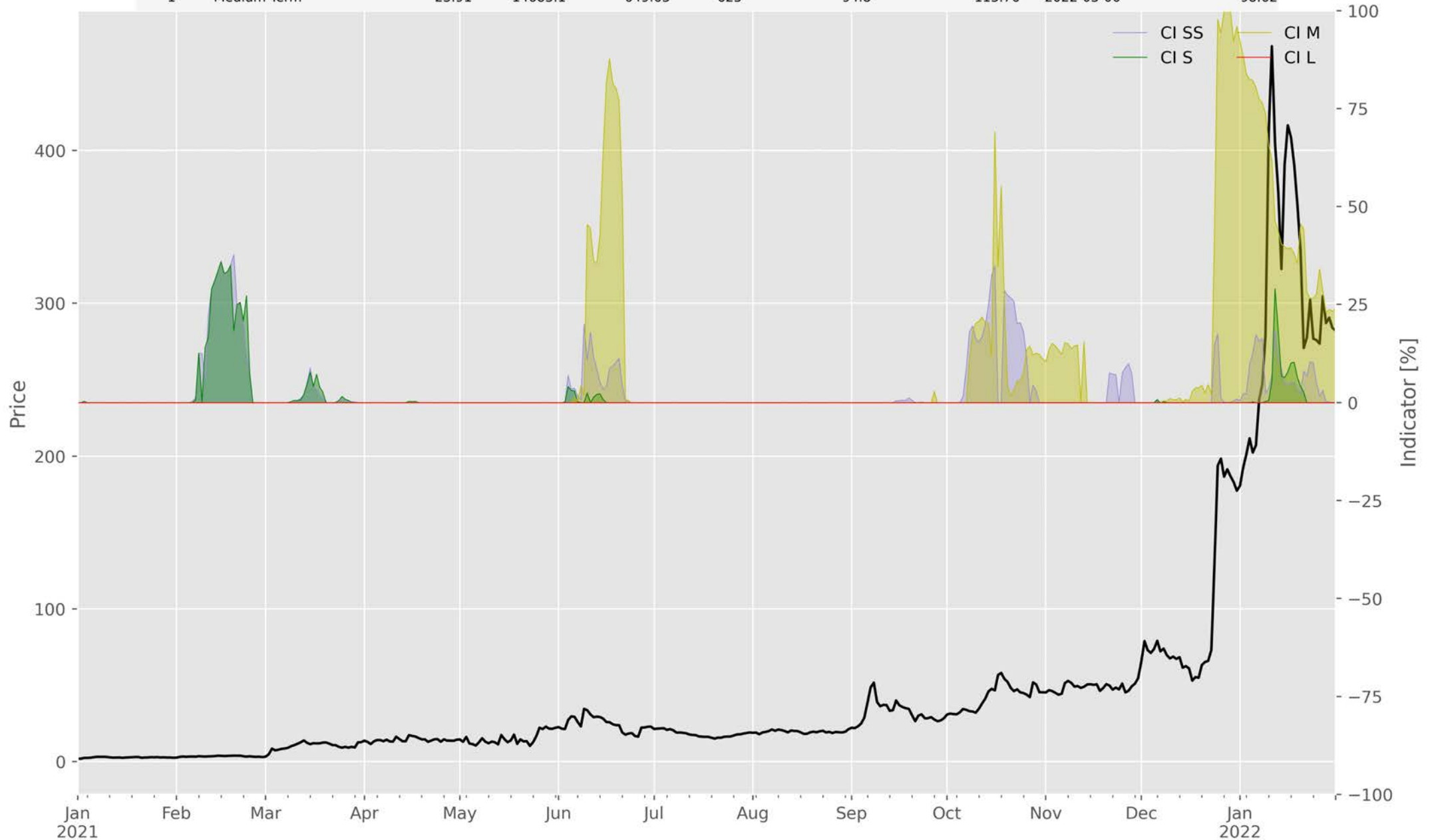The FCO Cockpit - Global Bubble Status Report

Jpm Japan Reer Ppi (2010=100)

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Medium Term	75.84	-16.59	-11.45	376	97.25	43.87	2022-02-11	99.99
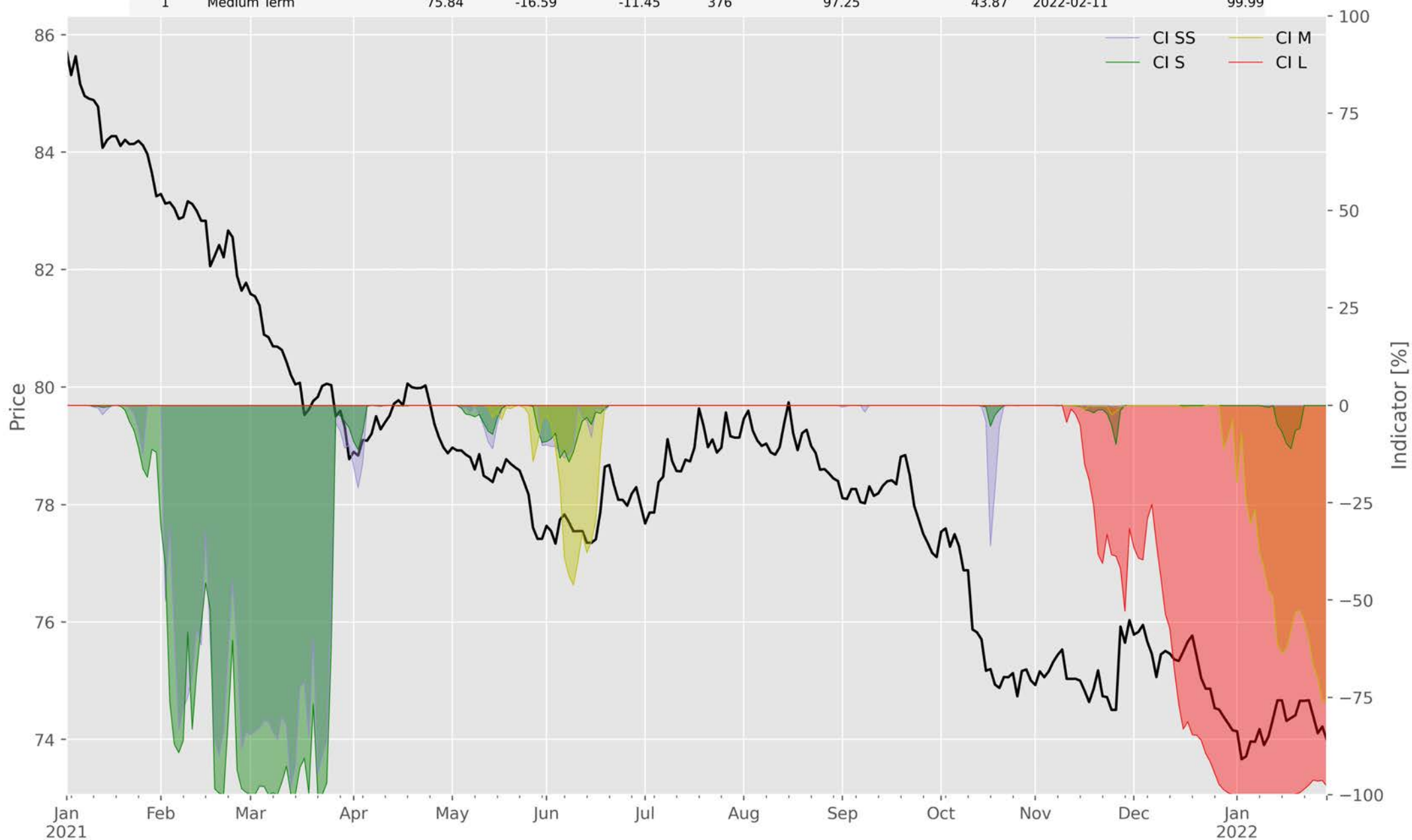
Jpm Japan Reer Cpi (2010=100)

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Medium Term	88.11	-14.33	-8.96	415	98.73	42.72	2022-02-05	99.99
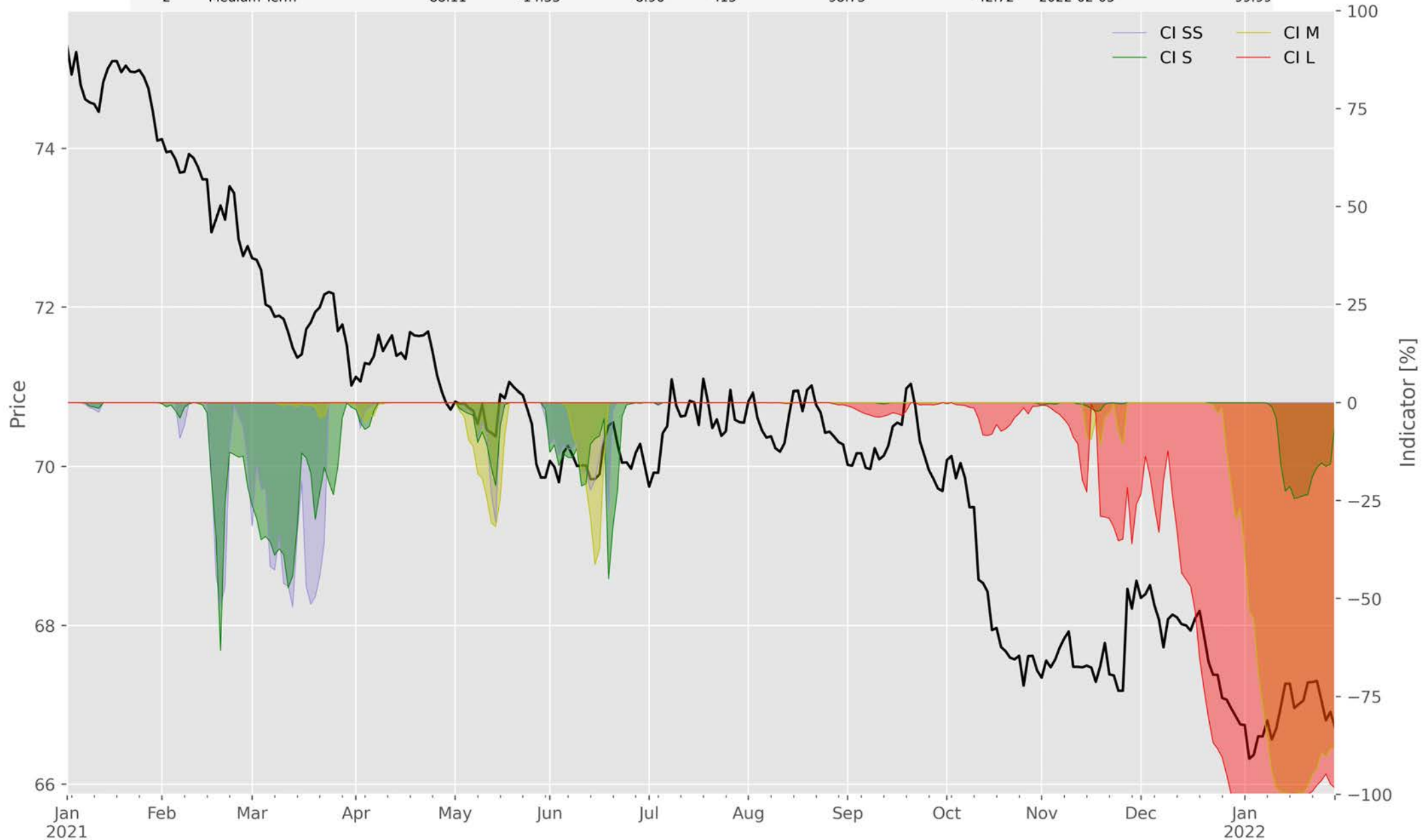
Jpm Switzerland Reer Ppi (2010=100)

