



## The FCO Cockpit Global Bubble Status Report April 2022



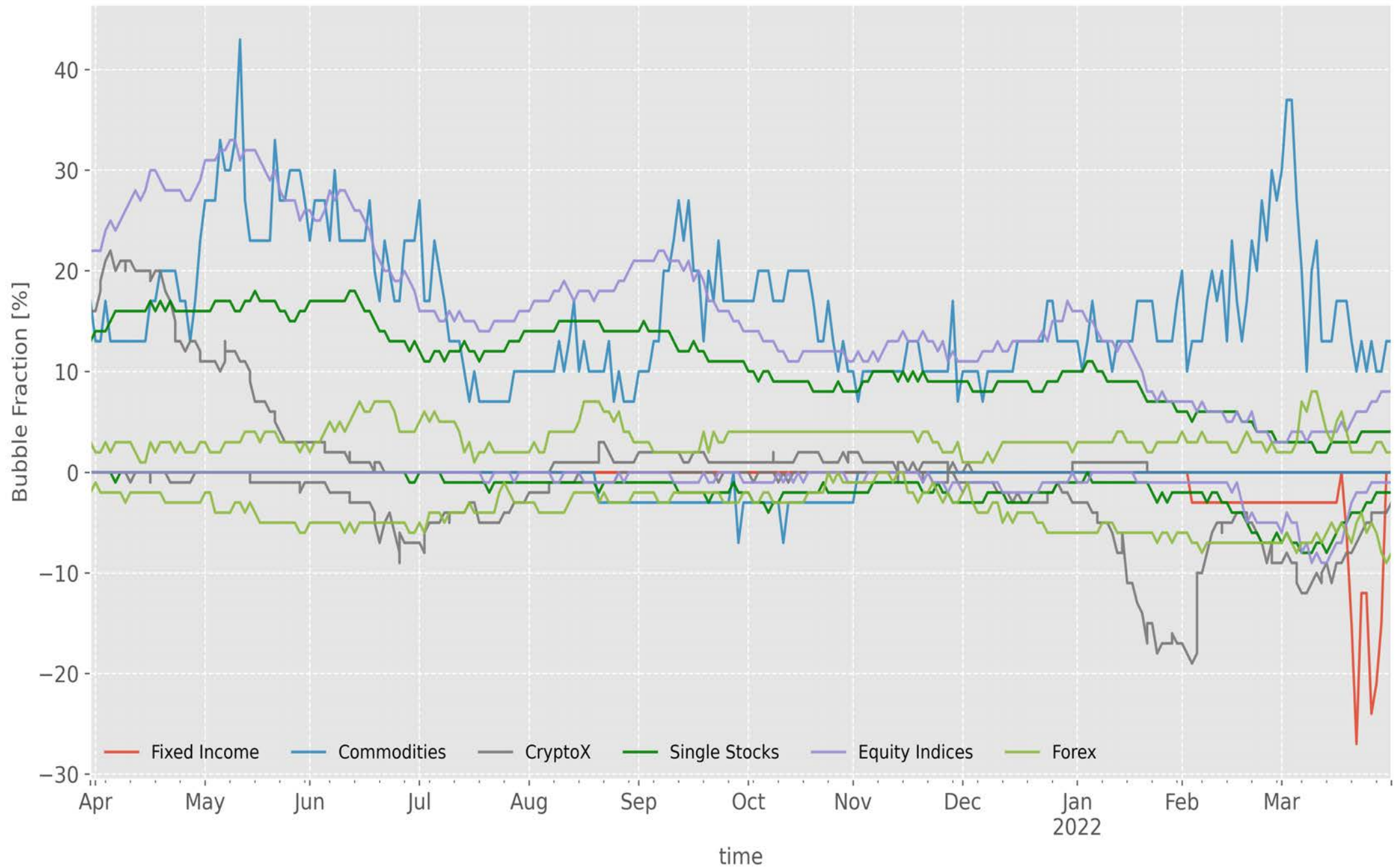
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# Purpose and Benefits

- ▶ 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 2022-03-31

|                       | Region        | Analyzed Assets | Fraction of Pos. Bubbles [%] | Fraction of Neg. Bubbles [%] |
|-----------------------|---------------|-----------------|------------------------------|------------------------------|
| <b>Fixed Income</b>   |               | 33              | 0                            | 0                            |
| <b>Commodities</b>    |               | 30              | 13                           | 0                            |
| <b>Single Stocks</b>  |               | 1604            | 4                            | 2                            |
|                       | Europe        | 935             | 2                            | 3                            |
|                       | United States | 656             | 7                            | 2                            |
| <b>Equity Indices</b> |               | 857             | 8                            | 1                            |
|                       | Europe        | 52              | 0                            | 0                            |
|                       | United States | 376             | 13                           | 1                            |
|                       | Global        | 383             | 6                            | 1                            |
| <b>Forex</b>          |               | 97              | 2                            | 8                            |
| <b>CryptoX</b>        |               | 456             | 0                            | 3                            |

- ▶ In the fixed income sector, no bubble signal is observed by April 1<sup>st</sup> 2022.
- ▶ In the commodities sector, the positive bubble fraction has dropped considerably from 27% to 13%, while the negative bubble activity remains zero.
- ▶ In the single stocks sector, bubble activities remain at a low level with negative bubble signal falling slightly from 6% to 2%.
- ▶ In the equity indices sector, the positive bubble fraction has increased from 5 % to 8%, while its negative counterpart has decreased from 4 % to only 1%.
- ▶ In the Forex sector, the positive and negative bubble levels remain generally unchanged and low at 2% and 8%, respectively.
- ▶ In the CryptoX sector, the negative bubble signal continues declining from 9% to 3% with the positive bubble fraction remaining zero.



# FCO Market Outlook

## Asset Allocation during the Stagflation

Traditionally, equity tends to underperform in a stagflation (inflation+stagnation or recession) environment. Lower growth leads to lower expected earnings, while higher interest rates result in a higher cost of capital and a spike in the equity risk premium. The bond market also faces headwinds as higher inflation leads to higher yields. However, commodities, gold, and partial inflation-hedged REITs might immunize or benefit from inflation. We have already witnessed the S&P500 correction and Bond market carnage.

## China's economy walks on thin ice

The fear of escalating geopolitical tension, technology industry regulations, and the lockdown of major cities due to the COVID-19 outbreaks put tremendous pressure on the Chinese stock market, property market, and general economic activities.

1. Property sector: The property market downturn, auditor resignations (fear of litigation risks), credit rating downgrade, and strict lockdown make the once-shiny property developers now fallen from grace. Over thirty listed developers have been suspended from trading due to the difficulty of meeting their financial reporting deadline. Recent data indicates that the total revenue of the top 100 developers has dropped 47% YoY in Q1 2022.

2. Technology sector: The Chinese technology sector is under pressure from both anti-monopoly regulation and U.S. scrutiny. The Chinese central government is restricting the disorderly expansion of capital, leading to weak earning expectations. In addition, the China Securities Regulatory Commission (CSRC) has decided to give full access of auditing reports to U.S. SEC (except for data-sensitive companies). Otherwise, the SEC may delist all Chinese American Depository shares. The regulatory uncertainties from both countries led to significant stock prices drop (around 70% drop for the Golden Dragon China Index from its peak in February 2021) and massive large-scale layoffs in the Chinese Tech companies.

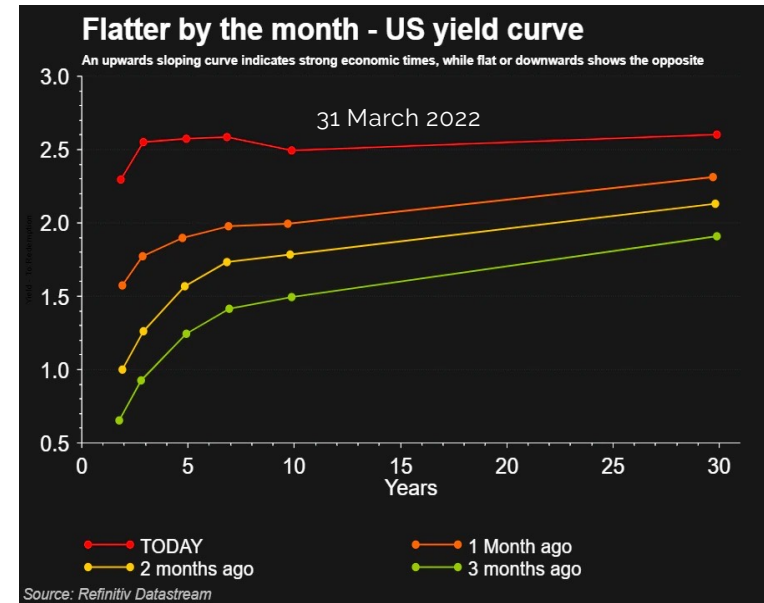
3. Supply Chain and Domestic Consumptions: The outbreak of Omicron in Shanghai, Shenzhen, and some major Chinese metropolitan cities results in strict lockdowns and travel restrictions. The secondary disasters of the pandemic might also impact the survival of the small and mid-size enterprises (SMEs), leading to a wave of unemployment. In addition, the strict lockdown also paralyzes the manufacturing production and international logistics (ports) in some major cities, which will delay the international supply chain and further increasing the global inflation risk.

**Fix income:** If people tell you that the inverted 2yr-10yr yield curve is not a big deal, you need to question their incentives. The high inflation, the rate-hike expectation, and the quantitative tapering (QT) make investors exit the bond market. The global bond index has plunged 11% from its peak in January 2021. The Russia-Ukraine war is not settled yet, and the market is pricing more than seven rate hikes due to uncontrollable inflation amplified by the successive waves of unprecedented sanctions against Russia. We expect the bear bond market won't stop unless the war-related risks are mitigated, the supply chain problems are solved, and global oil production suddenly increase. Besides, the U.S. China yield gap keeps narrowing, as a result of the opposite monetary policies in the two countries.

**U.S. Equity:** Softbank stock price had dropped by more than 40% from its peak in March 2021, and ARK Innovation ETF has plunged by around 60% from its top in February 2021. Both Masayoshi Son and Catherine Wood are aggressive disruptive technology investors who had excellent portfolio performance when the U.S. yields were lower and various forms of QEs at full speed. However, when liquidity begins to shrink (QT) and inflation heats up, the unprofitable growth stocks lost their “magic power”.

**Emerging Markets:** The current economic scenario reminds us of the stagflation back in the 1980s, when the Iranian Revolution disrupted the global oil supply in 1979. The U.S. inflation suddenly soared to 13.5% in 1980, and the former Federal Reserve Chairman Paul Volcker raised the interest rate to 20% in 1981 to curb the out-of-control inflation. The highly indebted Latin American countries found themselves in a desperate liquidity crunch and capital outflowed, then the Latin American Debt Crisis occurred. Similarly, the Russia-Ukraine war is aggravating inflation in the U.S. already caused by the supply chain problems created by the responses to the pandemic. The war also pushes the energy price higher. The Federal Reserve Chairman Jerome Powell, once again, has to raise the interest rate. What's worse, the global agriculture price is also increasing significantly as some major agriculture areas are strongly affected by war, drought, COVID-19 lockdowns, lack of labour, soaring fertilizer prices, and war directly (Russia and Ukraine account for 1/4 of global wheat trade; 1/5 of corn trade). We, at the Global Financial Crisis Observatory, see vulnerabilities and potential crisis precursors in some middle east, north African countries (MENA) and some Asian countries, whose energy and/or agriculture sectors are highly dependent on imports.

**Commodities:** Although president Biden decided to release the U.S. oil reserve (1 million barrels per day for 180 days), we have to say that these 180 million barrels can only support around nine days of U.S. total oil consumption (the U.S. consumed 19.8 million barrels per day in 2021 on average). The current drop in oil prices is mainly caused by the lockdowns of some major metropolitan cities in China, rather than the release of oil reserve. The U.S. also plans to send LNG to Europe to replace Russian gas, which will be much more expensive. In addition, the uranium price also increases, as nuclear power accounts for 20% of U.S. electricity production, while 16% of uranium comes from Russia.



# Fixed Income

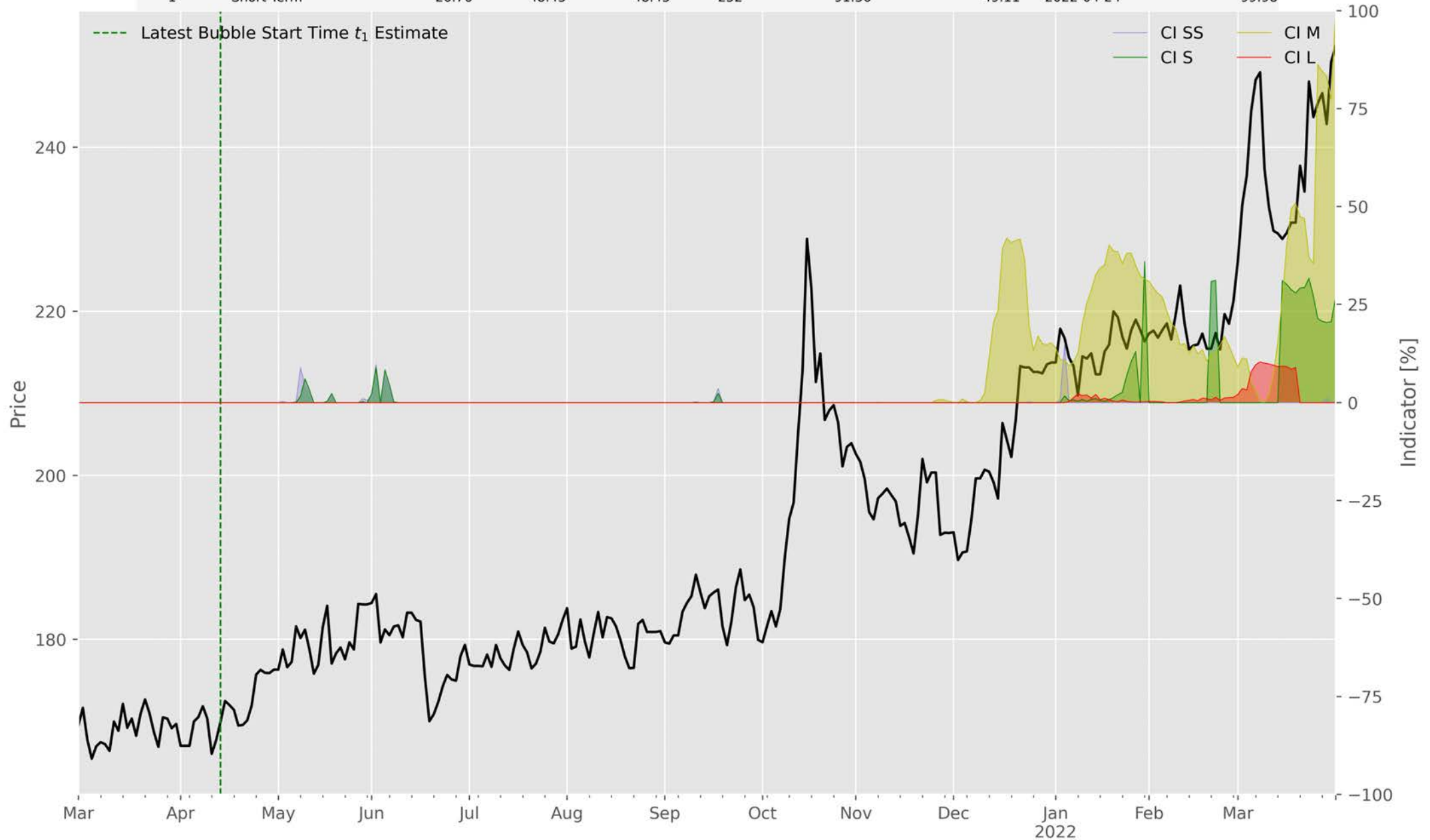
No bubbles to report

# Commodities



## Mlcx Zinc Spot Index

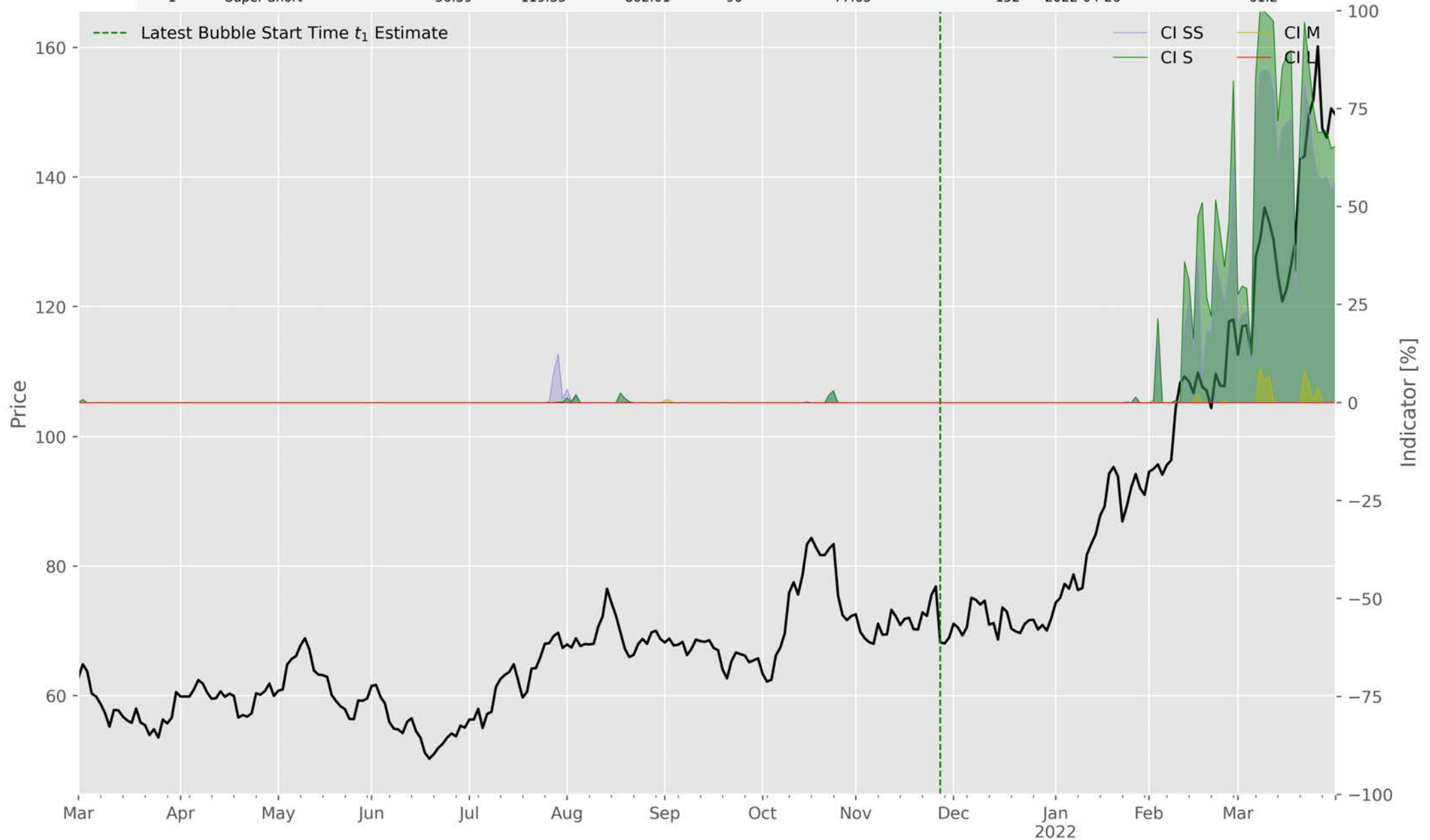
| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Short Term       | 26.76                                | 48.45                        | 48.45                        | 252                | 91.36                            | 49.11                                      | 2022-04-24                   | 99.98                       |



# Single Stocks

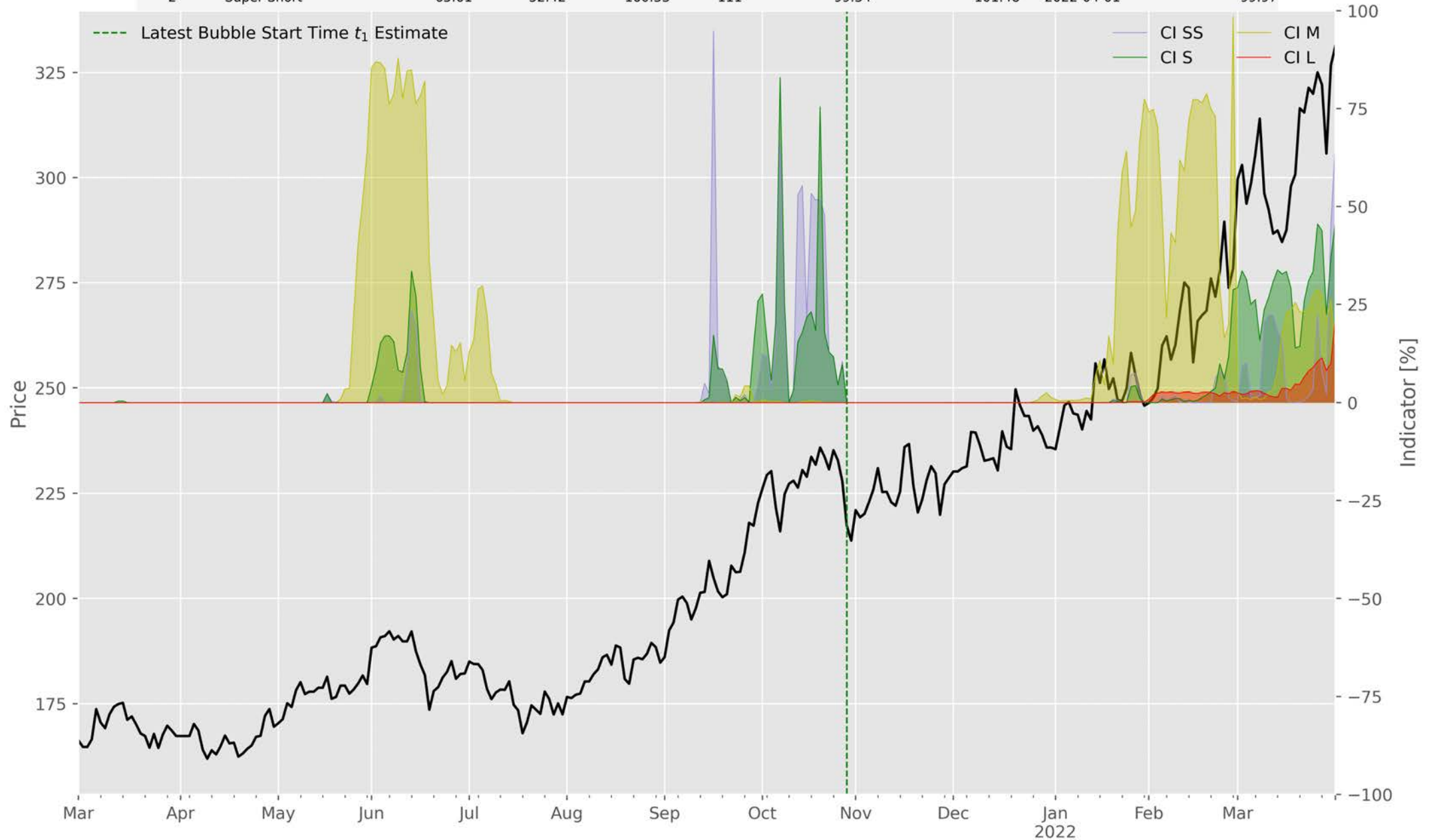
# Eramet

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Super Short      | 56.39                                | 119.35                       | 802.01                       | 90                 | 77.65                            | 152  | 2022-04-26                   | 61.2                        |



