



The FCO Cockpit Global Bubble Status Report March 2022



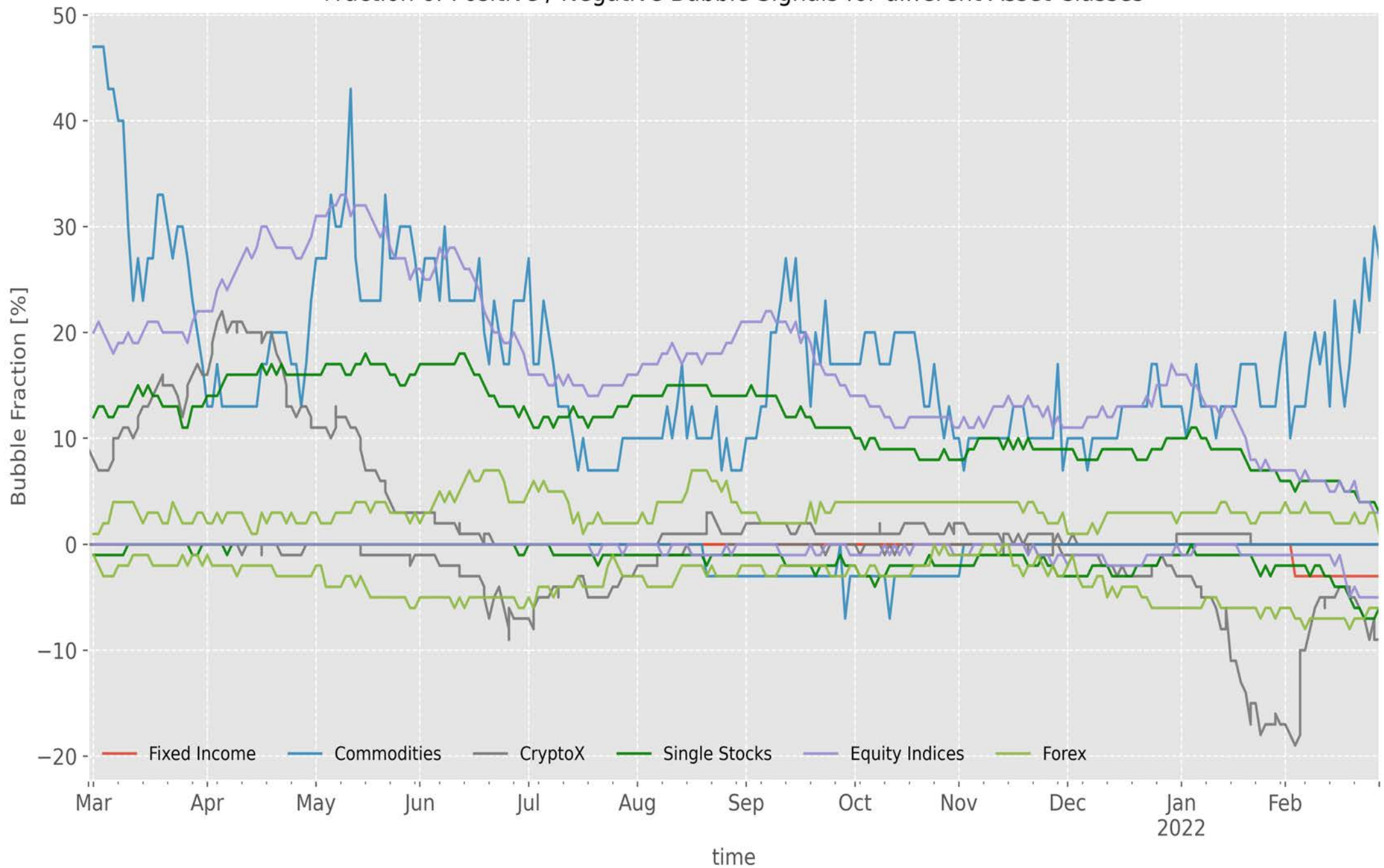
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Purpose and Benefits

- ▶ 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



General Results as of 2022-02-28

	Region	Analyzed Assets	Fraction of Pos. Bubbles [%]	Fraction of Neg. Bubbles [%]
Fixed Income		33	0	3
Commodities		30	27	0
Single Stocks		1606	3	6
	Europe	936	3	7
	United States	657	4	5
Equity Indices		857	3	5
	Europe	52	2	2
	United States	376	4	5
	Global	383	3	6
Forex		99	1	6
CryptoX		458	0	9

- ▶ In the fixed income sector, a negative bubble signal has emerged at 3% for the first time over the past twelve months.
- ▶ In the commodities sector, a substantial increase is observed from 17% to 27% in the positive bubble signal.
- ▶ In both the single stocks and equity indices sectors, the negative bubble fraction has gone up by 4 percent, but remains quite low along with the positive bubble signal.
- ▶ In the Forex sector, the positive bubble signal has experienced a slight drop of 3 percent to 1%, while the negative bubble remains unchanged at 6%.
- ▶ In the CryptoX sector, no positive bubble activity is observed as in previous months, yet a notable drop from 17% to 9% is seen in the negative bubble signal.

FCO Market Outlook

Russia-Ukraine War

Within one week, the Russia-Ukraine Crisis escalated into a war, which resulted in considerable destruction on the battlefields in Ukraine and heavy worldwide sanctions on Russia's economy. The possibility of WWII is increasing. The deletion of the Russia from SWIFT by the U.S. (excluding the Russian energy sector) is equal to a financial nuclear bomb to Russia since it directly kicks Russia (partly) out of the international trade and investment network. The sanctions lead to around 30% devaluation (and still increasing) of the Ruble (one Ruble is worth less than one U.S. cent), and Russia stock market crashed. Although the Russian Central Bank is raising the interest rate to 20% and implementing a massive buy-back plan to support the financial securities, we can say that Russia will have a technical default on its international debt, again. Even though Russia might win the war, it has already lost the media propaganda war with Ukraine and the economic war with the West.

Attempt to identify the roots of the war and their consequences

In our analysis, Russia has been pushed in a corner, with no ways to escape but to fight or accept the inescapable decay of Russia and the unsustainability of the present Putin regime.. Of course, this is because of the autocratic nature of the Russian government that refused to join the club of western "democratic" countries. The thinking of the European West, namely cornering Russia, was to naively hope that there would be a regime change in Russia. This is a possible political calculation and it is of course in a different dimension compared with the perception of Russia and Putin, who come from the historical perspective of "great Russia" and the 30 years of humiliation since 1990. This leads to a serious concern with the possibility, now at 10-20% in our estimation, that the West is pushing Putin and Russia in a nuclear war. It is not likely that Putin will back off and there is the need for an exit solution that is not an escalation.

Let us offer the following thoughts and hypothesis on how to interpret the present conflict from a large scale historical perspective.

The US and Europe were facing extraordinary challenges before the Ukraine-Russia war, which would have emerged with very serious consequences. These challenges come from the cumulative effect and (mis-)managements of the 2008 great financial crisis, the European great euro crises in 2010 and 2012 followed by extraordinary QEs and sky rocketing debts. This led to a first impoverishment of the 90% bottom of the population in rich Western countries.. Then came Covid-19, with even more debt and its extremely bad management in Western countries at the source (in addition to the US-China stand-off) of the emergence of inflation that is going to grow and impoverish even more and over the next decade the 90% bottom of the Western population (not speaking of the rest of the world apart China).

How would politicians get out of this mess? If this situation would be let to evolve by itself, the pain on the major part of the population is likely to lead to social unrest and even regime changes in Europe and in the US. As showed by numerous examples in the history, in order to solve the coming social crises, politicians may tend to take advantage of the situation to divert the attention of populations on the responsibilities and errors of dismal management. This is usually done via finding an external scapegoat for diversion, such as promoting their extreme agenda or escalating conflicts. We fear that this might be one reason for which Russia has been cornered by the West and was stupid enough to perform this absolutely unacceptable criminal act of invading Ukraine. There are no words strong enough to characterise the totally unacceptable invasion and consequent human suffering. However, things are never black and white and history has to be understood in a broad context with developments resulting from decades of complex socio-politico-economics processes. And our short account is necessary a cartoon of a very complex reality.

In terms of economic consequences of this war, we hypothesise that US might be a significant winner. The EU is going to pay several times the price of gas from the US compared with Russia. The demand will resurrect the boom on shale gas in the US that peaked in 2019, which created 3 millions jobs in the US and boosted its economy after the 2008 great financial crisis. Moreover, the US military-industrial complex is by far the largest in the world and this economic sector is going to boom for the next decade(s) with the likely rearmament of Germany, Japan and others. Japan and Germany are the number 3 and 4 largest economies in the world and have great buying power to rebuild their military arsenals given the increased safety concerns in Europe. Thus it might be the EU and Japan that are going to pay the bills with a very sad impoverishment and suffering from the major part of the EU population. The consequences of accelerated deglobalization and sanctions will be unfortunately even stronger on many developing countries that depends on food imports to feed their population.

There are other, perhaps secondary, but still important considerations about the Ukraine-Russia war. Very important gas reserves have been found along the southern coast of Ukraine, which may potentially threaten (with the help of the West) the gas supremacy of Russia. Moreover, Crimea is starving from lack of water, as Ukraine has closed after 2014 the water life source from the Dnieper river. These two “economic” drivers may also explain the annexation of Crimea and the need for and extended control of Ukraine by Russia. Moreover, Nickel and other key minerals have been found in the Donbass region and the central part of Ukraine, which could make Ukraine (with the help of the Western technology and investment) one of the major producers of these minerals so important for the energy transition.

These remarks do not justify in any way the terrible aggression of Russia, which is absolutely unacceptable. This war is a major mistake from Putin and for Russia and the rest of the world. There were other ways. But it is important to understand possible economic drivers. In the end, most wars are done for economic and energy reasons.

Deglobalization

A need-hate cycle exists in the world: when countries need each other more than they can endure the conflicts, the globalization trend begins. On the contrary, when conflict levels are above a threshold, countries hate each other more than they want to cooperate, deglobalization ensues. The world has experienced globalization for several decades, even though some regional conflicts occurred from time to time. Generally speaking, most of the counties in the world agree that they need each other in the supply-chain specialization and cooperation, new customer/market acquisitions, and intellectual knowledge sharing for the past few decades.

However, one can notice many worrisome signs of deglobalization in the past few years: Brexit in 2016, the U.S.-China trade war since 2018, the territorial disputes in the South China Sea, the deterioration of the middle east and north Africa (MENA) economics, the global supply-chain crisis due to the pandemic since 2020, the West-Russia economic decoupling due to the Russia-Ukraine war, etc. International cooperation is becoming more and more unstable, and some countries have more Asian hate, Black-white conflict, potential Anti-Russia hate, etc. In addition, the income inequality between the poor and the rich creates social instability, and politicians in many countries try to transform internal anger into external hatred toward foreign countries and it generally works. Deglobalization is just at its beginning, and economic segregation will become more prominent.

Fix income: The U.S. yield curve flattens (10-year and 2-year spread drop to below 40 bases points, a new low since March 2020) due to the Russia-Ukraine war, since the war results in a global surge of energy prices. We notice the 10-year yield of western countries drop as institutions expect that worldwide inflation risk will last much longer than previously thought, and Europe and U.S. post-pandemic recoveries will be delayed. It is still difficult to evaluate whether the economic shock will lead to other economic catastrophes or not, but the Fed still has to increase the interest rate if it wants to fight soaring inflation.

U.S. Equity: The U.S. stock markets generally remain stable. The price of ZOOM had dropped back to the pre-pandemic level as its revenue growth slowed. We expect the same thing will happen to other companies that benefited from the COVID-19. Moreover, the SEC is investigating the short sellers in the U.S. market, urging them to provide monthly data for their short selling positons.

Developed Markets: The European markets suffered losses due to their strong economic tie with Russia (energy supply and economic uncertainty). Only one sector performed well, the military industry unsurprisingly. In addition, household spending in European countries will be squeezed further as their utility costs soar.

Emerging Markets: The Russia CDS spread keeps surging, showing around 56% likelihood of default. China is the largest trading partner of Russia and Ukraine; thus, the Russia-Ukraine war directly impacts China's upper supply chain. In addition, the MENA countries have and will suffer from high agriculture commodity prices, tourism industry shrinkage, and energy shortage, already from last year. And the spillover effect of the war might make it even worse as many MENA countries mainly depend on Russia and Ukraine for food and energy imports.

Commodities: Russia and Ukraine combined to supply 29% of global wheat exports, 14% of global barley export, 76% of sunflower oil; Russia and Belarus also supply 20% of global potash fertilizer; Russia accounts for 11.3% of oil and 16.5% of natural gas global supply, and EU imports 46.7% of coal, 41.1% of natural gas, 26.9% of oil from Russia; As for the base metals, Russia provides 5.6% global Aluminum supply, 9.3% of nickel, 4.2% of copper.

How the Ruble's Value Has Changed

20 rubles per U.S. dollar



Note: Scale is inverted to show the decline in the ruble's value. Price as of 5:00 p.m. Eastern. • Source: FactSet • By The New York Times

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 t_1 is $bs = \frac{p_t}{p_1} - 1$ and the bubble duration is $bd = t - t_1$
- ▶ By estimation of the start time t_1 and the predicted end time t_c 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.

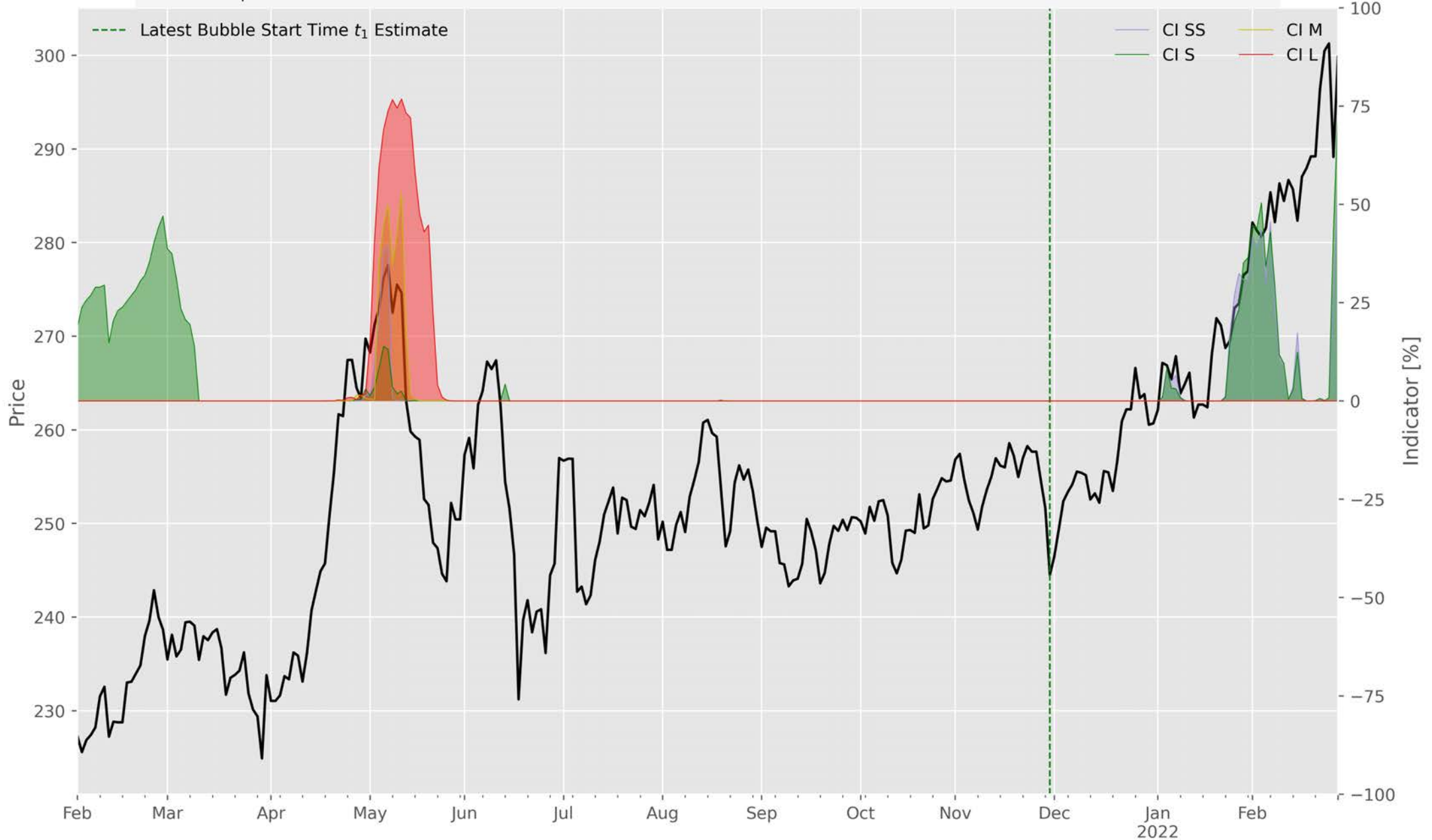
Fixed Income

No bubbles to report

Commodities

Mlcx Biofuels Exchange Spot

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
1	Super Short	55	22.65	120.66	65	92.94	85.12	2022-03-05	99.98



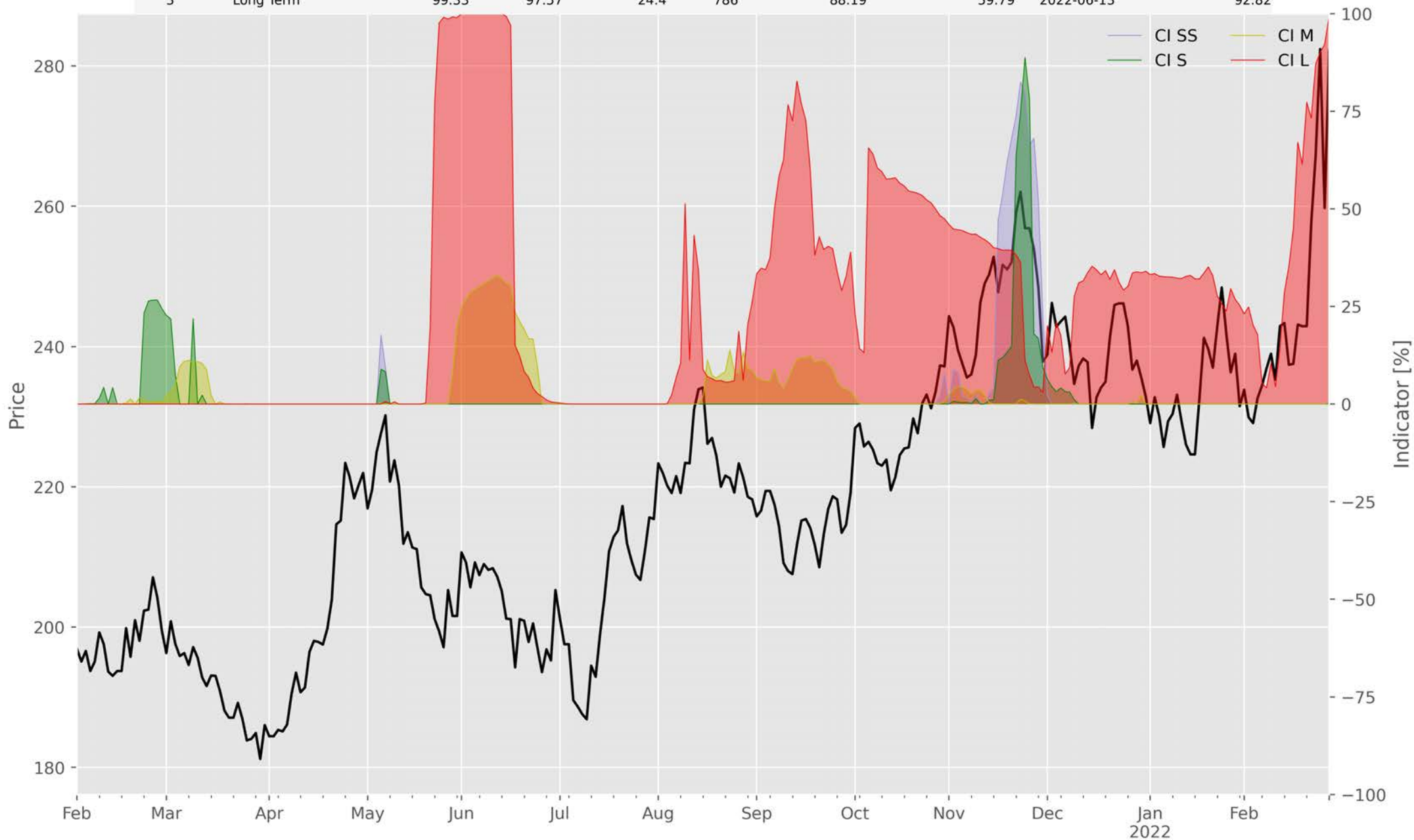
Mlcx Soybean Spot Index

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci, bg, bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
2	Super Short	27.22	33.52	140.55	83	84.83	68.72	2022-03-15	99.98



Mlcx Wheat Spot Index

Rank	Strongest Signal	DS-LPPLS Confidence	Bubble Size	Bubble CAGR	Duration	Bubble Progress	Geometric Average	Critical Time	Scenario Probability
		ci [%]	bs [%]	bg [%]	[days]	bp [%]	(ci, bg, bp)	\tilde{t}_c	[%]
3	Long Term	99.33	97.57	24.4	786	88.19	59.79	2022-06-13	92.82