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
3	Short Term	69.75	-10.36	-10.8	241	93.93	41.37	2022-02-16	99.99

CryptoX

Chrono.tech/USD

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Medium Term	23.91	14683.1	649.63	625	94.8	113.76	2022-03-06	98.62

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Swing/USD

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
1	Super Short	65.57	-44.26	-74.11	109	82.39	73.7	2022-02-23	74.49

Holo/USD

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
2	Super Short	51.11	-67.67	-95.31	93	81.71	73.56	2022-02-21	62.84

DxChain Token/USD

Rank	Strongest Signal	DS-LPPLS Confidence ci [%]	Bubble Size bs [%]	Bubble CAGR bg [%]	Duration [days]	Bubble Progress bp [%]	Geometric Average (ci, bg, bp)	Critical Time $\bar{t}_c$	Scenario Probability [%]
3	Short Term	59.19	-78.74	-71.36	312	84.63	70.97	2022-03-29	49.14

Sectors

GICS Industry Group Name	Yearly Return		Bubble Size		Bubble Score		Value Score		Growth Score	
	Feb 1st	Jan 1st	Feb 1st	Jan 1st	Feb 1st	Jan 1st	Feb 1st	Jan 1st	Feb 1st	Jan 1st
Pharmaceuticals, Biotechnology & Life Sciences	5.5%	13.5%	0.0%	0.0%	0.0%	0.0%	62.1%	62.6%	57.9%	56.7%
Consumer Services	2.0%	11.4%	0.0%	0.0%	0.0%	0.0%	22.6%	22.0%	62.7%	60.6%
Retailing	-2.8%	11.5%	0.0%	0.0%	0.0%	0.0%	18.8%	19.2%	48.5%	46.2%
Transportation	4.9%	12.4%	0.0%	0.0%	0.0%	0.0%	48.8%	46.9%	55.3%	55.8%
Consumer Durables & Apparel	2.3%	16.7%	0.0%	0.0%	0.0%	0.0%	35.6%	32.0%	42.4%	49.9%
Semiconductors & Semiconductor Equipment	14.1%	39.0%	0.0%	36.7%	0.0%	7.7%	63.5%	59.3%	40.1%	43.4%
Technology Hardware & Equipment	21.8%	33.3%	0.0%	0.0%	0.0%	0.0%	77.3%	77.5%	57.8%	56.7%
Automobiles & Components	11.7%	21.7%	0.0%	0.0%	0.0%	0.0%	46.0%	45.7%	48.4%	47.2%
Telecommunication Services	-8.7%	-9.7%	0.0%	-12.3%	0.0%	-11.5%	62.3%	61.4%	40.1%	43.4%
Energy	40.2%	18.0%	0.0%	0.0%	0.0%	0.0%	57.7%	50.0%	61.3%	69.6%
Software & Services	2.5%	23.3%	0.0%	0.0%	0.0%	0.0%	36.8%	39.4%	52.3%	50.6%
Materials	4.4%	7.4%	0.0%	0.0%	0.0%	0.0%	46.8%	49.7%	47.7%	50.9%
Health Care Equipment & Services	6.1%	18.3%	0.0%	0.0%	0.0%	0.0%	57.0%	53.3%	54.2%	51.9%
Capital Goods	3.2%	9.9%	0.0%	0.0%	0.0%	0.0%	47.9%	49.6%	50.7%	48.8%
Media & Entertainment	1.3%	24.8%	-14.1%	0.0%	-89.8%	0.0%	44.0%	27.6%	37.3%	33.7%
Commercial & Professional Services	7.4%	25.0%	0.0%	0.0%	0.0%	0.0%	29.7%	32.2%	55.0%	52.5%
Food & Staples Retailing	11.4%	17.4%	0.0%	0.0%	0.0%	0.0%	40.4%	40.7%	61.2%	61.1%
Household & Personal Products	4.4%	8.1%	0.0%	0.0%	0.0%	0.0%	33.0%	29.8%	56.3%	54.4%
Food, Beverage & Tobacco	12.4%	13.9%	0.0%	0.0%	0.0%	0.0%	48.3%	49.0%	58.8%	56.6%
Utilities	4.8%	6.2%	0.0%	0.0%	0.0%	0.0%	43.6%	43.6%	55.2%	53.8%
Insurance	13.8%	12.1%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Real Estate	13.6%	28.2%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Diversified Financials	18.5%	24.8%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Banks	20.9%	17.6%	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 observe one industry group indices with a high (negative) bubble score: *Media & Entertainment.* This means that the probability of a quick rebound is high, which has started in the last days of Jan 2022.

▸ The industry group *Semiconductors & Semiconductor Equipment*, identified with a medium positive bubble last month has gone down by 20%, marking the end of the previous positive bubble regime. The industry group *Telecommunication Services* that was identified with a medium negative bubble signal last month has rebounded with the disappearance of the bubble signals. This means that the index has ended its previous market regime.
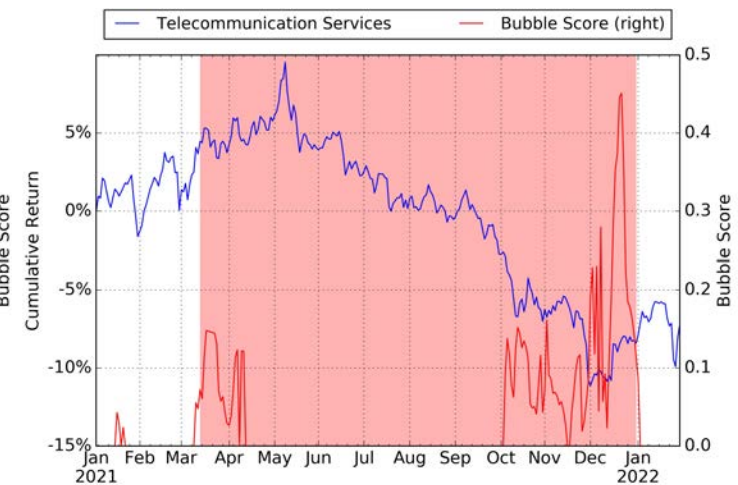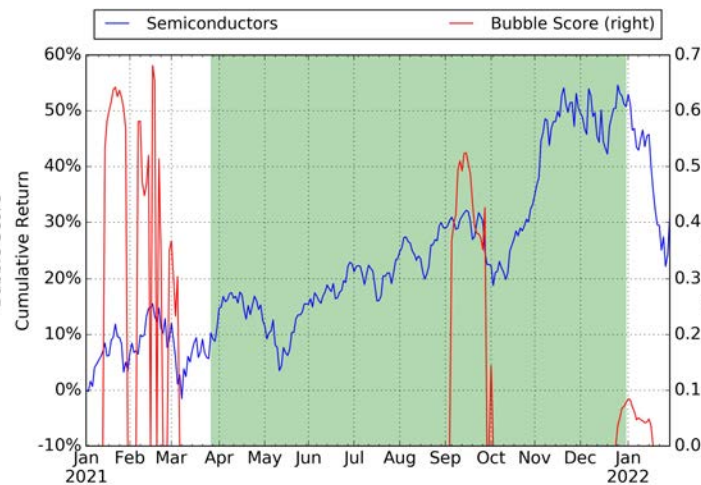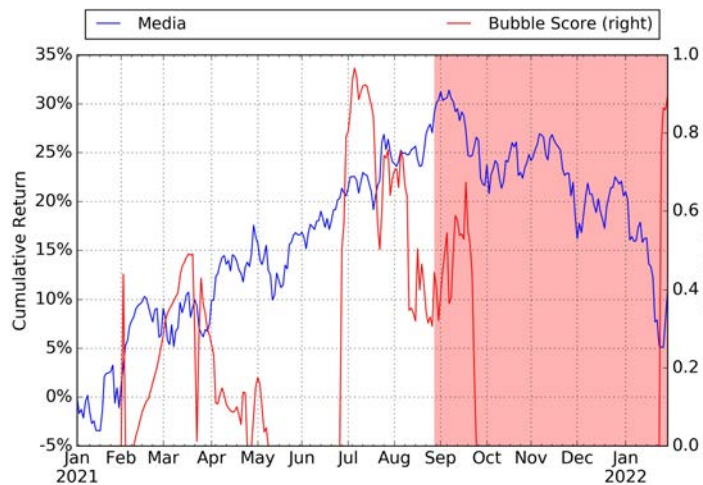
Portfolio Construction & Performance

▸ 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 has experienced a volatile month with large drawdowns. Contrarian Long and Short Portfolios start outperforming the market and the short portfolios has shown good performance in the last month due to the market turmoil.