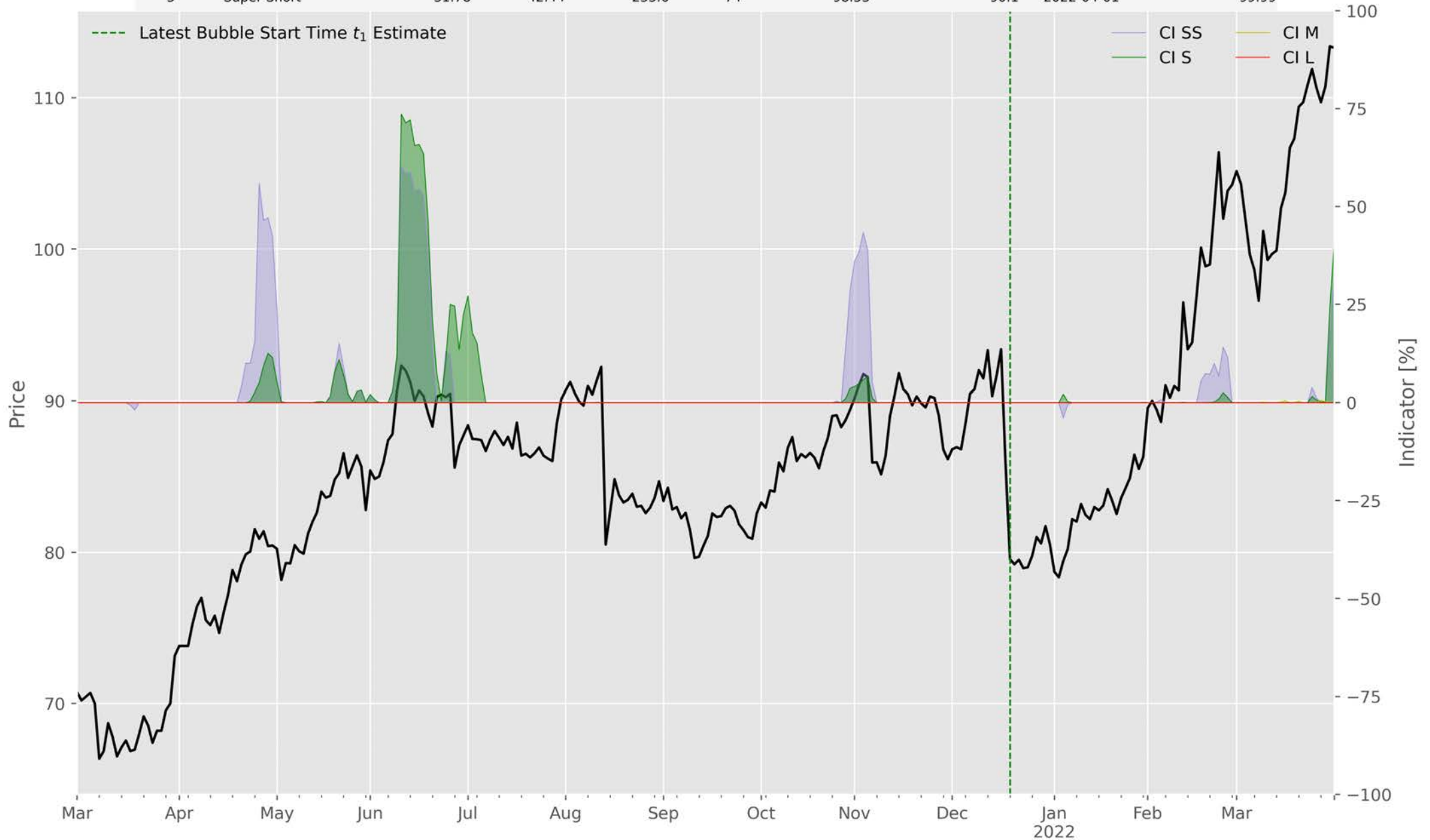
# Equinor

| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | ( $ci, bg, bp$ )  | $\hat{t}_c$   | [%]                  |
| 2    | Super Short      | 65.61               | 52.42       | 160.33      | 111      | 99.34           | 101.48            | 2022-04-01    | 99.97                |



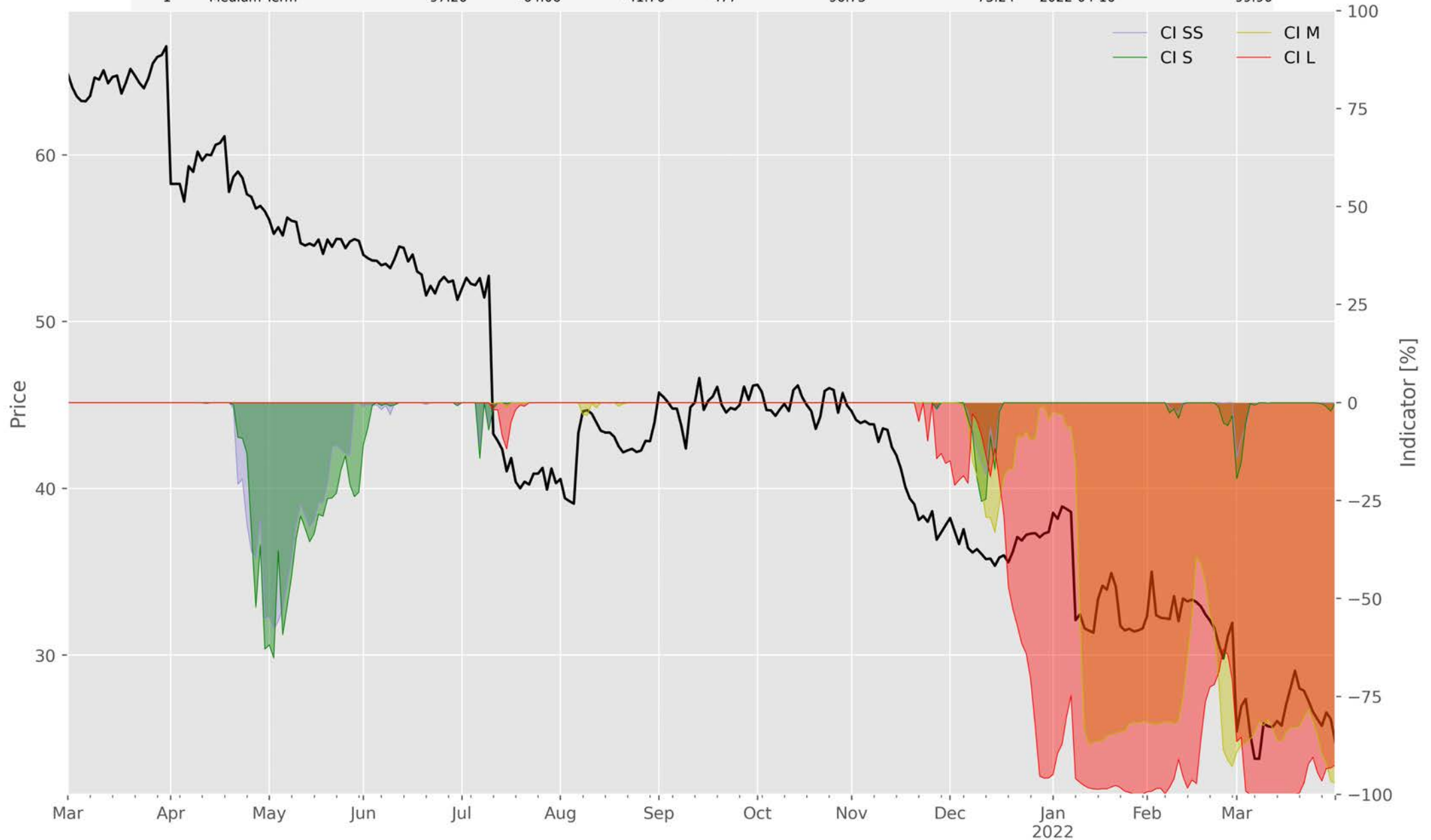
# Ipsen

| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | $(ci, bg, bp)$    | $\hat{t}_c$   | [%]                  |
| 3    | Super Short      | 31.78               | 42.44       | 233.6       | 74       | 98.53           | 90.1              | 2022-04-01    | 99.99                |



# Atos

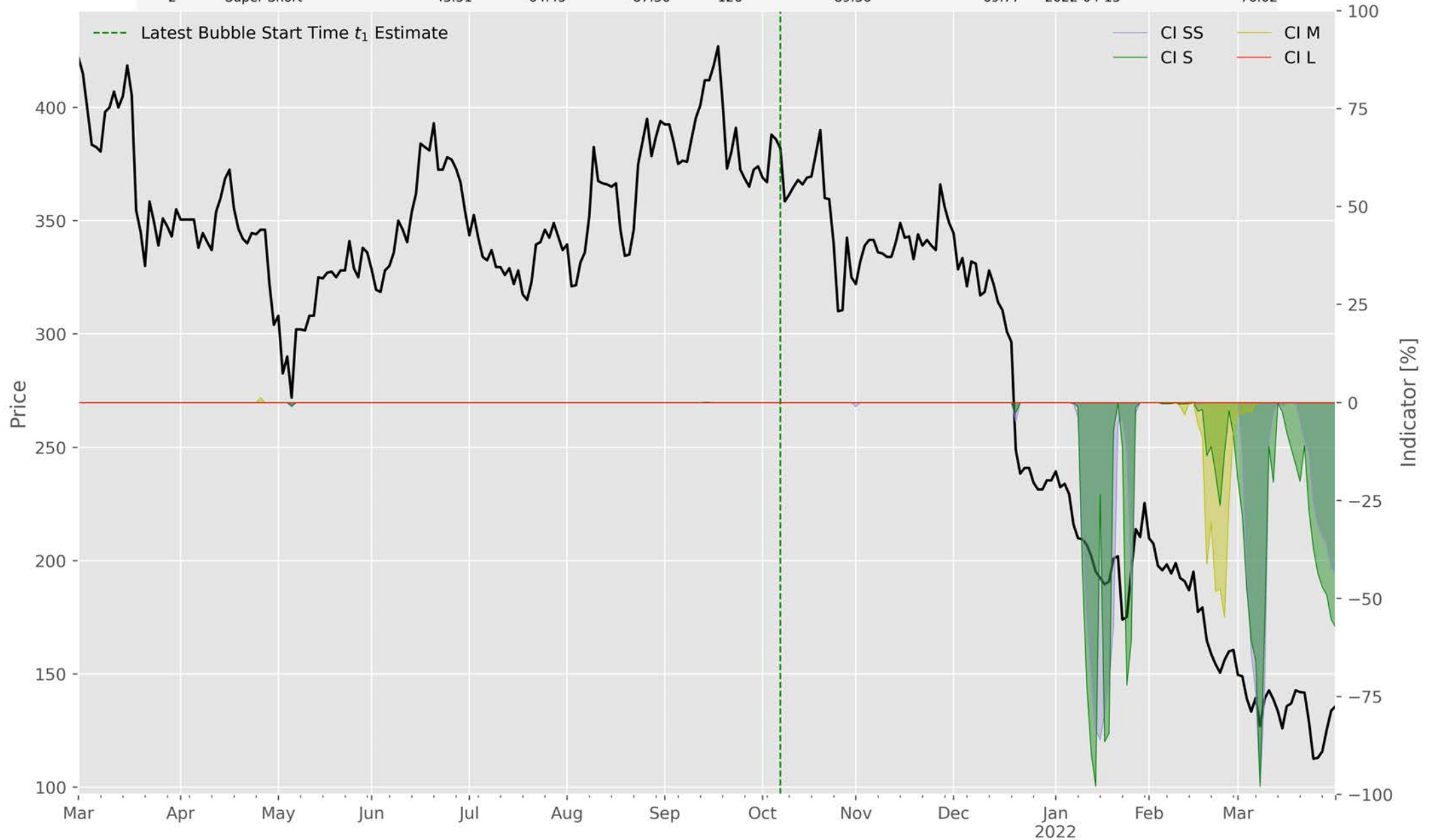
| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | ( $ci, bg, bp$ )  | $\hat{t}_c$   | [%]                  |
| 1    | Medium Term      | 97.26               | -64.06      | -41.76      | 477      | 96.73           | 73.24             | 2022-04-16    | 99.96                |





## Zur Rose

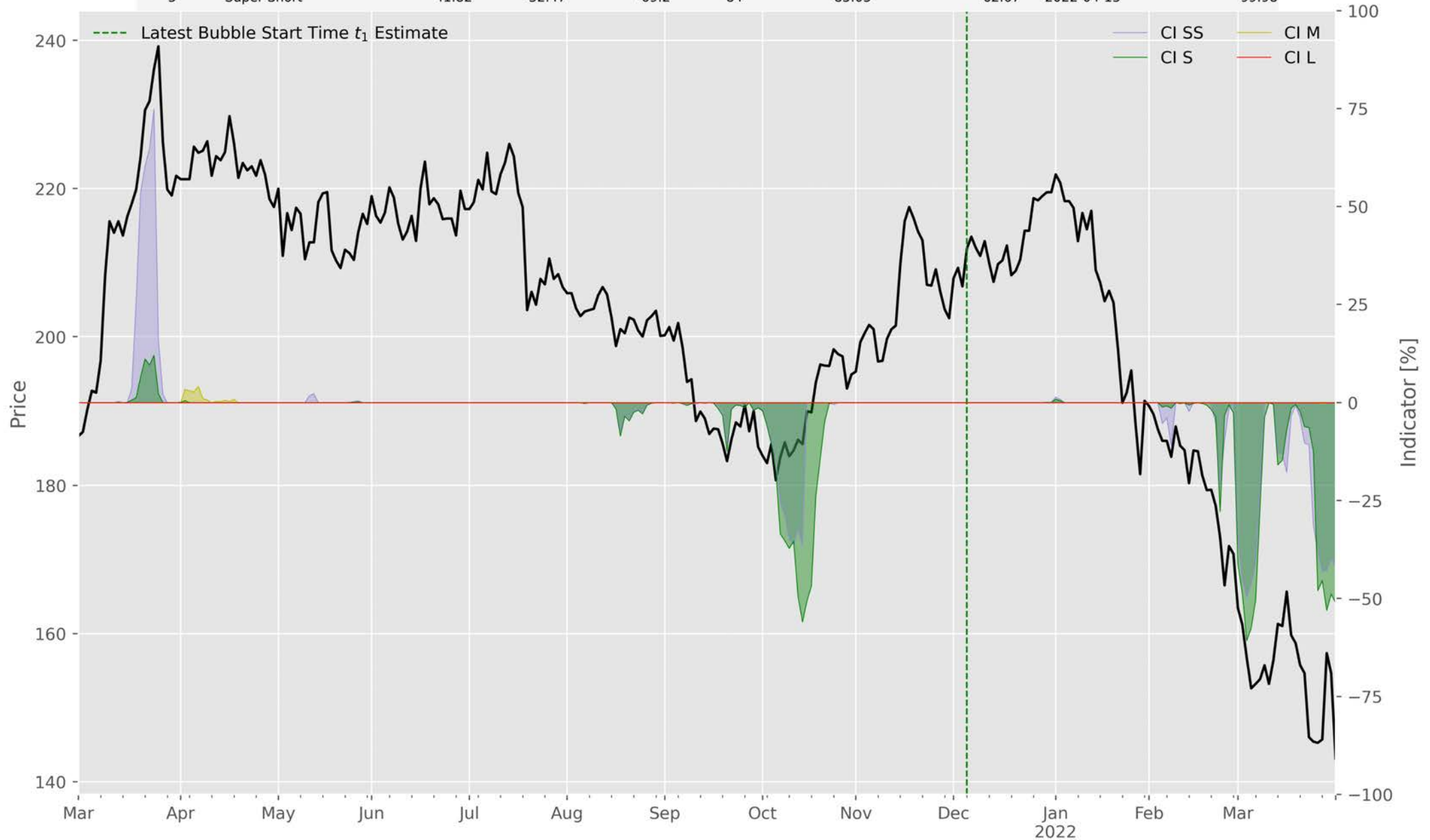
| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 2    | Super Short      | 43.51                                | -64.45                       | -87.36                       | 126                | 89.36                            | 69.77  | 2022-04-15                   | 76.02                       |





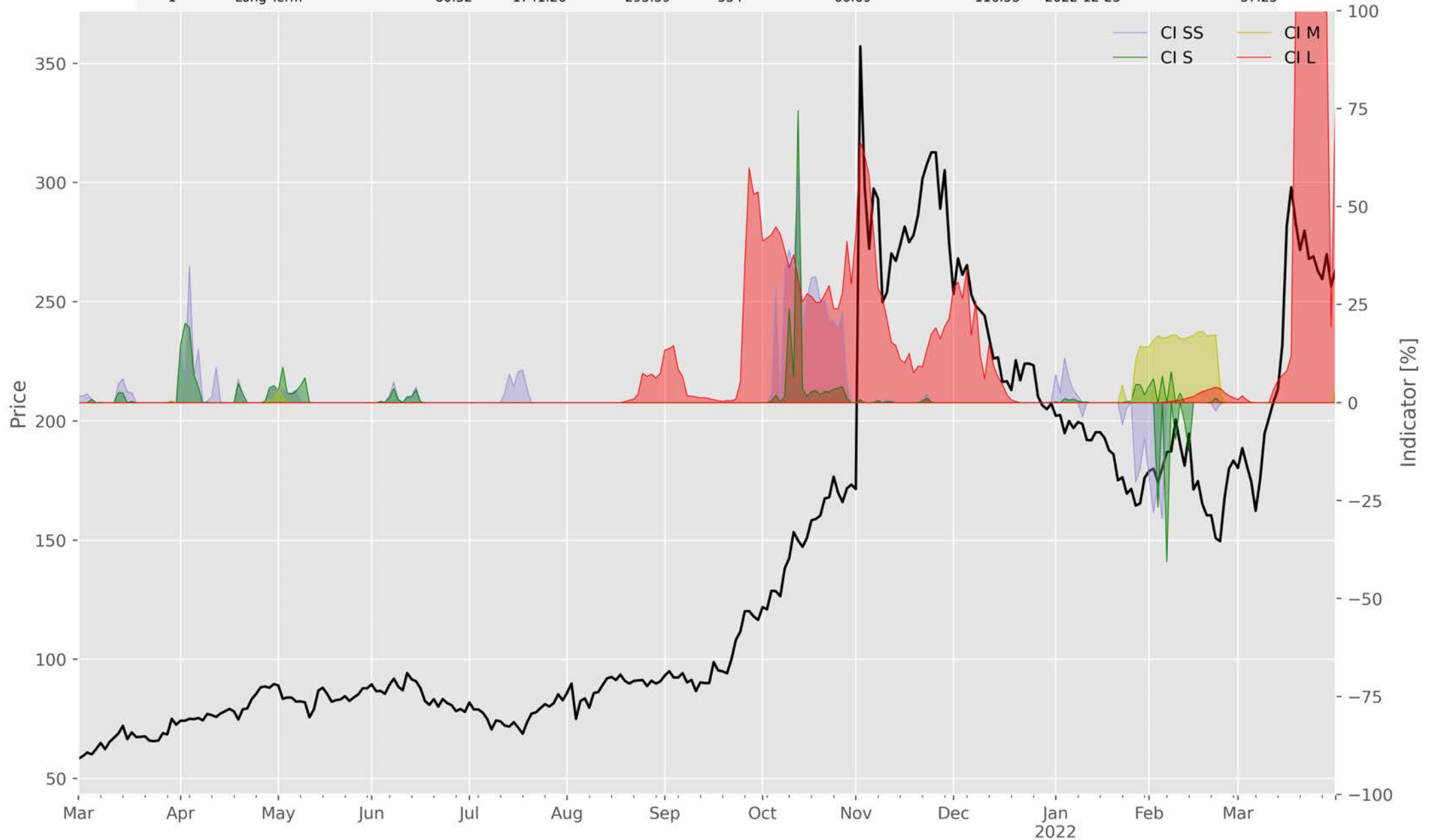
## Electrolux B

| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | $(ci, bg, bp)$    | $\hat{t}_c$   | [%]                  |
| 3    | Super Short      | 41.82               | -32.47      | -69.2       | 84       | 85.05           | 62.67             | 2022-04-15    | 99.98                |