Single Stocks

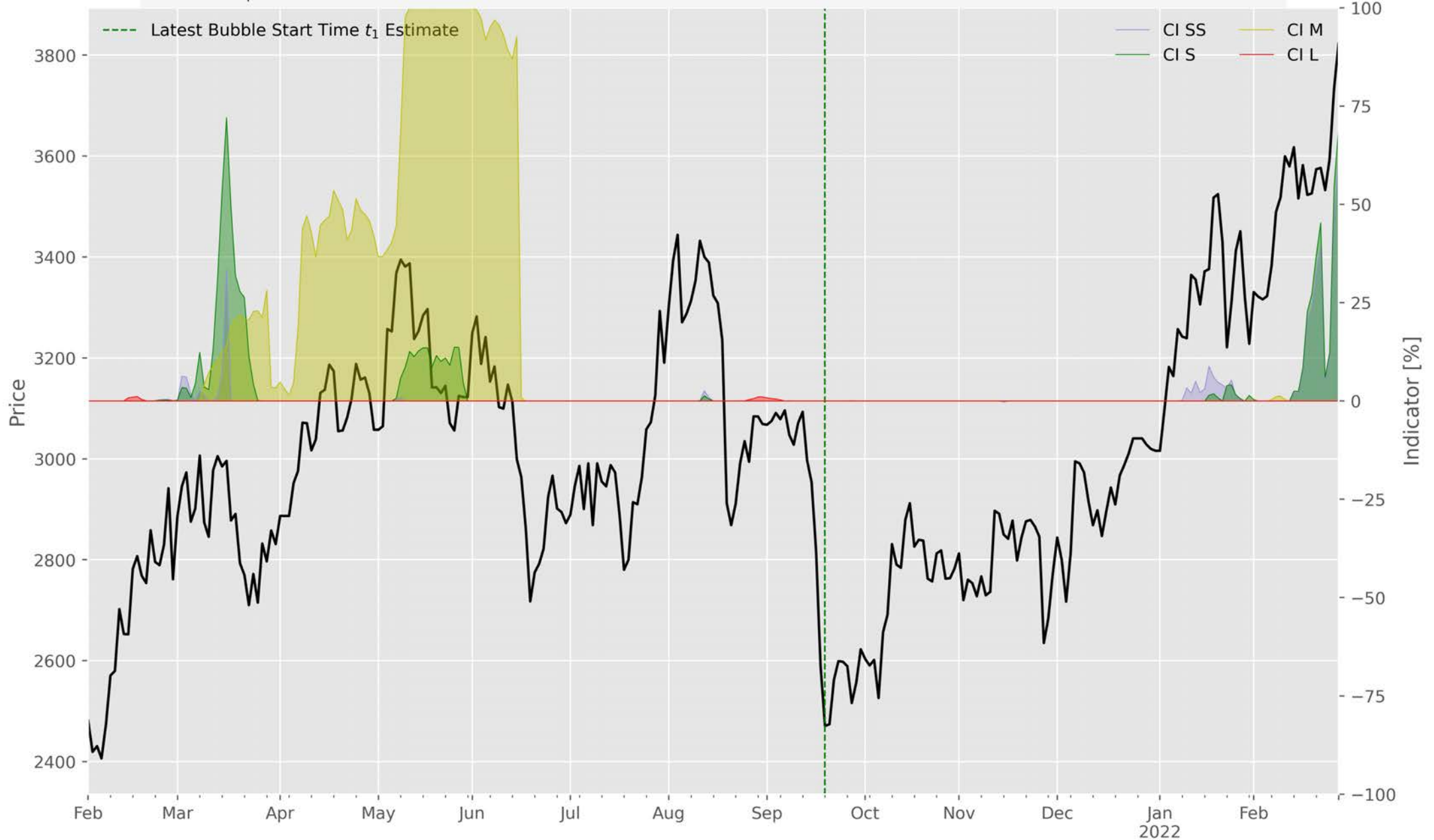
Eramet

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
1	Super Short	60.53	73.02	686.2	67	84.57	152.01	2022-03-12	66.97



Anglo American

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	Super Short	61.03	54.75	158.19	116	100	98.84	2022-02-28	99.99



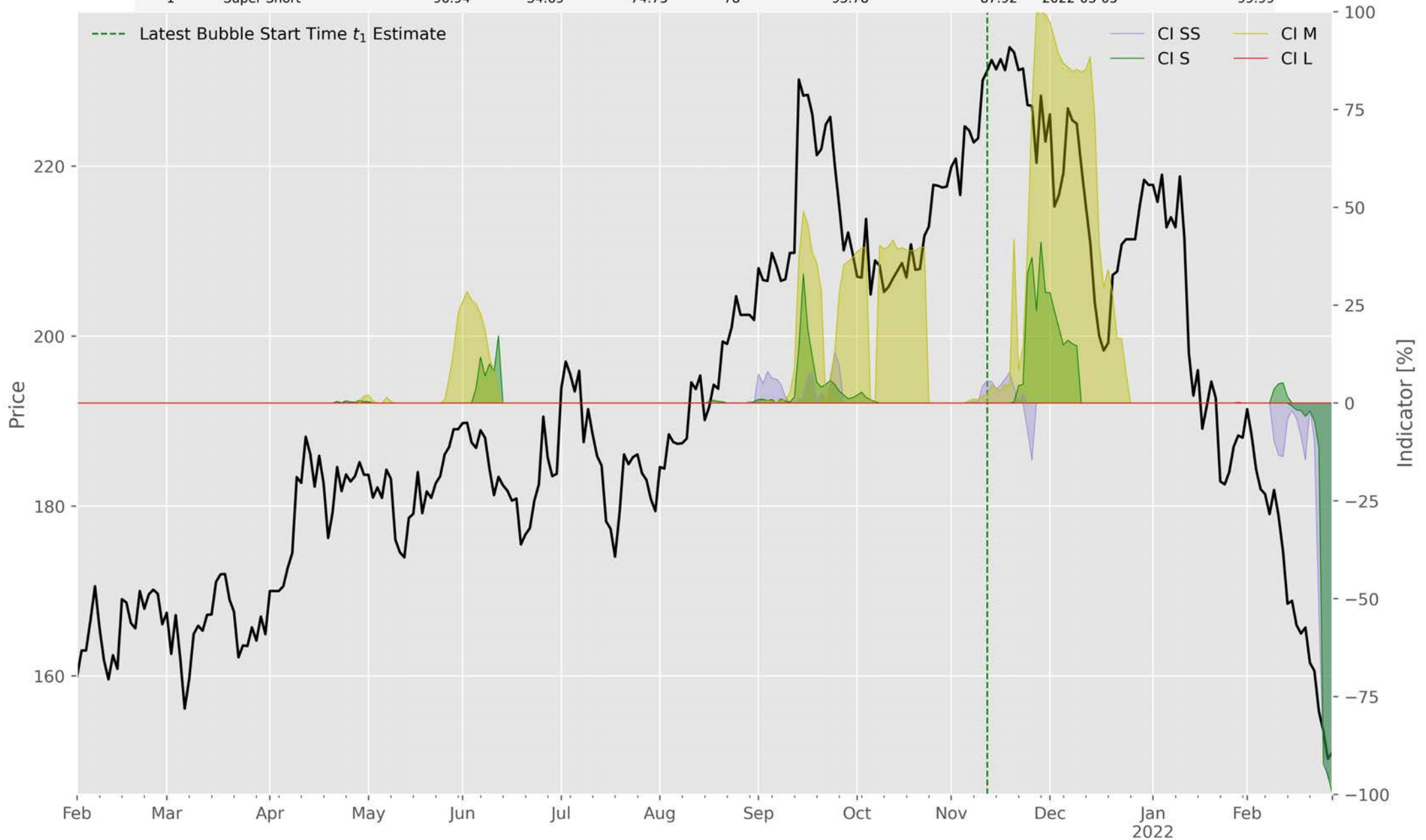
Dassault Aviation

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci, bg, bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
3	Super Short	40.15	46.78	176.74	95	92.67	86.96	2022-03-08	99.99



Jd Sports Fashion

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
1	Super Short	96.94	-34.69	-74.75	78	93.78	87.92	2022-03-05	99.99



Capita

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
2	Super Short	60.35	-43.74	-71.96	114	86.91	72.27	2022-03-17	93.81



Adevinta

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
3	Super Short	55.88	-45.03	-69.79	126	86.54	69.62	2022-03-20	70.56



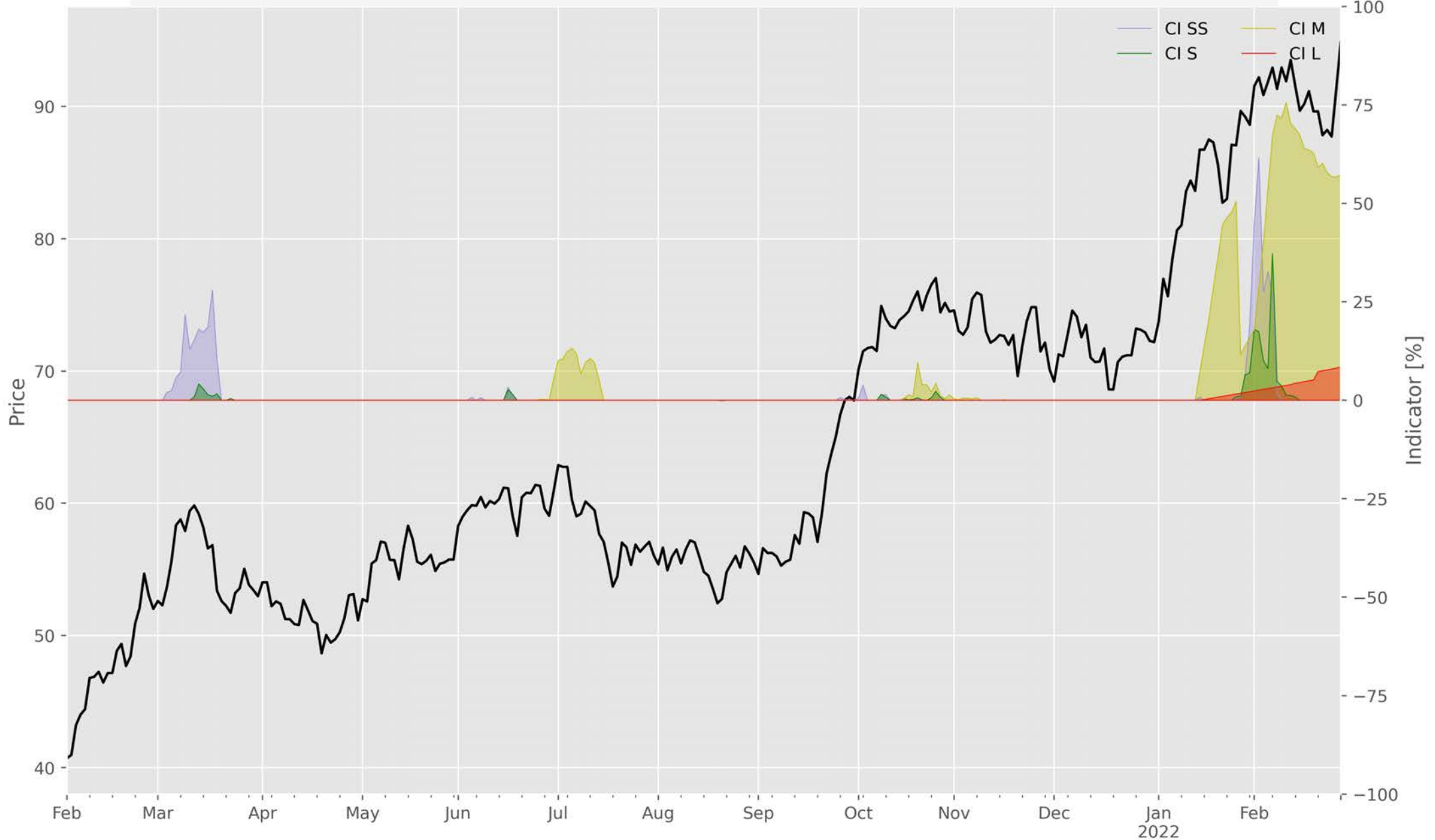
Allegheny Techs.

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 [%]
1	Super Short	40.27	77.39	792.28	66	66.83	128.71	2022-04-02	52.71



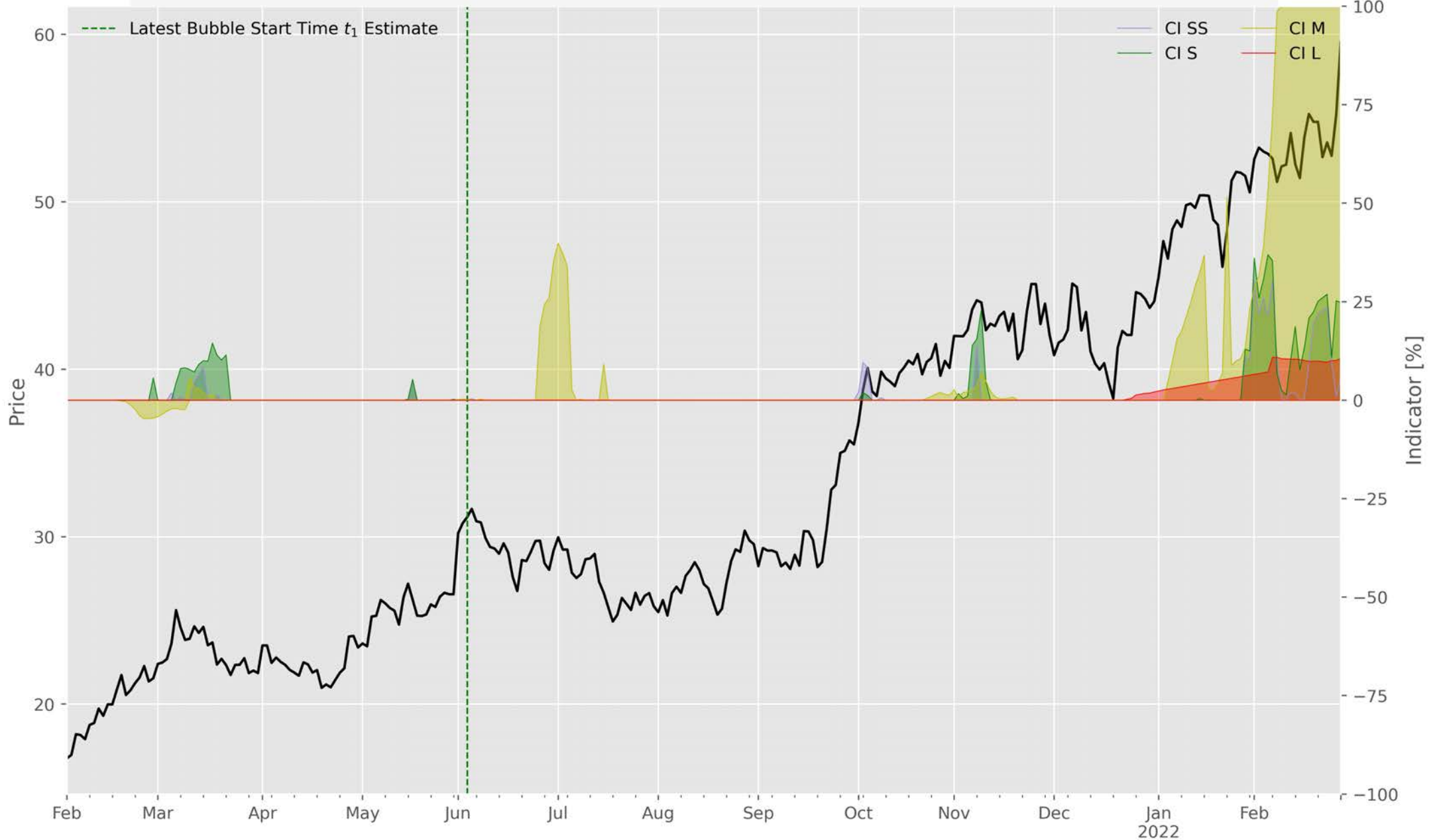
Conocophillips

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
2	Medium Term	57.26	144.17	95.72	335	87.74	78.35	2022-04-16	98.66



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	Short Term	24.74	91.05	132.86	193	97.01	68.32	2022-03-06	99.99



Qurate Retail Series A

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \hat{t}_c	Scenario Probability [%]
1	Short Term	42.39	-51.64	-51.64	252	94.44	59.13	2022-03-15	84.89



Leggett&Platt

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	40.29	-33.75	-38.42	214	95.85	52.94	2022-03-09	99.98



Ebay

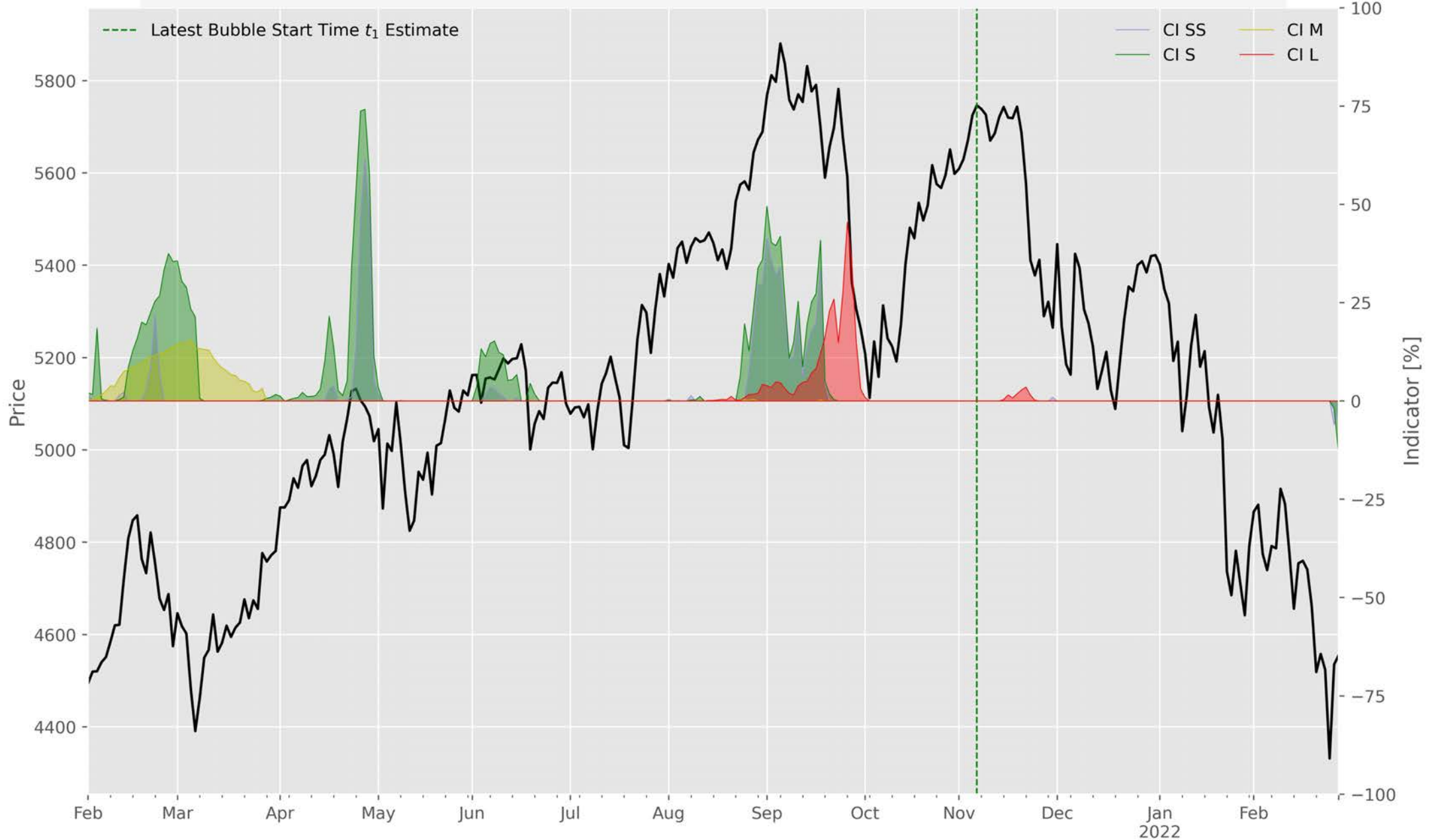
Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
3	Super Short	31.03	-28.85	-62.68	87	75.42	52.74	2022-03-28	98.75