▶ Contrarian Portfolios are more delicate to use due to their sensitivity to timing the expected reversal and exhibit very volatile performances. 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.
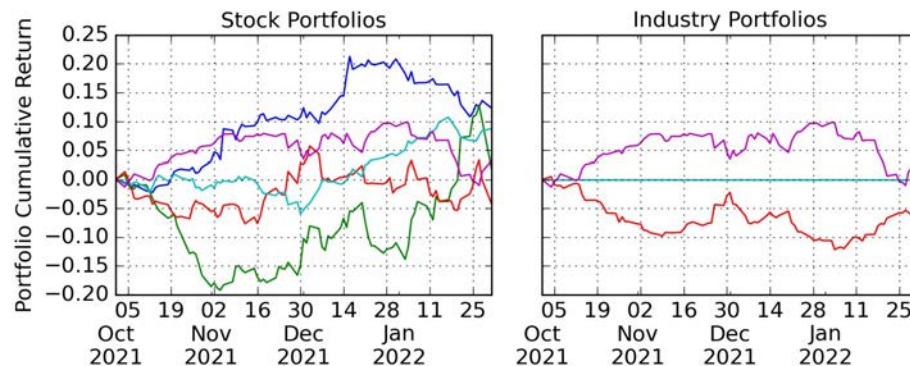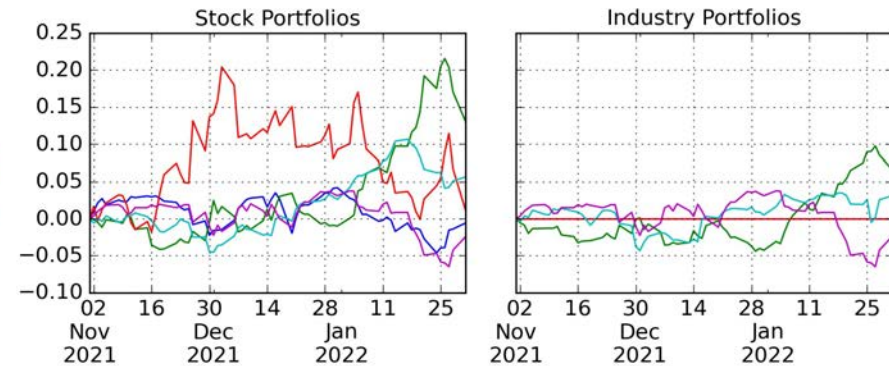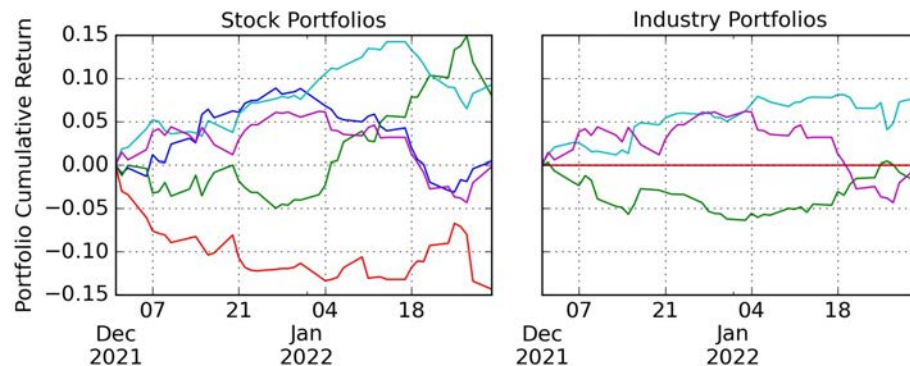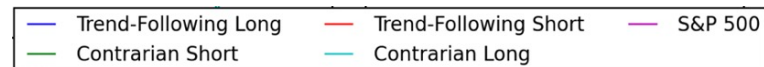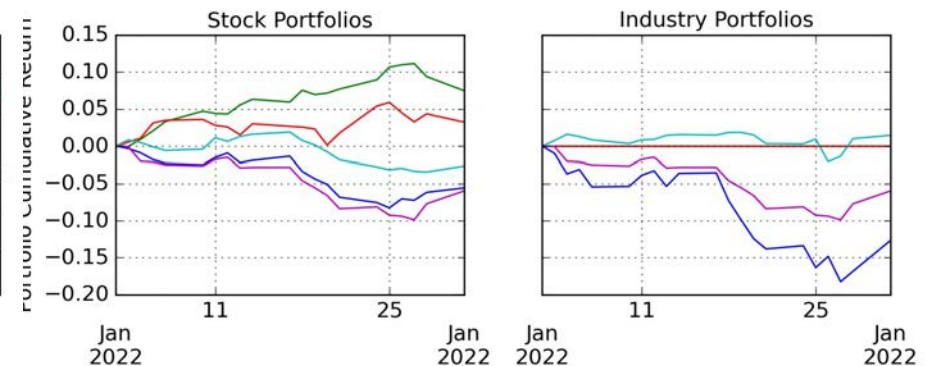
Single Stocks

We can divide the stocks into four quadrants[1]

The four quadrants: value versus bubble score
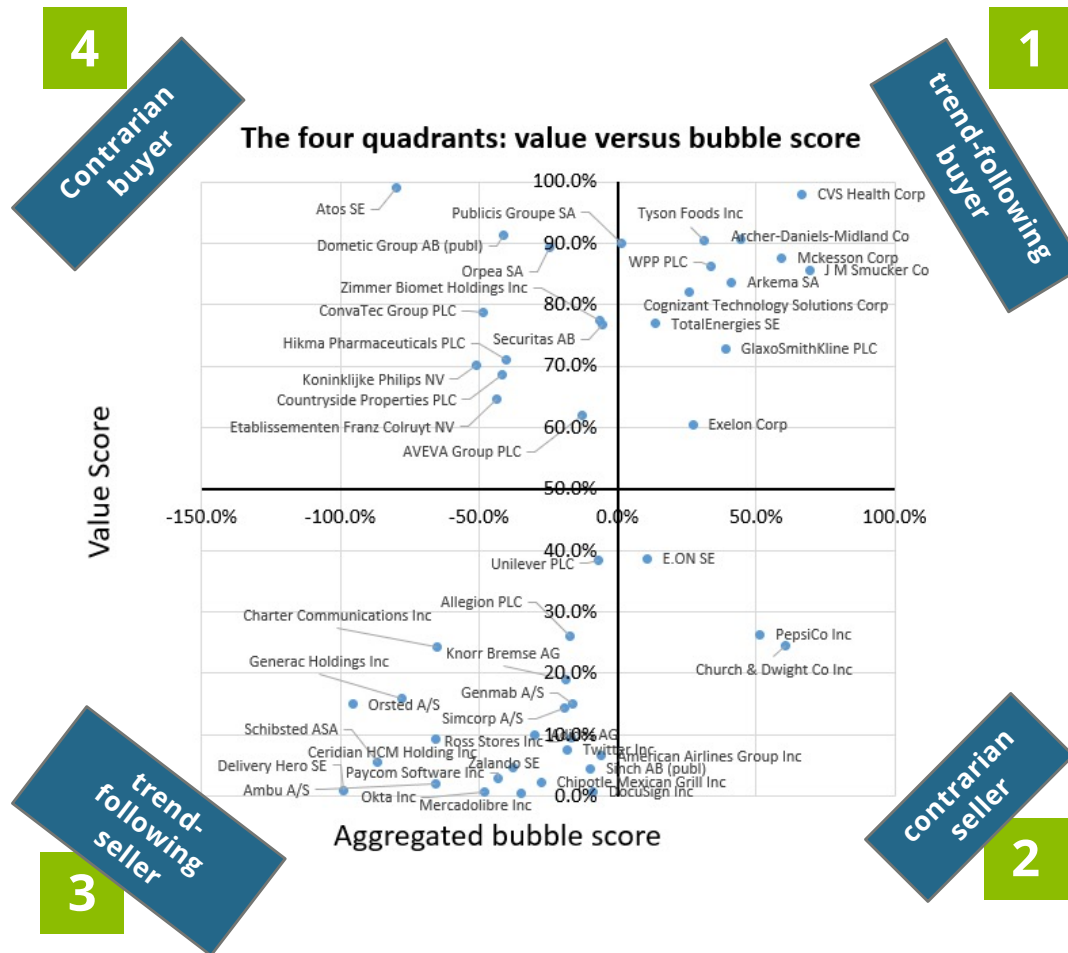
- ▸ **Quadrant 1**: Stocks with a strong value score are cheap relative to their earnings potential. The strong positive bubble signal should be interpreted as a momentum indicator possibly the consequence of a repricing based on the fundamentals. As an investor, one could be a **trend-following buyer**. E.g. Exelon Corp.

- ▸ **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. PepsiCo Inc

- ▸ **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. Ambu A/S

- ▸ **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. Atos SE

[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 823 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
Exelon Corp	United States of America	Utilities	35.6%	30.1%	Jun-21	27.2%	60.4%	26.0%
CVS Health Corp	United States of America	Health Care Equipment & Services	44.7%	30.6%	Aug-21	66.6%	97.9%	46.5%
J M Smucker Co	United States of America	Food, Beverage & Tobacco	23.3%	16.6%	Sep-21	69.2%	85.6%	24.3%
Archer-Daniels-Midland Co	United States of America	Food, Beverage & Tobacco	36.6%	21.1%	Jun-21	44.5%	90.6%	22.6%
Mckesson Corp	United States of America	Health Care Equipment & Services	41.2%	30.4%	Aug-21	59.3%	87.5%	65.0%
Cognizant Technology Solutions Corp	United States of America	Software & Services	11.0%	17.6%	May-21	26.0%	82.0%	78.9%
Tyson Foods Inc	United States of America	Food, Beverage & Tobacco	39.1%	17.6%	Aug-21	31.0%	90.4%	7.2%
GlaxoSmithKline PLC	United Kingdom	Pharmaceuticals, Biotechnology & Life Sciences	30.9%	32.2%	Mar-21	39.0%	72.8%	37.4%
Publicis Groupe SA	France	Media & Entertainment	27.0%	8.3%	May-21	1.2%	90.0%	9.3%
Arkema SA	France	Materials	45.3%	20.9%	May-21	41.2%	83.7%	19.9%
WPP PLC	United Kingdom	Media & Entertainment	39.7%	22.2%	Jul-21	33.6%	86.2%	49.5%
TotalEnergies SE	France	Energy	45.0%	34.0%	Feb-21	13.8%	76.9%	82.9%

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Single Stocks

Quadrant 1 Stocks Current Month Example – J M Smucker Co.
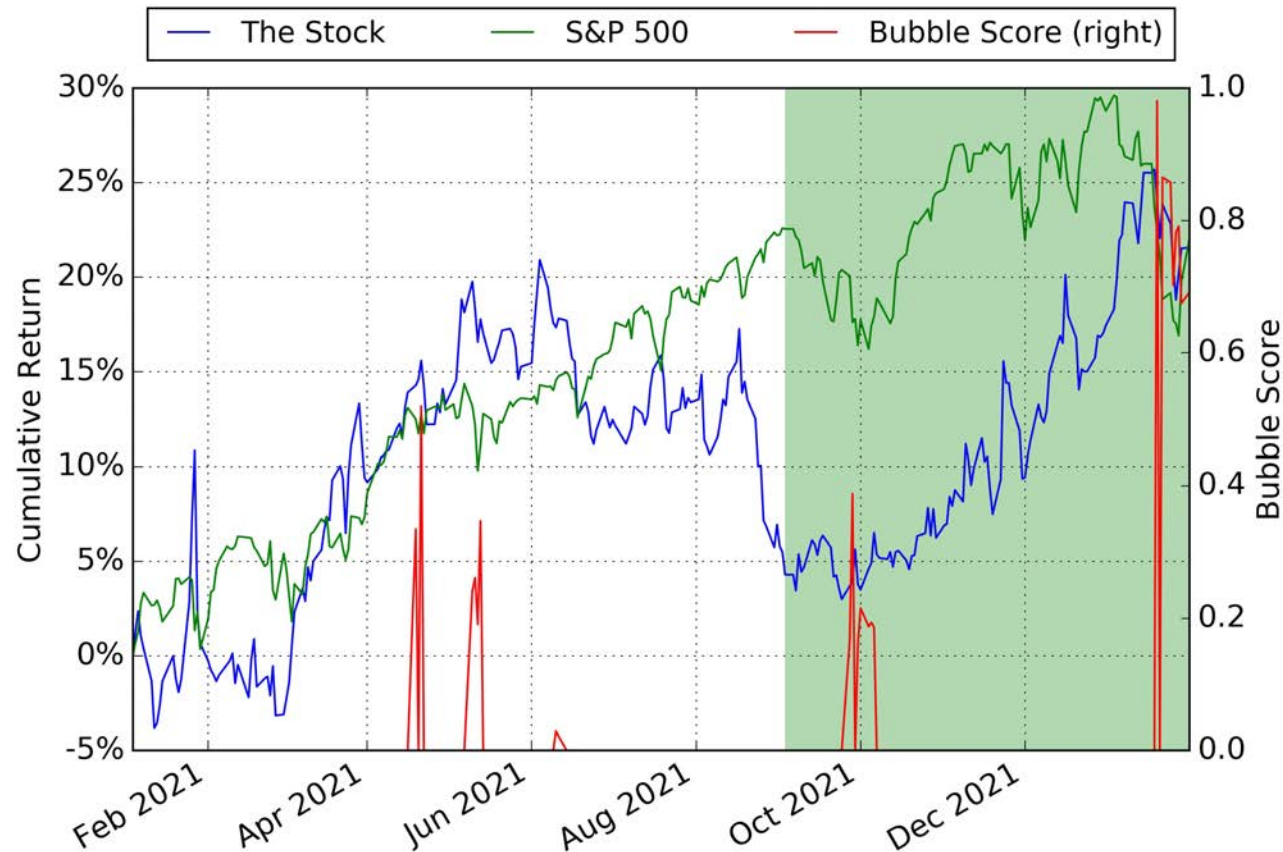
- ▸ The above graph shows the one-year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period delineates the time interval within which the positive bubble is identified. The Bubble Score of this five-month bubble has reached 69.2% with a bubble size 16.6%. We can see that the highest Bubble Score indicates the peak of the bubble, followed by a small correction.