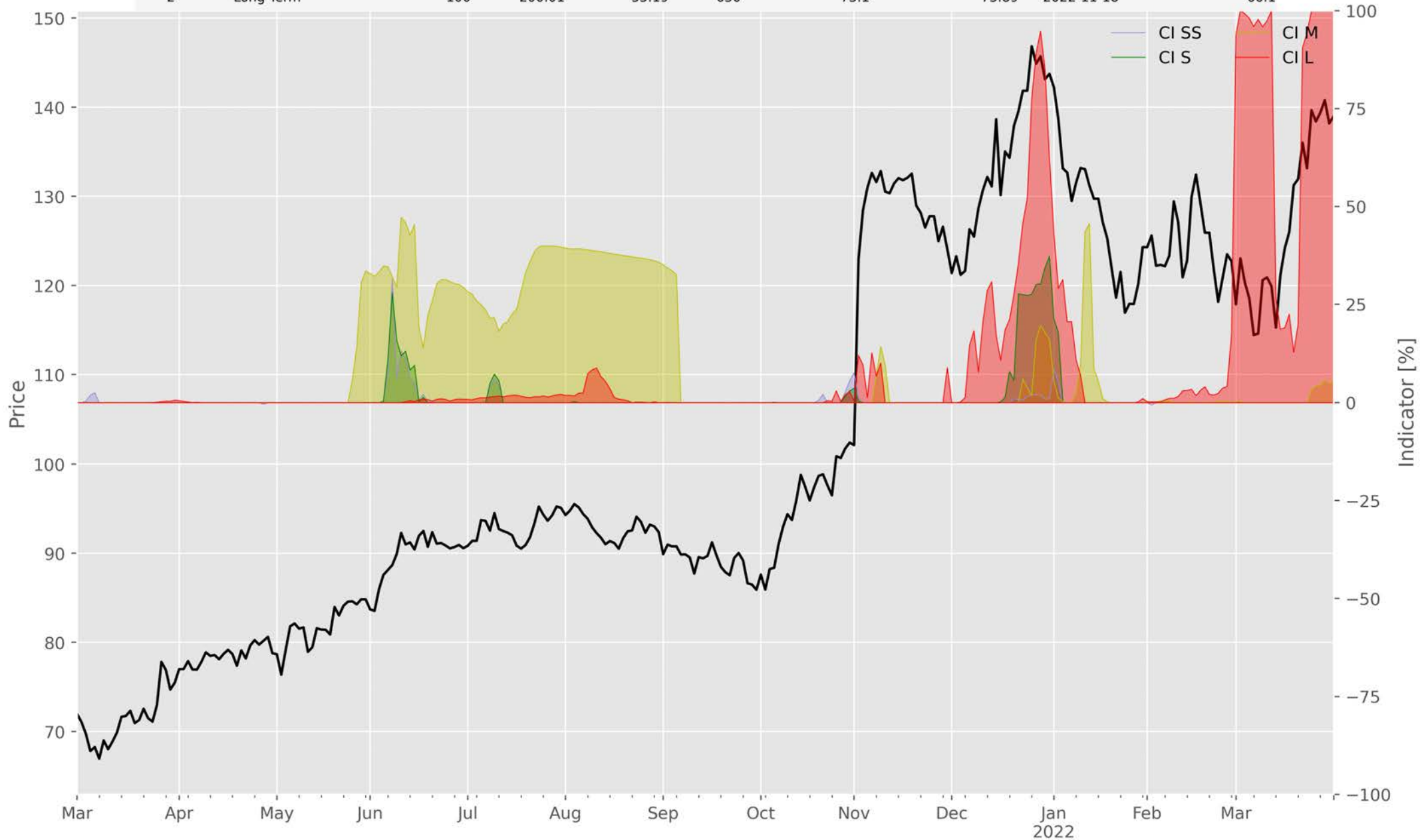
## Avis Budget Group

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Long Term        | 80.32                                | 1741.26                      | 295.39                       | 534                | 66.69                            | 116.53   | 2022-12-23                   | 37.25                       |



# Arista Networks

| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | $(ci, bg, bp)$    | $\hat{t}_c$   | [%]                  |
| 2    | Long Term        | 100                 | 200.01      | 55.19       | 630      | 73.1            | 73.89             | 2022-11-18    | 66.1                 |



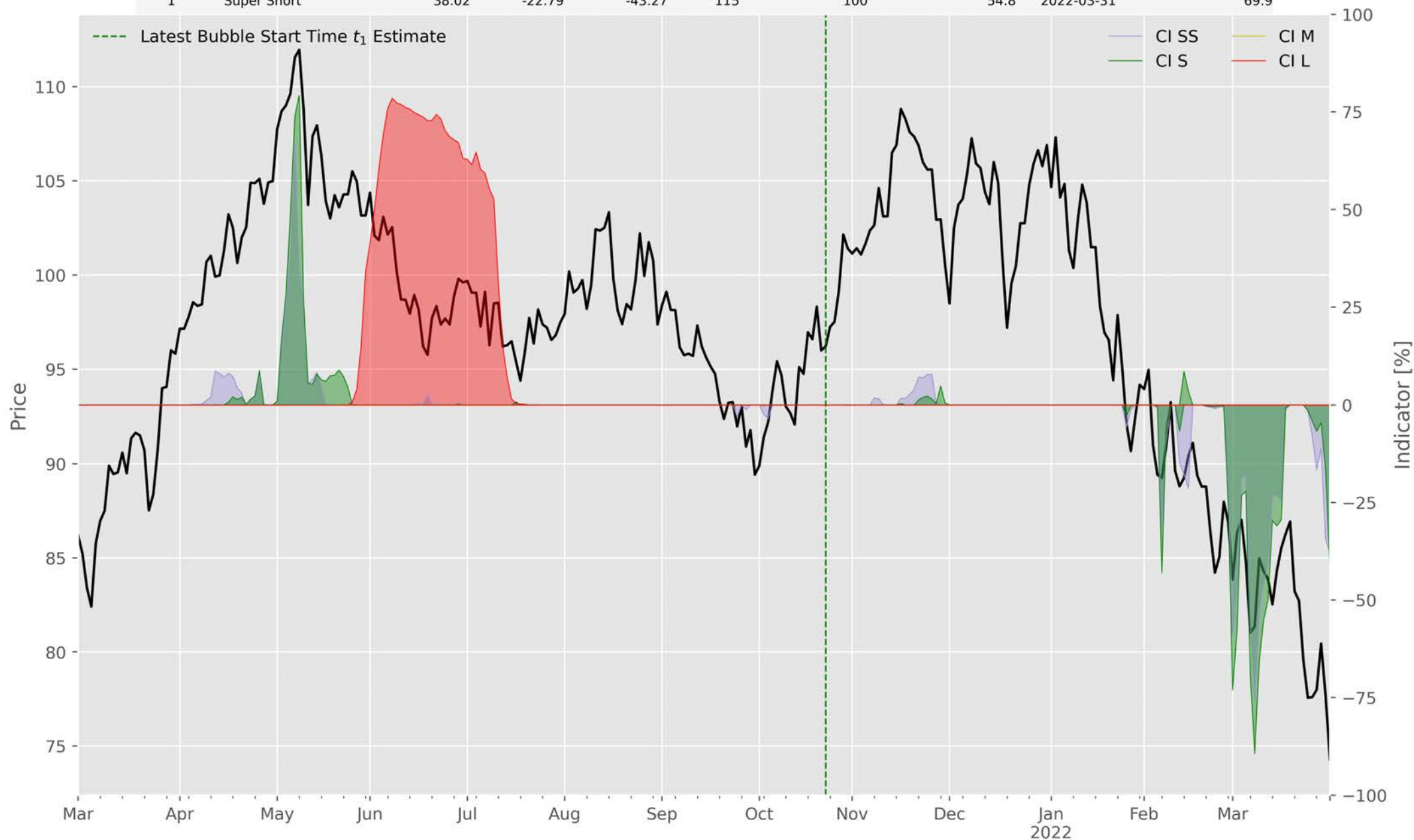
# Atmos Energy

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 3    | Super Short      | 50.75                                | 29.6                         | 70.84                        | 122                | 94.32                            | 69.73  | 2022-04-07                   | 99.98                       |



## Fortune Bns.Hm.& Scty.

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Super Short      | 38.02                                | -22.79                       | -43.27                       | 115                | 100                              | 54.8                                       | 2022-03-31                   | 69.9                        |





# Leggett&Platt

| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | $(ci, bg, bp)$    | $\hat{t}_c$   | [%]                  |
| 2    | Short Term       | 42.17               | -37.82      | -39.67      | 237      | 80.55           | 51.27             | 2022-05-27    | 53.44                |



# Gap

| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | ( $ci, bg, bp$ )  | $\hat{t}_c$   | [%]                  |
| 3    | Short Term       | 32.97               | -57.29      | -57.44      | 251      | 66.67           | 50.17             | 2022-08-03    | 59.83                |

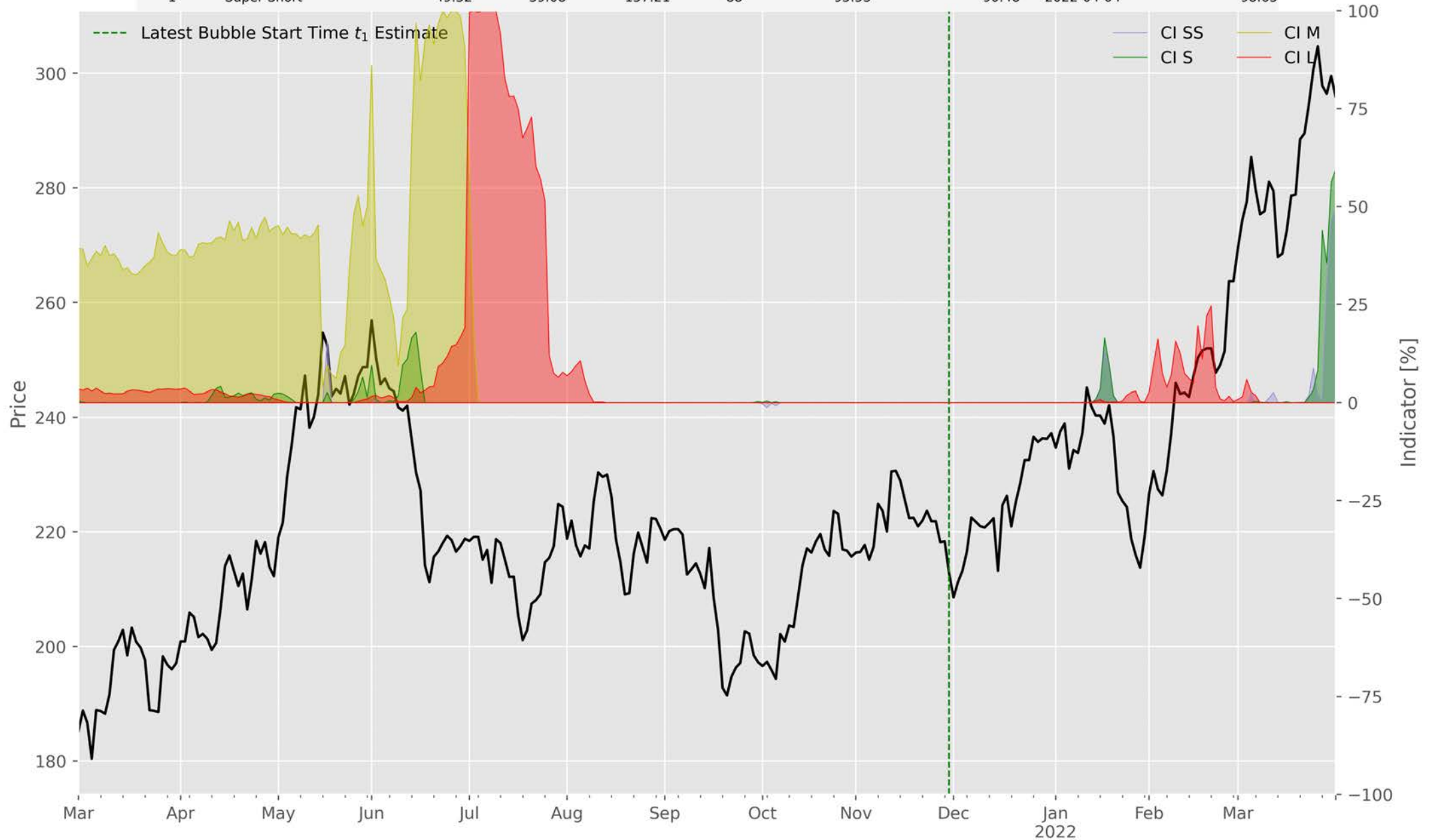




# Equity Indices

## S&P500 Metals & Mining

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Super Short      | 49.32                                | 39.08                        | 157.21                       | 88                 | 95.53                            | 90.48                                      | 2022-04-04                   | 98.65                       |



## S&P500 Gas Utilities

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 2    | Super Short      | 50.75                                | 29.6                         | 70.84                        | 122                | 94.32                            | 69.74  | 2022-04-07                   | 99.98                       |



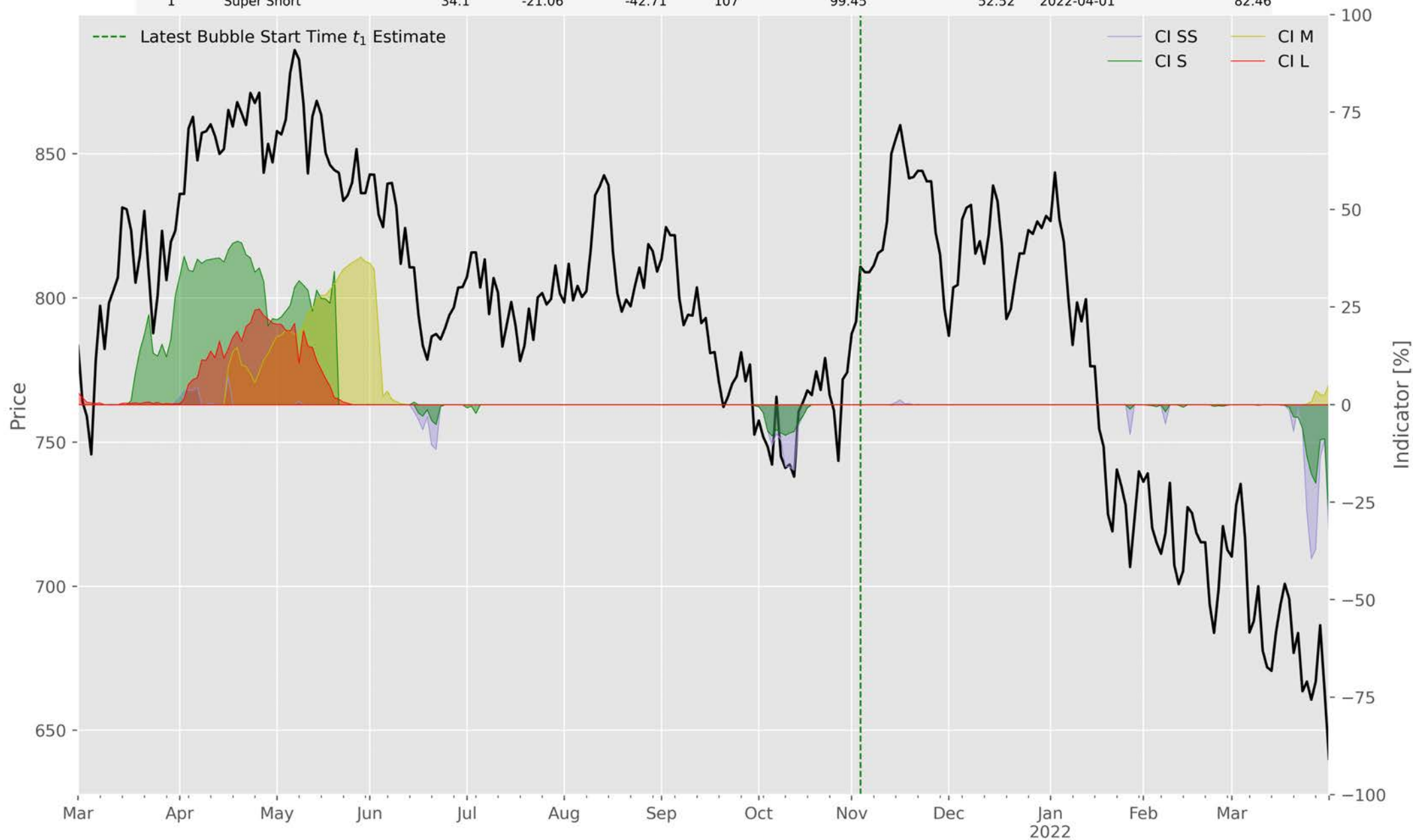
## S&P500 Gas Utilities Si

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 3    | Super Short      | 50.75                                | 29.6                         | 70.84                        | 122                | 94.32                            | 69.74                                      | 2022-04-07                   | 99.98                       |



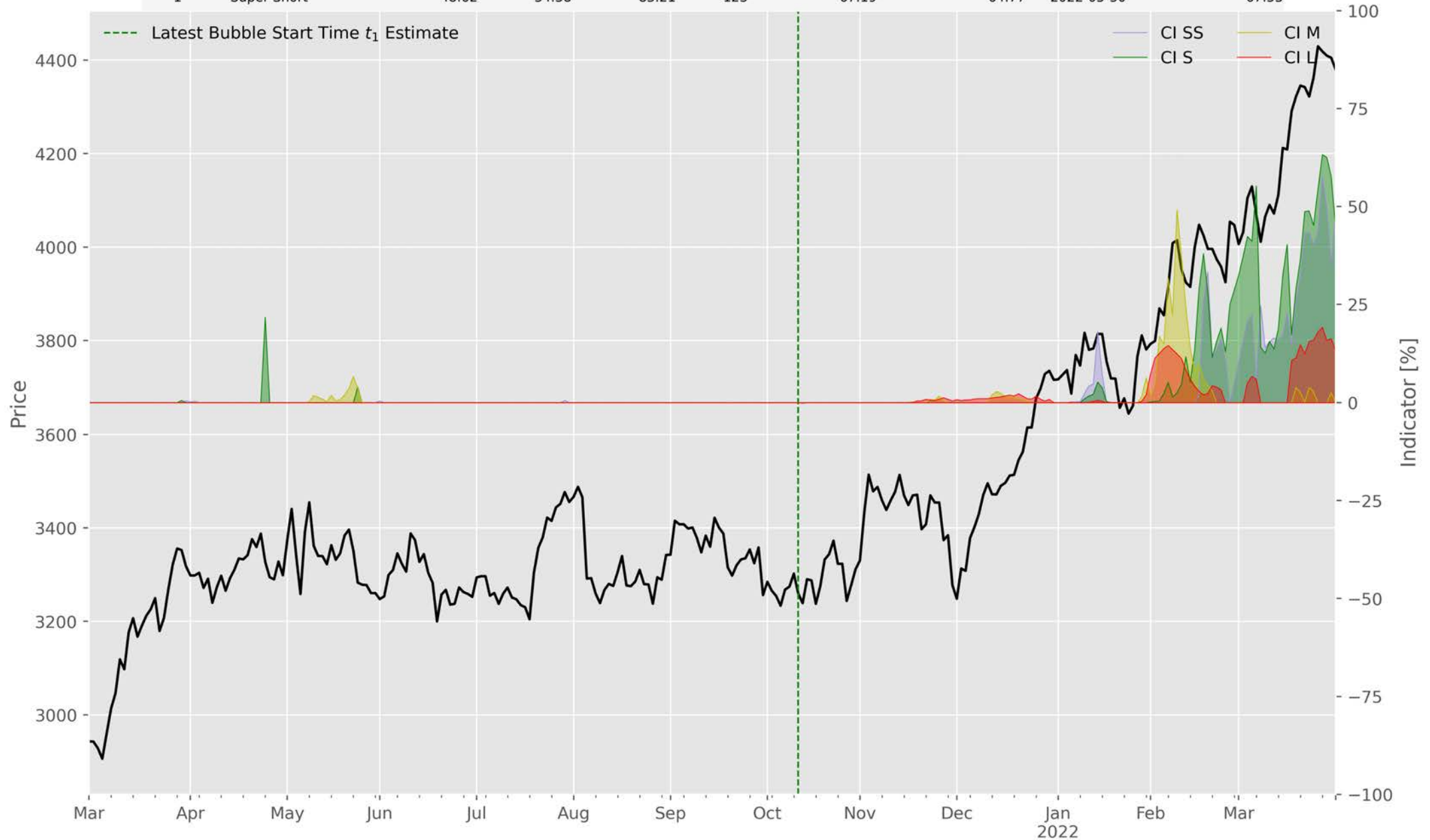
## S&P1500 Household Appliances

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Super Short      | 34.1                                 | -21.06                       | -42.71                       | 107                | 99.45                            | 52.52  | 2022-04-01                   | 82.46                       |



## S&P Global 1200 H/C Distributors

| Rank | Strongest Signal | DS-LPPLS Confidence<br>$ci$ [%] | Bubble Size<br>$bs$ [%] | Bubble CAGR<br>$bg$ [%] | Duration<br>[days] | Bubble Progress<br>$bp$ [%] | Geometric Average<br>( $ci, bg, bp$ ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|---------------------------------|-------------------------|-------------------------|--------------------|-----------------------------|---------------------------------------|------------------------------|-----------------------------|
| 1    | Super Short      | 48.62                           | 34.38                   | 83.21                   | 123                | 67.19                       | 64.77                                 | 2022-05-30                   | 67.53                       |