Equity Indices

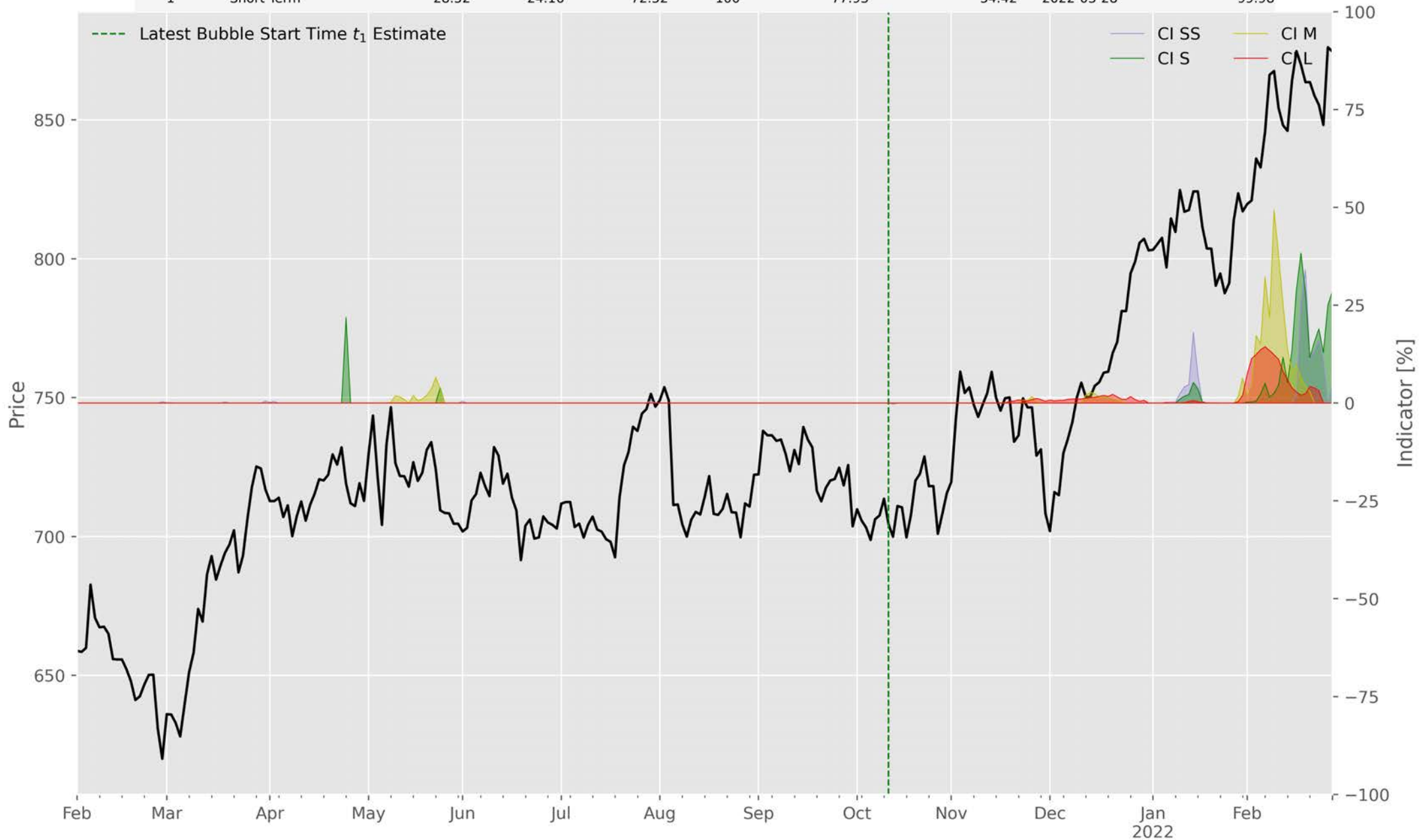
Msci Netherlands U\$

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
1	Short Term	13.26	-20.74	-51.05	82	85.45	38.67	2022-03-14	87.75



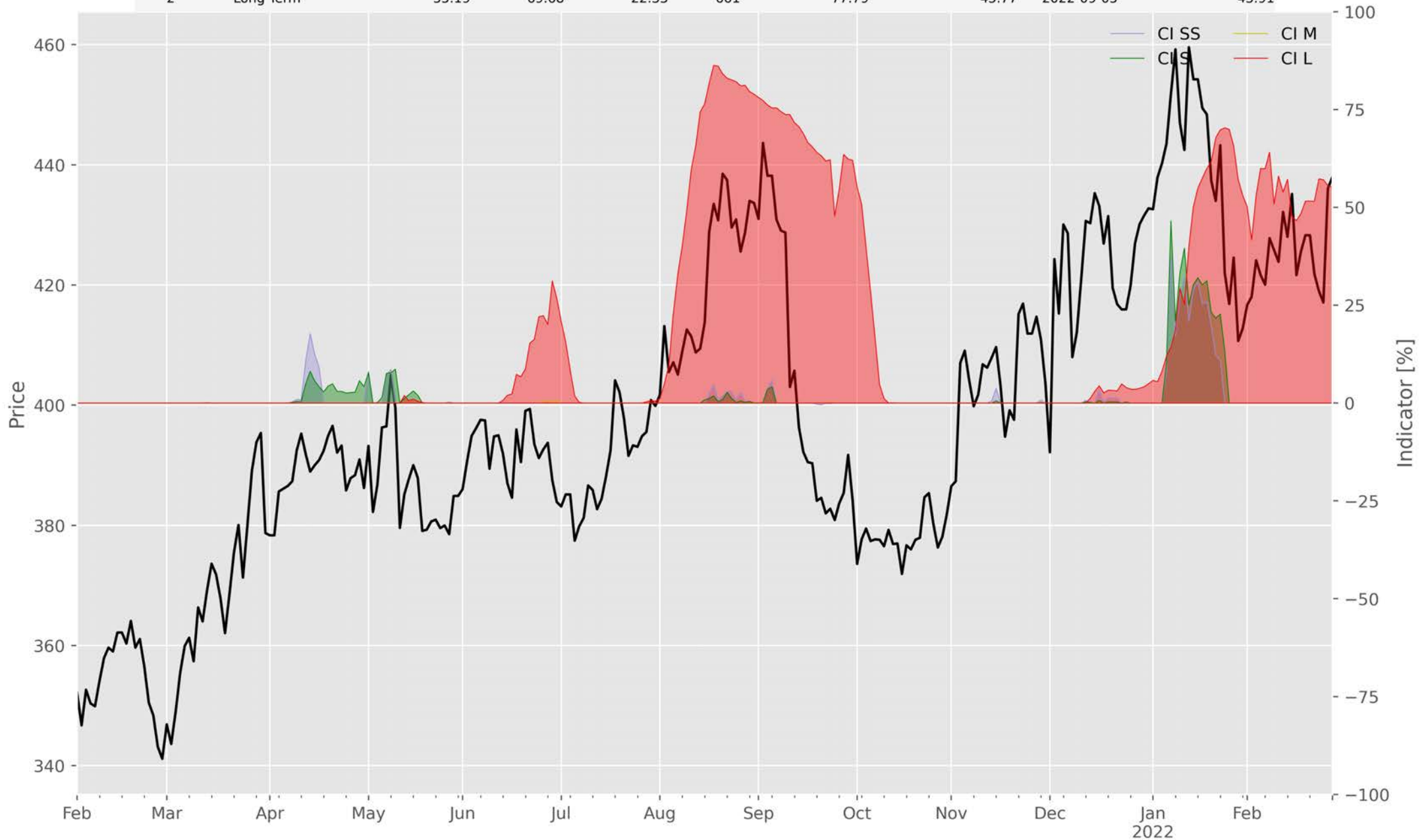
S&P500 H/Care Dist

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci, bg, bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
1	Short Term	28.52	24.16	72.52	100	77.93	54.42	2022-03-28	99.98



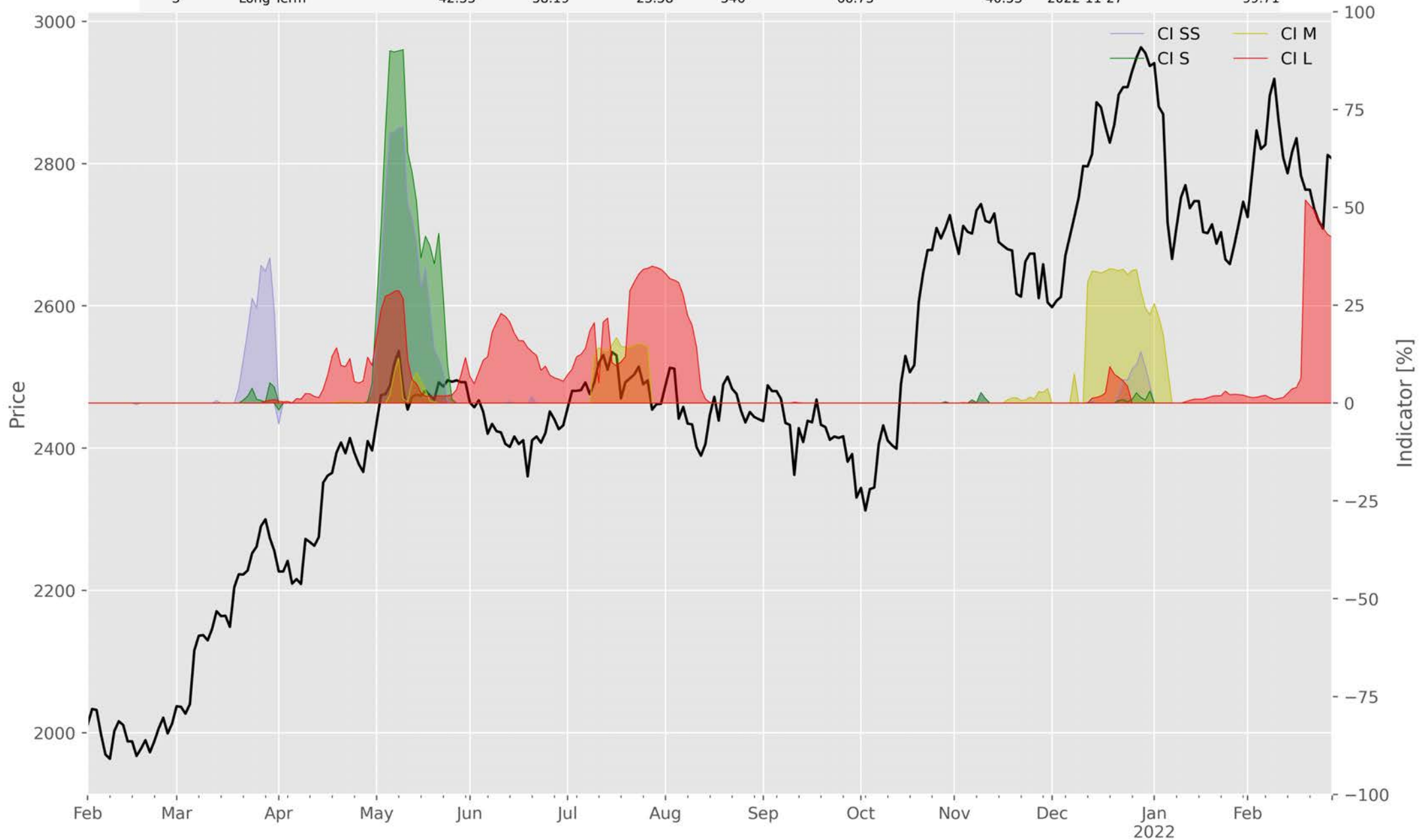
S&P1500 Food Retail

Rank	Strongest Signal	DS-LPPLS Confidence	Bubble Size	Bubble CAGR	Duration	Bubble Progress	Geometric Average	Critical Time	Scenario Probability
		ci [%]	bs [%]	bg [%]	[days]	bp [%]	(ci, bg, bp)	\tilde{t}_c	[%]
2	Long Term	55.19	69.68	22.33	661	77.79	45.77	2022-09-05	43.91



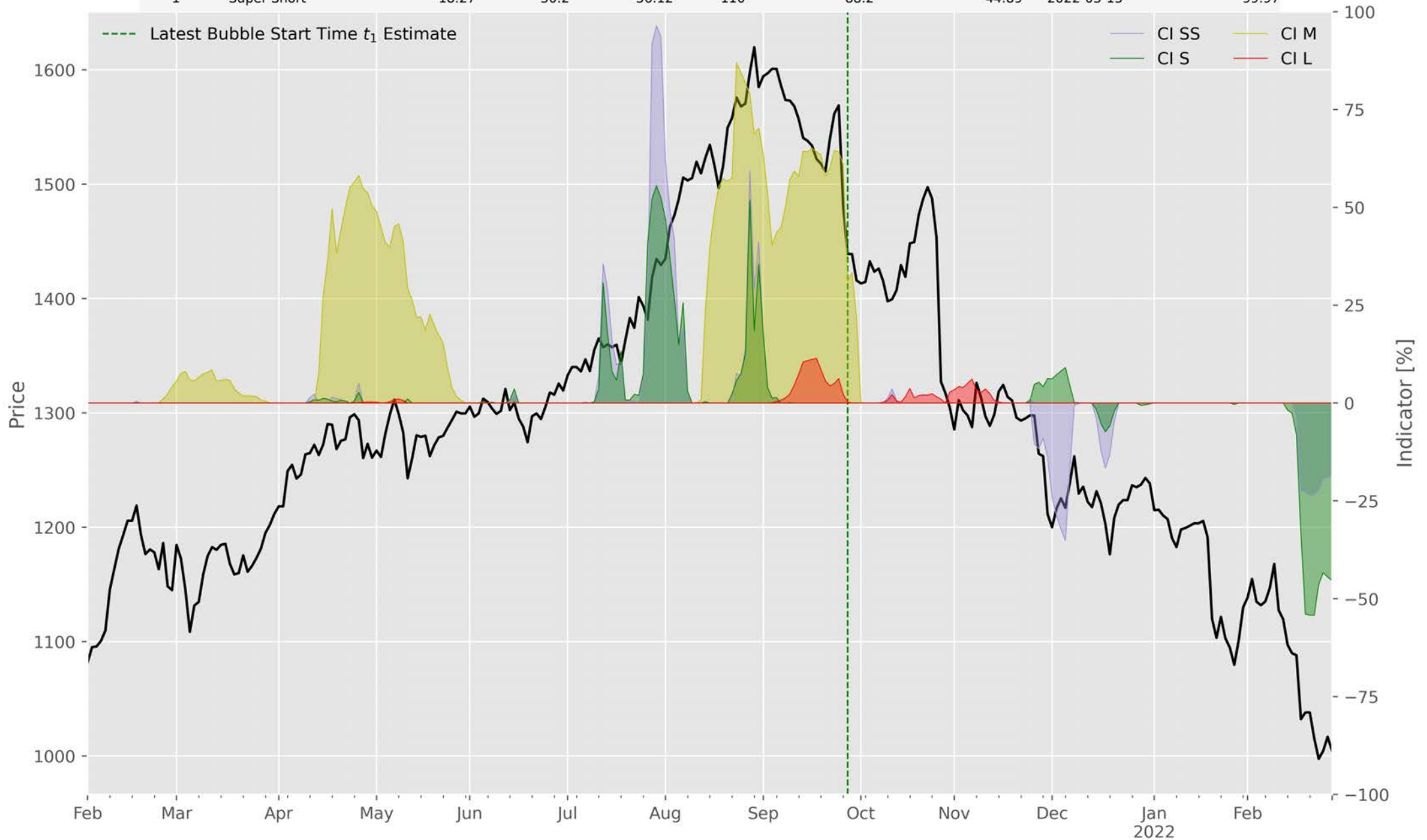
S&P1500 Managed Health Care

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
3	Long Term	42.33	58.19	23.58	546	66.73	40.53	2022-11-27	99.71



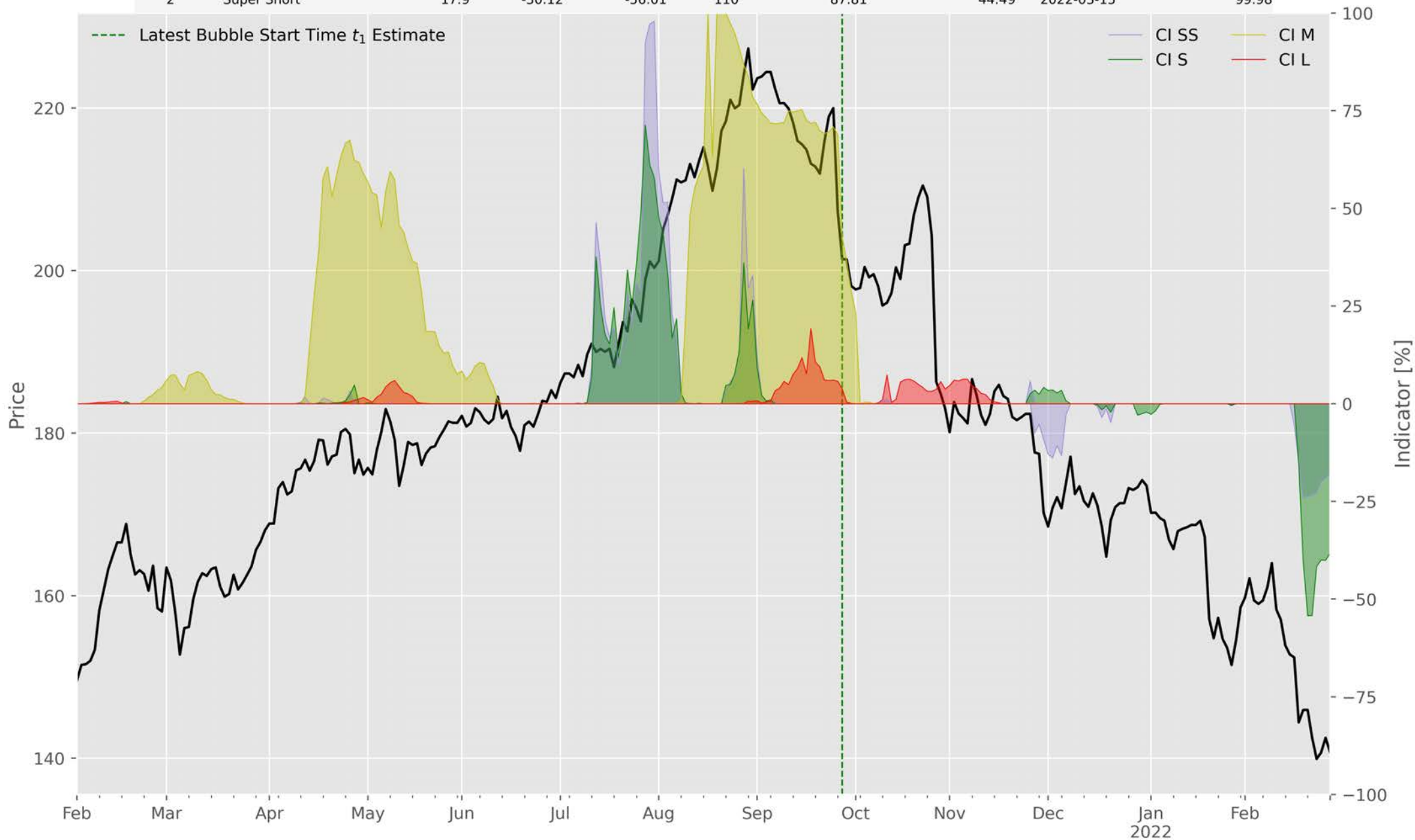
S&P1500 Consumer Electronics

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 [%]
1	Super Short	18.27	-30.2	-56.12	110	88.2	44.89	2022-03-15	99.97



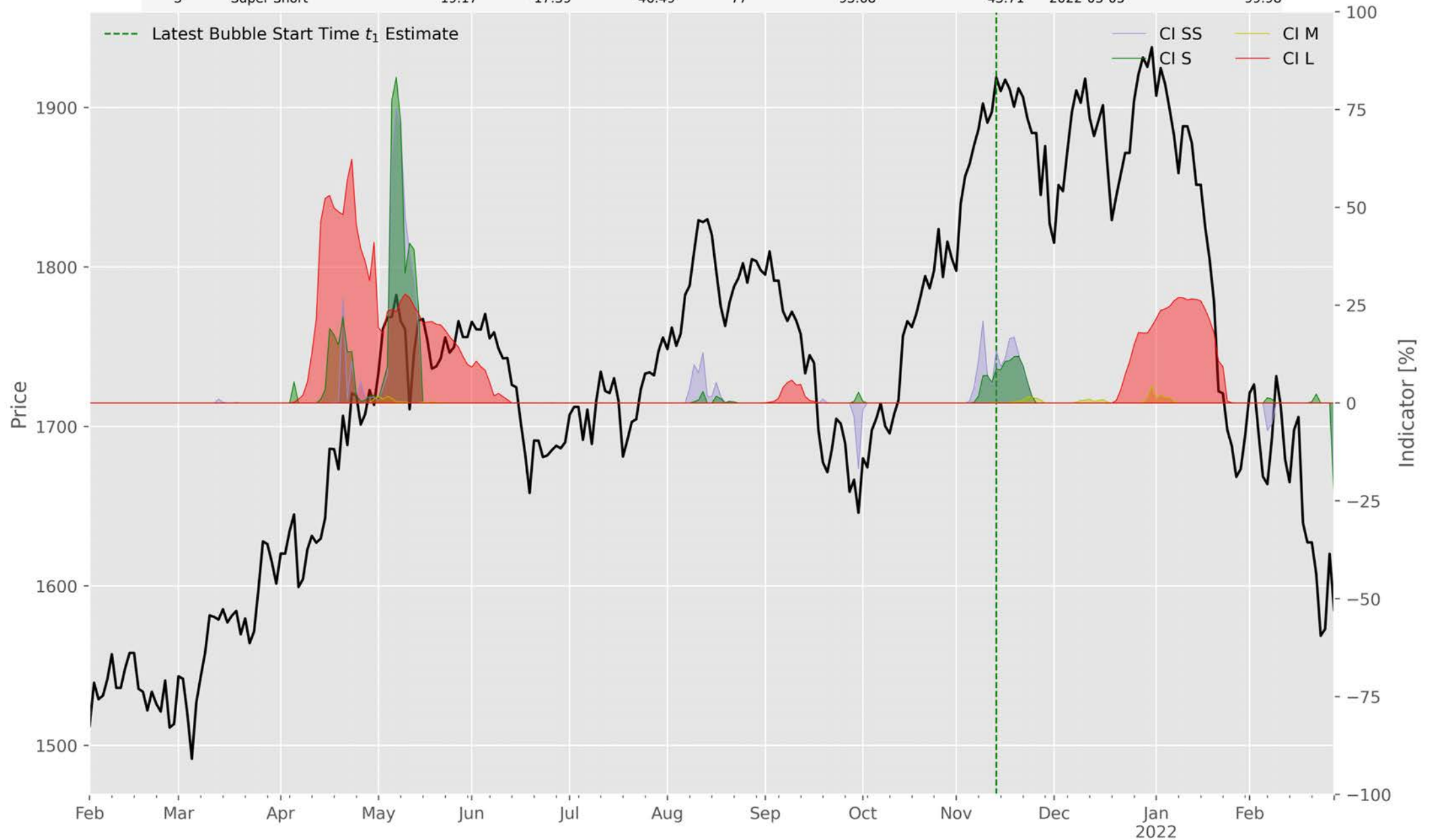
S&P500 Consumer Electronics

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
2	Super Short	17.9	-30.12	-56.01	110	87.81	44.49	2022-03-15	99.98