Single Stocks

Quadrant 1 Stocks Last Month Example – McKesson Corp.
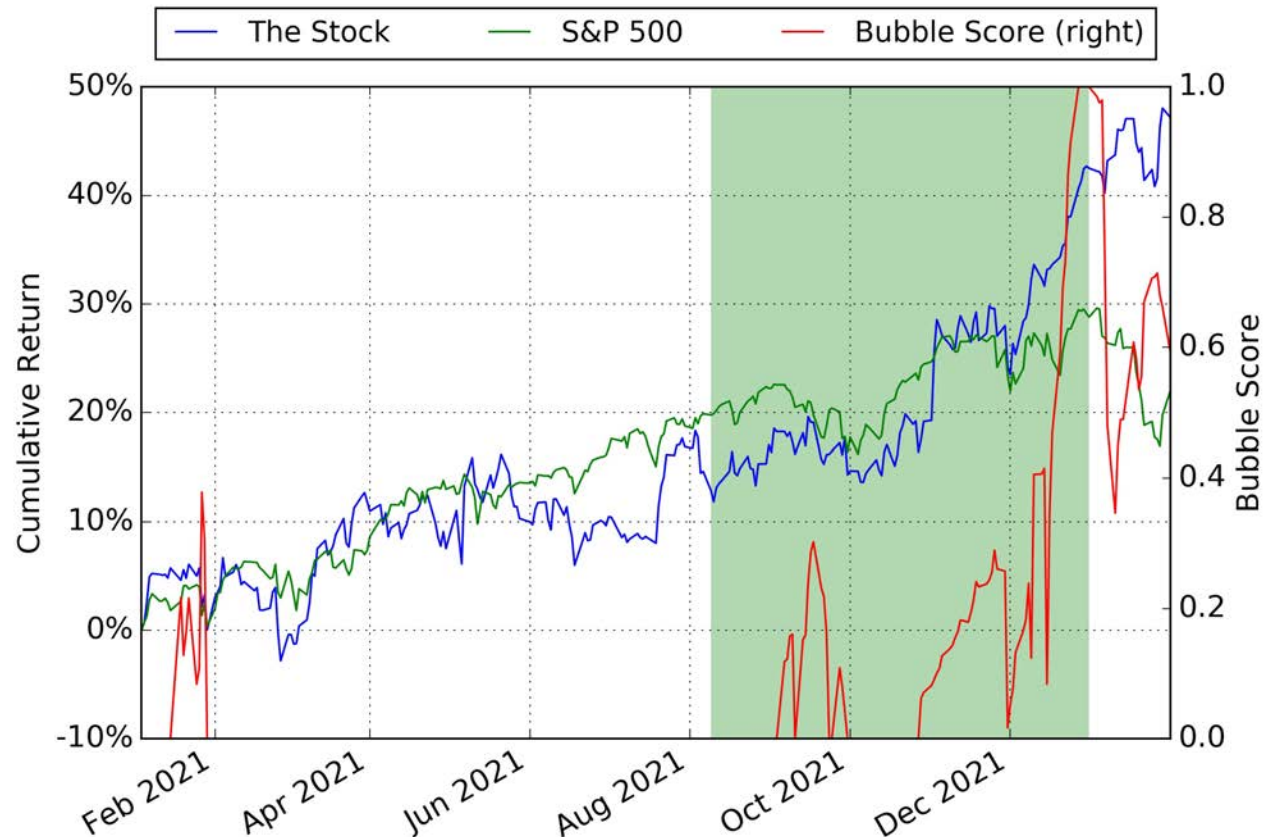
▸ The figure above plots the one-year cumulative return of the stock (blue), S&P 500 (green) and LPPLS Bubble Score (red lines on the right y-axis). The green shaded period delineates the time interval within which a strong positive bubble has been identified and reported last month. The stock price continued to march higher in the past month with a slower velocity, with a still positive bubble this month. The bubble may continue to develop into a larger bubble, but one should remain cautious as the risk of regime shifting may significantly increase as well.

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
PepsiCo Inc	United States of America	Food, Beverage & Tobacco	28.6%	12.6%	Aug-21	51.4%	26.3%	70.6%
Church & Dwight Co Inc	United States of America	Household & Personal Products	24.1%	24.1%	Sep-21	60.5%	24.4%	61.6%
E.ON SE	Germany	Utilities	40.3%	28.0%	Mar-21	10.7%	38.6%	31.1%

Single Stocks

Quadrant 2 Stocks Current Month Example – Church & Dwight Co Inc.
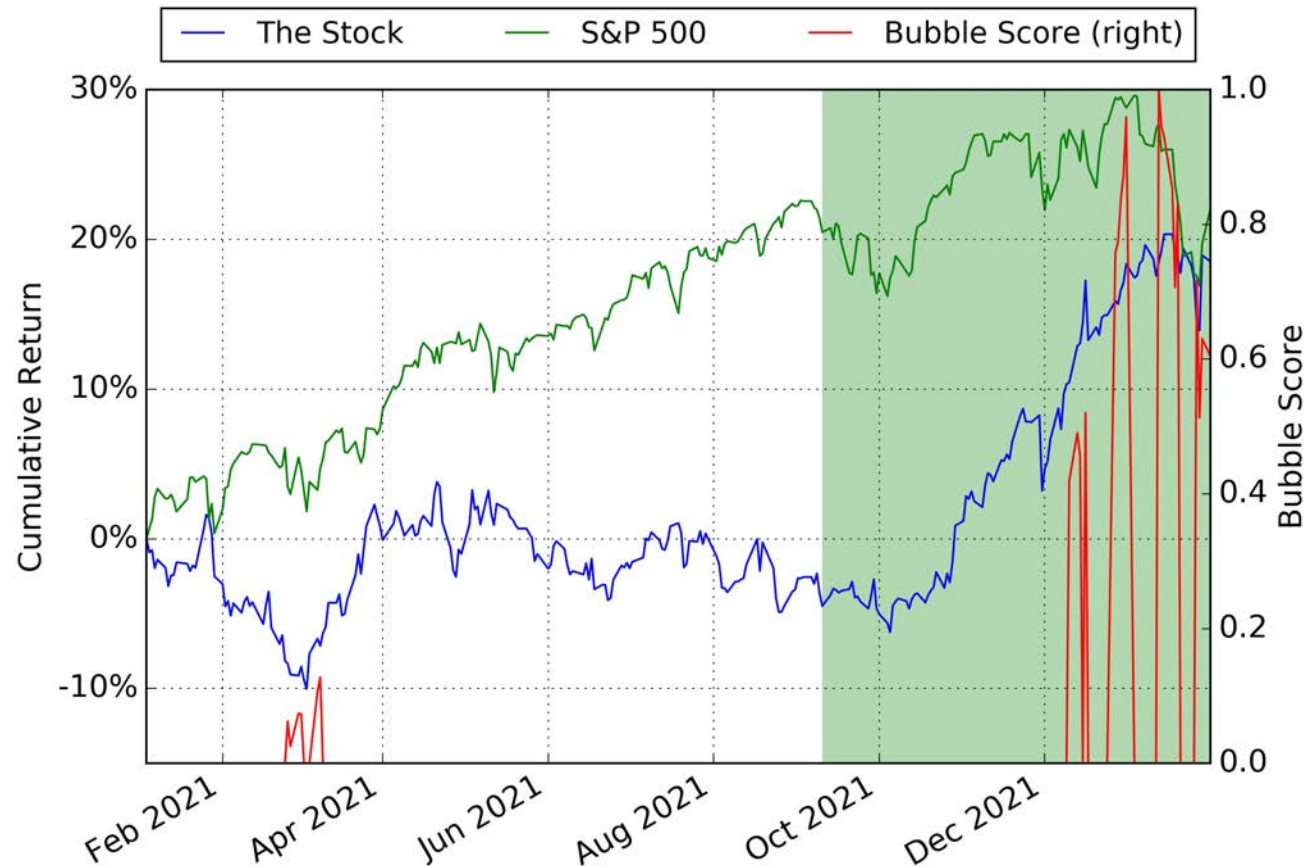
▸ The above graph shows the one-year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period delineates the time interval within which the positive bubble is identified. The Bubble Score of this five-month bubble has reached 60.5% with a bubble size 24.1%. The strong positive bubble signal and weak fundamentals may indicate a high probability of correction in the future.