## Stoxx Europe 600 Basic Resource E

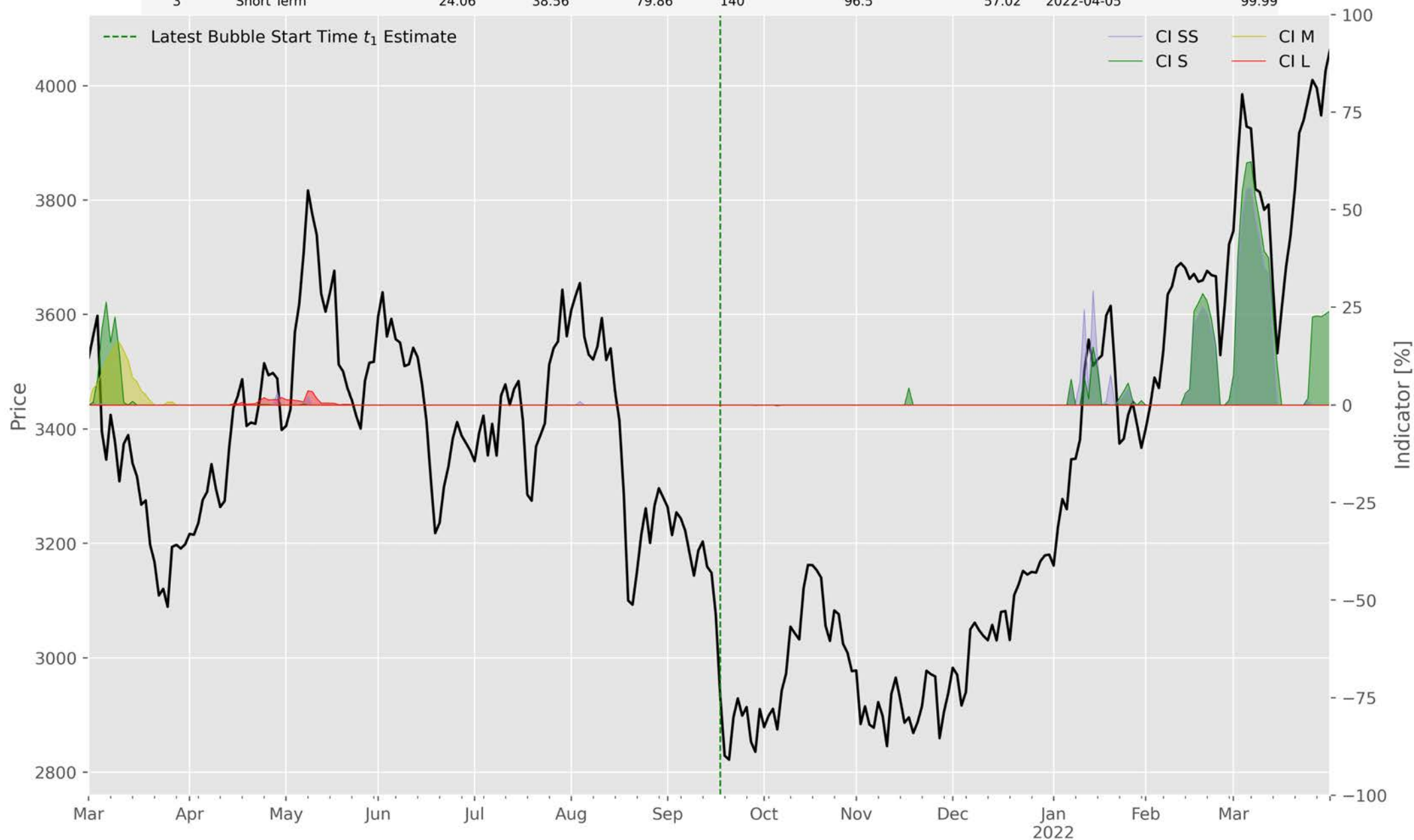
| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 2    | Super Short      | 39.38                                | 27.59                        | 62.8                         | 126                | 94.52                            | 61.6                                       | 2022-04-07                   | 66.37                       |





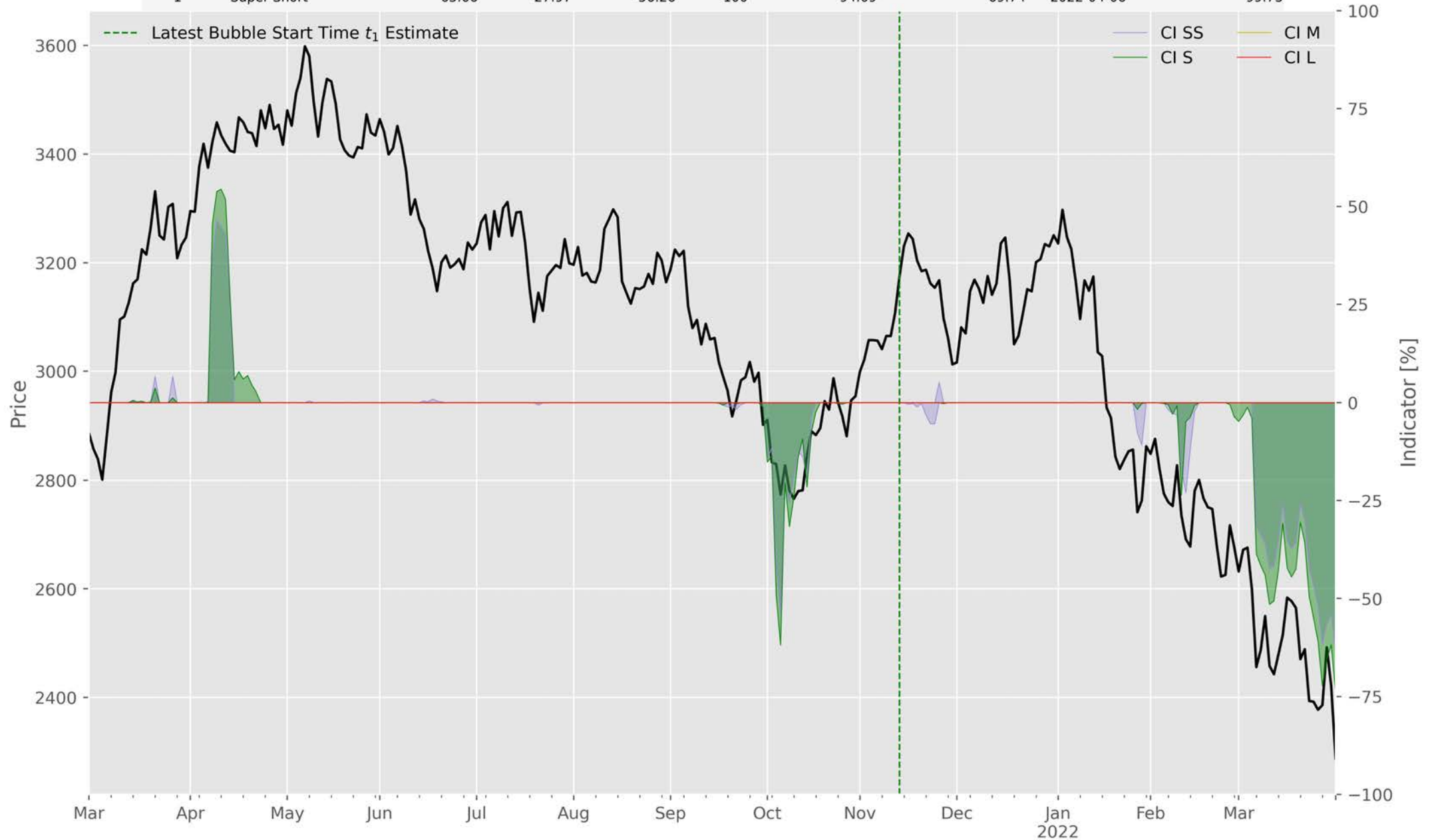
## S&P Global 1200 Div Met & Min

| Rank | Strongest Signal | DS-LPPLS Confidence<br>$ci$ [%] | Bubble Size<br>$bs$ [%] | Bubble CAGR<br>$bg$ [%] | Duration<br>[days] | Bubble Progress<br>$bp$ [%] | Geometric Average<br>( $ci, bg, bp$ ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|---------------------------------|-------------------------|-------------------------|--------------------|-----------------------------|---------------------------------------|------------------------------|-----------------------------|
| 3    | Short Term       | 24.06                           | 38.56                   | 79.86                   | 140                | 96.5                        | 57.02                                 | 2022-04-05                   | 99.99                       |



## S&P Global 1200 H/H Appliances

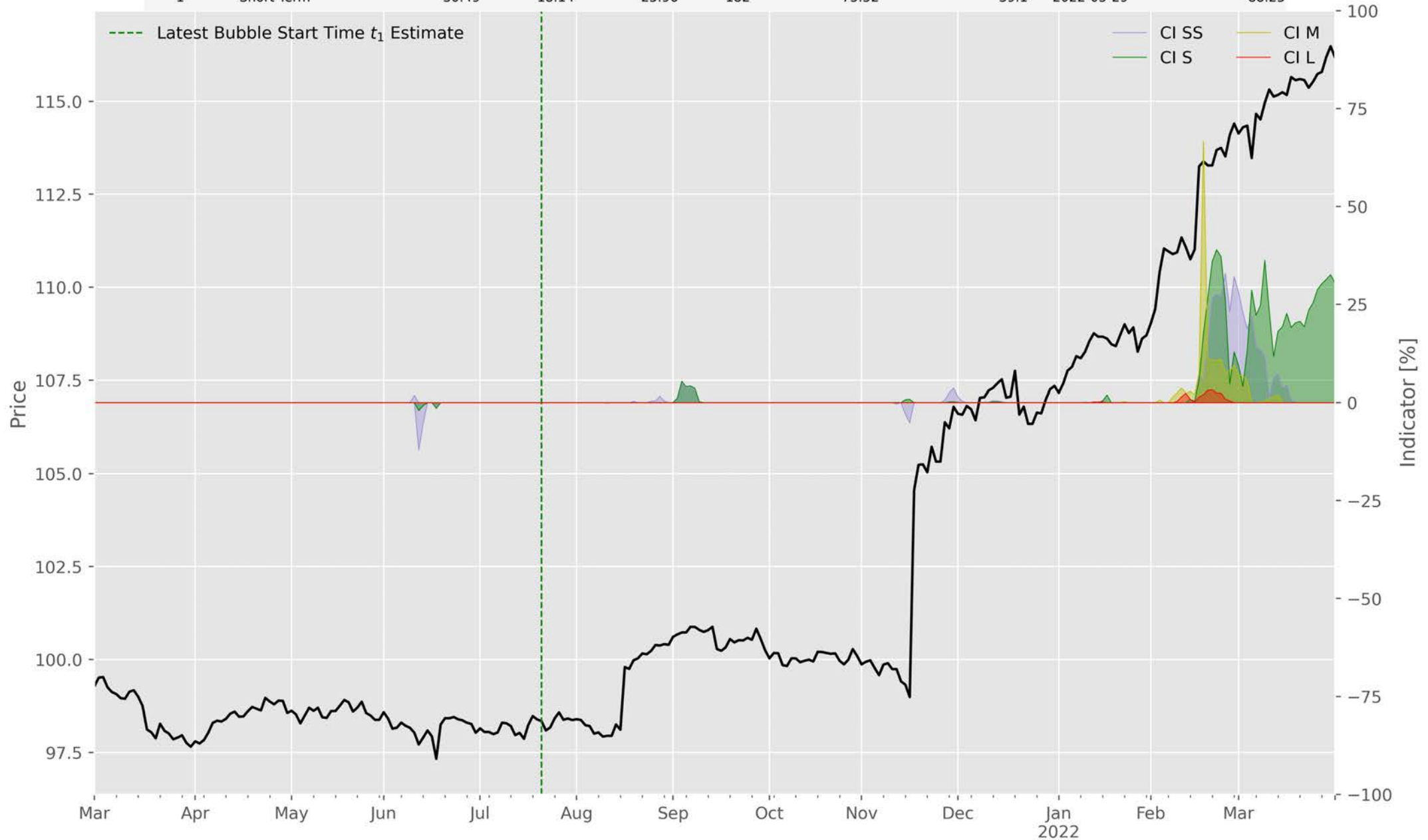
| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Super Short      | 63.66                                | -27.97                       | -56.26                       | 100                | 94.69                            | 69.74  | 2022-04-06                   | 99.73                       |



# Forex

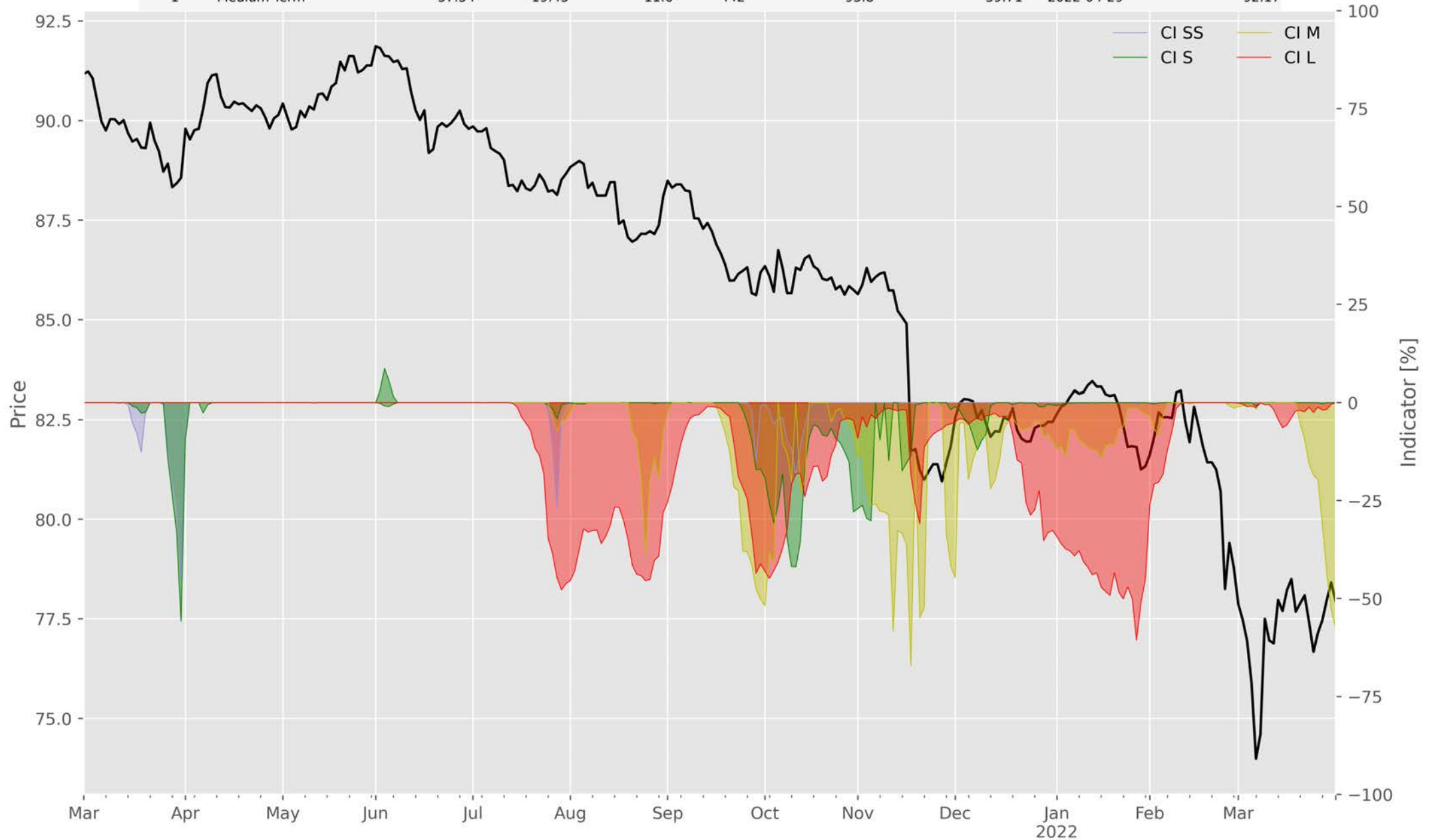
## Jpm Euro Area Reer Ppi (2010=100)

| Rank | Strongest Signal | DS-LPPLS Confidence<br>$ci$ [%] | Bubble Size<br>$bs$ [%] | Bubble CAGR<br>$bg$ [%] | Duration<br>[days] | Bubble Progress<br>$bp$ [%] | Geometric Average<br>( $ci, bg, bp$ ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|---------------------------------|-------------------------|-------------------------|--------------------|-----------------------------|---------------------------------------|------------------------------|-----------------------------|
| 1    | Short Term       | 30.49                           | 18.14                   | 25.96                   | 182                | 75.52                       | 39.1                                  | 2022-05-29                   | 88.25                       |



## Jpm Poland Reer Ppi (2010=100)

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\tilde{t}_c$ | Scenario Probability [%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|--------------------------------|--------------------------|
| 1    | Medium Term      | 57.54                                | -19.45                       | -11.6                        | 442                | 93.8                             | 39.71                                      | 2022-04-29                     | 92.17                    |



## Jpm Switzerland Reer Ppi (2010=100)

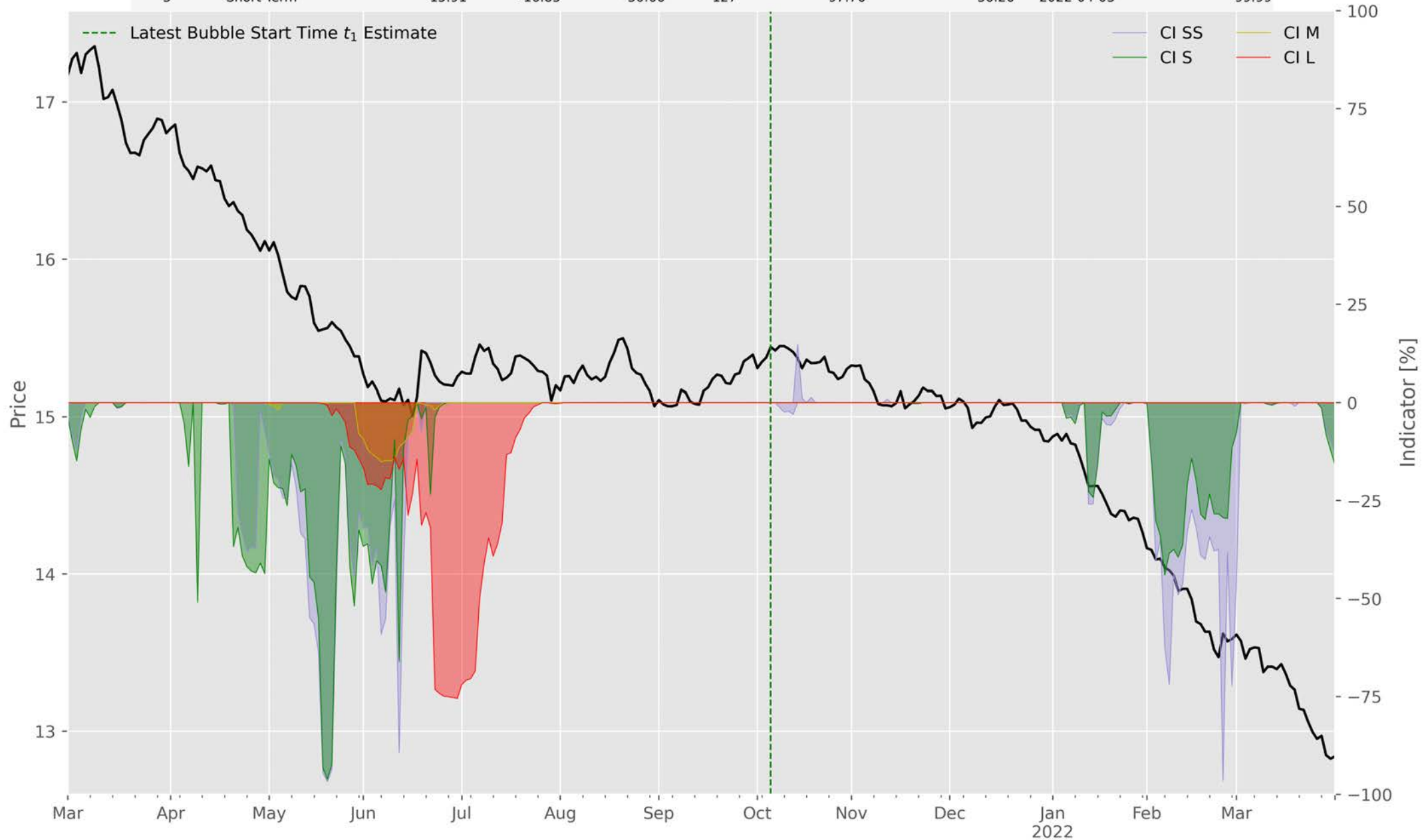
| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size   | Bubble CAGR   | Duration | Bubble Progress | Geometric Average                     | Critical Time | Scenario Probability |
|------|------------------|---------------------|---------------|---------------|----------|-----------------|---------------------------------------|---------------|----------------------|
|      |                  | <i>ci</i> [%]       | <i>bs</i> [%] | <i>bg</i> [%] | [days]   | <i>bp</i> [%]   | ( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | $\hat{t}_c$   | [%]                  |
| 2    | Short Term       | 41.88               | -11.84        | -16.42        | 177      | 87.7            | 39.22                                 | 2022-04-25    | 99.98                |





## Jpm Argentina Reer Ppi (2010=100)

| Rank | Strongest Signal | DS-LPPLS Confidence | Bubble Size | Bubble CAGR | Duration | Bubble Progress | Geometric Average | Critical Time | Scenario Probability |
|------|------------------|---------------------|-------------|-------------|----------|-----------------|-------------------|---------------|----------------------|
|      |                  | $ci$ [%]            | $bs$ [%]    | $bg$ [%]    | [days]   | $bp$ [%]        | $(ci, bg, bp)$    | $\hat{t}_c$   | [%]                  |
| 3    | Short Term       | 15.91               | -16.85      | -30.66      | 127      | 97.76           | 36.26             | 2022-04-03    | 99.99                |