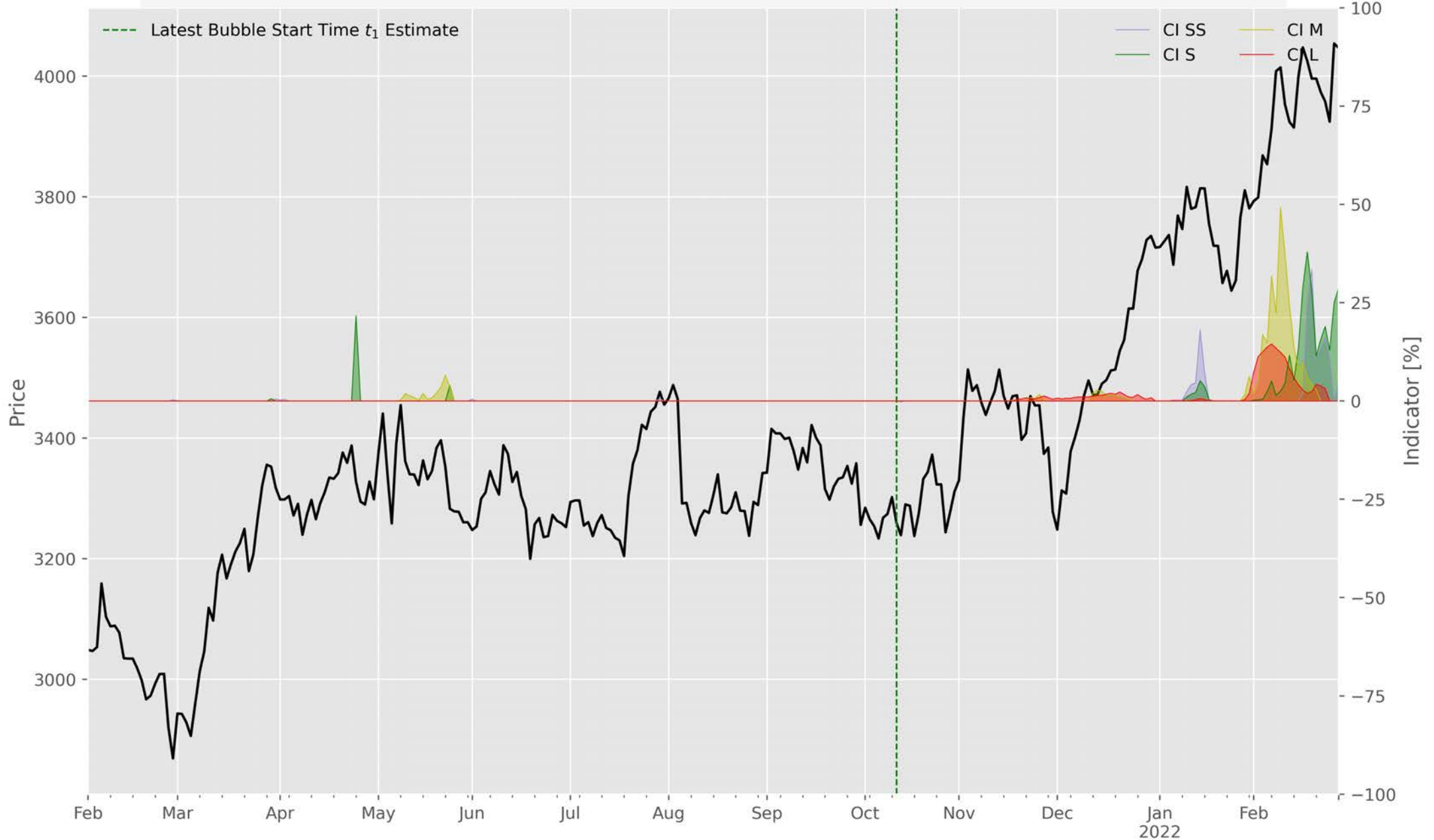
S&P500 Specialty Chemicals

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \hat{t}_c	Scenario Probability [%]
3	Super Short	19.17	-17.39	-46.49	77	93.68	43.71	2022-03-05	99.98



S&P Global 1200 H/C Distributors

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \hat{t}_c	Scenario Probability [%]
1	Short Term	28.69	24.16	72.52	100	77.93	54.53	2022-03-28	99.97



S&P Global 1200 Metals & Mining

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \hat{t}_c	Scenario Probability [%]
2	Super Short	16.39	15.95	51.33	90	90.51	42.39	2022-03-09	99.99



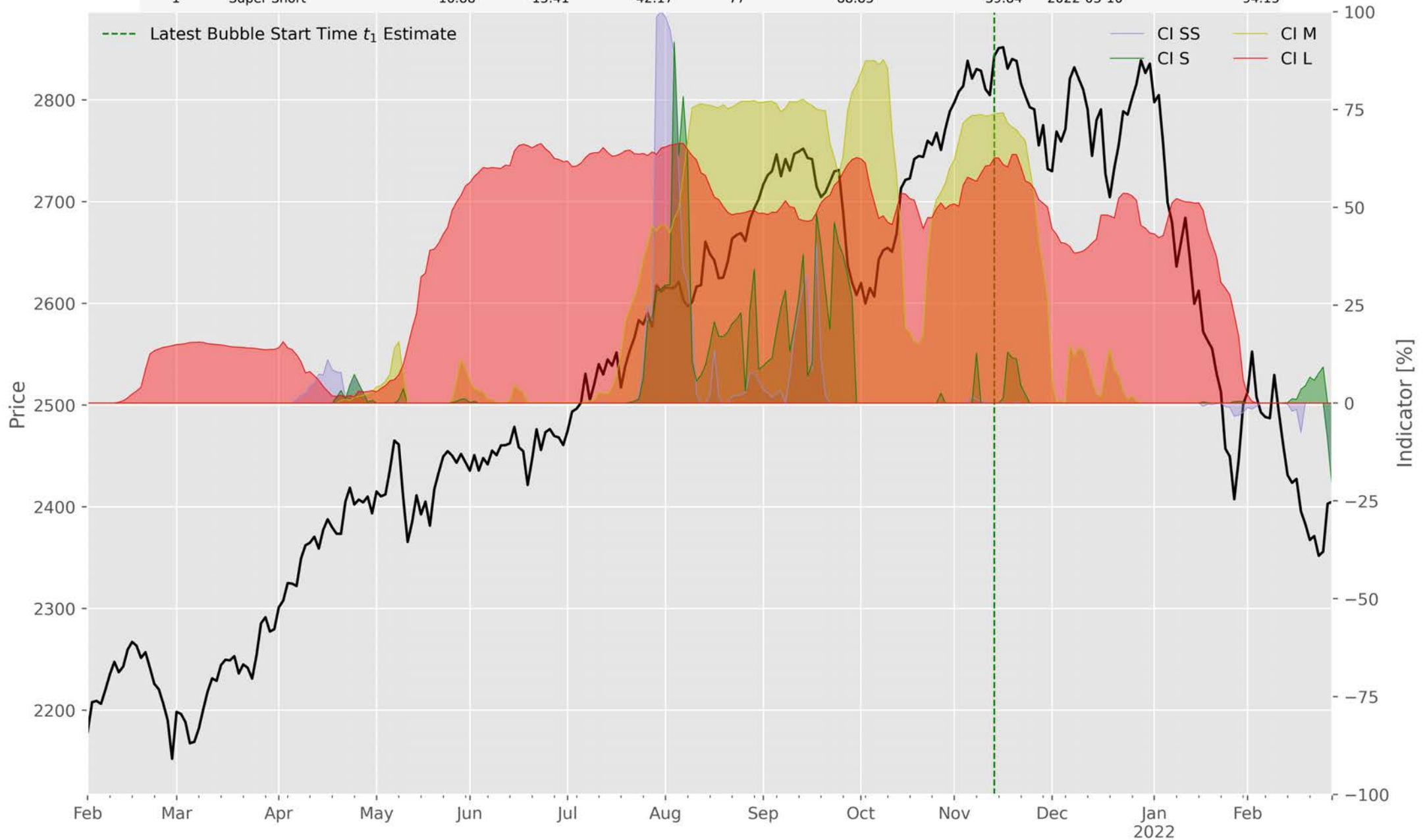
S&P Global 1200 Soft Drinks

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
3	Medium Term	46.33	30.15	14.32	496	66.76	35.38	2022-11-02	94.03



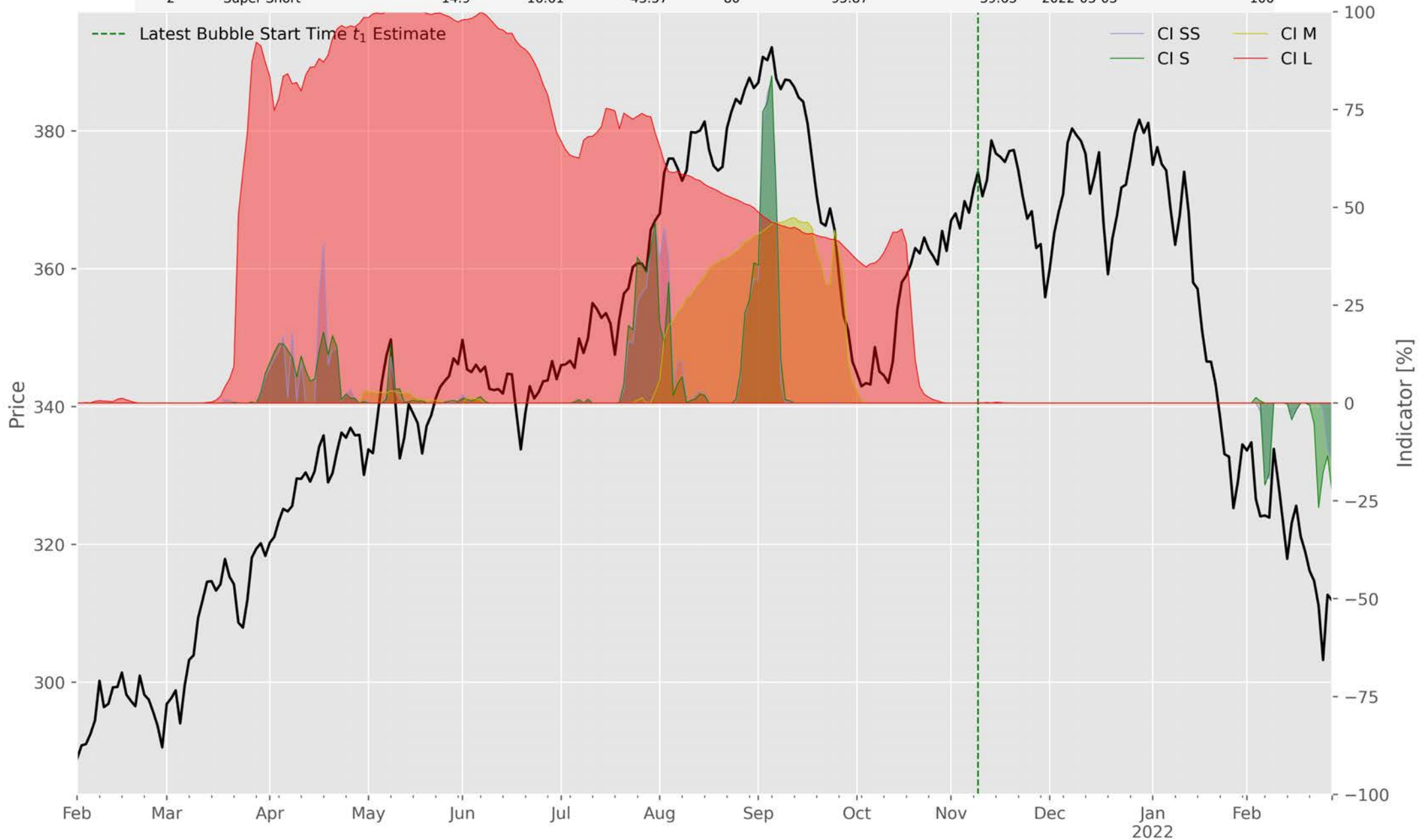
S&P Global 1200 Comm.Svs.&Supls

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \hat{t}_c	Scenario Probability [%]
1	Super Short	16.88	-15.41	-42.17	77	88.85	39.84	2022-03-10	94.15



Msci World Bldg Prd \$

Rank	Strongest Signal	DS-LPPLS Confidence	Bubble Size	Bubble CAGR	Duration	Bubble Progress	Geometric Average	Critical Time	Scenario Probability
		ci [%]	bs [%]	bg [%]	[days]	bp [%]	(ci, bg, bp)	\tilde{t}_c	[%]
2	Super Short	14.9	-16.61	-43.57	80	95.87	39.63	2022-03-03	100



S&P Global 1200 Pers Products

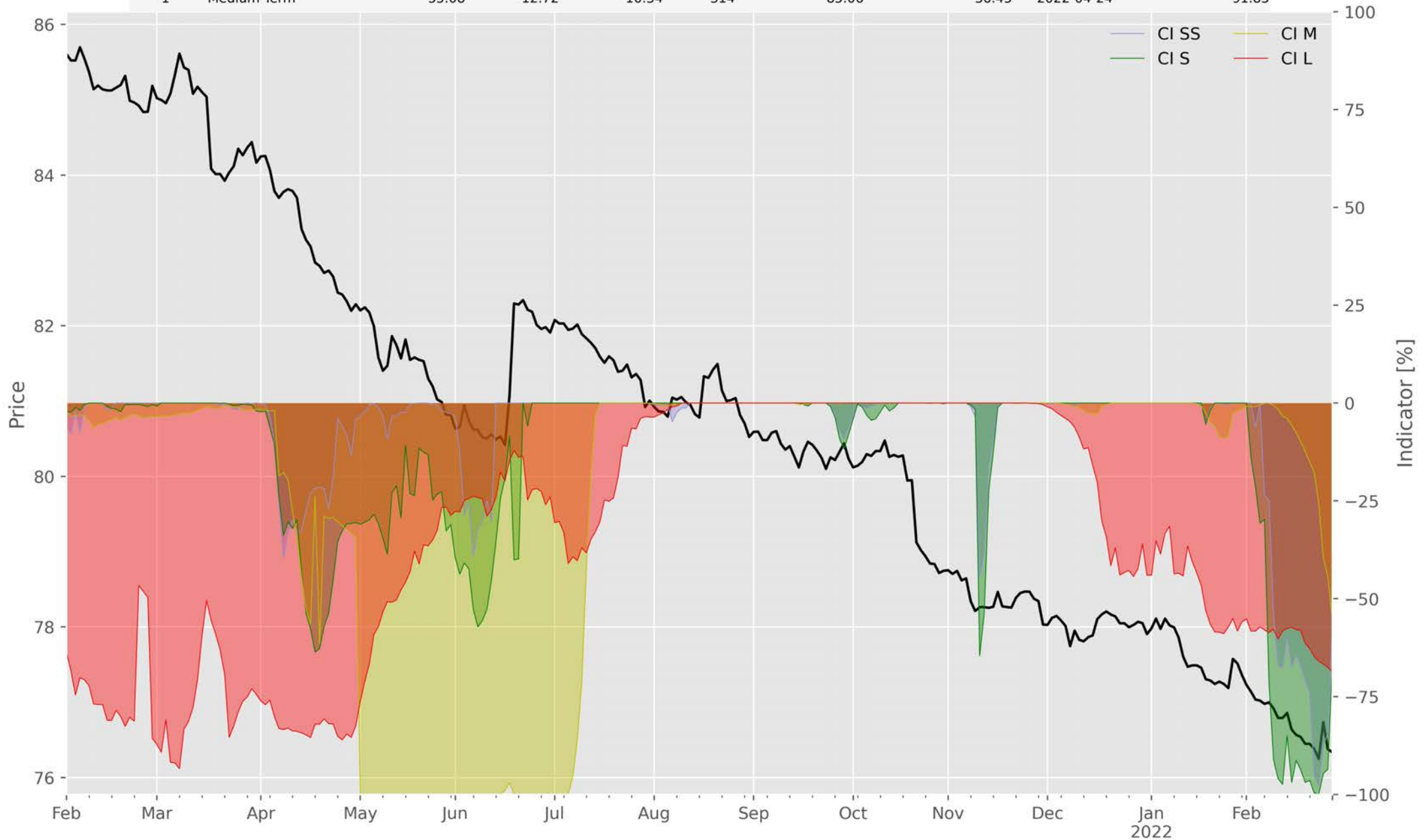
Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
3	Short Term	27.95	-14.27	-22.66	151	98.15	39.61	2022-03-03	99.99



Forex

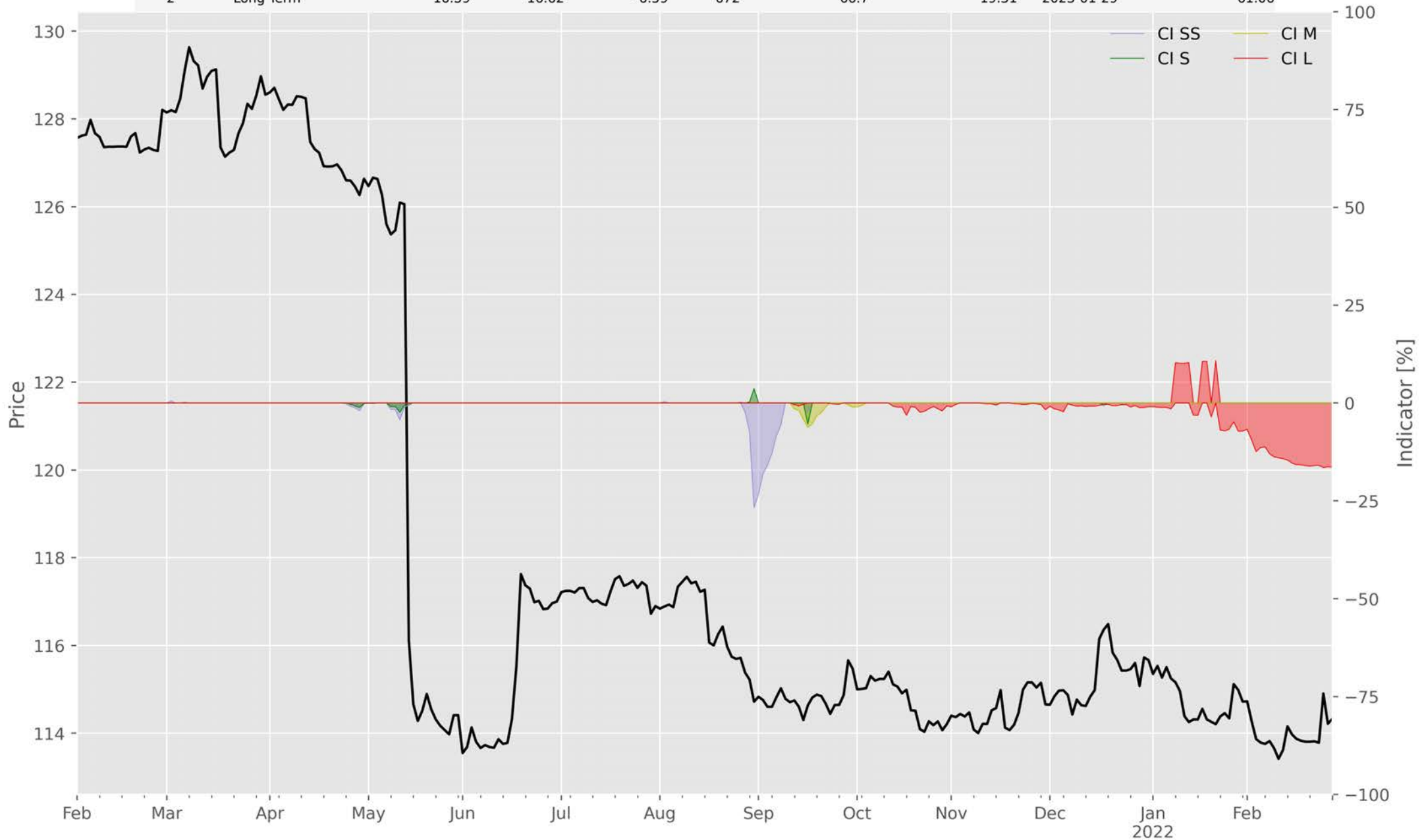
Jpm Hong Kong Reer Ppi (2010=100)

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
1	Medium Term	55.08	-12.72	-10.34	314	85.06	36.45	2022-04-24	91.85



Jpm Nigeria Reer Ppi (2010=100)