Single Stocks

Quadrant 2 Stocks Last Month Example – PepsiCo Inc.
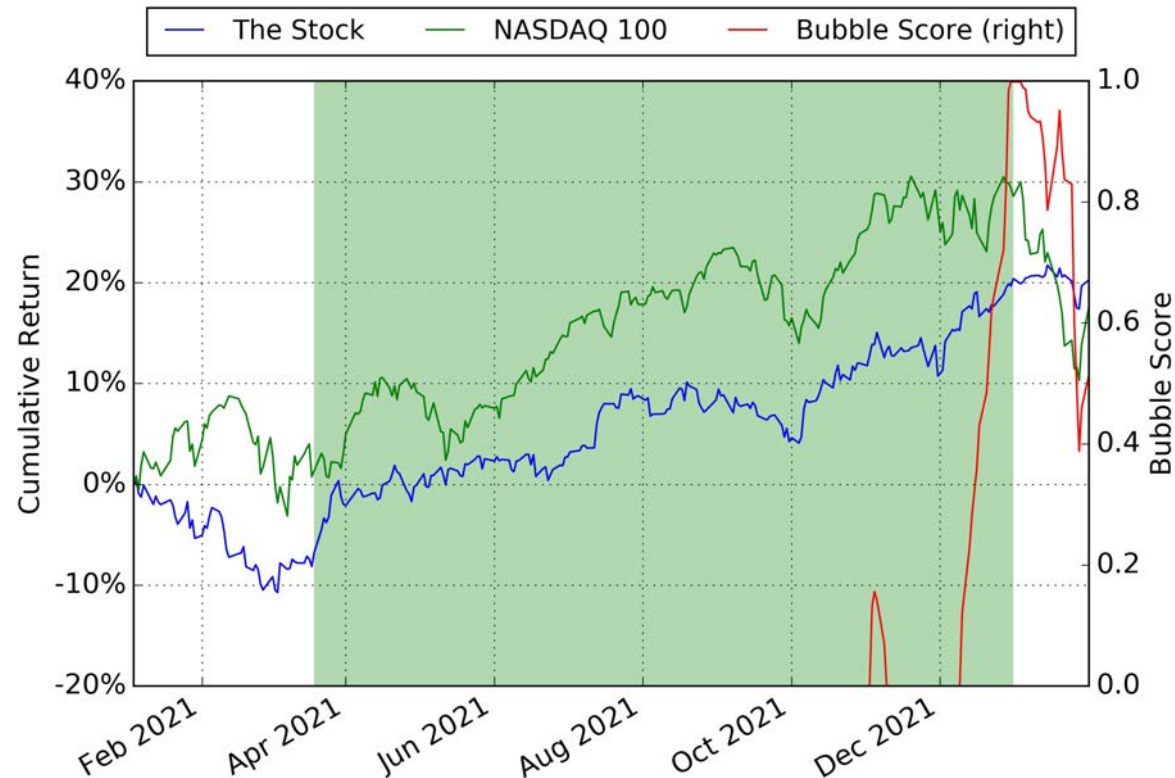
The figure above plots the one-year cumulative return of the stock (blue), NASDAQ 100 (green) and LPPLS Bubble Score (red lines on the right y-axis). The green shaded period delineates the time interval within which a strong positive bubble has been identified and reported last month. The stock price has entered a volatile plateau in the past month, indicating a change of regime, which is in agreement with the LPPLS signal. The weak fundamentals suggests that risks for the stock price to exhibit future corrections.

ETH zürich   SUSTech

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
Paycom Software Inc	United States of America	Software & Services	-17.7%	-30.9%	Aug-21	-43.0%	3.0%	63.4%
Ceridian HCM Holding Inc	United States of America	Software & Services	-20.8%	-32.0%	Aug-21	-65.8%	9.3%	79.9%
Chipotle Mexican Grill Inc	United States of America	Consumer Services	-3.7%	-15.4%	Jul-21	-27.5%	2.2%	72.5%
Generac Holdings Inc	United States of America	Capital Goods	-10.7%	-37.7%	Sep-21	-77.8%	15.8%	50.5%
Charter Communications Inc	United States of America	Media & Entertainment	-4.1%	-22.9%	Aug-21	-64.9%	24.2%	15.7%
American Airlines Group Inc	United States of America	Transportation	-3.1%	-29.5%	May-21	-5.7%	6.6%	10.3%
Ross Stores Inc	United States of America	Retailing	-19.8%	-23.3%	Apr-21	-16.6%	9.5%	89.6%
Allegion PLC	Ireland; Republic of	Capital Goods	3.0%	-12.4%	May-21	-17.2%	26.0%	31.7%
Twitter Inc	United States of America	Media & Entertainment	-45.3%	-45.1%	Jun-21	-18.0%	7.5%	89.8%
Okta Inc	United States of America	Software & Services	-31.0%	-24.1%	Aug-21	-47.8%	0.6%	58.7%
Mercadolibre Inc	Argentina	Retailing	-41.7%	-36.6%	Aug-21	-34.8%	0.4%	81.9%
DocuSign Inc	United States of America	Software & Services	-50.9%	-59.4%	Sep-21	-8.8%	0.8%	38.0%
Sinch AB (publ)	Sweden	Software & Services	-32.6%	-37.1%	Jun-21	-9.6%	4.5%	72.9%
Orsted A/S	Denmark	Utilities	-32.5%	-29.7%	Aug-21	-95.5%	14.9%	92.0%
Unilever PLC	United Kingdom	Household & Personal Products	-3.0%	-11.4%	Jun-21	-7.0%	38.4%	58.1%
Zalando SE	Germany	Retailing	-30.7%	-25.4%	Jul-21	-37.9%	4.8%	48.3%
Ambu A/S	Denmark	Health Care Equipment & Services	-56.4%	-31.9%	Sep-21	-65.6%	1.9%	84.8%
Schibsted ASA	Norway	Media & Entertainment	-24.6%	-45.5%	Aug-21	-86.7%	5.5%	88.7%
Adidas AG	Germany	Consumer Durables & Apparel	-17.5%	-23.3%	Jul-21	-29.8%	10.0%	69.7%
Delivery Hero SE	Germany	Retailing	-48.2%	-47.8%	Sep-21	-99.0%	0.9%	98.8%
Knorr Bremse AG	Germany	Capital Goods	-16.8%	-16.8%	Feb-21	-18.5%	19.0%	89.2%
Genmab A/S	Denmark	Pharmaceuticals, Biotechnology & Life Sciences	-10.8%	-26.7%	Aug-21	-16.4%	15.0%	69.2%
Simcorp A/S	Denmark	Software & Services	-24.5%	-28.6%	Aug-21	-19.2%	14.4%	82.3%

Single Stocks

Quadrant 3 Stocks Current Month Example – Delivery Hero SE.
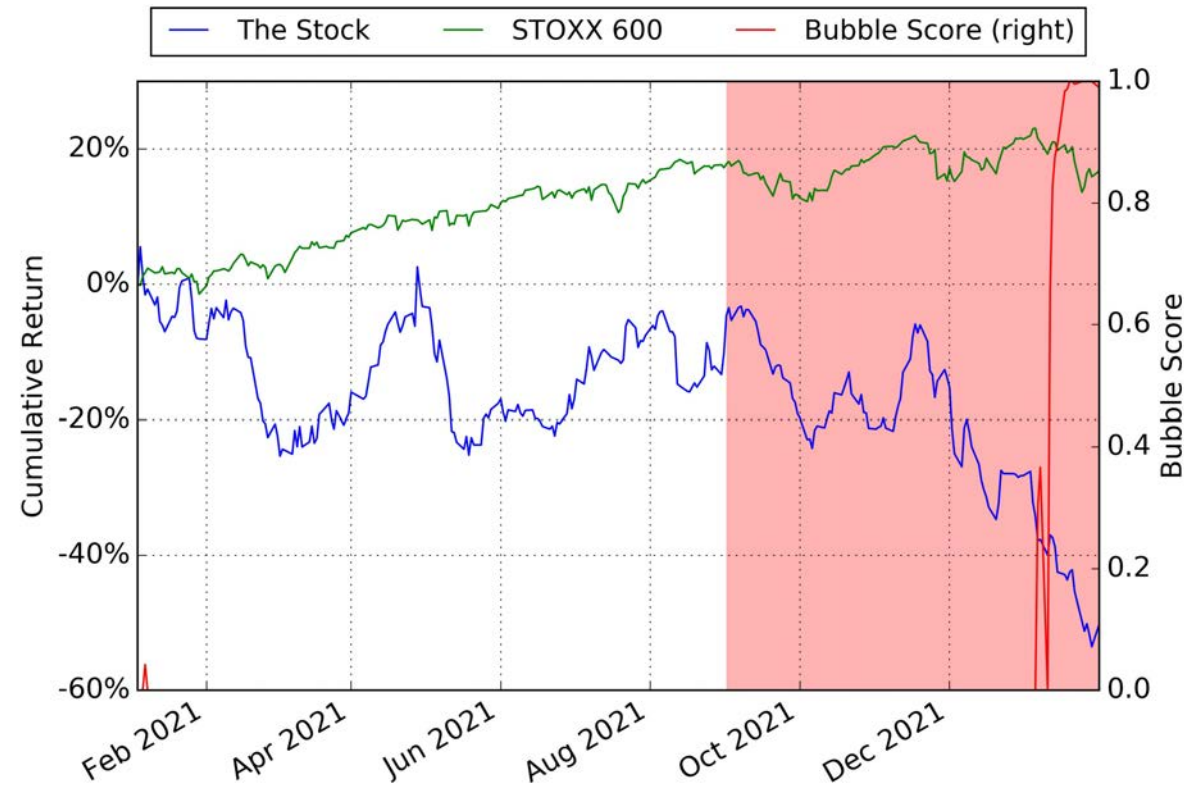
▸ The above graph shows the one-year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period delineates the time interval within which the negative bubble is identified. The Bubble Score of this five-month bubble has reached 99.0% with a bubble size -47.8%.

Single Stocks

Quadrant 3 Stocks Last Month Example – Ubisoft Entertainment SA.
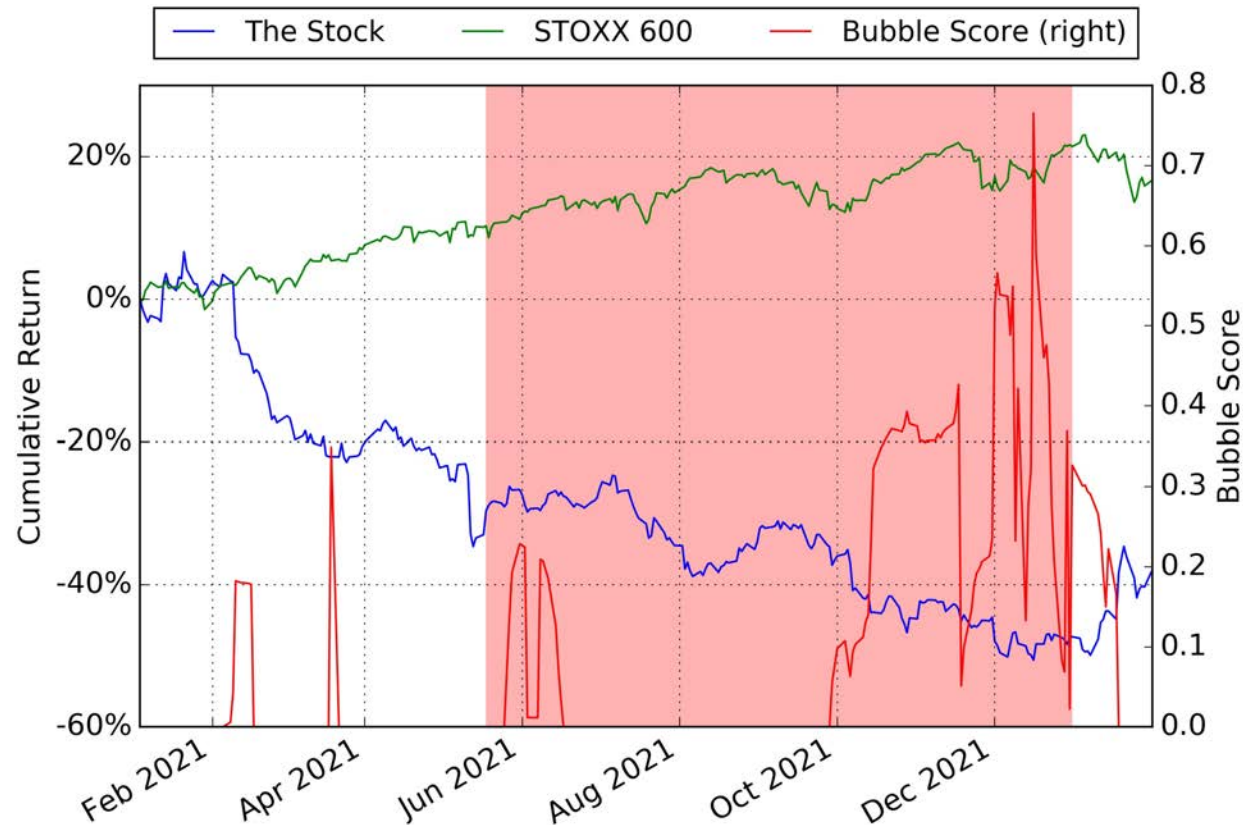
▸ The figure above plots the one-year cumulative return of the stock (blue), STOXX 600 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period delineates the time interval within which the strong negative bubble was identified and reported last month. The stock price has started to rebound in the past month, which is in agreement with our DS LPPLS Bubble Signal. One should remain cautious however, given the weak fundamentals of this stock, which may indicate a continuation of the negative bubble in the future.