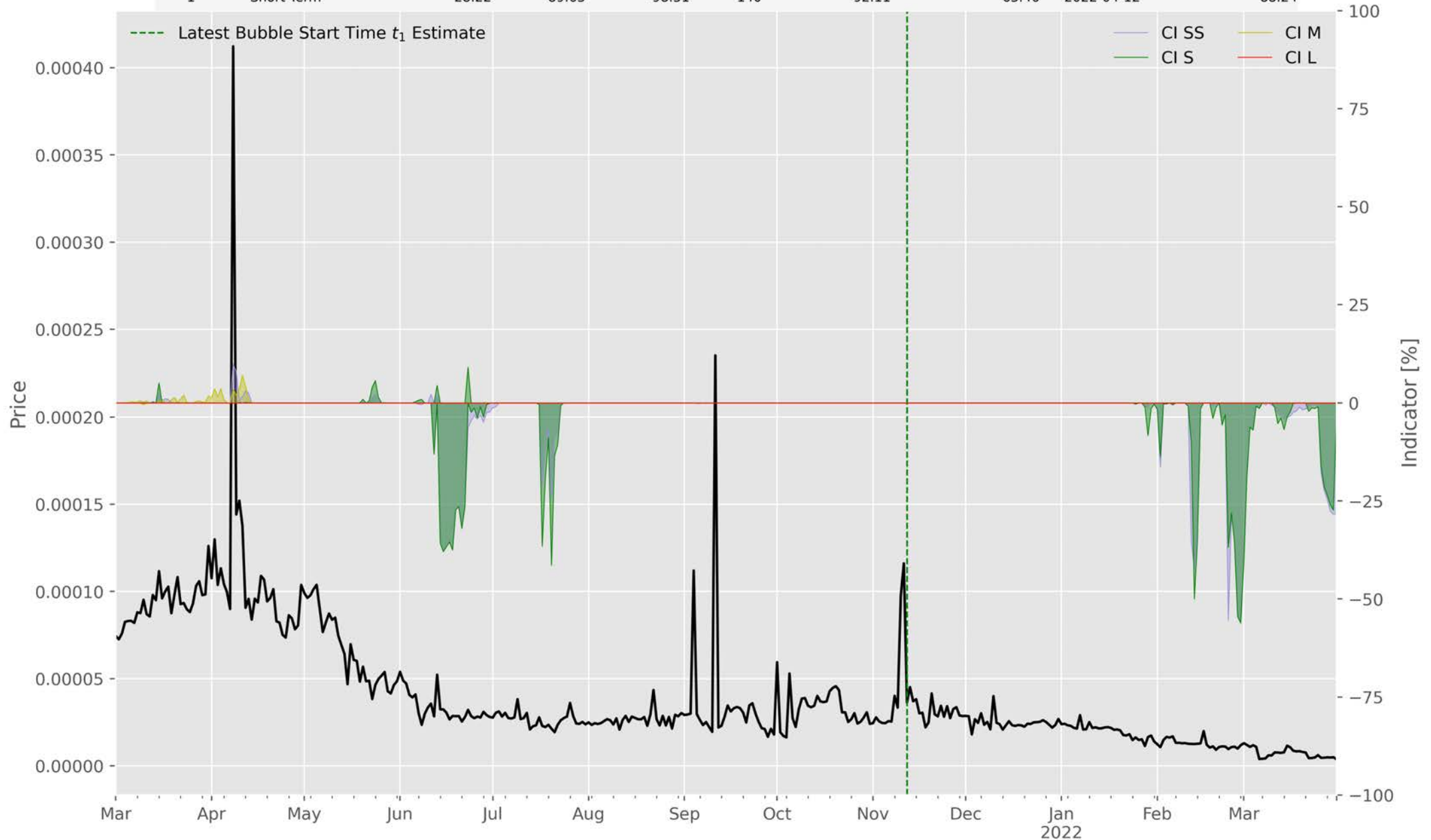


# CryptoX

No positive bubbles to report

## StrongHands/USD

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 1    | Short Term       | 28.22                                | -89.63                       | -98.31                       | 140                | 92.11                            | 63.46                                      | 2022-04-12                   | 88.24                       |



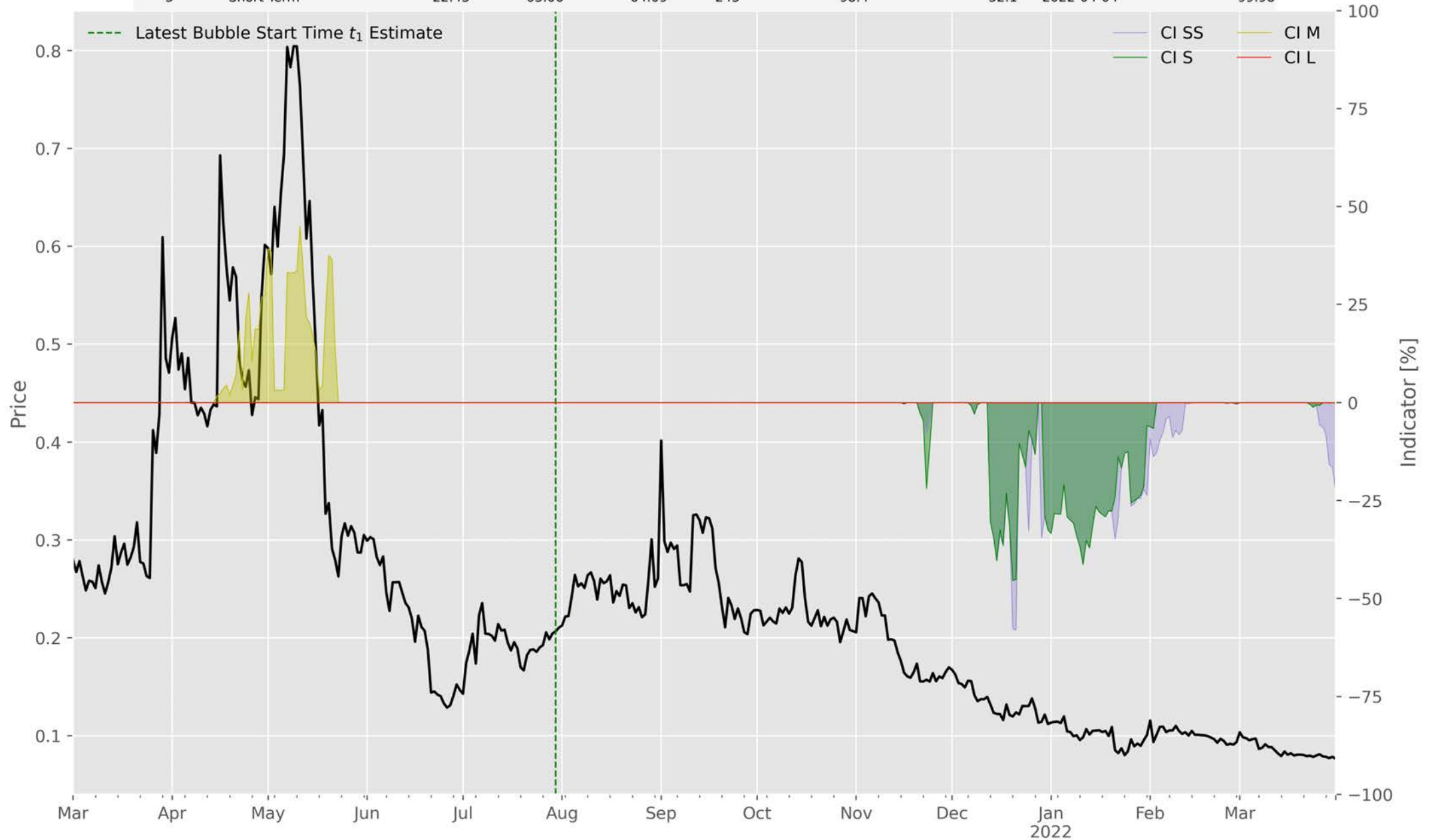
# 1irstcoin/USD

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci, bg, bp</i> ) | Critical Time<br>$\tilde{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|--------------------------------|-----------------------------|
| 2    | Super Short      | 23.9                                 | -97.87                       | -99.61                       | 175                | 87.13                            | 59.19                                      | 2022-04-26                     | 98.87                       |



# SALT/USD

| Rank | Strongest Signal | DS-LPPLS Confidence<br><i>ci</i> [%] | Bubble Size<br><i>bs</i> [%] | Bubble CAGR<br><i>bg</i> [%] | Duration<br>[days] | Bubble Progress<br><i>bp</i> [%] | Geometric Average<br>( <i>ci</i> , <i>bg</i> , <i>bp</i> ) | Critical Time<br>$\hat{t}_c$ | Scenario Probability<br>[%] |
|------|------------------|--------------------------------------|------------------------------|------------------------------|--------------------|----------------------------------|--|------------------------------|-----------------------------|
| 3    | Short Term       | 22.43                                | -63.06                       | -64.09                       | 245                | 98.4                             | 52.1   | 2022-04-04                   | 99.98                       |

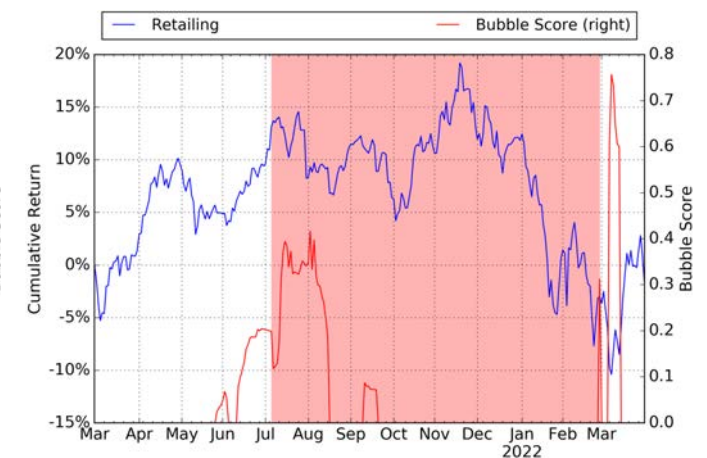
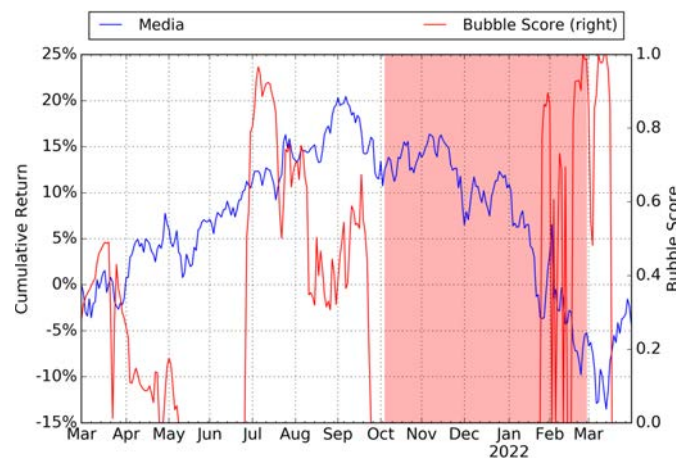
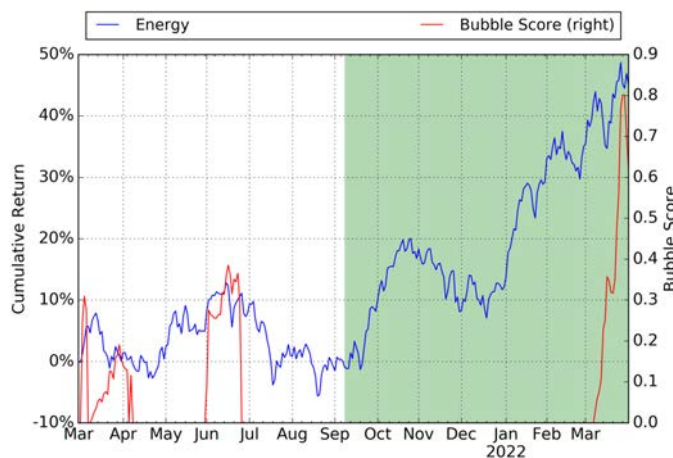


# Sectors

| GICS Industry Group Name                       | Yearly Return |         | Bubble Size |         | Bubble Score |         | Value Score |         | Growth Score |         |
|--|---------------|---------|-------------|---------|--------------|---------|-------------|---------|--------------|---------|
|  | Apr 1st       | Mar 1st | Apr 1st     | Mar 1st | Apr 1st      | Mar 1st | Apr 1st     | Mar 1st | Apr 1st      | Mar 1st |
| Pharmaceuticals, Biotechnology & Life Sciences | 14.2%         | 9.6%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 61.3%       | 62.2%   | 57.6%        | 56.8%   |
| Consumer Services                              | -8.0%         | -5.4%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 18.8%       | 19.3%   | 62.0%        | 61.3%   |
| Retailing                                      | -8.5%         | -2.7%   | 0.0%        | -14.3%  | 0.0%         | -31.3%  | 21.5%       | 19.5%   | 44.8%        | 47.3%   |
| Transportation                                 | 3.0%          | 0.9%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 49.4%       | 47.5%   | 52.3%        | 55.1%   |
| Consumer Durables & Apparel                    | -9.0%         | -2.7%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 35.1%       | 37.6%   | 41.3%        | 40.6%   |
| Semiconductors & Semiconductor Equipment       | 15.1%         | 23.6%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 64.3%       | 64.6%   | 40.3%        | 39.9%   |
| Technology Hardware & Equipment                | 21.6%         | 25.4%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 83.3%       | 76.5%   | 58.8%        | 58.8%   |
| Automobiles & Components                       | 13.6%         | 9.6%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 47.4%       | 41.1%   | 47.2%        | 51.1%   |
| Telecommunication Services                     | -11.2%        | -11.3%  | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 56.2%       | 62.0%   | 44.6%        | 42.3%   |
| Energy   | 43.7%         | 25.2%   | 46.5%       | 0.0%    | 62.2%        | 0.0%    | 53.3%       | 52.6%   | 49.8%        | 49.6%   |
| Software & Services                            | -2.2%         | 1.2%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 36.6%       | 35.2%   | 53.2%        | 53.2%   |
| Materials                                      | 5.8%          | 3.3%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 46.0%       | 48.2%   | 51.9%        | 54.0%   |
| Health Care Equipment & Services               | 7.2%          | 10.8%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 49.1%       | 48.4%   | 56.4%        | 57.6%   |
| Capital Goods                                  | -5.0%         | -3.0%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 47.4%       | 46.8%   | 50.7%        | 50.7%   |
| Media & Entertainment                          | -7.7%         | -4.9%   | 0.0%        | -15.8%  | 0.0%         | -98.9%  | 39.0%       | 40.3%   | 36.0%        | 36.1%   |
| Commercial & Professional Services             | 5.2%          | 5.1%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 31.9%       | 31.6%   | 56.3%        | 56.0%   |
| Food & Staples Retailing                       | 18.6%         | 15.4%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 41.2%       | 41.8%   | 60.2%        | 60.5%   |
| Household & Personal Products                  | -6.1%         | 2.5%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 27.9%       | 26.7%   | 53.4%        | 54.2%   |
| Food, Beverage & Tobacco                       | 6.6%          | 11.9%   | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 49.5%       | 49.2%   | 59.8%        | 60.0%   |
| Utilities                                      | 5.2%          | 5.5%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | 44.5%       | 43.0%   | 57.2%        | 57.3%   |
| Insurance                                      | 8.8%          | 5.5%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | -           | -       | -            | -       |
| Real Estate                                    | 8.7%          | 8.4%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | -           | -       | -            | -       |
| Diversified Financials                         | 8.7%          | 9.7%    | 0.0%        | 0.0%    | 0.0%         | 0.0%    | -           | -       | -            | -       |
| Banks  | 2.2%          | 5.6%    | 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 index with a large positive bubble score: *Energy*. The strong positive bubble signal indicates a high probability of correction in the future if the large price gains would be endogenous. As there is a significant exogenous component (Russia-Ukraine war + sanctions), this index needs to be continuously monitored to disentangle the exo- from the endogenous components.
- ▶ Both industry group indices with a high negative bubble score identified last month (*Media & Entertainment* and *Retailing*) have rebounded strongly in the last month, together with the rebound of the overall market.





# 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.

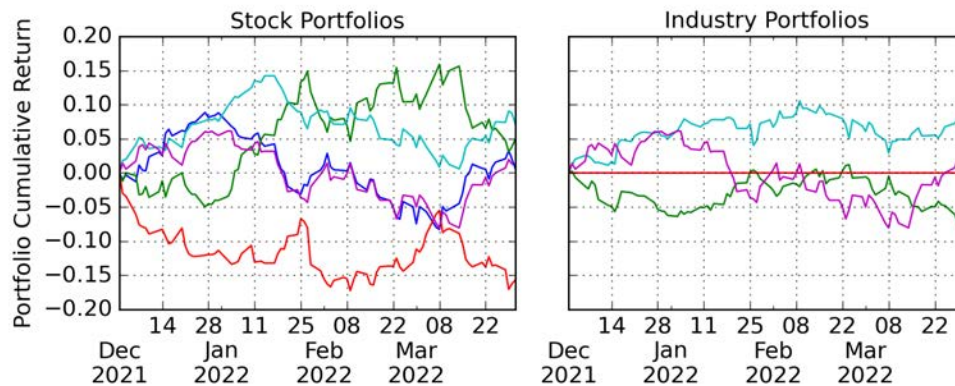
# Portfolio Construction & Performance

- ▶ 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.

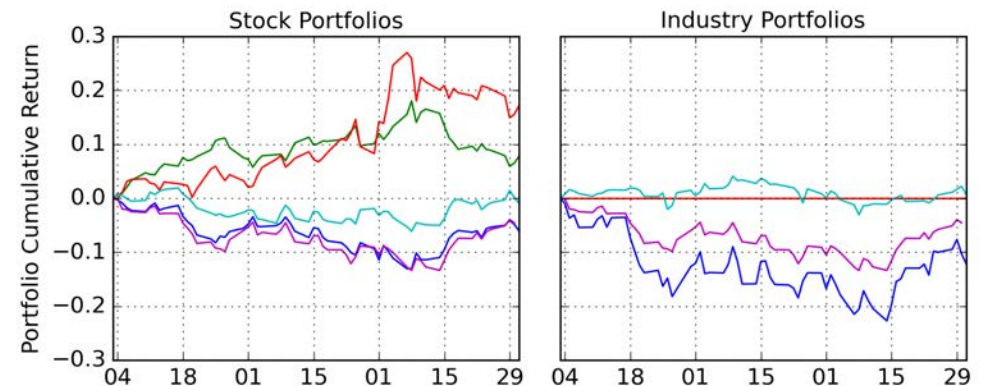
# Portfolio Construction & Performance

- ▶ The market rebounded in the past month after stocks had plunged to start the year. The Fed's long-awaited plan for interest rates fit in neatly with investors' expectations. During this period, our Short Portfolios underperformed and Long Portfolios rebounded.
- ▶ 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.

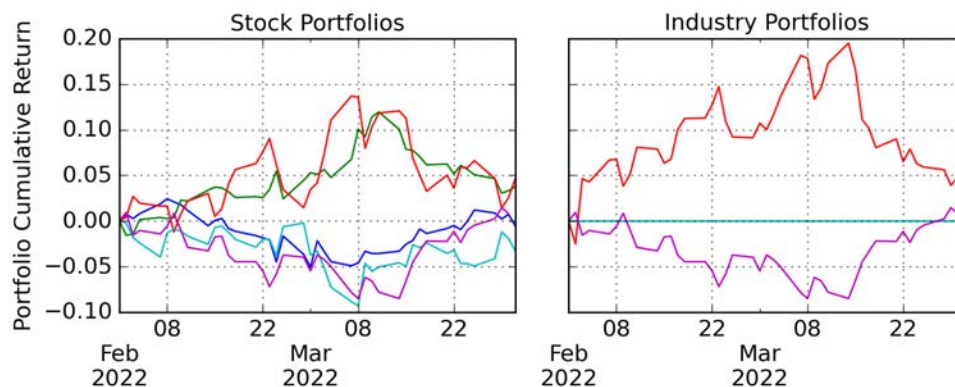
Portfolios Initiated in December 2021



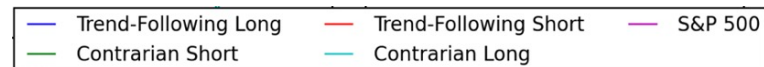
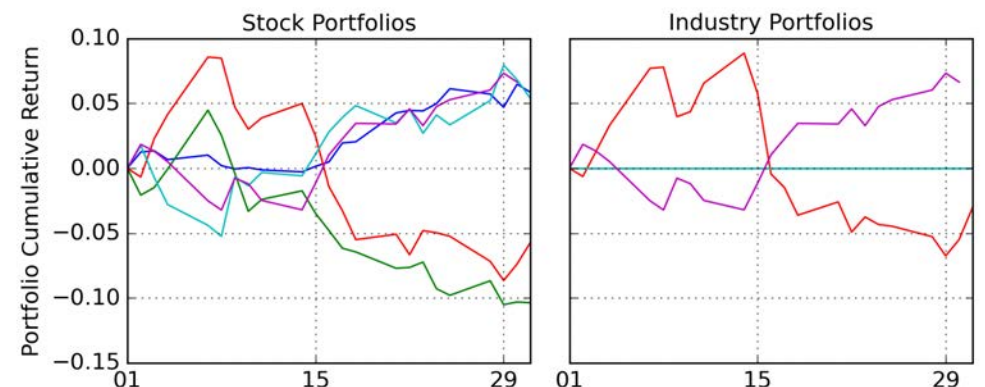
Portfolios Initiated in January 2022