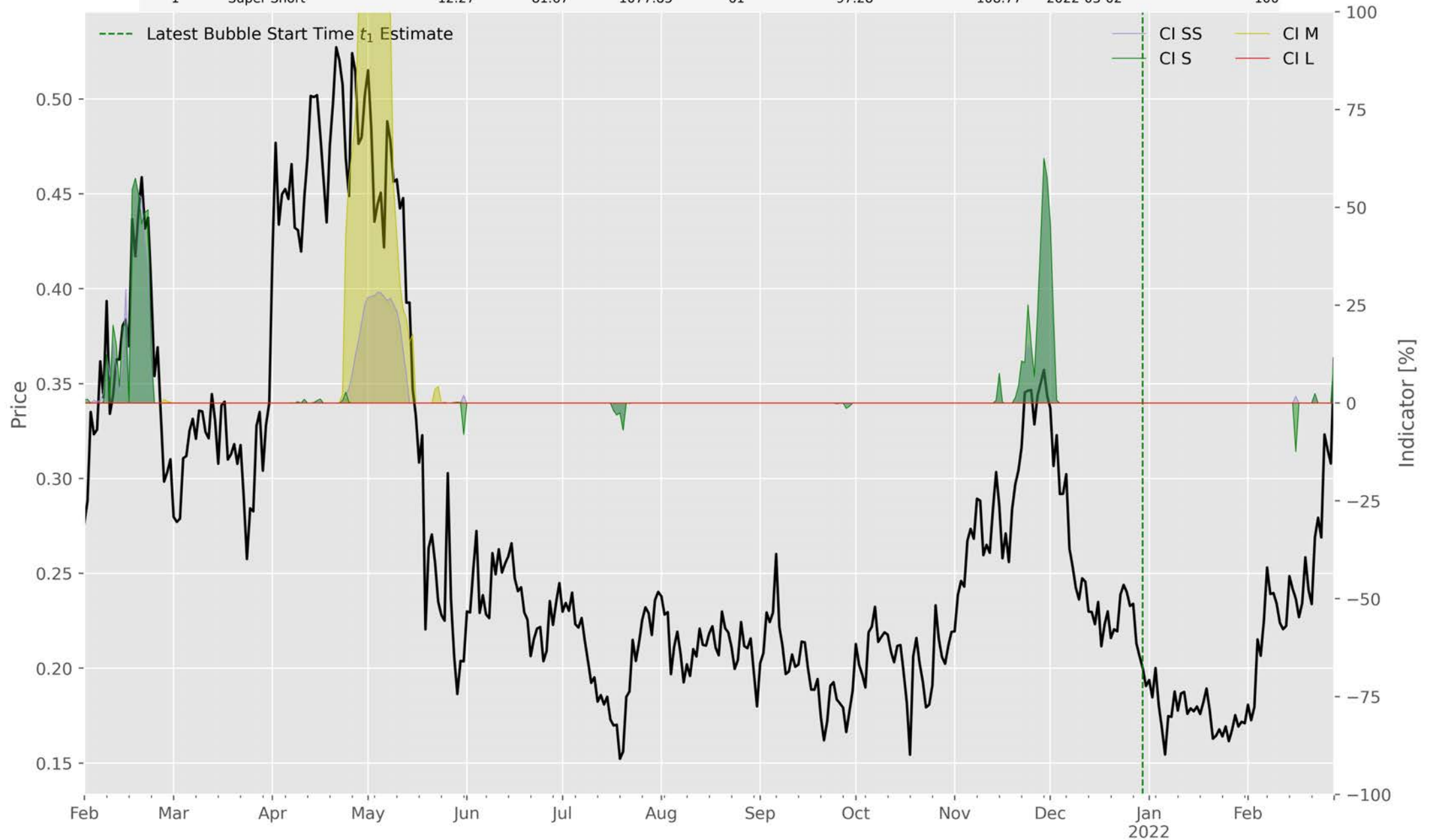
Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci, bg, bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
2	Long Term	16.39	-16.62	-6.59	672	66.7	19.31	2023-01-29	61.06



CryptoX

Quantum Resistant Ledger/USD

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
1	Super Short	12.27	81.67	1077.85	61	97.28	108.77	2022-03-02	100



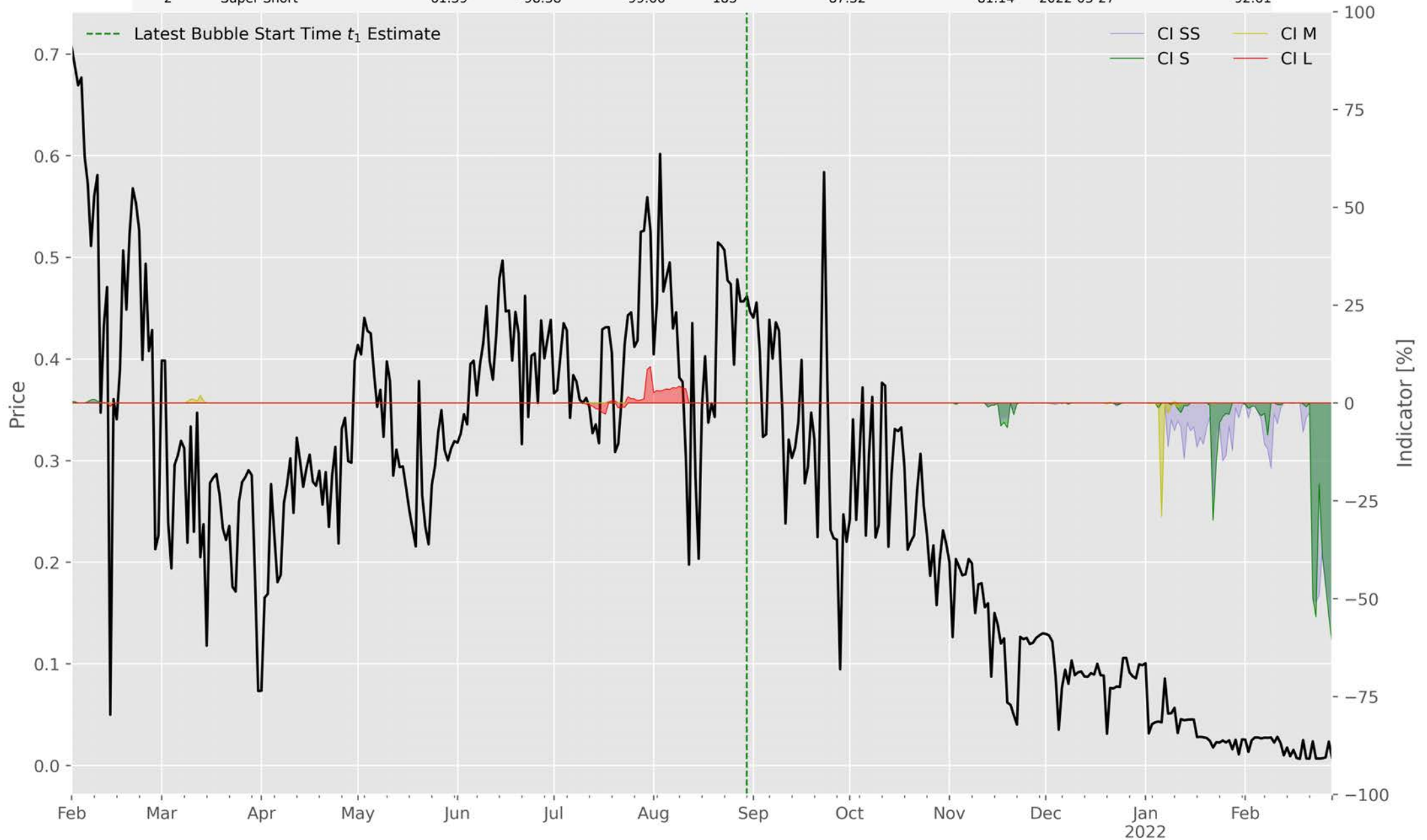
Bitcore/USD

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \hat{t}_c	Scenario Probability [%]
1	Medium Term	100	-75.74	-60.34	386	92.88	82.45	2022-03-30	49.45



NuBits/USD

Rank	Strongest Signal	DS-LPPLS Confidence <i>ci</i> [%]	Bubble Size <i>bs</i> [%]	Bubble CAGR <i>bg</i> [%]	Duration [days]	Bubble Progress <i>bp</i> [%]	Geometric Average (<i>ci</i> , <i>bg</i> , <i>bp</i>)	Critical Time \tilde{t}_c	Scenario Probability [%]
2	Super Short	61.39	-98.38	-99.66	183	87.32	81.14	2022-03-27	92.61



SaluS/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 \tilde{t}_c	Scenario Probability [%]
3	Short Term	67.59	-86.86	-92.54	197	84.5	80.85	2022-04-05	96.43

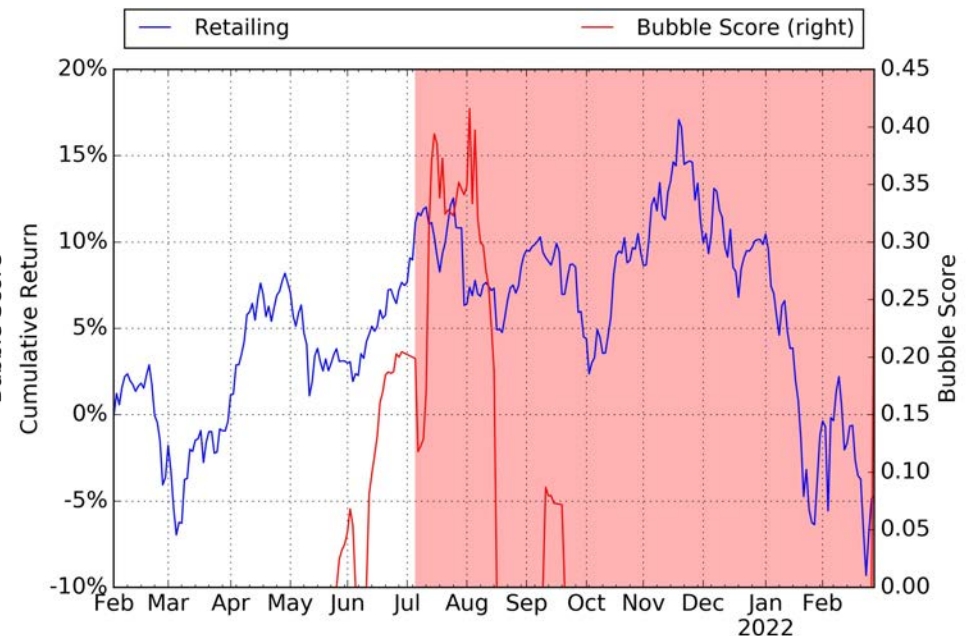
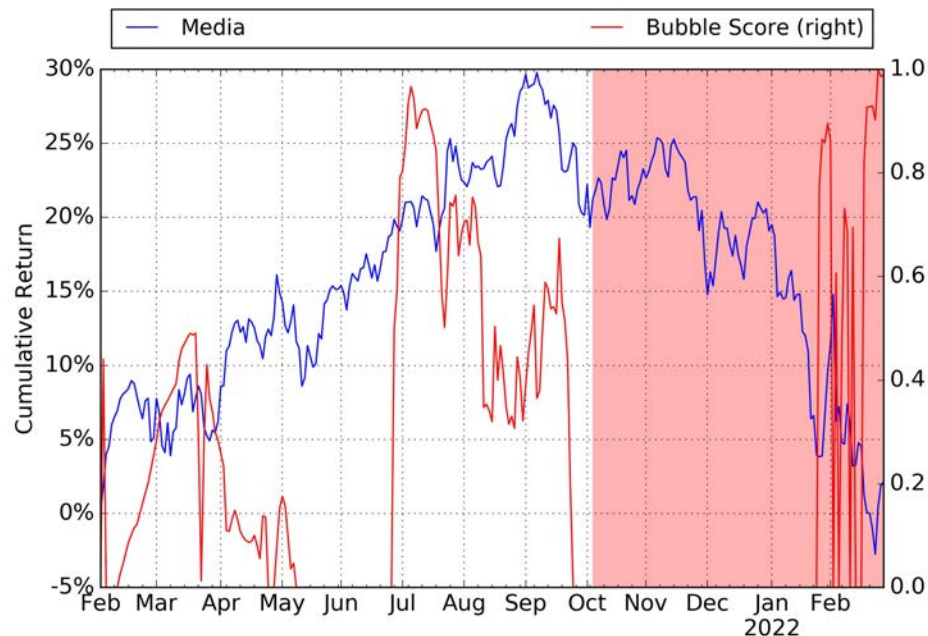


Sectors

GICS Industry Group Name	Yearly Return		Bubble Size		Bubble Score		Value Score		Growth Score	
	Mar 1st	Feb 1st	Mar 1st	Feb 1st	Mar 1st	Feb 1st	Mar 1st	Feb 1st	Mar 1st	Feb 1st
Pharmaceuticals, Biotechnology & Life Sciences	9.6%	5.5%	0.0%	0.0%	0.0%	0.0%	62.2%	62.1%	56.8%	57.9%
Consumer Services	-5.4%	2.0%	0.0%	0.0%	0.0%	0.0%	19.3%	22.6%	61.3%	62.7%
Retailing	-2.7%	-2.8%	-14.3%	0.0%	-31.3%	0.0%	19.5%	18.8%	47.3%	48.5%
Transportation	0.9%	4.9%	0.0%	0.0%	0.0%	0.0%	47.5%	48.8%	55.1%	55.3%
Consumer Durables & Apparel	-2.7%	2.3%	0.0%	0.0%	0.0%	0.0%	37.6%	35.6%	40.6%	42.4%
Semiconductors & Semiconductor Equipment	23.6%	14.1%	0.0%	0.0%	0.0%	0.0%	64.6%	63.5%	39.9%	40.1%
Technology Hardware & Equipment	25.4%	21.8%	0.0%	0.0%	0.0%	0.0%	76.5%	77.3%	58.8%	57.8%
Automobiles & Components	9.6%	11.7%	0.0%	0.0%	0.0%	0.0%	41.1%	46.0%	51.1%	48.4%
Telecommunication Services	-11.3%	-8.7%	0.0%	0.0%	0.0%	0.0%	62.0%	62.3%	42.3%	40.1%
Energy	25.2%	40.2%	0.0%	0.0%	0.0%	0.0%	52.6%	57.7%	49.6%	61.3%
Software & Services	1.2%	2.5%	0.0%	0.0%	0.0%	0.0%	35.2%	36.8%	53.2%	52.3%
Materials	3.3%	4.4%	0.0%	0.0%	0.0%	0.0%	48.2%	46.8%	54.0%	47.7%
Health Care Equipment & Services	10.8%	6.1%	0.0%	0.0%	0.0%	0.0%	48.4%	57.0%	57.6%	54.2%
Capital Goods	-3.0%	3.2%	0.0%	0.0%	0.0%	0.0%	46.8%	47.9%	50.7%	50.7%
Media & Entertainment	-4.9%	1.3%	-15.8%	-14.1%	-98.9%	-89.8%	40.3%	44.0%	36.1%	37.3%
Commercial & Professional Services	5.1%	7.4%	0.0%	0.0%	0.0%	0.0%	31.6%	29.7%	56.0%	55.0%
Food & Staples Retailing	15.4%	11.4%	0.0%	0.0%	0.0%	0.0%	41.8%	40.4%	60.5%	61.2%
Household & Personal Products	2.5%	4.4%	0.0%	0.0%	0.0%	0.0%	26.7%	33.0%	54.2%	56.3%
Food, Beverage & Tobacco	11.9%	12.4%	0.0%	0.0%	0.0%	0.0%	49.2%	48.3%	60.0%	58.8%
Utilities	5.5%	4.8%	0.0%	0.0%	0.0%	0.0%	43.0%	43.6%	57.3%	55.2%
Insurance	5.5%	13.8%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Real Estate	8.4%	13.6%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Diversified Financials	9.7%	18.5%	0.0%	0.0%	0.0%	0.0%	-	-	-	-
Banks	5.6%	20.9%	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 two industry group indices with a high negative bubble score: *Media & Entertainment* and *Retailing*. Although we see a strong rebound of the industry group *Media & Entertainment* in the last days of Jan 2022 (as we have noted last month), it turns out that a further selloff happened afterwards together with the market drawdown. The strong negative bubble signal indicates a high probability of rebound in the future.



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.

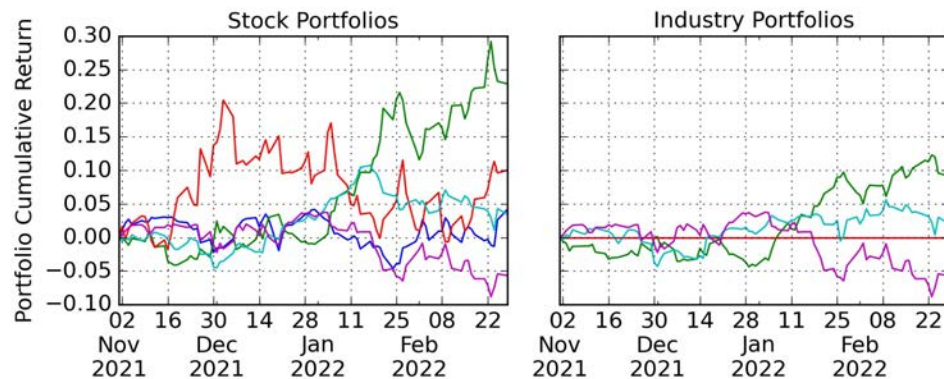
Portfolio Construction & Performance

- ▶ 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.

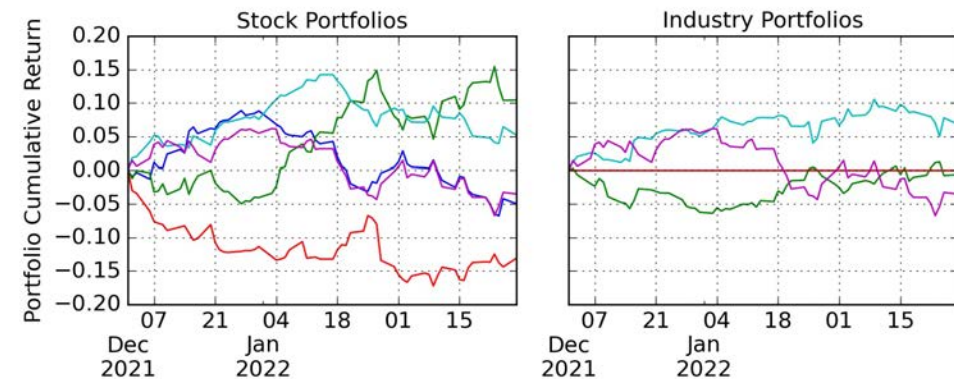
Portfolio Construction & Performance

- ▶ The market continued to deteriorate give the uncertainties of the Ukraine-Russian war. During this period, contrarian portfolios seem to be robust while other portfolios are underperforming.
- ▶ 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.

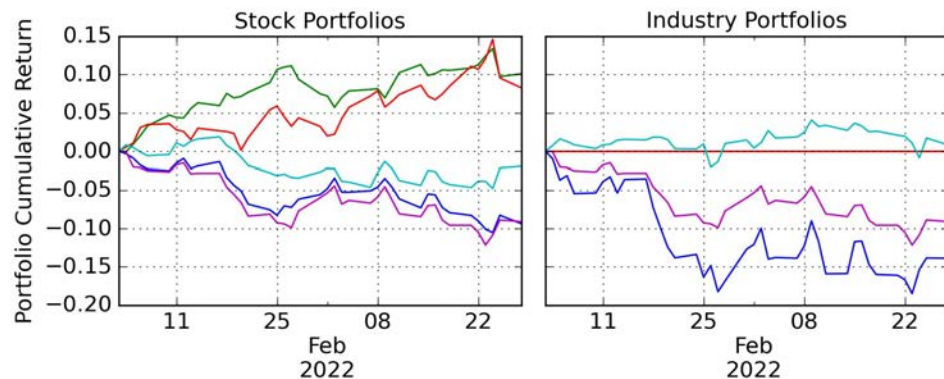
Portfolios Initiated in November 2021



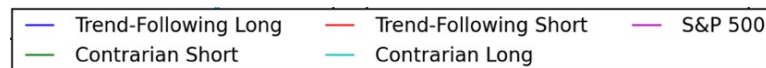
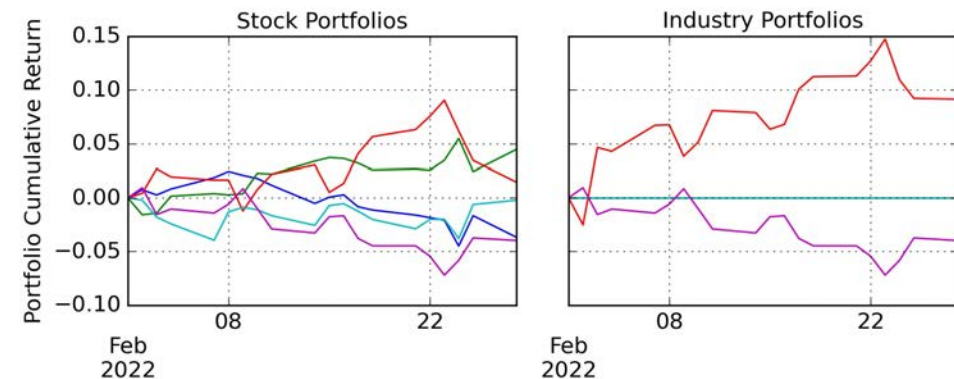
Portfolios Initiated in December 2021



Portfolios Initiated in January 2022

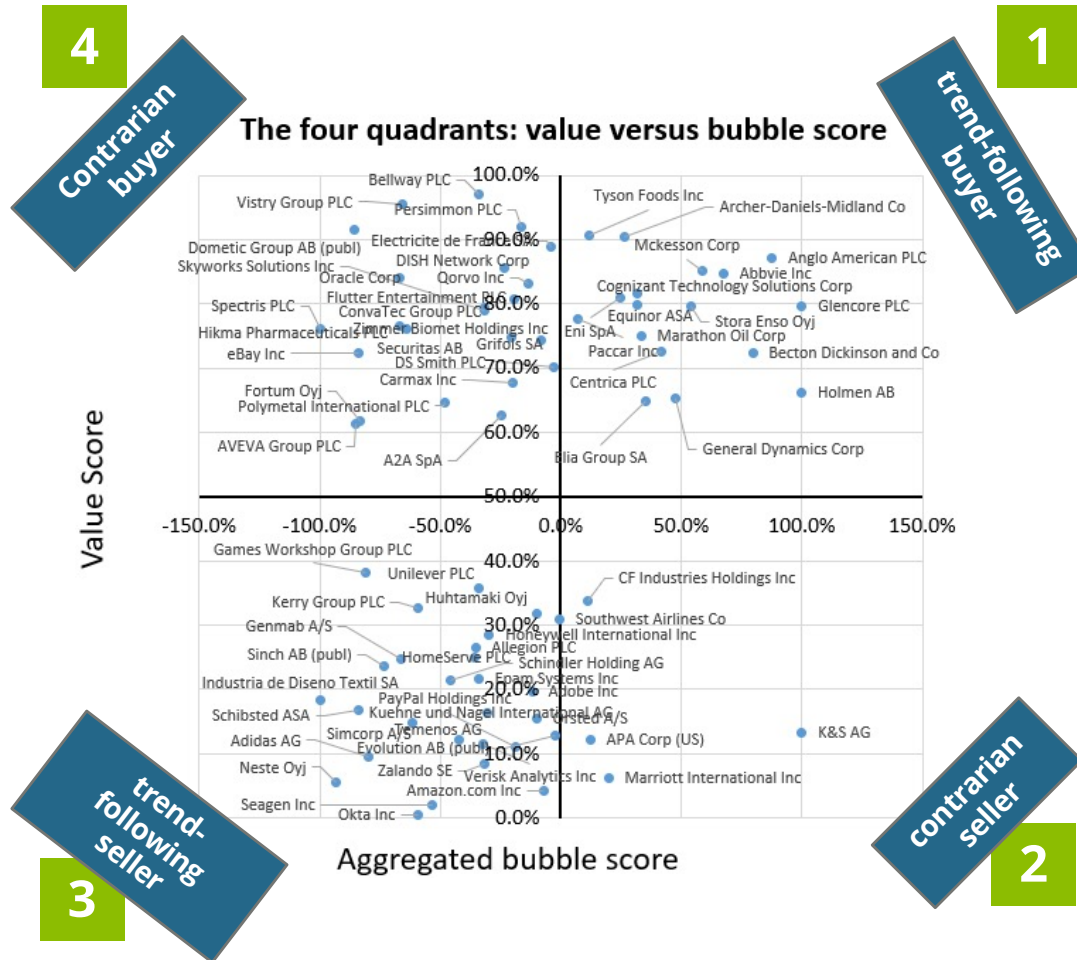


Portfolios Initiated in February 2022



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. Homen AB.
- **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. K&S AG
- **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. Sinch AB (publ)
- **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. eBay Inc

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.