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
Zimmer Biomet Holdings Inc	United States of America	Health Care Equipment & Services	-24.2%	-26.6%	May-21	-6.3%	77.5%	50.9%
Dometic Group AB (publ)	Sweden	Automobiles & Components	-8.7%	-30.2%	Aug-21	-41.0%	91.3%	95.5%
ConvaTec Group PLC	United Kingdom	Health Care Equipment & Services	-12.3%	-21.9%	Aug-21	-48.6%	78.7%	83.3%
Etablissementen Franz Colruyt NV	Belgium	Food & Staples Retailing	-29.5%	-23.8%	Jul-21	-43.7%	64.5%	9.6%
Atos SE	France	Software & Services	-52.2%	-27.1%	Aug-21	-79.7%	99.0%	94.9%
Koninklijke Philips NV	Netherlands	Health Care Equipment & Services	-37.7%	-36.8%	May-21	-50.8%	70.2%	43.4%
AVEVA Group PLC	United Kingdom	Software & Services	-23.6%	-17.3%	Jun-21	-12.6%	62.0%	80.1%
Securitas AB	Sweden	Commercial & Professional Services	-11.2%	-25.7%	Jul-21	-5.4%	76.7%	91.0%
Hikma Pharmaceuticals PLC	United Kingdom	Pharmaceuticals, Biotechnology & Life Sciences	-9.5%	-19.6%	Aug-21	-40.2%	71.1%	30.1%
Countryside Properties PLC	United Kingdom	Consumer Durables & Apparel	-31.4%	-39.7%	Mar-21	-41.7%	68.6%	21.6%
Orpea SA	France	Health Care Equipment & Services	-66.3%	-65.5%	Feb-21	-24.6%	89.2%	92.7%

Single Stocks

Quadrant 4 Stocks Current Month Example – Atos SE.
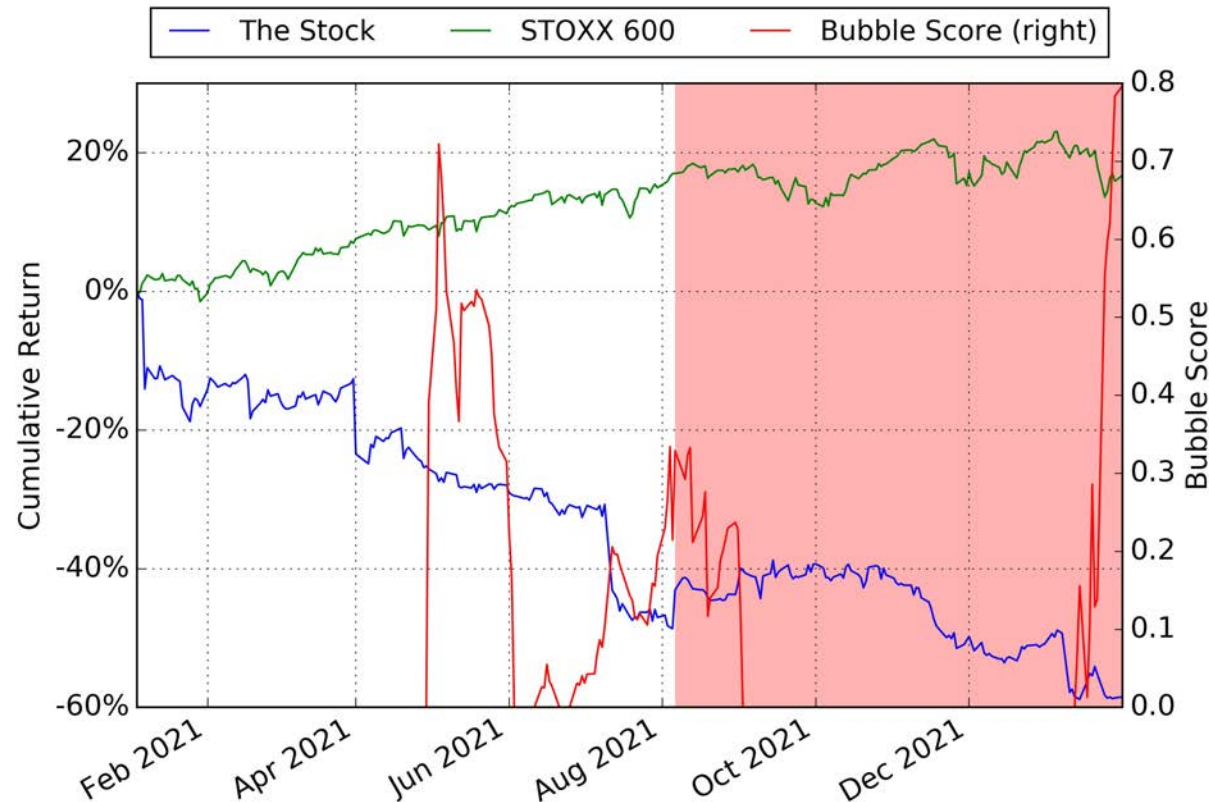
▸ The above graph shows the one-year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period delineates the time interval within which the strong negative bubble is identified. The Bubble Score of this six-month bubble has reached 79.7% with a negative bubble size -27.1%. We expect a rebound in the future when the negative bubble is mature, given our diagnostic of a negative bubble signal with strong fundamentals, calling for a contrarian buyer position.