Portfolios Initiated in February 2022

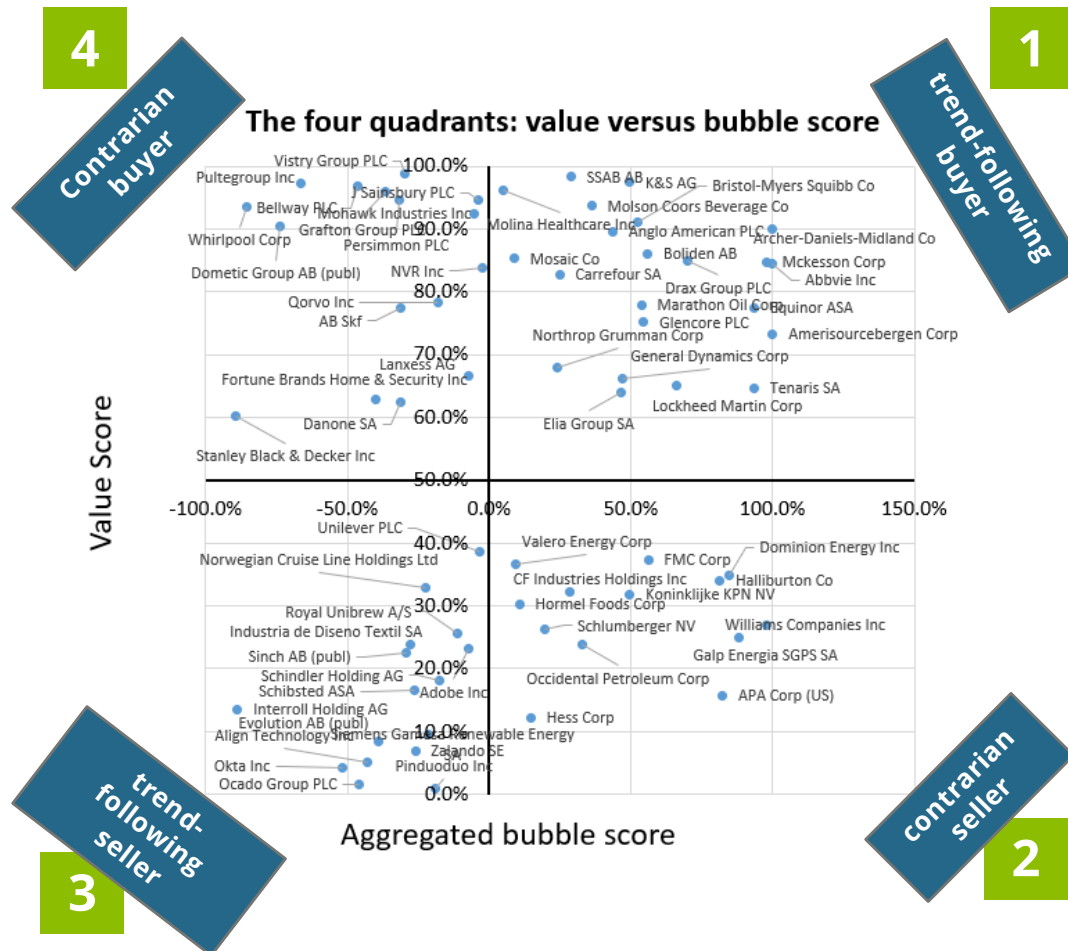


Portfolios Initiated in March 2022



# Single Stocks

We can divide the stocks into four quadrants<sup>1)</sup>



- **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. Tenaris SA
- **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. APA Corp (US)
- **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. Okta Inc
- **Quadrant 4:** These stocks are cheap relative to their financial performance. The strong negative bubble signal is an indication of sentiment and herding. These stocks can be considered as over-sold. As an investor, one could be a **contrarian buyer**. E.g. Pultegroup Inc

<sup>1)</sup> 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

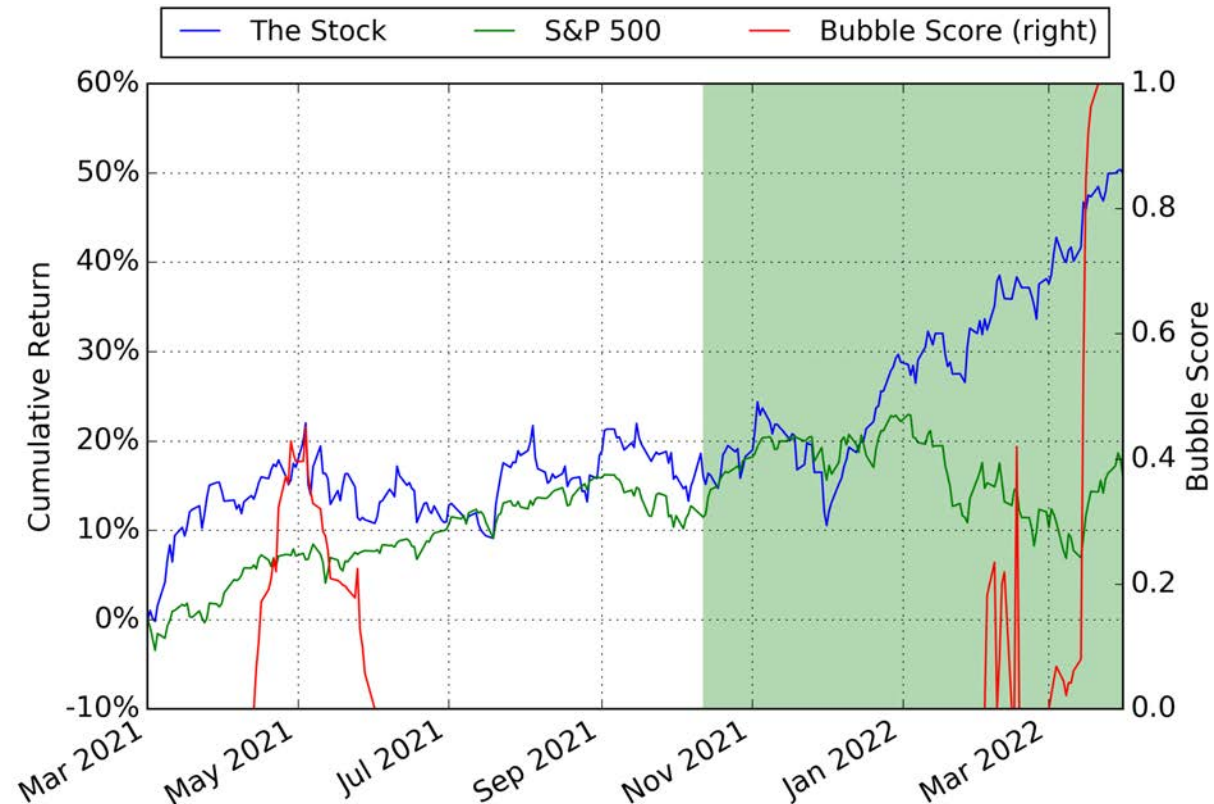
Quadrant 1 stocks: strong positive bubble signals with strong fundamentals

| Company Name              | Country of Headquarters  | GICS Industry Group Name                       | Yearly Return | Bubble Size | Bubble Start | Bubble Score | Value Score | Growth Score |
|---------------------------|--------------------------|--|---------------|-------------|--------------|--------------|-------------|--------------|
| Mosaic Co                 | United States of America | Materials                                      | 99.5%         | 90.3%       | Jun-21       | 8.8%         | 85.3%       | 64.8%        |
| Amerisourcebergen Corp    | United States of America | Health Care Equipment & Services               | 31.1%         | 29.2%       | Oct-21       | 100.0%       | 73.3%       | 65.6%        |
| General Dynamics Corp     | United States of America | Capital Goods                                  | 31.4%         | 19.0%       | Oct-21       | 46.9%        | 66.3%       | 72.1%        |
| Northrop Grumman Corp     | United States of America | Capital Goods                                  | 30.8%         | 24.7%       | Oct-21       | 24.0%        | 68.0%       | 36.4%        |
| Marathon Oil Corp         | United States of America | Energy   | 126.4%        | 69.3%       | Oct-21       | 53.7%        | 77.9%       | 6.6%         |
| Archer-Daniels-Midland Co | United States of America | Food, Beverage & Tobacco                       | 54.2%         | 50.3%       | Aug-21       | 100.0%       | 89.9%       | 27.5%        |
| Mckesson Corp             | United States of America | Health Care Equipment & Services               | 60.6%         | 39.8%       | Nov-21       | 97.8%        | 84.6%       | 67.0%        |
| Molina Healthcare Inc     | United States of America | Health Care Equipment & Services               | 36.6%         | 31.5%       | Apr-21       | 5.1%         | 96.3%       | 85.5%        |
| Bristol-Myers Squibb Co   | United States of America | Pharmaceuticals, Biotechnology & Life Sciences | 14.4%         | 27.5%       | Oct-21       | 52.3%        | 91.0%       | 31.9%        |
| Abbvie Inc                | United States of America | Pharmaceuticals, Biotechnology & Life Sciences | 53.1%         | 41.2%       | Nov-21       | 100.0%       | 84.5%       | 61.8%        |
| Molson Coors Beverage Co  | United States of America | Food, Beverage & Tobacco                       | 4.4%          | 11.4%       | Aug-21       | 36.1%        | 93.6%       | 87.5%        |
| Lockheed Martin Corp      | United States of America | Capital Goods                                  | 13.6%         | 33.0%       | Oct-21       | 66.3%        | 65.1%       | 51.1%        |
| Anglo American PLC        | United Kingdom           | Materials                                      | 30.5%         | 54.9%       | Sep-21       | 43.6%        | 89.5%       | 21.9%        |
| Boliden AB                | Sweden                   | Materials                                      | 49.3%         | 60.4%       | Nov-21       | 55.9%        | 86.0%       | 22.4%        |
| SSAB AB                   | Sweden                   | Materials                                      | 40.9%         | 62.1%       | Oct-21       | 28.9%        | 98.3%       | 3.5%         |
| Tenaris SA                | Luxembourg               | Energy   | 44.2%         | 54.6%       | Sep-21       | 93.5%        | 64.6%       | 1.8%         |
| K&S AG                    | Germany                  | Materials                                      | 227.8%        | 142.0%      | May-21       | 49.5%        | 97.4%       | 0.3%         |
| Carrefour SA              | France                   | Food & Staples Retailing                       | 31.4%         | 29.5%       | Sep-21       | 24.8%        | 82.8%       | 21.6%        |
| Drax Group PLC            | United Kingdom           | Utilities                                      | 91.3%         | 45.4%       | Oct-21       | 70.2%        | 85.0%       | 86.5%        |
| Glencore PLC              | Switzerland              | Materials                                      | 66.8%         | 41.1%       | Nov-21       | 54.5%        | 75.1%       | 8.1%         |
| Elia Group SA             | Belgium                  | Utilities                                      | 53.1%         | 31.5%       | Sep-21       | 46.7%        | 64.0%       | 53.1%        |
| Equinor ASA               | Norway                   | Energy   | 100.9%        | 52.4%       | Oct-21       | 93.5%        | 77.5%       | 84.0%        |
| Shell PLC                 | United Kingdom           | Energy   | 46.6%         | 44.6%       | Jun-21       | 12.5%        | 74.5%       | 31.4%        |



# Single Stocks

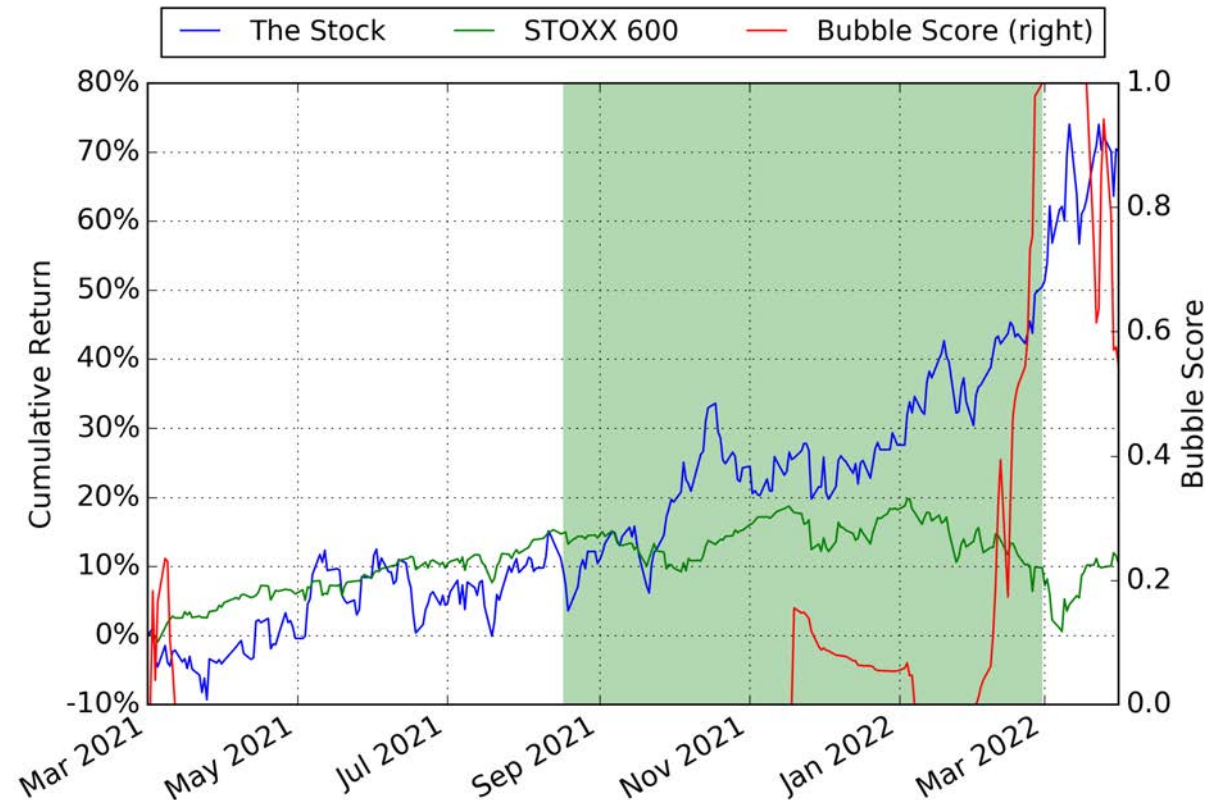
Quadrant 1 Stocks Current Month Example – Amerisourcebergen Corp.



- ▶ The above graph shows the one-year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The green shaded period 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 29.2%. 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 – Glencore PLC.



- The figure above plots the one-year cumulative return of the stock (blue), STOXX 600 (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 lost its upward momentum and seems to have switched to a new market regime. One should remain cautious as there is still a positive bubble score this month.

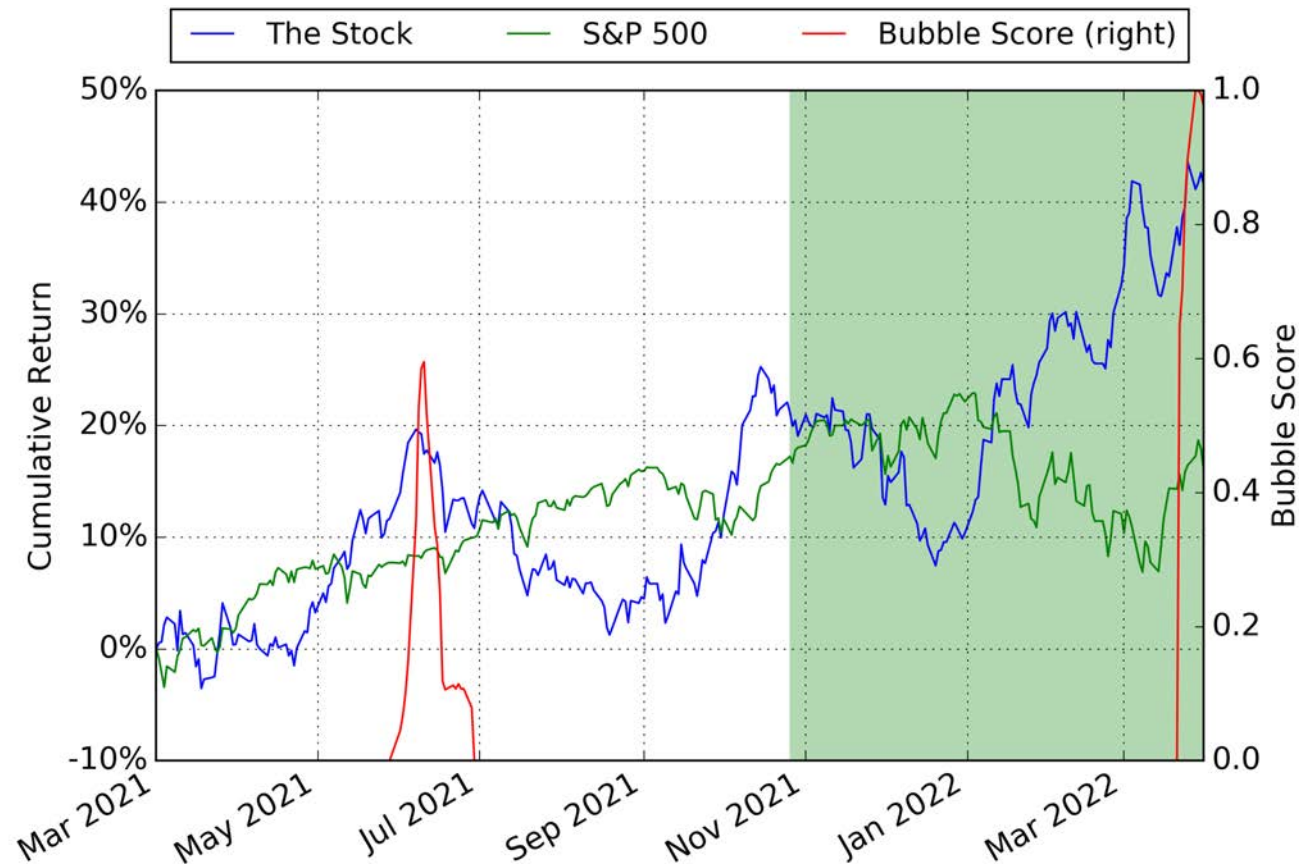
# Single Stocks

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 |
|----------------------------|--------------------------|----------------------------|---------------|-------------|--------------|--------------|-------------|--------------|
| Williams Companies Inc     | United States of America | Energy                     | 41.3%         | 16.9%       | Oct-21       | 97.8%        | 26.9%       | 92.9%        |
| Occidental Petroleum Corp  | United States of America | Energy                     | 122.1%        | 128.9%      | Aug-21       | 33.0%        | 23.8%       | 28.1%        |
| Valero Energy Corp         | United States of America | Energy                     | 40.5%         | 50.1%       | Jul-21       | 9.2%         | 36.6%       | 4.6%         |
| Schlumberger NV            | United States of America | Energy                     | 51.3%         | 32.5%       | Jul-21       | 19.8%        | 26.3%       | 53.3%        |
| CF Industries Holdings Inc | United States of America | Materials                  | 118.3%        | 74.3%       | Oct-21       | 28.4%        | 32.1%       | 83.3%        |
| FMC Corp                   | United States of America | Materials                  | 18.3%         | 41.1%       | Aug-21       | 56.2%        | 37.3%       | 43.8%        |
| Dominion Energy Inc        | United States of America | Utilities                  | 9.8%          | 13.0%       | Oct-21       | 84.6%        | 34.9%       | 73.4%        |
| APA Corp (US)              | United States of America | Energy                     | 127.8%        | 69.7%       | Oct-21       | 82.3%        | 15.8%       | 87.3%        |
| Hess Corp                  | United States of America | Energy                     | 48.0%         | 26.4%       | Oct-21       | 14.7%        | 12.3%       | 66.3%        |
| Hormel Foods Corp          | United States of America | Food, Beverage & Tobacco   | 10.7%         | 18.3%       | Sep-21       | 10.7%        | 30.3%       | 66.9%        |
| Halliburton Co             | United States of America | Energy                     | 74.8%         | 95.7%       | Sep-21       | 81.4%        | 34.0%       | 49.8%        |
| Galp Energia SGPS SA       | Portugal                 | Energy                     | 15.4%         | 25.8%       | Oct-21       | 87.9%        | 25.0%       | 92.8%        |
| Koninklijke KPN NV         | Netherlands              | Telecommunication Services | 10.7%         | 13.7%       | Sep-21       | 49.7%        | 31.9%       | 11.8%        |

# Single Stocks

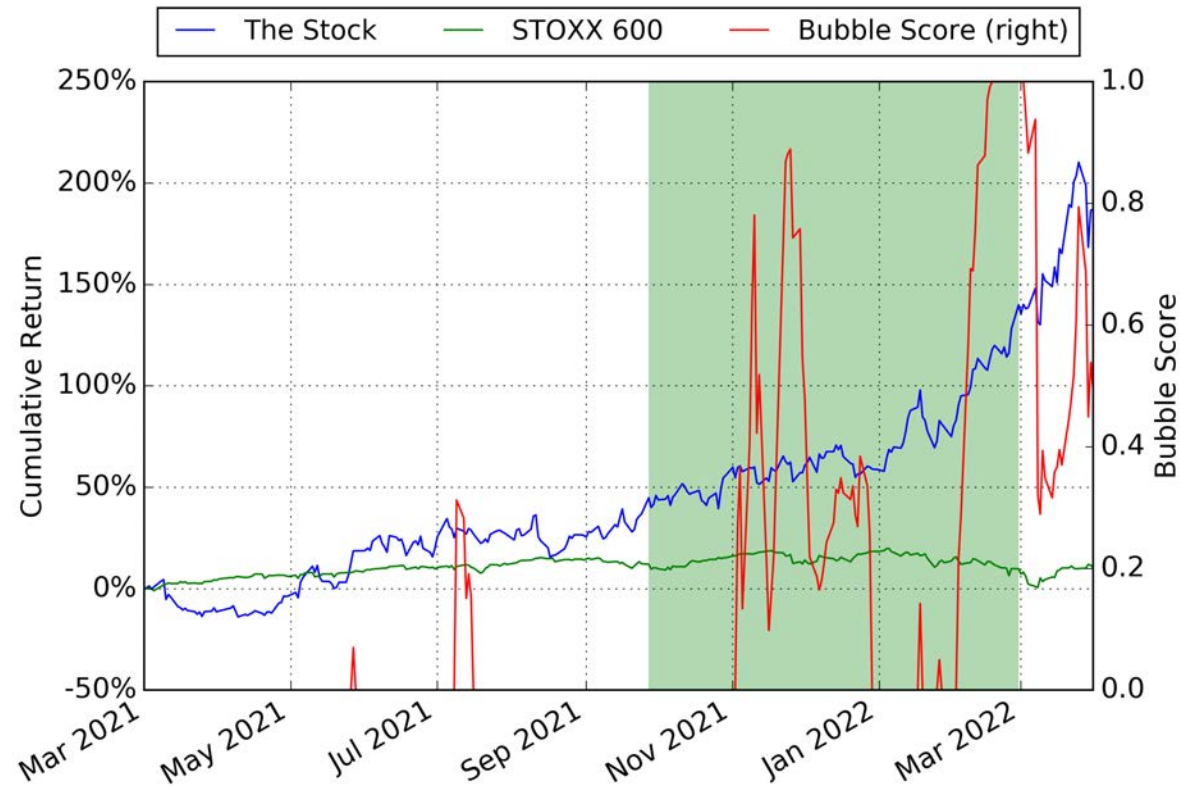
Quadrant 2 Stocks Current Month Example – Williams Companies Inc.



- ▶ 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 97.8% with a bubble size 16.9%. 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 – K&S AG.