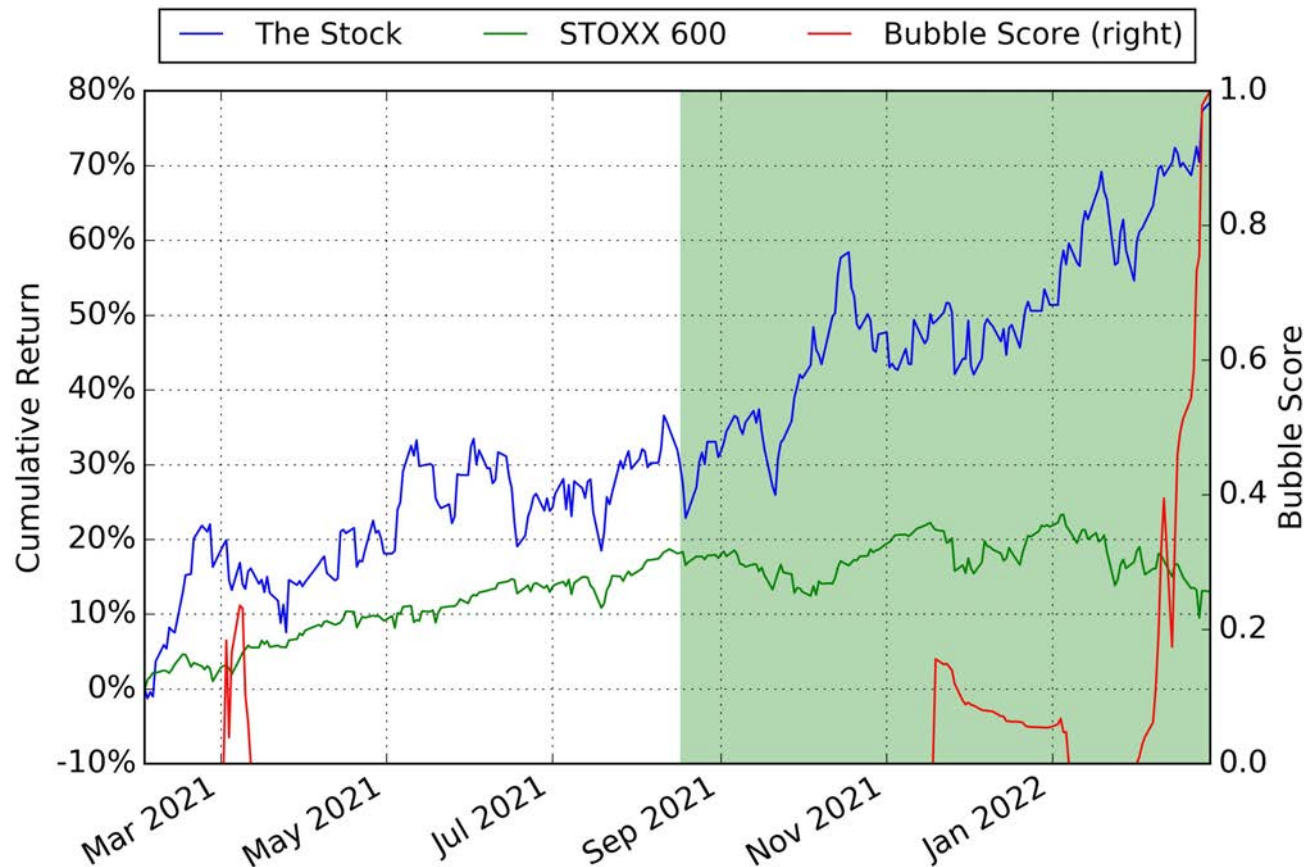
Single Stocks

Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

Company Name	Country of Headquarters	GLCS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Paccar Inc	United States of America	Capital Goods	-6.1%	8.5%	Jul-21	7.0%	77.6%	47.9%
General Dynamics Corp	United States of America	Capital Goods	35.8%	23.4%	Jul-21	47.4%	65.3%	72.6%
Becton Dickinson and Co	United States of America	Health Care Equipment & Services	13.9%	12.2%	Oct-21	79.5%	72.4%	45.4%
Marathon Oil Corp	United States of America	Energy	80.3%	64.0%	Jun-21	33.2%	75.0%	6.2%
Archer-Daniels-Midland Co	United States of America	Food, Beverage & Tobacco	33.9%	26.7%	Jun-21	26.3%	90.3%	24.0%
Mckesson Corp	United States of America	Health Care Equipment & Services	50.1%	37.2%	Aug-21	58.9%	85.2%	66.8%
Cognizant Technology Solutions Corp	United States of America	Software & Services	11.1%	21.8%	May-21	31.8%	81.5%	80.6%
Tyson Foods Inc	United States of America	Food, Beverage & Tobacco	25.3%	19.9%	Aug-21	11.6%	90.6%	9.0%
Abbvie Inc	United States of America	Pharmaceuticals, Biotechnology & Life Sciences	37.0%	35.5%	Sep-21	67.4%	84.7%	61.3%
Anglo American PLC	United Kingdom	Materials	30.7%	47.5%	Sep-21	87.6%	87.0%	21.5%
Centrica PLC	United Kingdom	Utilities	49.6%	32.5%	Oct-21	41.7%	72.6%	3.3%
Glencore PLC	Switzerland	Materials	54.2%	37.4%	Aug-21	100.0%	79.7%	6.7%
Stora Enso Oyj	Finland	Materials	2.5%	16.8%	Sep-21	54.2%	79.6%	17.0%
Elia Group SA	Belgium	Utilities	44.8%	40.2%	Mar-21	35.2%	64.8%	53.8%
Equinor ASA	Norway	Energy	59.8%	39.4%	Sep-21	31.5%	79.8%	85.3%
Holmen AB	Sweden	Materials	21.7%	18.9%	Sep-21	99.8%	66.2%	15.6%
Eni SpA	Italy	Energy	34.3%	33.4%	Jun-21	24.4%	81.0%	25.7%

Single Stocks

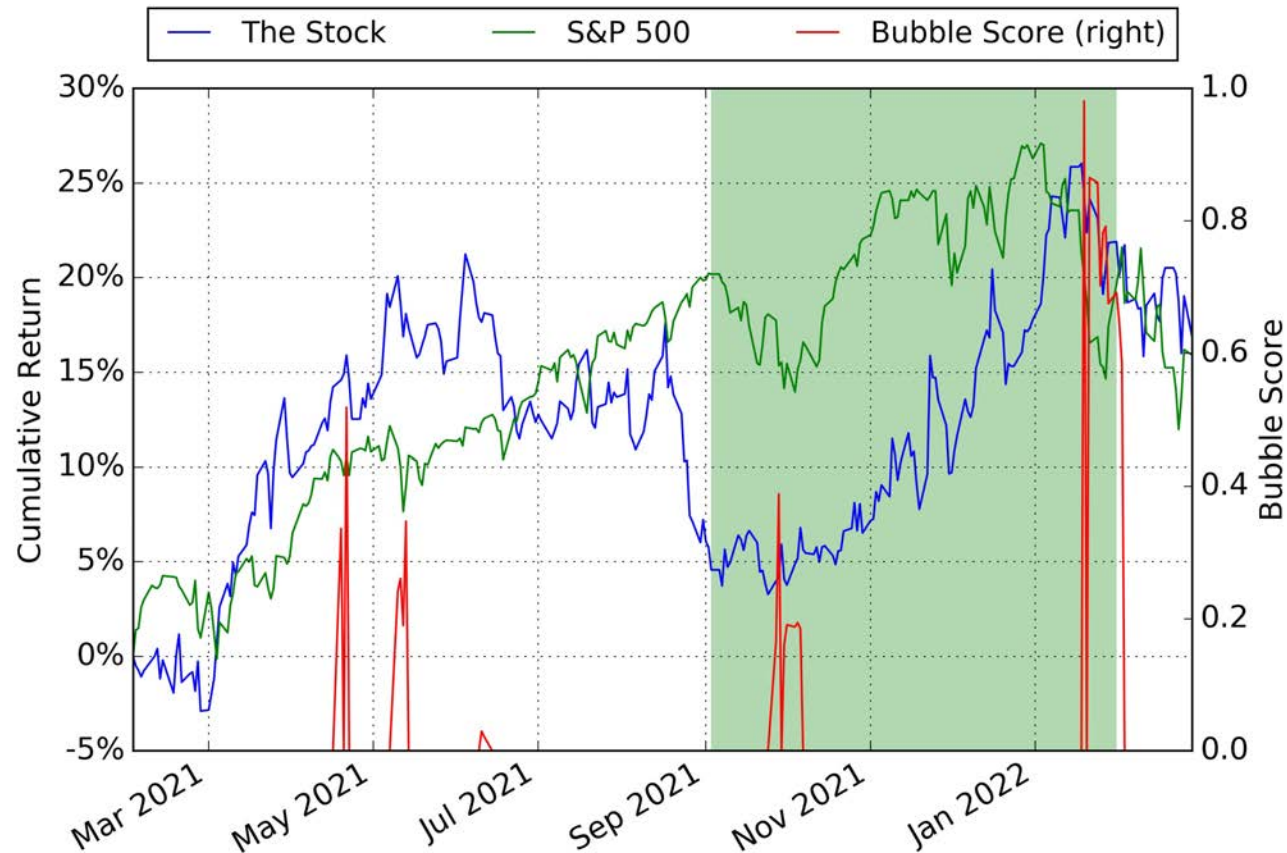
Quadrant 1 Stocks Current Month Example – Glencore PLC.



- ▶ 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 green shaded period delineates the time interval within which the positive bubble is identified. The Bubble Score of this six-month bubble has reached 100% with a bubble size 37.4%. The high bubble score indicates a high probability of correction in the future due to the unsustainable bubble growth.

Single Stocks

Quadrant 1 Stocks Last Month Example – J M Smucker Co.



- 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 has corrected together with the market. As we can see, the peak of our bubble signal matches the peak of the stock price in Jan 2022.

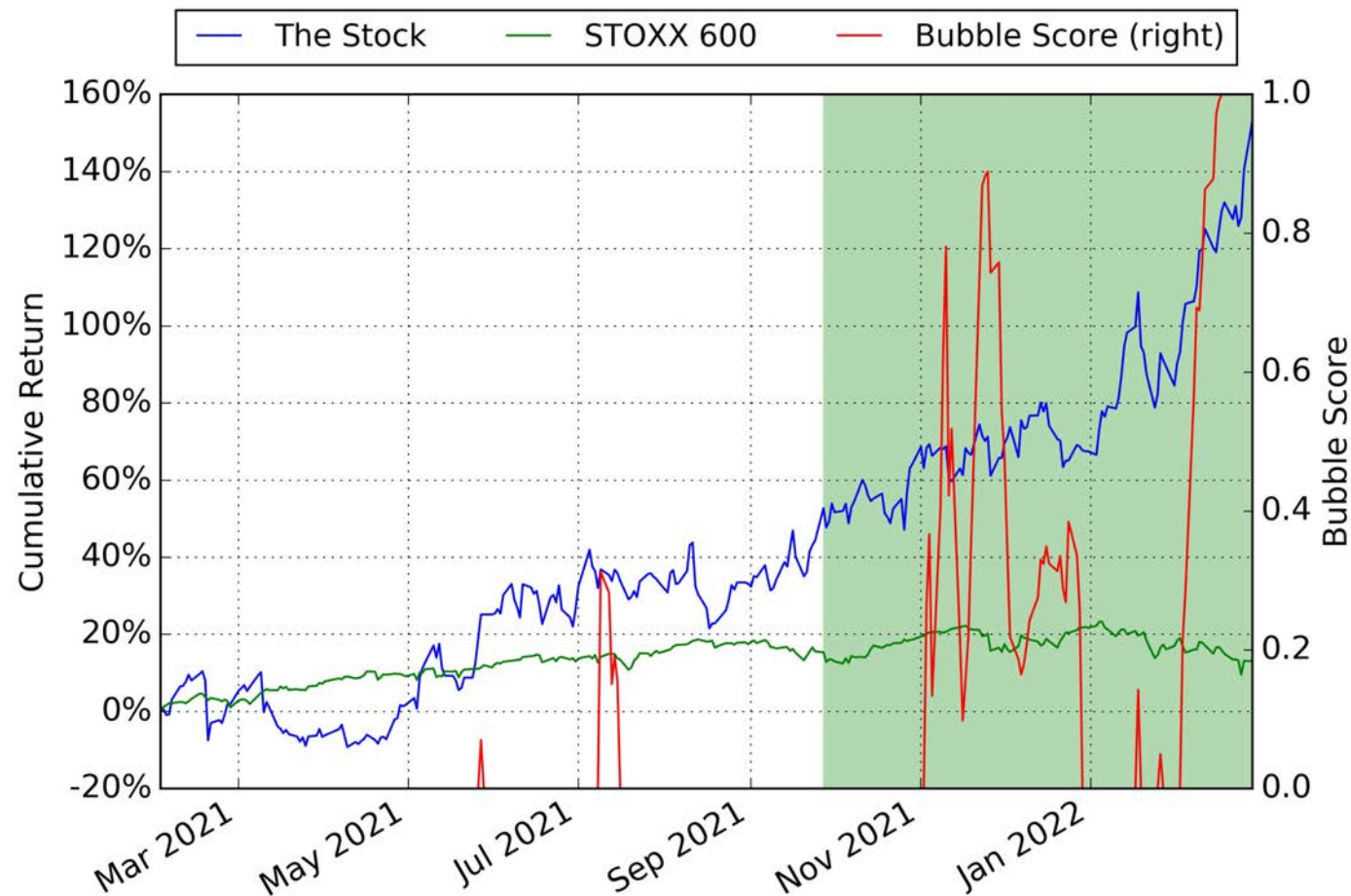
Single Stocks

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
CF Industries Holdings Inc	United States of America	Materials	60.6%	53.3%	May-21	11.0%	33.8%	85.1%
APA Corp (US)	United States of America	Energy	62.8%	56.0%	Jun-21	12.2%	12.2%	88.4%
Marriott International Inc	United States of America	Consumer Services	14.3%	21.0%	May-21	19.7%	6.3%	24.9%
K&S AG	Germany	Materials	146.9%	65.7%	Sep-21	100.0%	13.4%	0.3%

Single Stocks

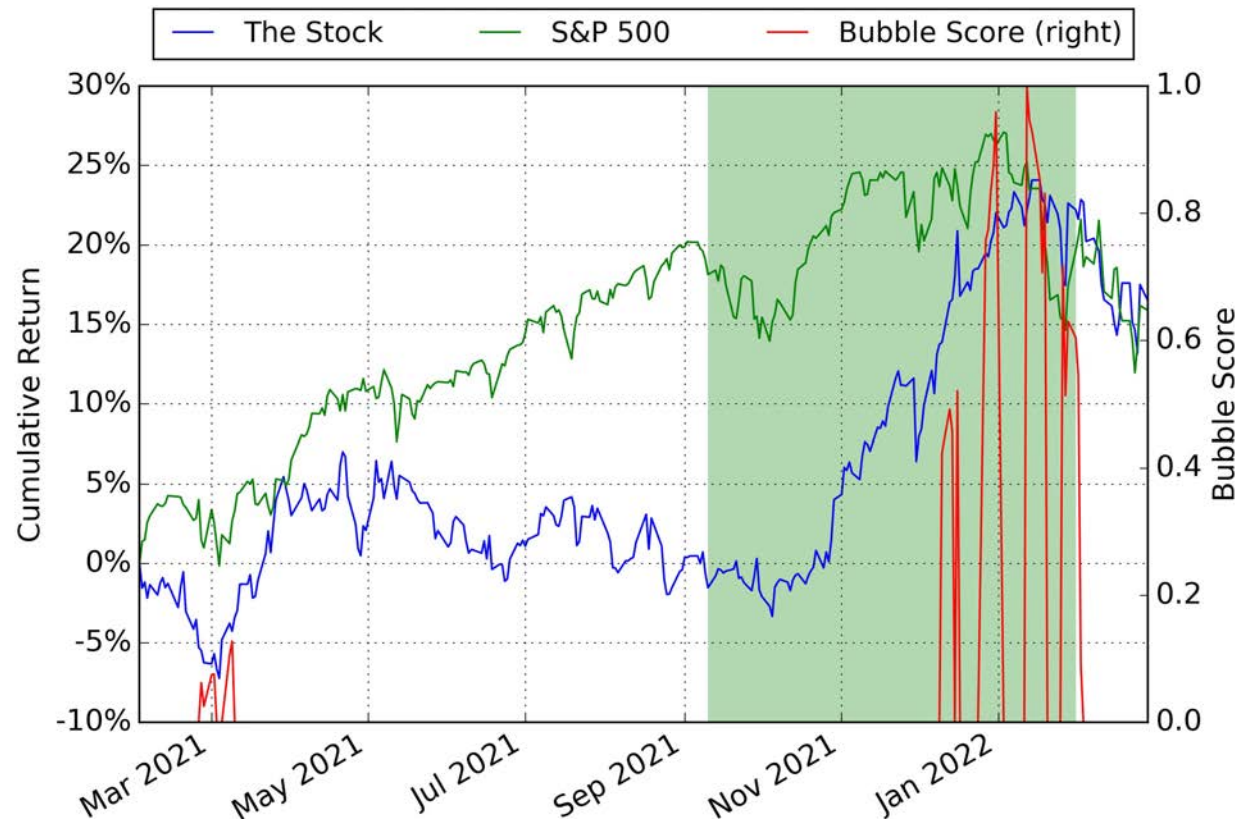
Quadrant 2 Stocks Current Month Example – K&S AG.



- The above graph shows the one-year cumulative return of the stock in blue (left hand scale), STOXX 600 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period delineates the time interval within which the positive bubble is identified. The Bubble Score of this five-month bubble has reached 100% with a bubble size 65.7%. 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 – Church & Dwight Co Inc.



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 has corrected by about 10% together with the market, which is in agreement with the LPPLS signal. The weak fundamentals suggests risks for the stock price to exhibit future corrections.