Single Stocks

Quadrant 4 Stocks Last Month Example – Medtronic PLC.
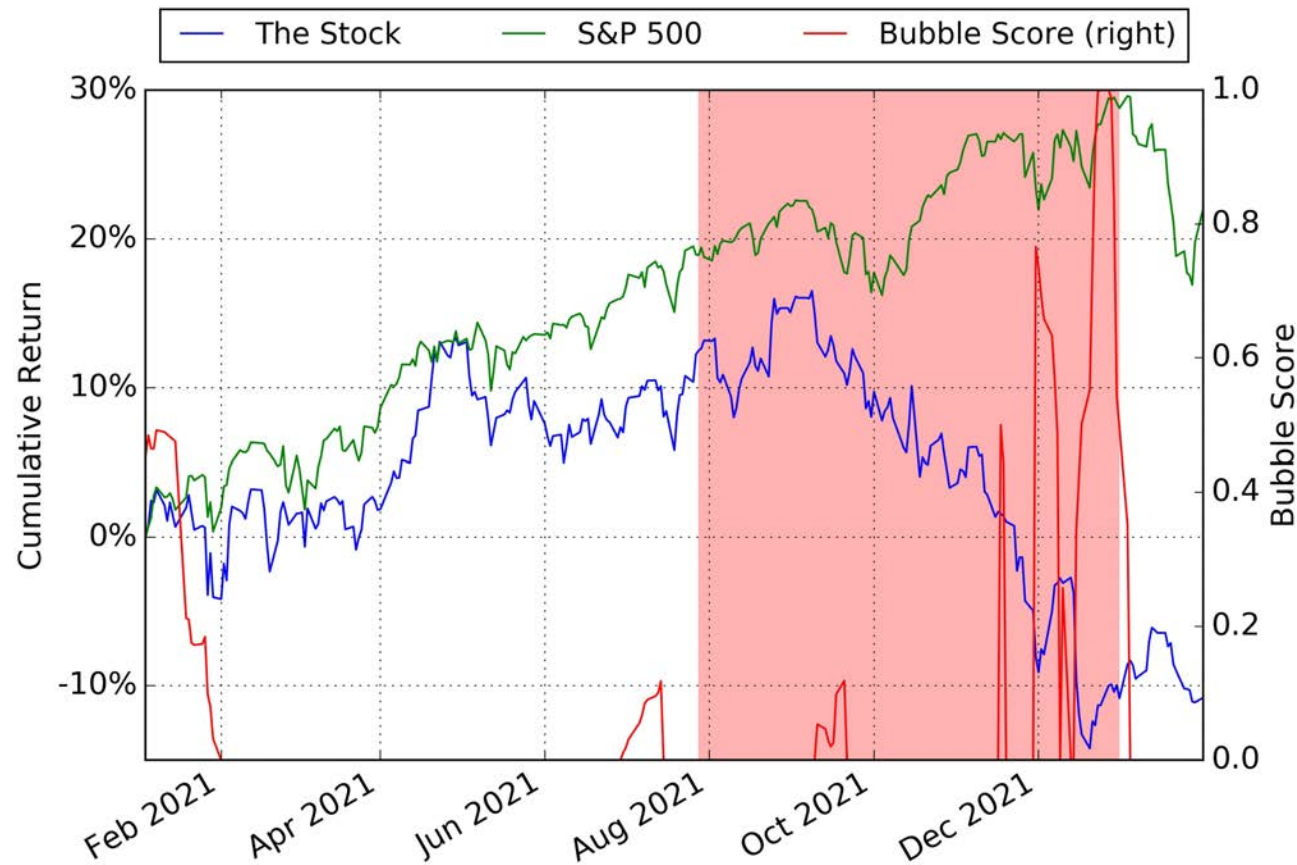
▸ The figure above plots the one-year cumulative return of the stock (blue), S&P 500 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period delineates the time interval within which the strong negative bubble was identified and reported last month. The stock price has started a rebound in the past month with the disappearance of the bubble signal, marking the end of the previous negative bubble regime.
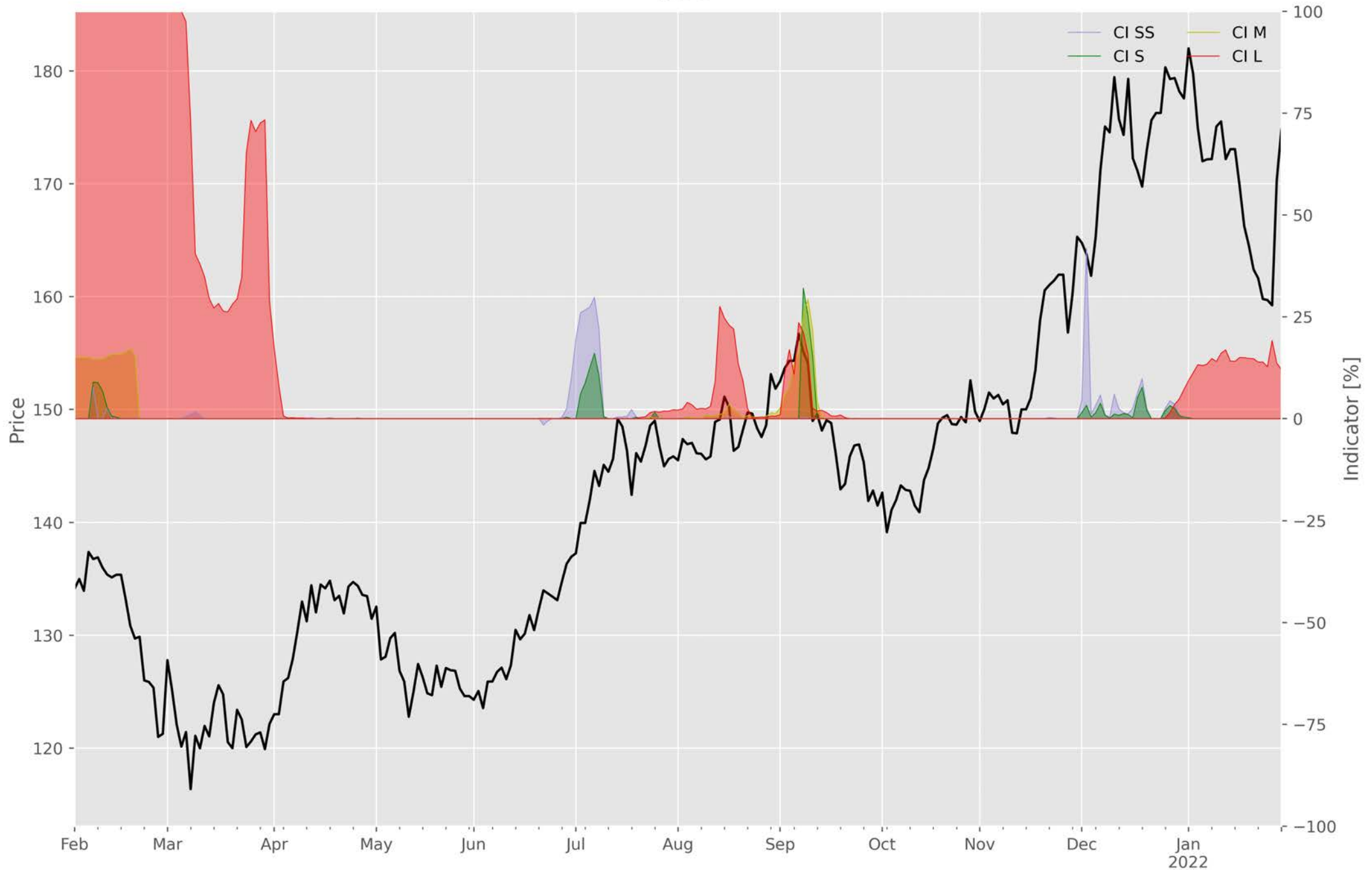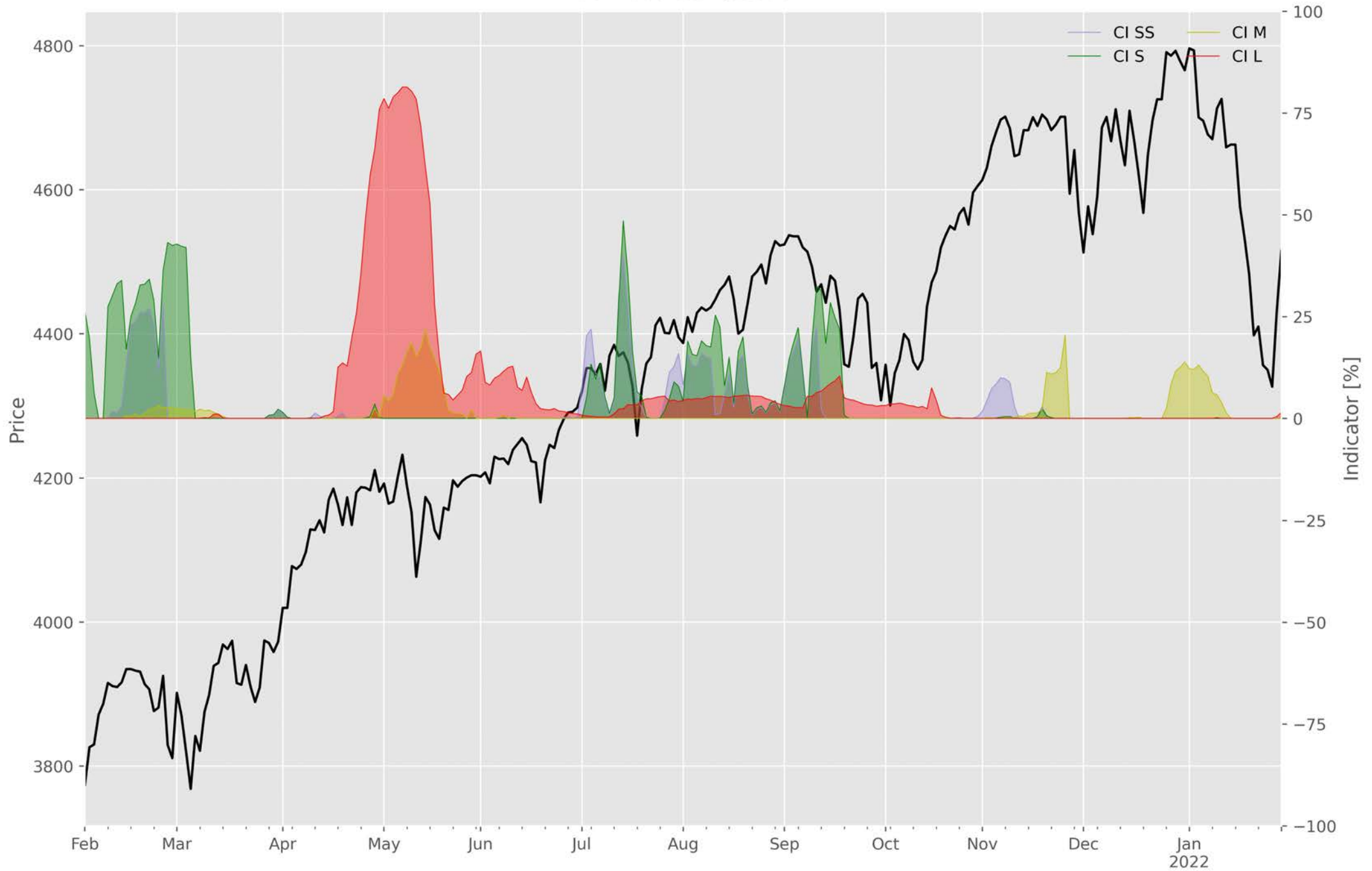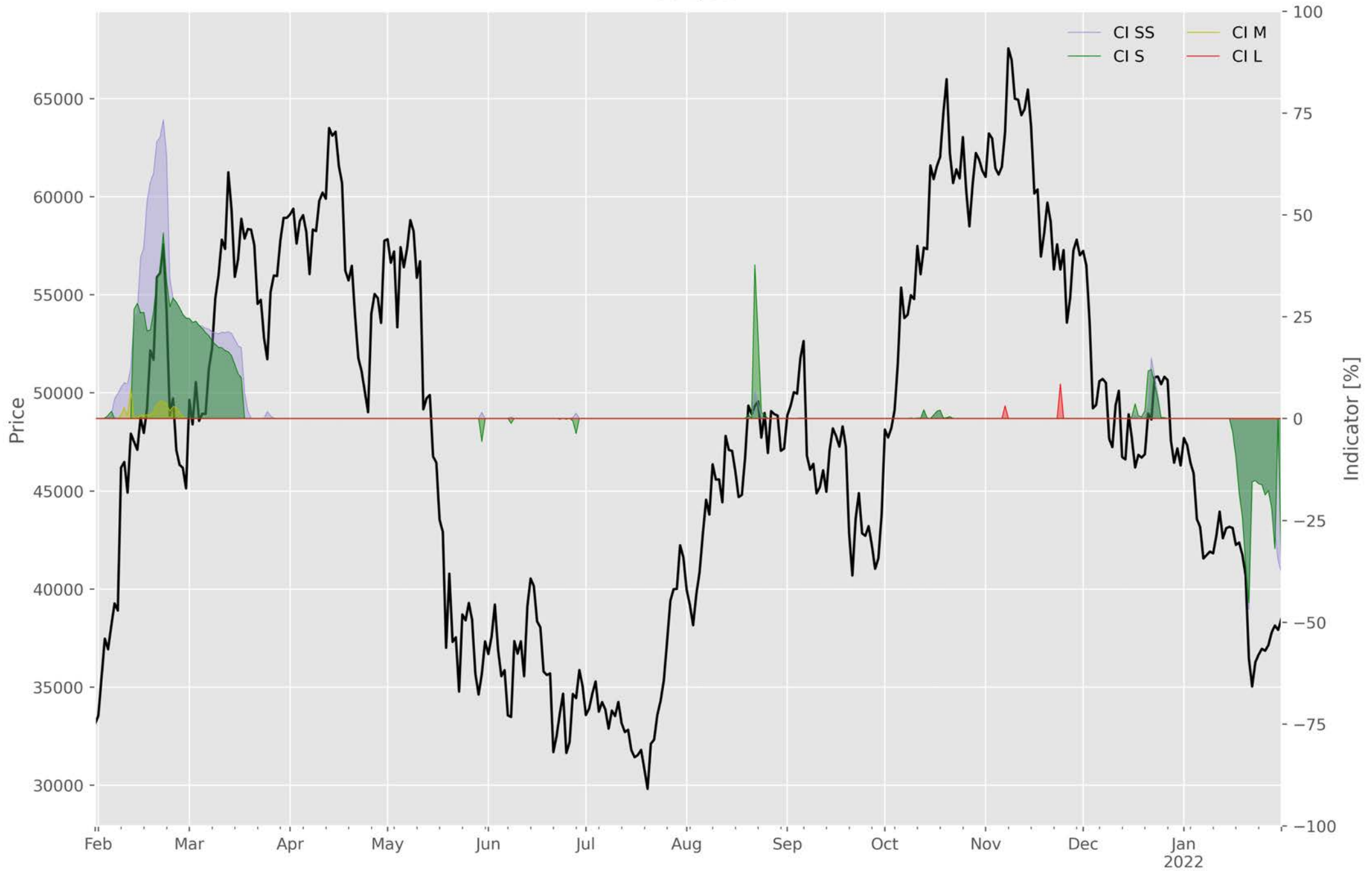
Appendix