The figure above plots the one-year cumulative return of the stock (blue), STOXX 600 (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 continued to rise by 50% in the past month before starting its correction. The strong bubble signal identified last month turned out to be too early, as the bubble score has continued to accelerate until the peak in March 2022. Together with the weak fundamentals, this suggests a significant risk for the stock price to exhibit further corrections.

# Single Stocks

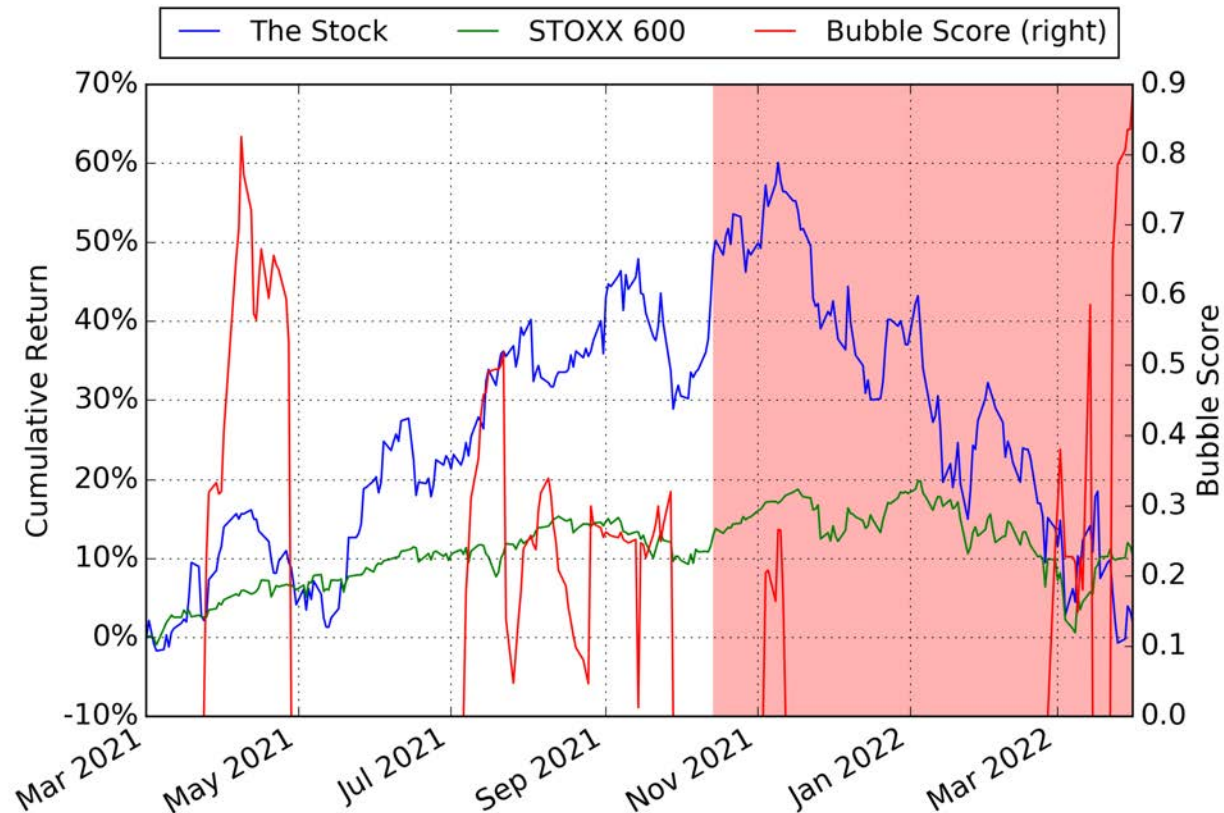
Quadrant 3 stocks: strong negative bubble signals with weak fundamentals

| Company Name                       | Country of Headquarters  | GICS Industry Group Name         | Yearly Return | Bubble Size | Bubble Start | Bubble Score | Value Score | Growth Score |
|------------------------------------|--------------------------|----------------------------------|---------------|-------------|--------------|--------------|-------------|--------------|
| Align Technology Inc               | United States of America | Health Care Equipment & Services | -26.7%        | -39.3%      | Sep-21       | -43.0%       | 5.0%        | 79.0%        |
| Norwegian Cruise Line Holdings Ltd | United States of America | Consumer Services                | -25.1%        | -31.0%      | May-21       | -22.3%       | 32.9%       | 97.6%        |
| Adobe Inc                          | United States of America | Software & Services              | -10.8%        | -30.8%      | Aug-21       | -7.3%        | 23.3%       | 67.9%        |
| Okta Inc                           | United States of America | Software & Services              | -41.9%        | -38.9%      | Oct-21       | -51.7%       | 4.1%        | 57.0%        |
| Pinduoduo Inc                      | China                    | Retailing                        | -69.8%        | -71.2%      | Jun-21       | -19.1%       | 1.0%        | 3.0%         |
| Sinch AB (publ)                    | Sweden                   | Software & Services              | -62.3%        | -46.7%      | Nov-21       | -29.2%       | 22.5%       | 19.0%        |
| Ocado Group PLC                    | United Kingdom           | Food & Staples Retailing         | -44.8%        | -40.2%      | Aug-21       | -46.1%       | 1.5%        | 76.6%        |
| Interroll Holding AG               | Switzerland              | Capital Goods                    | -11.3%        | -31.3%      | Oct-21       | -88.7%       | 13.5%       | 25.6%        |
| Evolution AB (publ)                | Sweden                   | Consumer Services                | -30.9%        | -34.5%      | May-21       | -39.2%       | 8.4%        | 76.3%        |
| Siemens Gamesa Renewable Energy SA | Spain                    | Capital Goods                    | -46.6%        | -43.4%      | May-21       | -21.7%       | 9.5%        | 5.8%         |
| Unilever PLC                       | United Kingdom           | Household & Personal Products    | -16.1%        | -18.0%      | Apr-21       | -3.6%        | 38.5%       | 27.8%        |
| Schindler Holding AG               | Switzerland              | Capital Goods                    | -27.8%        | -28.2%      | Jun-21       | -17.5%       | 18.0%       | 14.3%        |
| Zalando SE                         | Germany                  | Retailing                        | -47.2%        | -47.7%      | Sep-21       | -26.1%       | 6.9%        | 85.1%        |
| Industria de Diseno Textil SA      | Spain                    | Retailing                        | -28.9%        | -36.7%      | Sep-21       | -27.9%       | 23.9%       | 93.8%        |
| Schibsted ASA                      | Norway                   | Media & Entertainment            | -45.7%        | -51.0%      | Sep-21       | -26.1%       | 16.6%       | 87.6%        |
| Royal Unibrew A/S                  | Denmark                  | Food, Beverage & Tobacco         | -9.7%         | -17.8%      | May-21       | -11.0%       | 25.5%       | 74.9%        |
| Simcorp A/S                        | Denmark                  | Software & Services              | -38.2%        | -38.9%      | Nov-21       | -50.9%       | 16.1%       | 27.0%        |



# Single Stocks

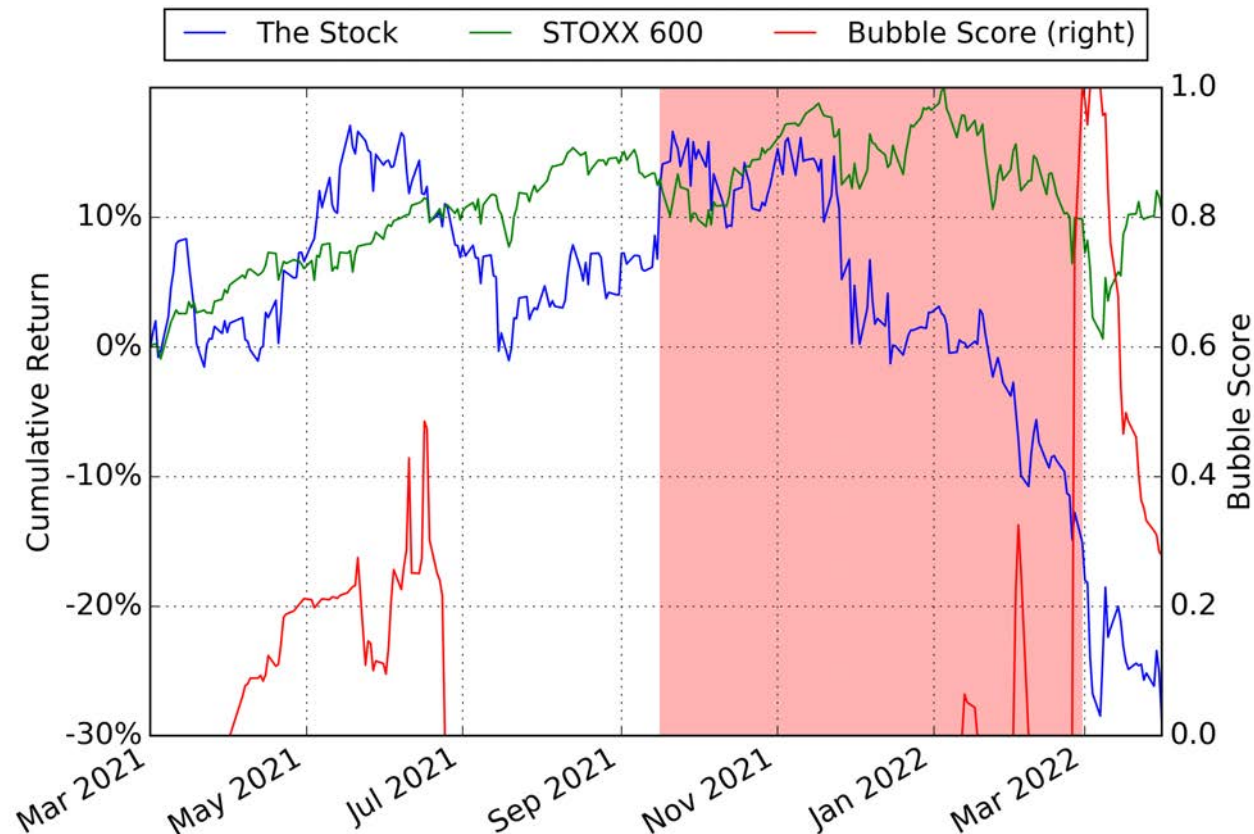
Quadrant 3 Stocks Current Month Example – Interroll Holding AG.



- 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 red shaded period delineates the time interval within which the negative bubble is identified. The Bubble Score of this six-month bubble has reached 88.7% with a bubble size -31.3%.

# Single Stocks

Quadrant 3 Stocks Last Month Example – Industria de Diseno Textil 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 had another 15% drop in the past month before its rebound and then went sideways, in agreement with our DS LPPLS bubble signal, which nicely matched the trough. One should remain cautious however, given the weak fundamentals of this stock, which may indicate a continuation of the negative bubble in the future.

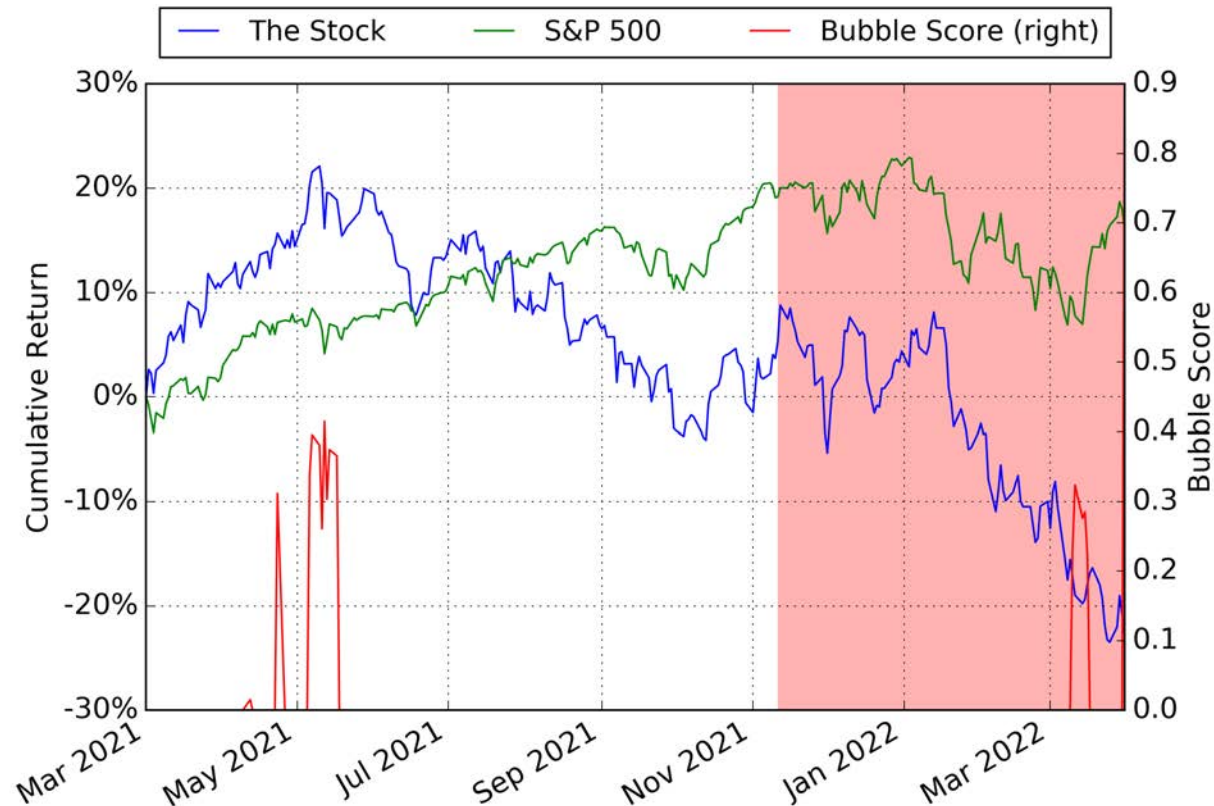
# Single Stocks

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 |
|------------------------------------|--------------------------|--|---------------|-------------|--------------|--------------|-------------|--------------|
| Qorvo Inc                          | United States of America | Semiconductors & Semiconductor Equipment | -34.6%        | -27.0%      | Sep-21       | -17.8%       | 78.3%       | 21.4%        |
| NVR Inc                            | United States of America | Consumer Durables & Apparel              | -7.3%         | -14.5%      | Aug-21       | -2.4%        | 83.9%       | 87.4%        |
| Fortune Brands Home & Security Inc | United States of America | Capital Goods                            | -25.7%        | -27.3%      | Oct-21       | -40.0%       | 62.8%       | 46.0%        |
| Pultegroup Inc                     | United States of America | Consumer Durables & Apparel              | -21.7%        | -19.3%      | Nov-21       | -66.6%       | 97.3%       | 9.5%         |
| Mohawk Industries Inc              | United States of America | Consumer Durables & Apparel              | -38.4%        | -35.4%      | Jun-21       | -5.5%        | 92.5%       | 18.6%        |
| Whirlpool Corp                     | United States of America | Consumer Durables & Apparel              | -25.5%        | -23.2%      | Nov-21       | -85.7%       | 93.5%       | 19.4%        |
| Stanley Black & Decker Inc         | United States of America | Capital Goods                            | -30.6%        | -26.5%      | Nov-21       | -89.3%       | 60.3%       | 23.3%        |
| Bellway PLC                        | United Kingdom           | Consumer Durables & Apparel              | -33.2%        | -29.7%      | Aug-21       | -46.5%       | 96.8%       | 11.0%        |
| Dometic Group AB (publ)            | Sweden                   | Automobiles & Components                 | -35.2%        | -40.4%      | Sep-21       | -73.6%       | 90.5%       | 96.6%        |
| Danone SA                          | France                   | Food, Beverage & Tobacco                 | -14.9%        | -20.9%      | Aug-21       | -31.4%       | 62.5%       | 49.4%        |
| Persimmon PLC                      | United Kingdom           | Consumer Durables & Apparel              | -32.0%        | -20.1%      | Oct-21       | -31.5%       | 94.5%       | 69.4%        |
| Vistry Group PLC                   | United Kingdom           | Consumer Durables & Apparel              | -21.3%        | -25.5%      | Jun-21       | -29.9%       | 98.8%       | 48.3%        |
| J Sainsbury PLC                    | United Kingdom           | Food & Staples Retailing                 | 4.9%          | -11.4%      | Aug-21       | -3.9%        | 94.6%       | 92.6%        |
| AB Skf                             | Sweden                   | Capital Goods                            | -37.2%        | -27.0%      | Oct-21       | -31.0%       | 77.4%       | 41.6%        |
| Lanxess AG                         | Germany                  | Materials                                | -35.3%        | -35.3%      | Apr-21       | -7.2%        | 66.6%       | 2.4%         |
| Grafton Group PLC                  | Ireland; Republic of     | Capital Goods                            | -11.1%        | -27.7%      | Aug-21       | -36.8%       | 96.0%       | 5.3%         |
| Kion Group AG                      | Germany                  | Capital Goods                            | -26.4%        | -33.1%      | Jun-21       | -53.8%       | 66.5%       | 3.1%         |
| Kingfisher PLC                     | United Kingdom           | Retailing                                | -24.9%        | -31.7%      | May-21       | -26.5%       | 97.5%       | 18.8%        |

# Single Stocks

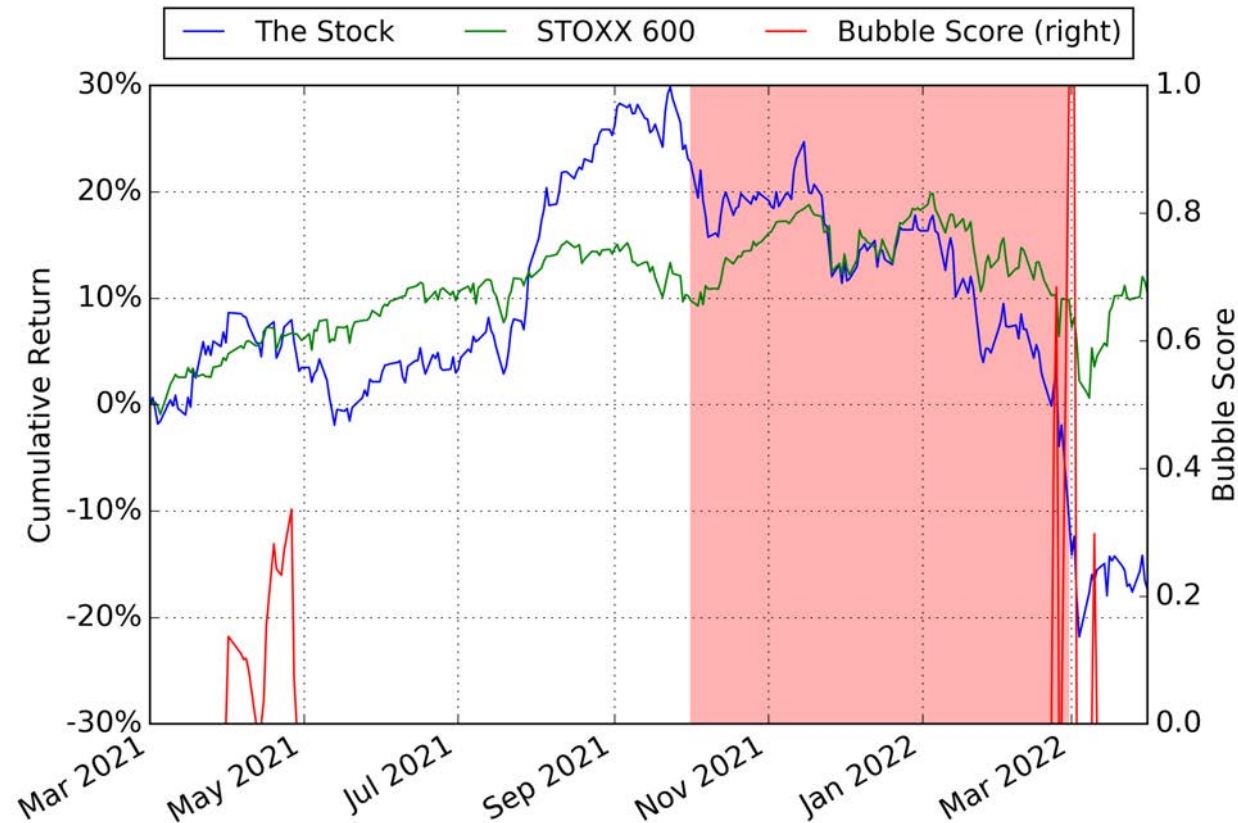
Quadrant 4 Stocks Current Month Example – Stanley Black & Decker Inc.



- The above graph shows the one-year cumulative return of the stock in blue (left hand scale), S&P 500 in green (left hand scale) and the calculated DS LPPLS Bubble Score in red (right hand scale). The red shaded period delineates the time interval within which the strong negative bubble is identified. The Bubble Score of this five-month bubble has reached 89.3% with a negative bubble size -26.5%. 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 – Spectris PLC.