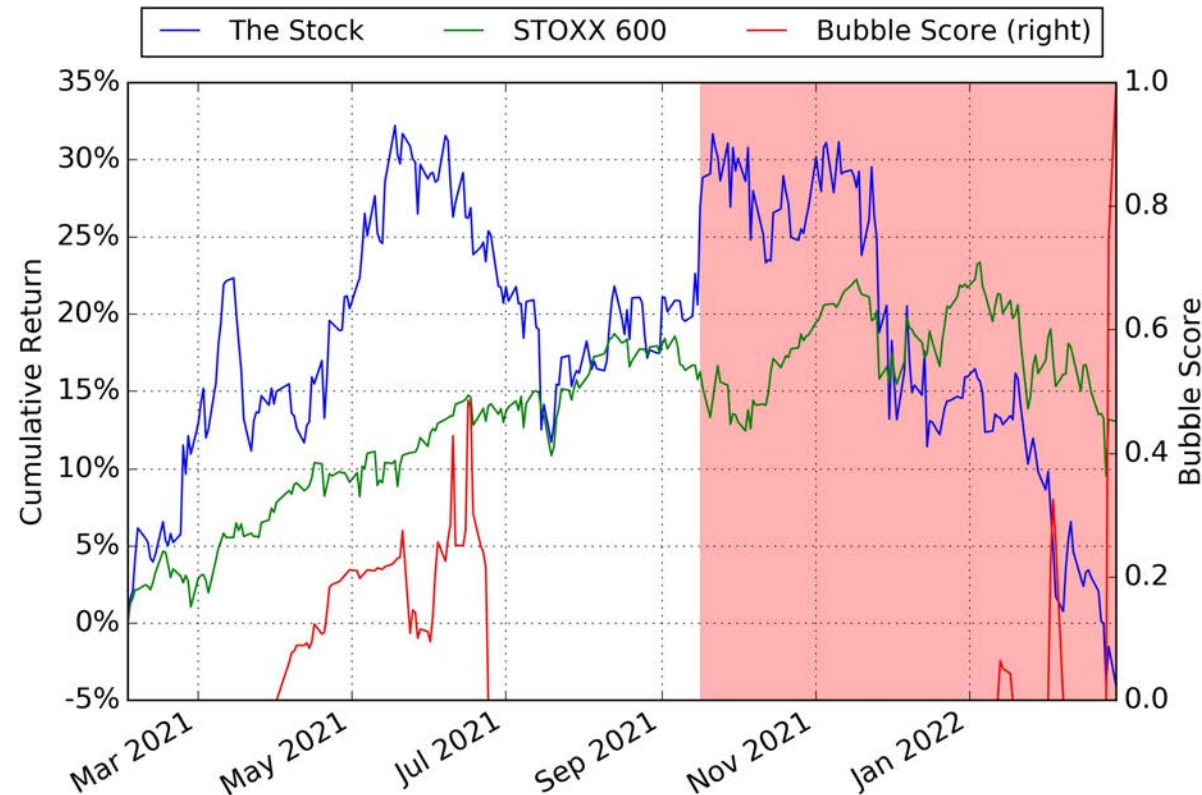
Single Stocks

Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

Company Name	Country of Headquarters	GLCS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Epam Systems Inc	United States of America	Software & Services	-43.2%	-65.1%	Oct-21	-34.1%	21.6%	42.1%
Allegion PLC	Ireland; Republic of	Capital Goods	-0.4%	-17.5%	May-21	-35.5%	26.4%	31.0%
Verisk Analytics Inc	United States of America	Commercial & Professional Services	2.4%	-14.2%	Oct-21	-32.0%	11.4%	69.6%
PayPal Holdings Inc	United States of America	Software & Services	-55.9%	-52.7%	Mar-21	-19.1%	11.0%	64.0%
Honeywell International Inc	United States of America	Capital Goods	-10.7%	-18.5%	Jul-21	-29.7%	28.4%	66.1%
Adobe Inc	United States of America	Software & Services	3.7%	-28.8%	Aug-21	-11.8%	19.6%	68.5%
Southwest Airlines Co	United States of America	Transportation	-25.1%	-25.1%	Mar-21	-0.5%	30.9%	14.9%
Amazon.com Inc	United States of America	Retailing	-1.4%	-16.4%	Jul-21	-7.3%	4.3%	32.3%
Okta Inc	United States of America	Software & Services	-23.6%	-31.0%	Aug-21	-59.2%	0.4%	61.8%
Seagen Inc	United States of America	Pharmaceuticals, Biotechnology & Life Sciences	-15.8%	-24.1%	Sep-21	-53.3%	2.0%	54.6%
Sinch AB (publ)	Sweden	Software & Services	-46.5%	-53.1%	Sep-21	-73.3%	23.7%	23.7%
Evolution AB (publ)	Sweden	Consumer Services	-1.2%	-34.1%	Apr-21	-2.1%	12.8%	76.4%
Orsted A/S	Denmark	Utilities	-11.8%	-15.3%	Aug-21	-10.0%	15.4%	92.0%
Kerry Group PLC	Ireland; Republic of	Food, Beverage & Tobacco	3.1%	-14.6%	Jul-21	-59.3%	32.7%	73.7%
Games Workshop Group PLC	United Kingdom	Consumer Durables & Apparel	-24.2%	-35.6%	Jun-21	-81.1%	38.2%	63.9%
Unilever PLC	United Kingdom	Household & Personal Products	-4.3%	-11.1%	Apr-21	-34.0%	35.7%	28.3%
Schindler Holding AG	Switzerland	Capital Goods	-21.6%	-20.8%	May-21	-46.0%	21.5%	15.1%
Zalando SE	Germany	Retailing	-30.8%	-39.8%	Jul-21	-31.7%	8.5%	84.3%
Industria de Diseno Textil SA	Spain	Retailing	-21.3%	-24.5%	Sep-21	-100%	18.3%	91.6%
Neste Oyj	Finland	Energy	-35.0%	-27.3%	Sep-21	-93.1%	5.5%	12.8%
Temenos AG	Switzerland	Software & Services	-29.7%	-33.1%	May-21	-42.1%	12.0%	81.5%
Schibsted ASA	Norway	Media & Entertainment	-33.6%	-47.4%	Aug-21	-84.0%	16.9%	87.8%
Adidas AG	Germany	Consumer Durables & Apparel	-29.3%	-28.6%	May-21	-79.5%	9.4%	70.4%
Huhtamaki Oyj	Finland	Materials	-17.0%	-27.7%	Aug-21	-9.7%	31.7%	48.0%
Kuehne und Nagel International AG	Switzerland	Transportation	-0.3%	-26.6%	Sep-21	-30.7%	16.4%	62.6%
HomeServe PLC	United Kingdom	Commercial & Professional Services	-40.0%	-21.5%	Oct-21	-35.9%	25.0%	56.9%
Genmab A/S	Denmark	Pharmaceuticals, Biotechnology & Life Sciences	9.7%	-25.6%	Aug-21	-66.2%	24.7%	64.9%
Simcorp A/S	Denmark	Software & Services	-23.1%	-31.3%	Sep-21	-61.4%	14.8%	29.7%

Single Stocks

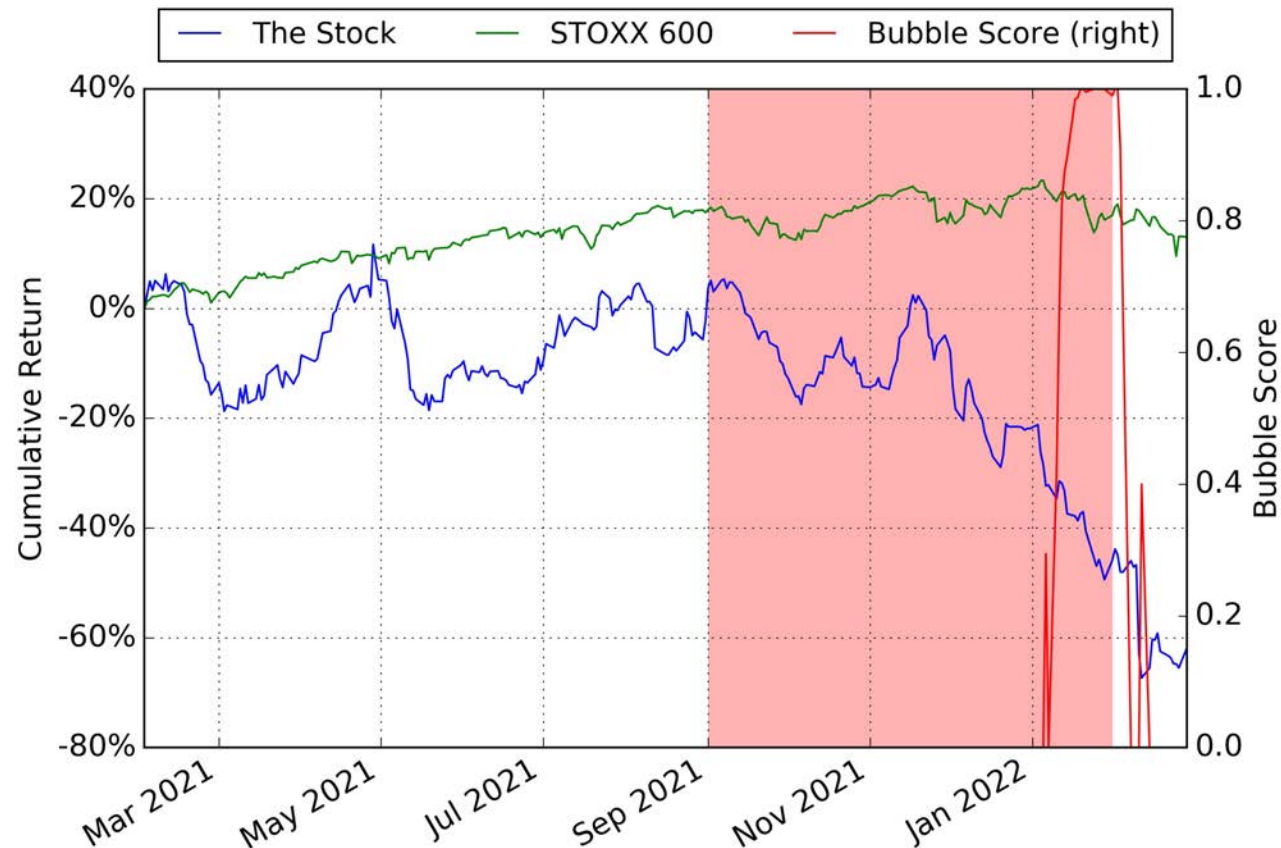
Quadrant 3 Stocks Current Month Example – Industria de Diseno Textil SA.



- 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 red shaded period delineates the time interval within which the negative bubble is identified. The Bubble Score of this six-month bubble has reached 100% with a bubble size -24.5%.

Single Stocks

Quadrant 3 Stocks Last Month Example – Delivery Hero SE.



- 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 had another 15% drop in the past month, which is coherent with the diagnostic of a strong negative bubble with weak fundamentals.

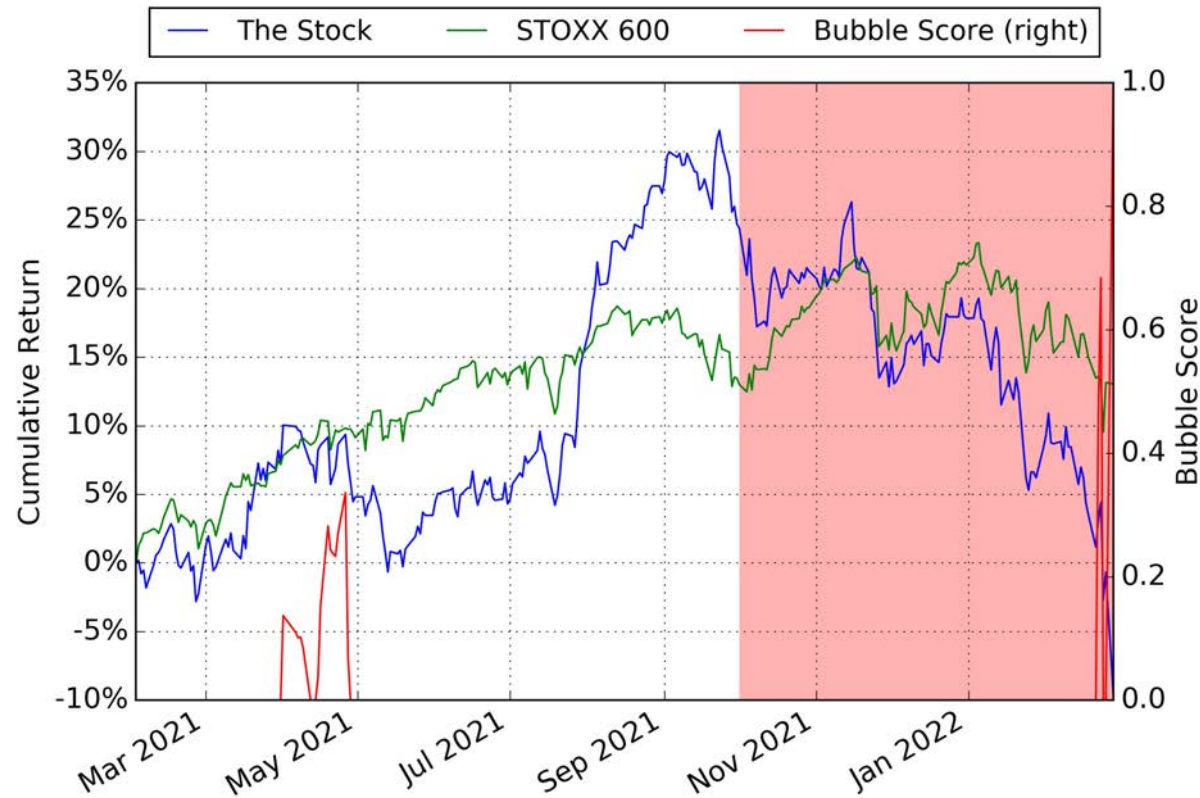
Single Stocks

Quadrant 4 stocks: strong negative bubble signals with strong fundamentals

Company Name	Country of Headquarters	GIICS Industry Group Name	Yearly Return	Bubble Size	Bubble Start	Bubble Score	Value Score	Growth Score
Qorvo Inc	United States of America	Semiconductors & Semiconductor Equipment	-21.8%	-29.1%	Apr-21	-13.5%	83.2%	22.6%
Oracle Corp	United States of America	Software & Services	12.7%	-19.5%	Oct-21	-67.0%	84.0%	25.8%
Zimmer Biomet Holdings Inc	United States of America	Health Care Equipment & Services	-20.7%	-20.7%	Mar-21	-20.8%	74.9%	64.7%
Carmax Inc	United States of America	Retailing	-17.8%	-18.3%	Jul-21	-20.0%	67.8%	45.7%
eBay Inc	United States of America	Retailing	-2.9%	-26.4%	Oct-21	-84.1%	72.3%	42.5%
Skyworks Solutions Inc	United States of America	Semiconductors & Semiconductor Equipment	-20.5%	-24.4%	Jun-21	-31.7%	79.1%	34.0%
DISH Network Corp	United States of America	Media & Entertainment	-11.0%	-30.5%	May-21	-23.5%	85.6%	4.3%
Bellway PLC	United Kingdom	Consumer Durables & Apparel	-13.3%	-17.0%	Jun-21	-34.1%	97.0%	12.2%
Dometic Group AB (publ)	Sweden	Automobiles & Components	-26.5%	-30.1%	Sep-21	-85.5%	91.6%	96.6%
Polymetal International PLC	Cyprus	Materials	-76.6%	-76.9%	Aug-21	-48.3%	64.7%	1.4%
ConvaTec Group PLC	United Kingdom	Health Care Equipment & Services	-5.7%	-19.8%	Aug-21	-31.5%	79.5%	83.4%
Flutter Entertainment PLC	Ireland; Republic of	Consumer Services	-31.7%	-36.0%	Mar-21	-19.3%	80.6%	90.7%
Persimmon PLC	United Kingdom	Consumer Durables & Apparel	-19.2%	-16.0%	Aug-21	-16.3%	92.0%	27.1%
Vistry Group PLC	United Kingdom	Consumer Durables & Apparel	-5.7%	-17.3%	Sep-21	-66.0%	95.5%	11.9%
Fortum Oyj	Finland	Utilities	-14.7%	-29.5%	Oct-21	-83.1%	61.6%	1.7%
Electricite de France SA	France	Utilities	-25.9%	-32.1%	Jun-21	-4.1%	88.9%	0.9%
AzA SpA	Italy	Utilities	7.7%	-15.6%	Aug-21	-24.6%	62.6%	4.6%
AVEVA Group PLC	United Kingdom	Software & Services	-28.3%	-33.4%	Jun-21	-84.9%	61.4%	82.5%
Securitas AB	Sweden	Commercial & Professional Services	-19.7%	-23.7%	Jul-21	-64.0%	76.2%	93.8%
Hikma Pharmaceuticals PLC	United Kingdom	Pharmaceuticals, Biotechnology & Life Sciences	-6.6%	-17.2%	Aug-21	-67.2%	76.4%	32.6%
Grifols SA	Spain	Pharmaceuticals, Biotechnology & Life Sciences	-16.7%	-28.3%	May-21	-8.1%	74.2%	97.6%
Spectris PLC	United Kingdom	Technology Hardware & Equipment	-11.5%	-27.3%	Oct-21	-100%	76.0%	75.4%
DS Smith PLC	United Kingdom	Materials	-14.5%	-14.5%	Mar-21	-2.8%	70.0%	39.3%

Single Stocks

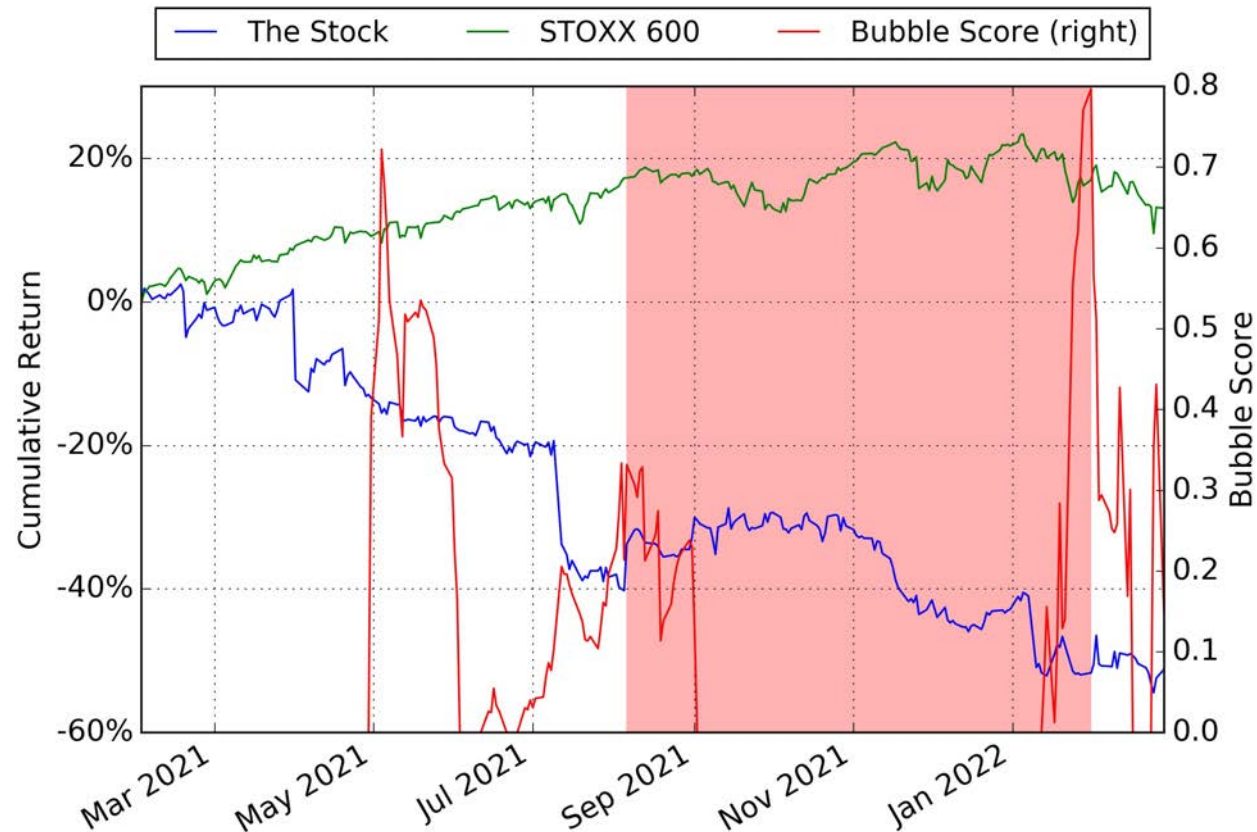
Quadrant 4 Stocks Current Month Example – Spectris PLC.