Amazon.Com

The FCO Cockpit - Global Bubble Status Report

Microsoft
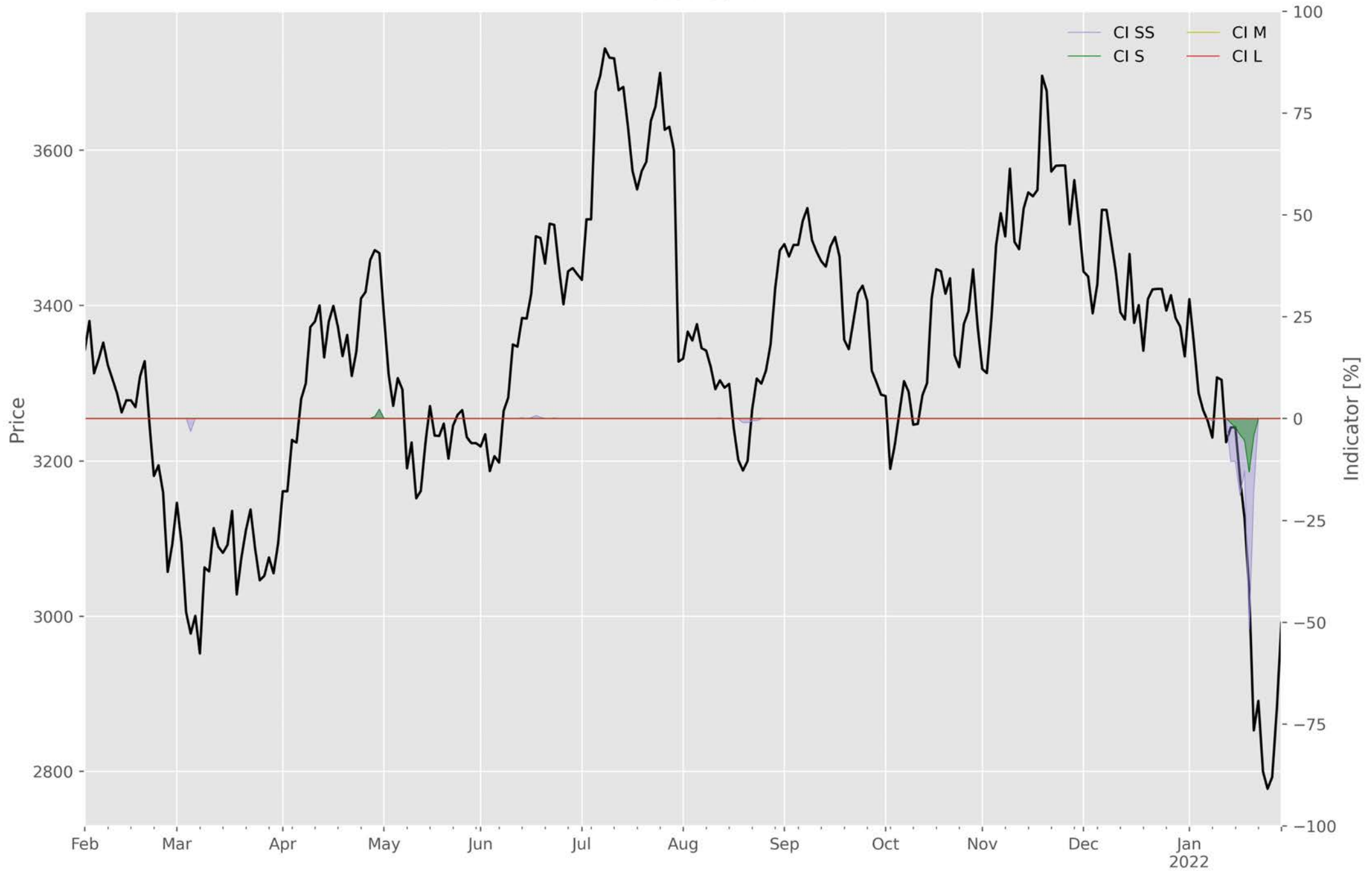
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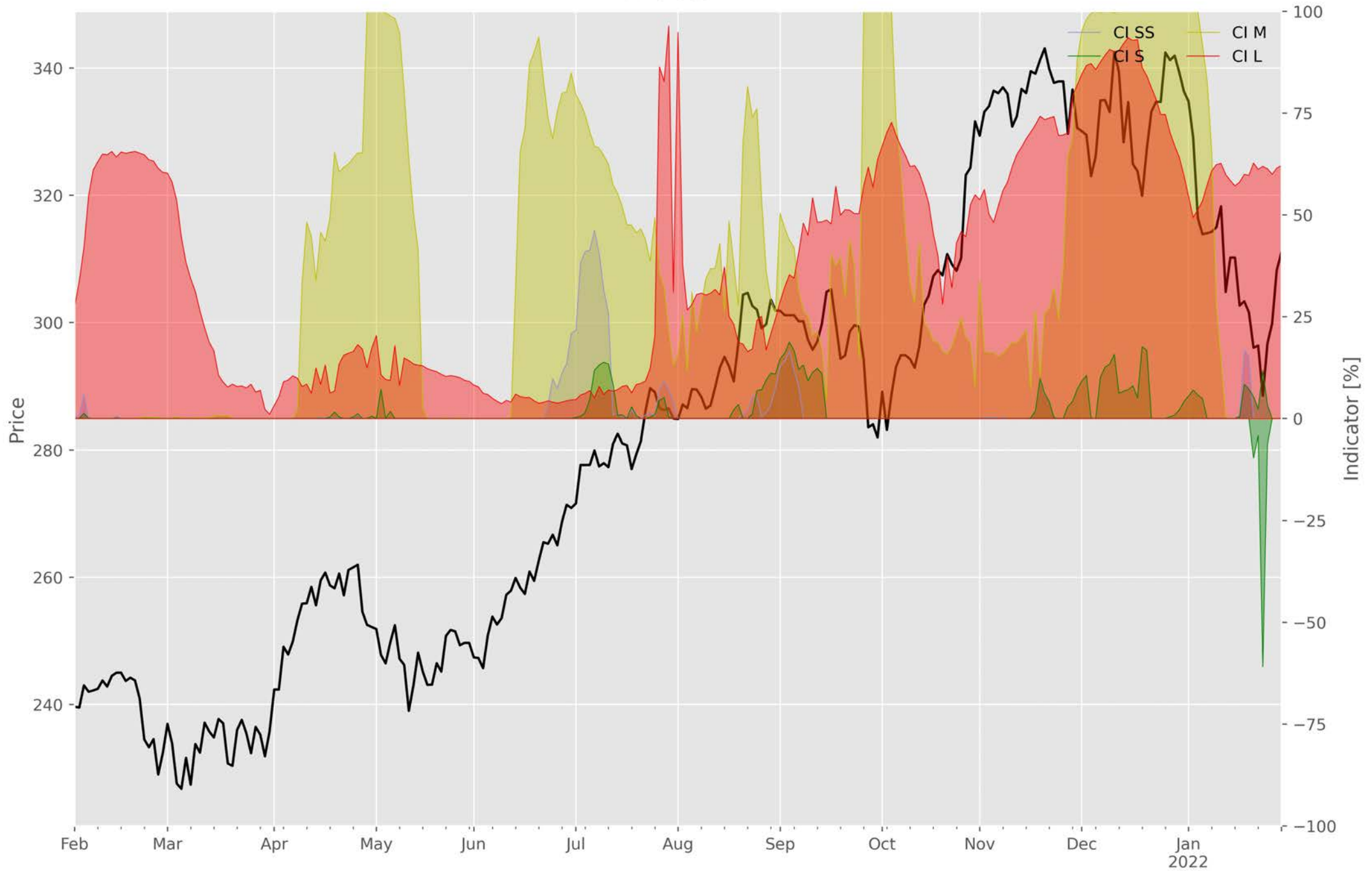
Tesla

Apple

S&P 500 Composite

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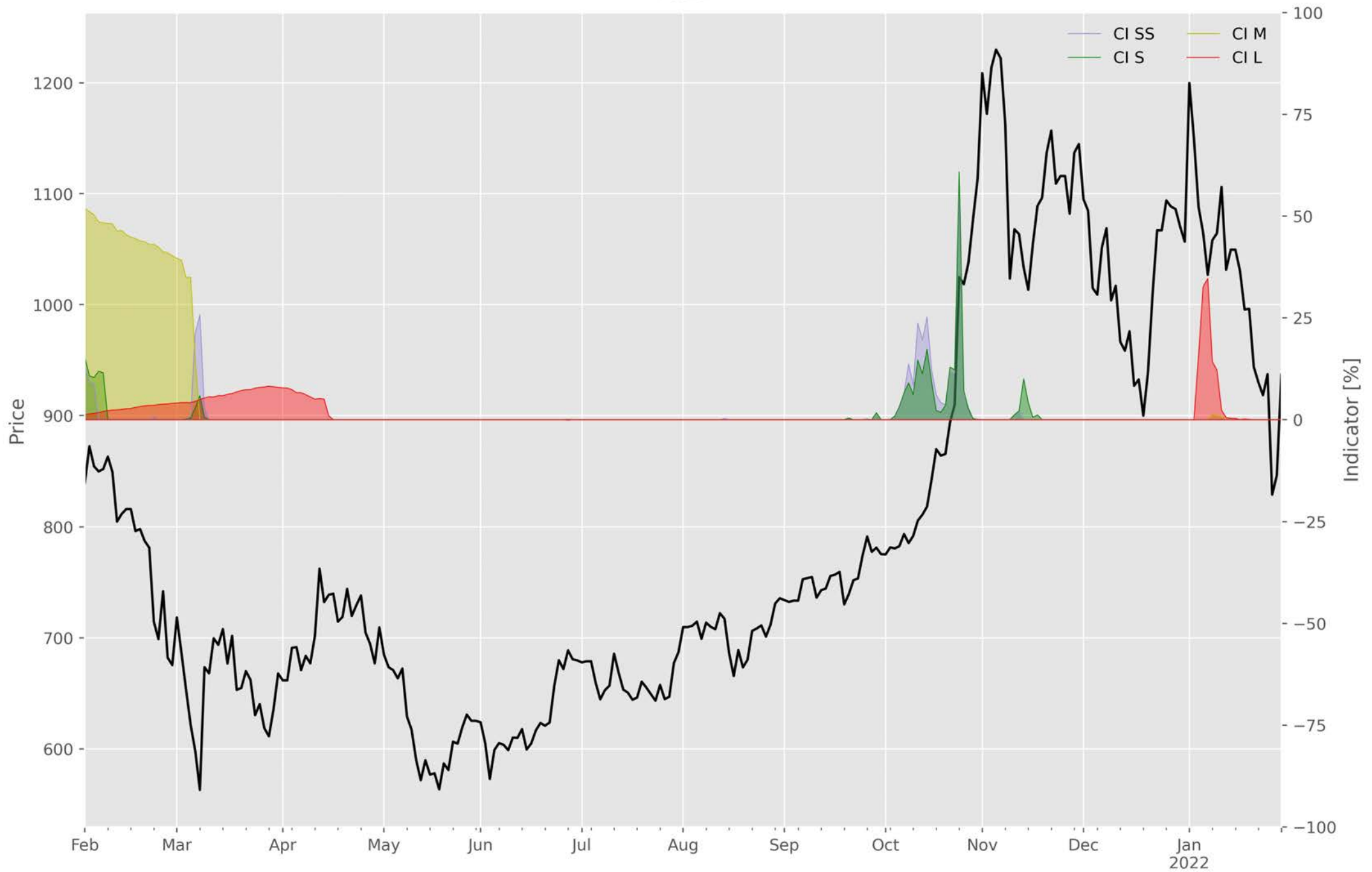
Bitcoin/USD

More Information

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

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

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