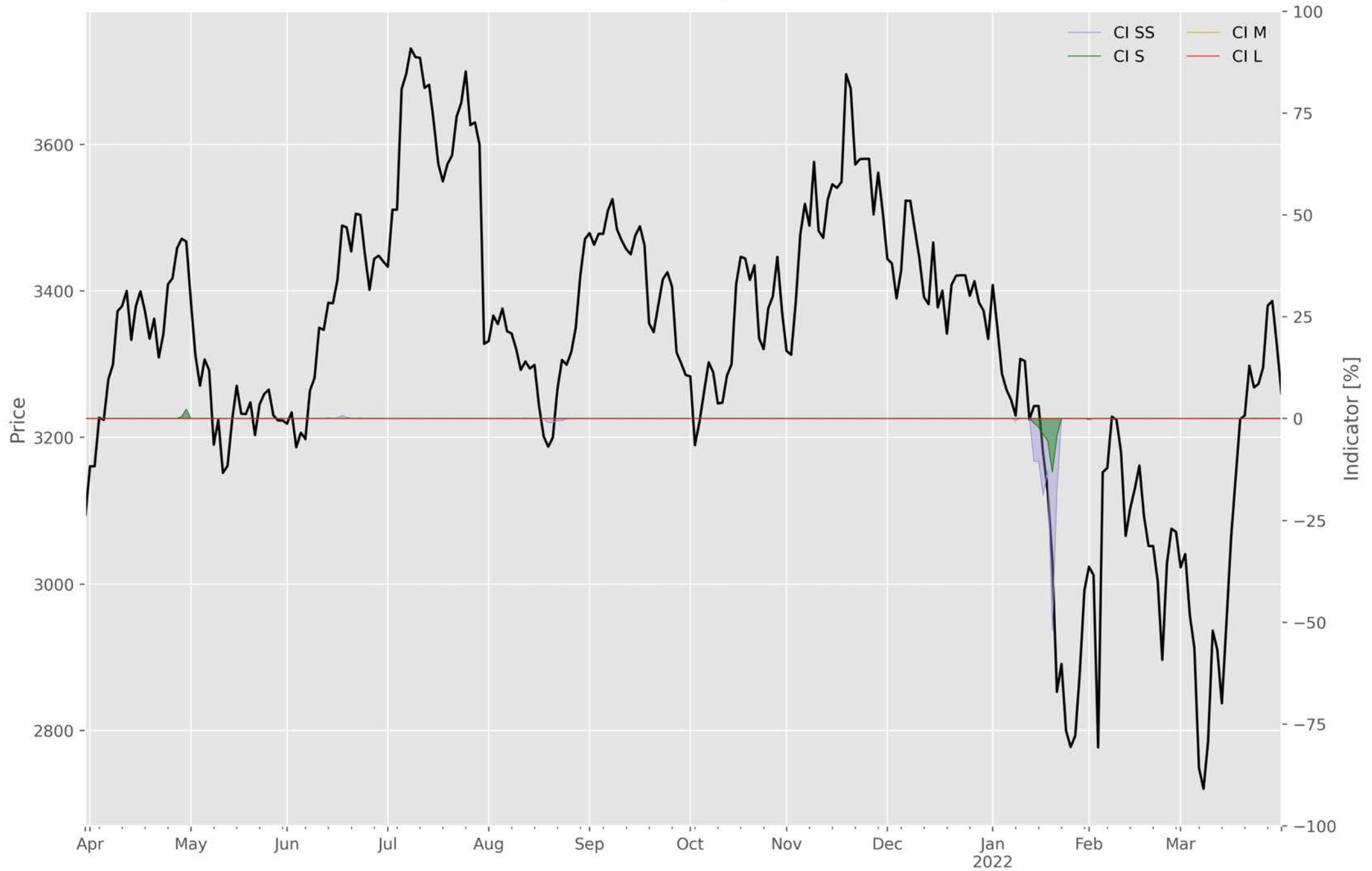


- The figure above plots the one-year cumulative return of the stock (blue), STOXX 600 (green) and LPPLS Bubble Score (red line on the right y-axis). The red shaded period delineates the time interval within which the strong negative bubble was identified and reported last month. The stock price has rebounded in the past month, although not yet into a strong rebound. This is in agreement with our DS LPPLS Bubble Signal, indicating that the stock price has ended its previous negative bubble regime. It is likely that this stock will continue its rebound.

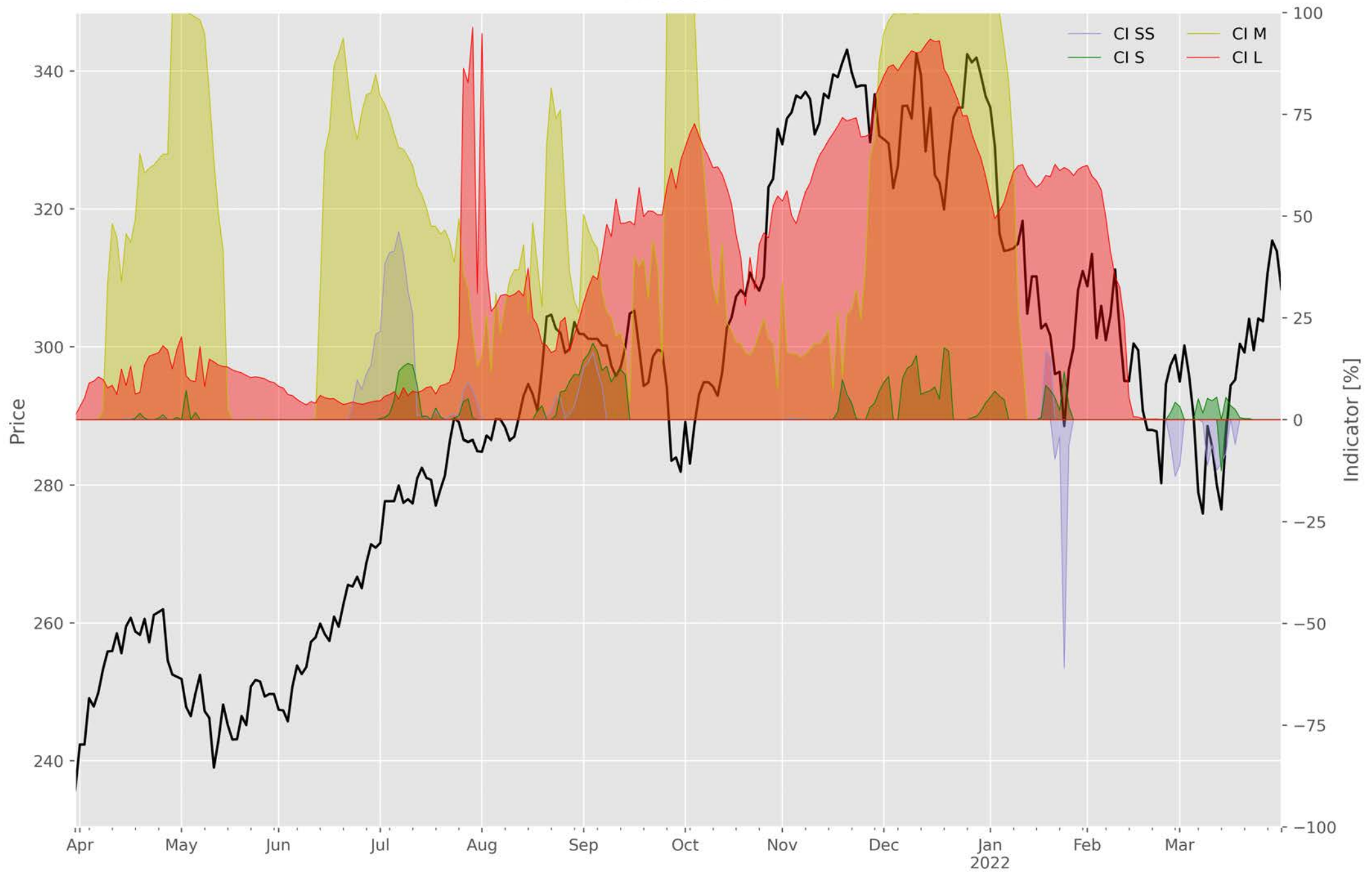
# Appendix



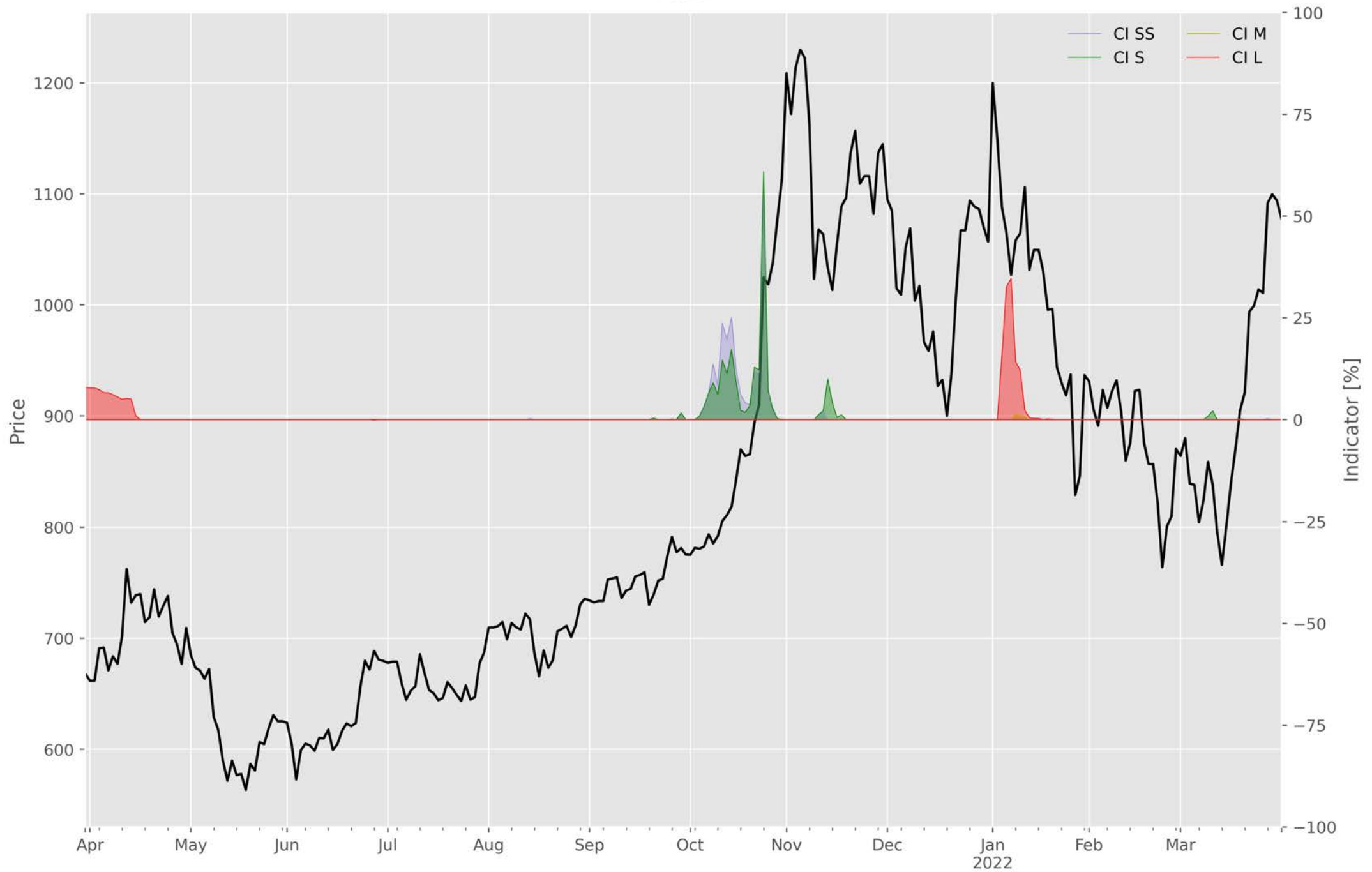
# Amazon.Com



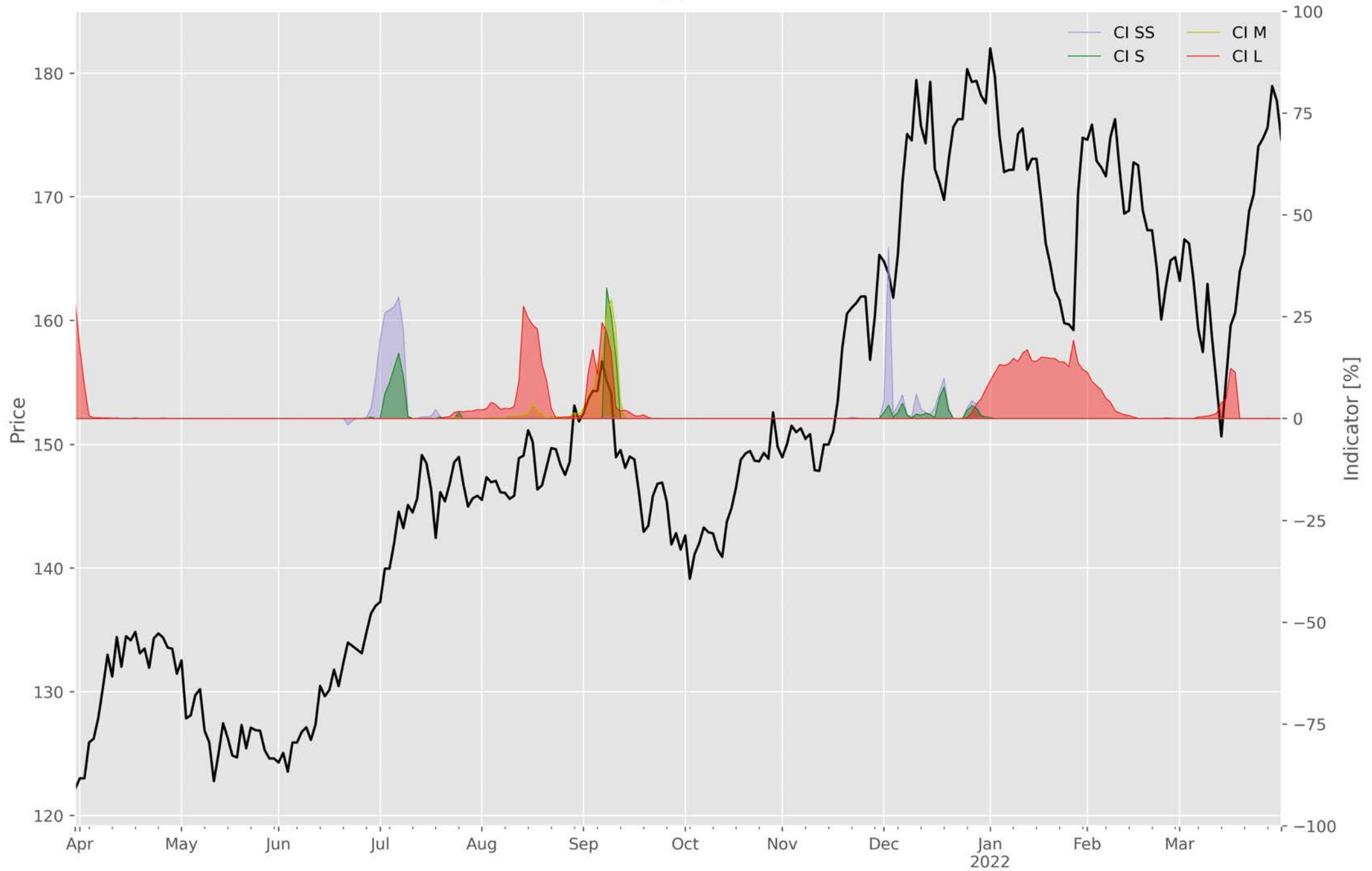
## Microsoft



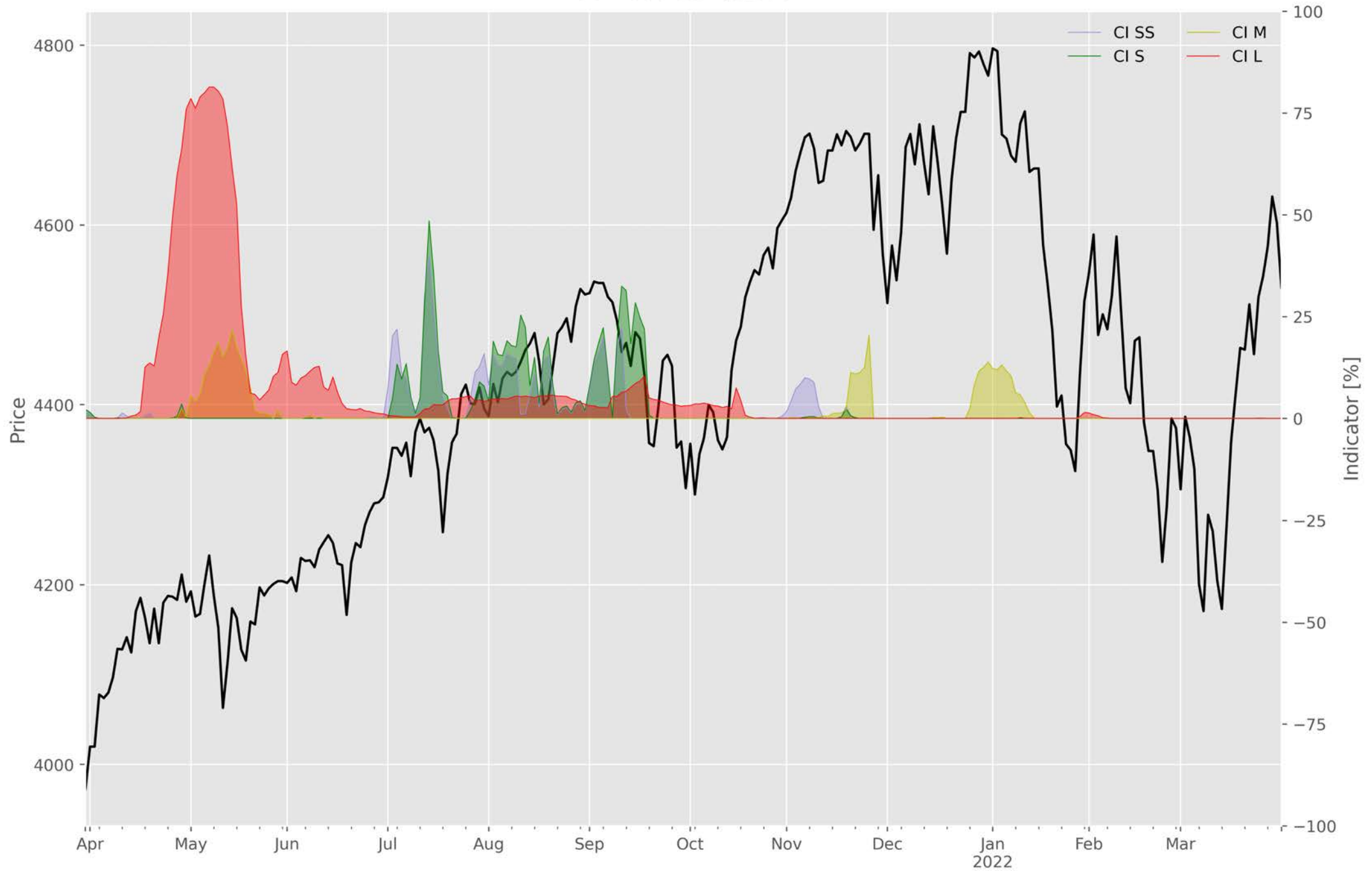
# Tesla



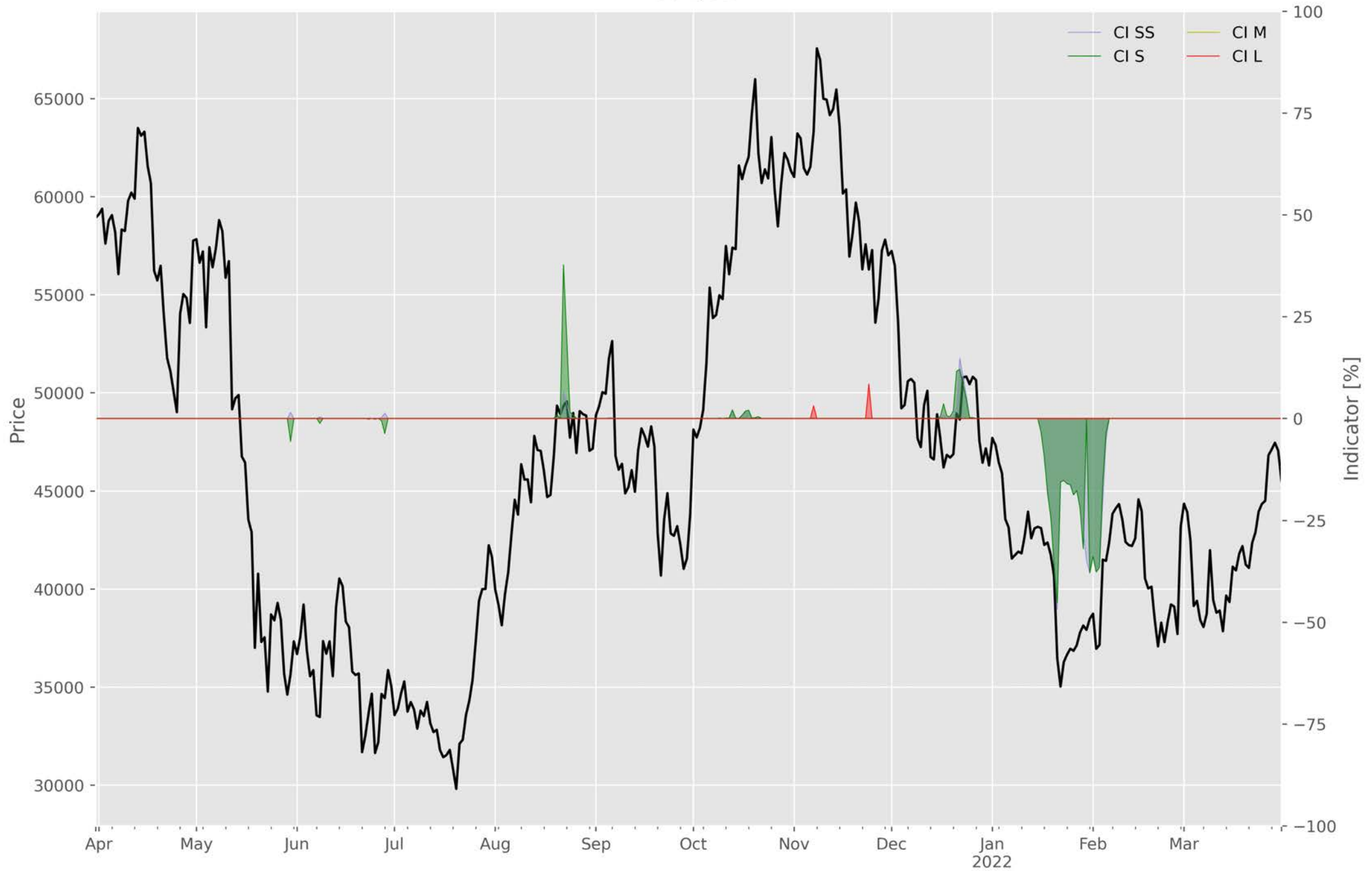
# Apple



## 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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