- 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 five-month bubble has reached 100% with a negative bubble size -27.3%. 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

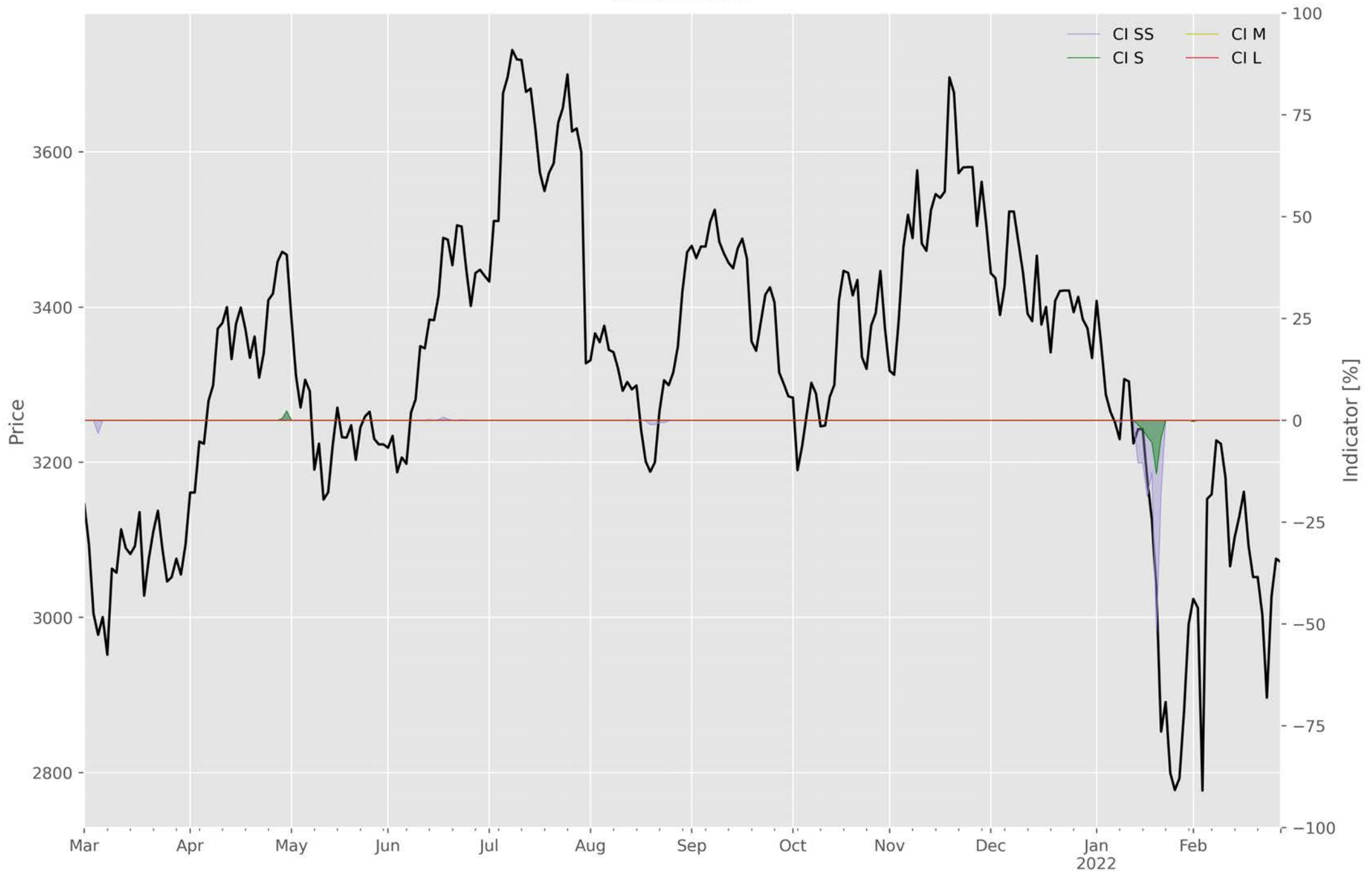
Quadrant 4 Stocks Last Month Example – Atos SE.



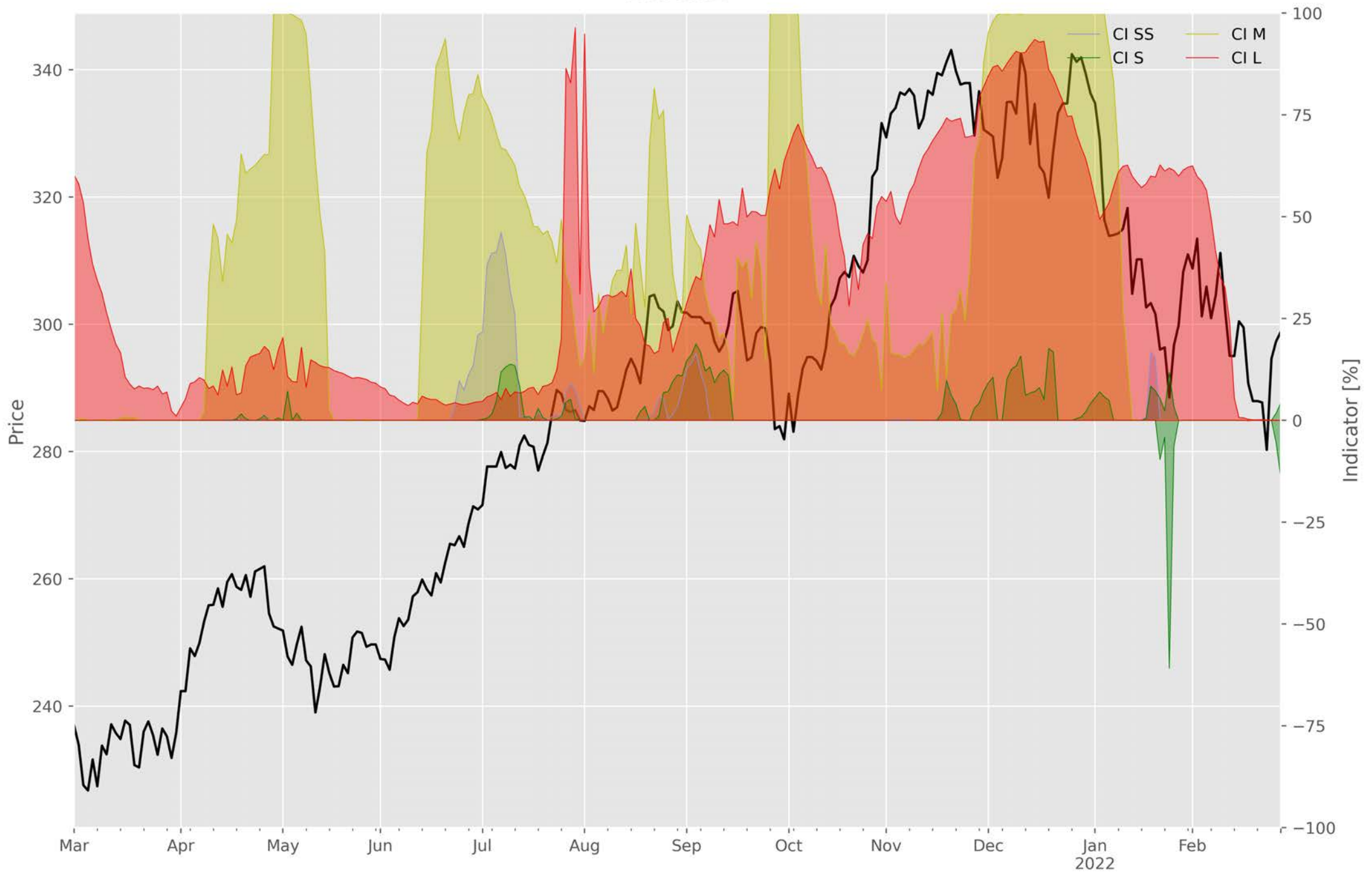
- The figure above plots the one-year cumulative return of the stock (blue), STOXX 600 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period delineates the time interval within which the strong negative bubble was identified and reported last month. The stock price has outperformed the market in the past month, although not yet into a strong rebound. We still see a medium bubble score identified this month, showing that the negative bubble is not yet at the end.

Appendix

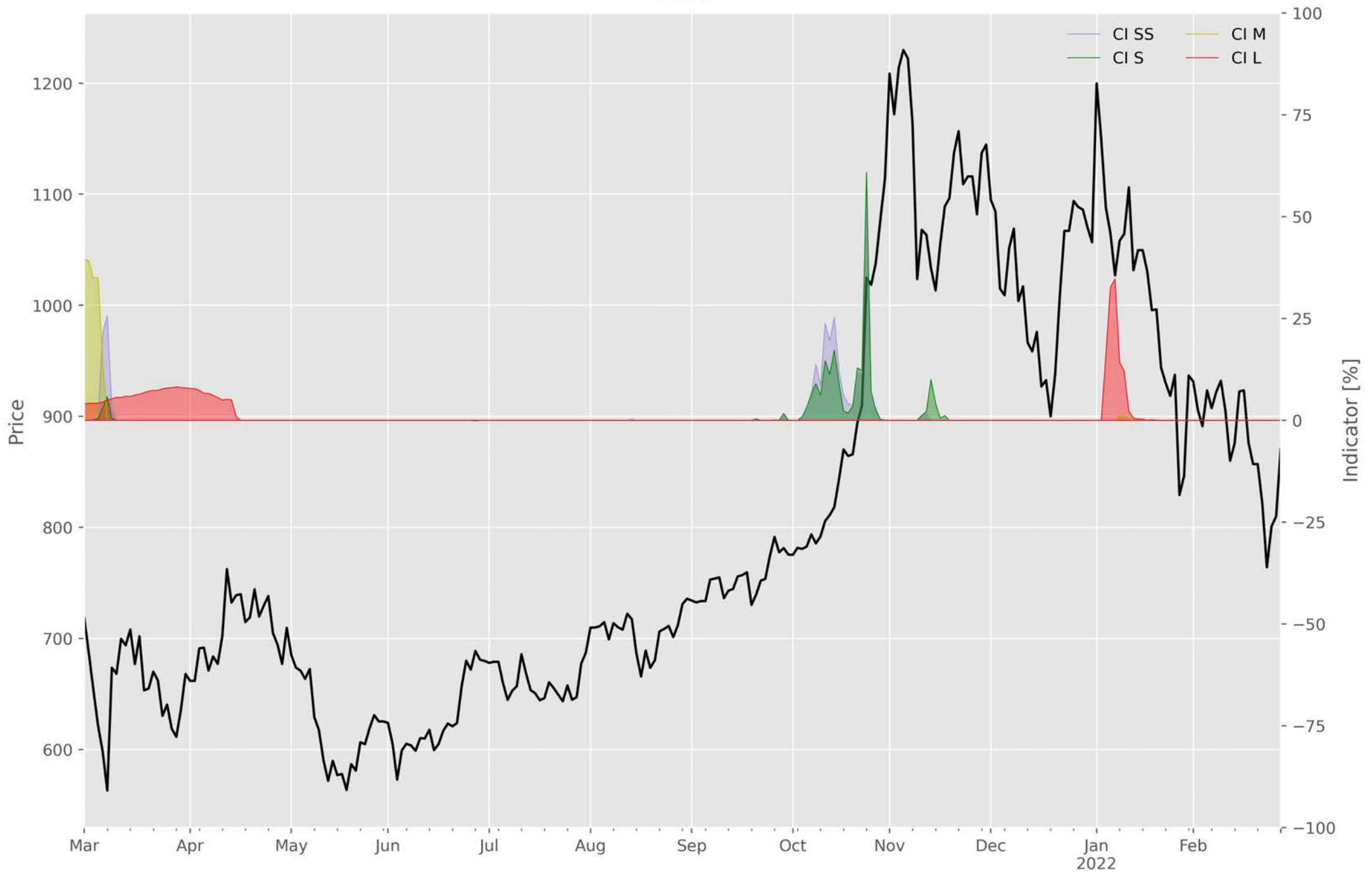
Amazon.Com



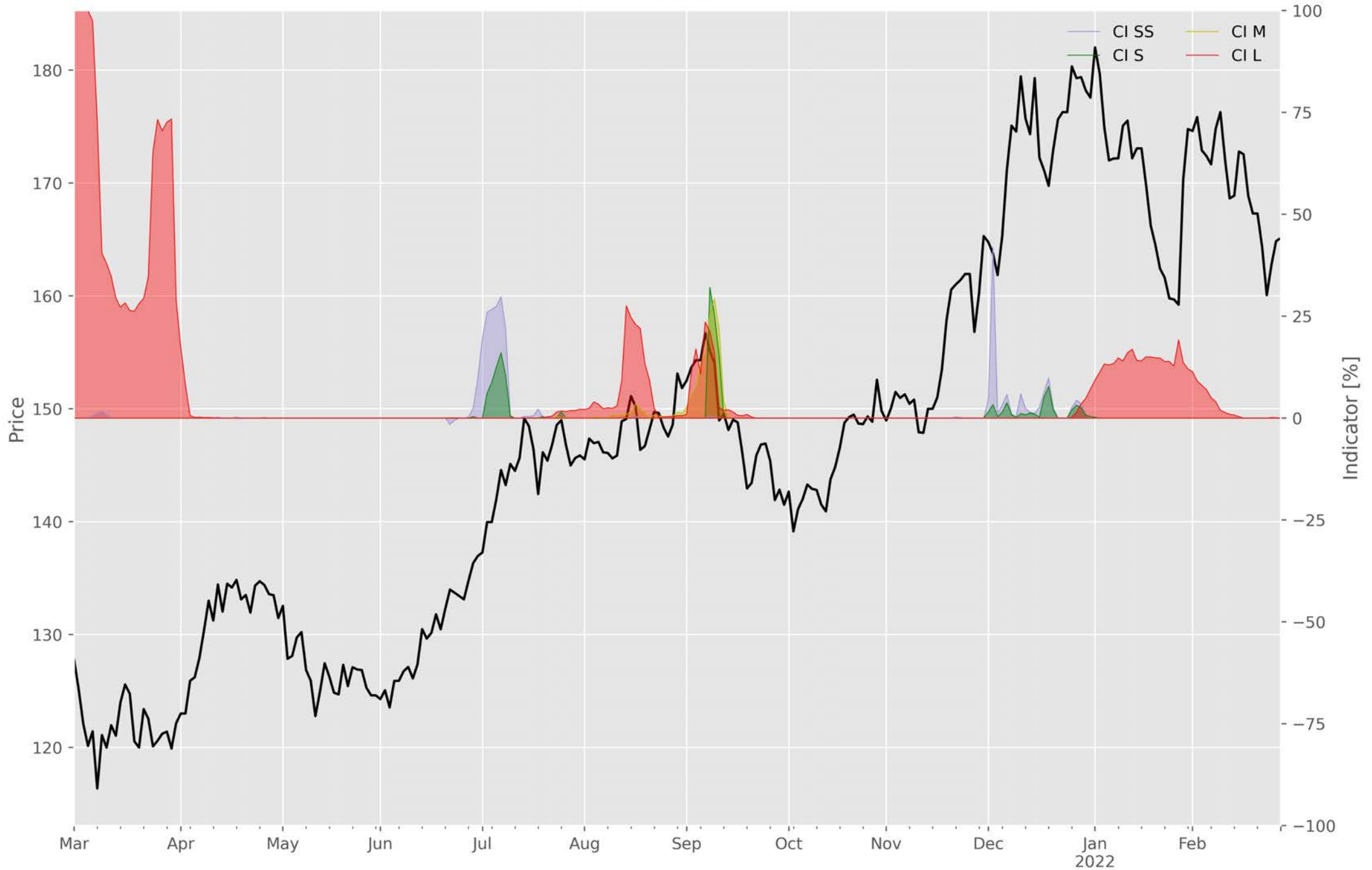
Microsoft



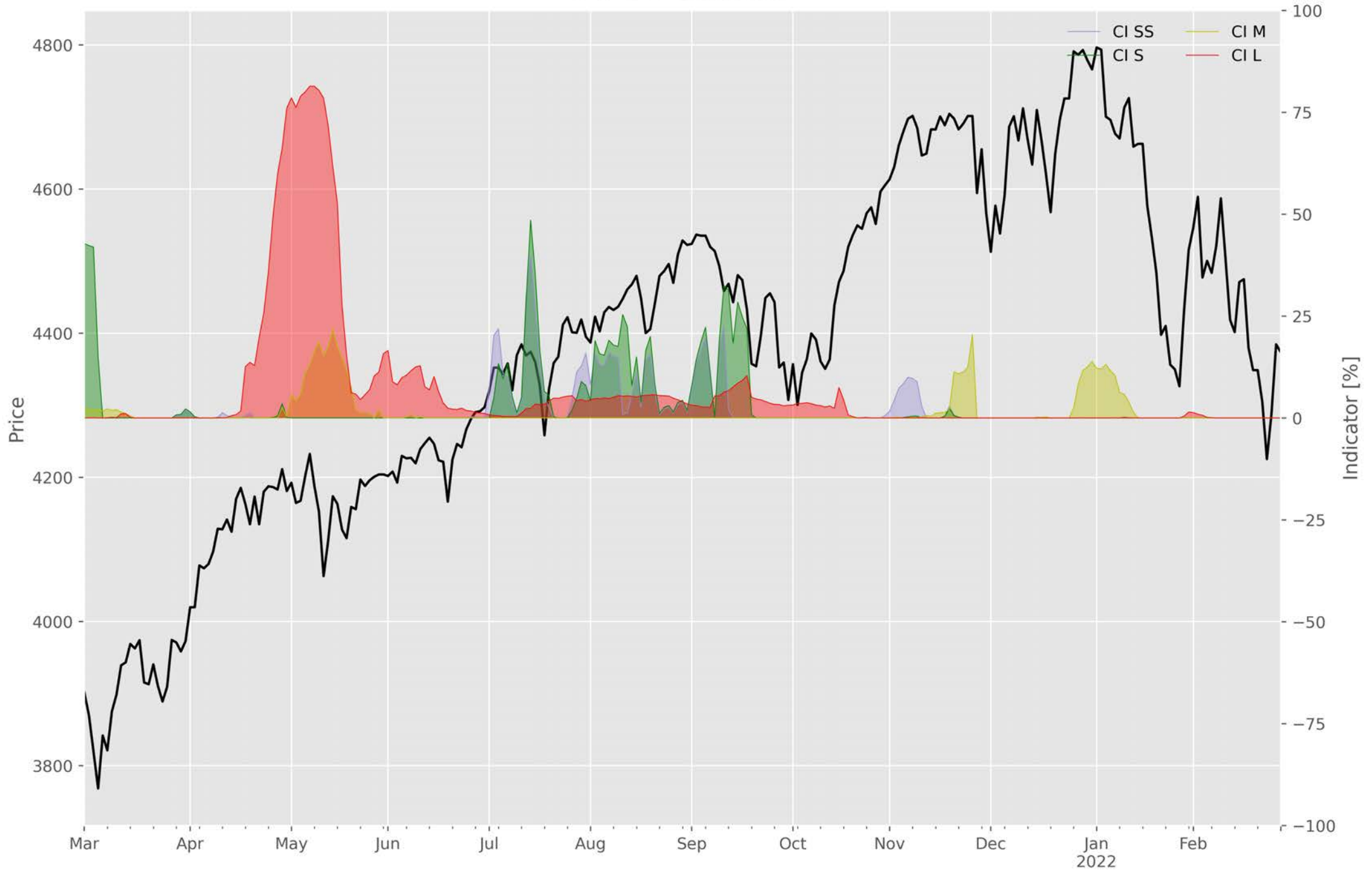
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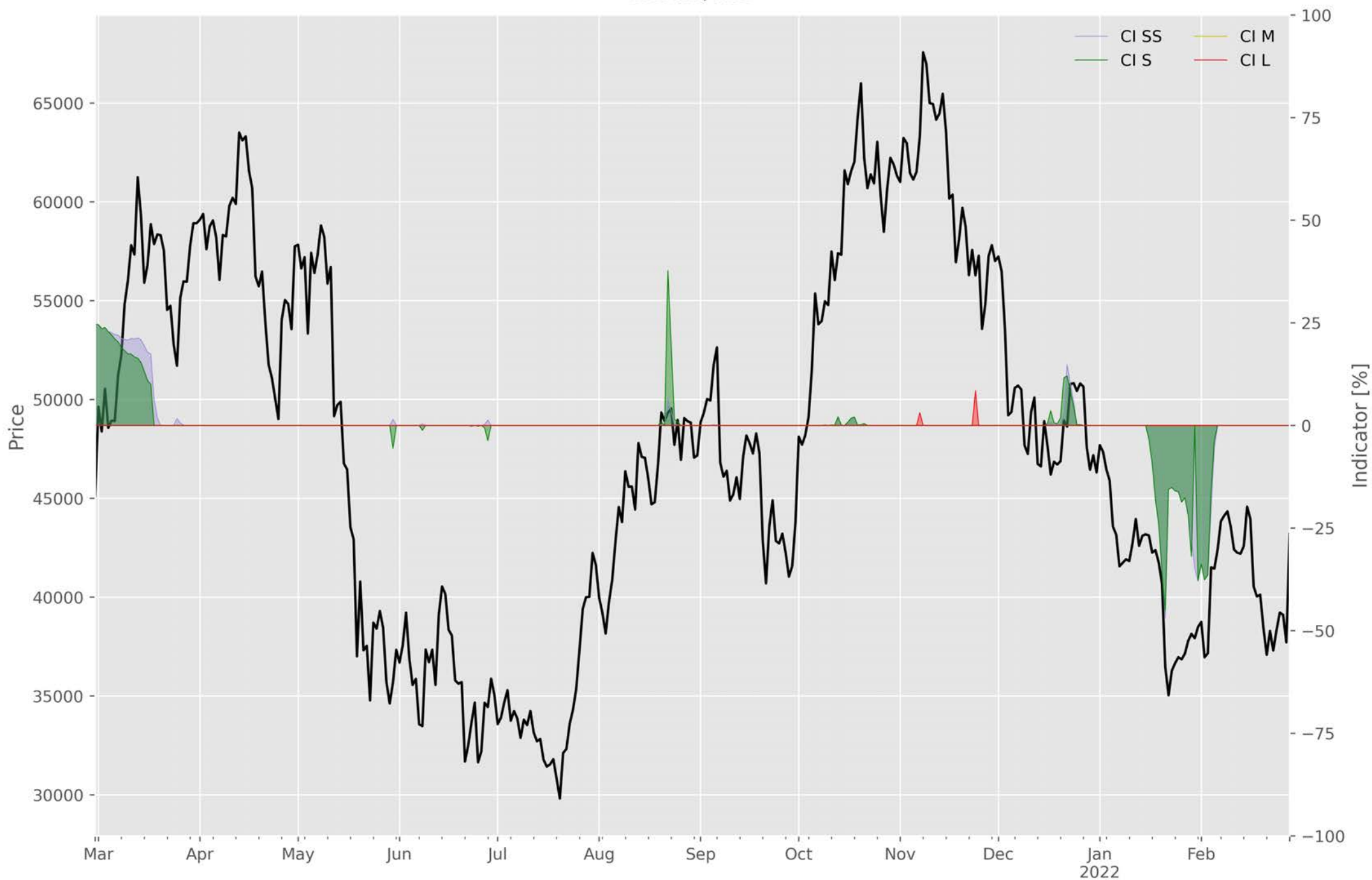
Apple



S&P 500 Composite



Bitcoin/USD



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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