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The results shown in the reports are indicative only and depend on the adopted methodology, data selection, parameters, assumptions, and the way risk and return measures are calculated. Actual results may differ materially from historical or simulated results.

The author may hold positions in the instruments discussed or may apply a similar approach in practice. The information contained in the reports may change without prior notice.

Methodology

TradingEdge.Pro's methodology describes a multi-step process for building and validating trading strategies, structured into two parts: strategy development and testing, and practical use. In the testing phase, a strategy is defined as a set of objective rules, validated through initial tests, optimised, and assessed for stability (robustness), and then evaluated using Walk-Forward Analysis. The detailed testing assumptions (including the instrument universe, in-sample/out-of-sample periods, data sources, transaction costs, and execution rules) are described in the "Testing Specification" document. The full methodology and metric definitions are available on the TradingEdge.Pro "Methodology" page.

Trading New Highs v.2

Investment Strategy Testing Summary

Trading Strategy New Highs is a swing trading investment technique that uses the **Donchian channel** (52 weeks) and **the RSI** (Relative Strength Index) to open positions **in line with the trend after a correction has formed.** The key assumption of the strategy is research, which indicates that **after the instrument reaches a new, 52-week high, the market enters a correction and then continues to grow.**

Compared to **Trading New Highs v.1** this strategy, **the parameters were optimized using The Grid technique Search,** replaced the **ConnorsRSI indicator with the classic RSI,** changed the method of opening a position to **the opening price of the next day,** and **added a stop loss order.**

It should be noted that while the strategy results on in-sample data are acceptable, the strategy failed the stability test on the financial instruments portfolio. This means that the strategy loses its profitability when tests are performed on a suboptimal set of instruments. **Therefore, it is not recommended to use it in real transactions.**

Our goal is to have a strategy that remains **profitable and effective over a wide range of parameters,** because the market is a changing organism and the optimal parameters can change over different periods. **I cannot** emphasize enough that for **a strategy to work** in real conditions, it must also work on **suboptimal parameters** and in **suboptimal conditions.** In a word - **it must be stable** to changing market conditions.

I don't know who said these words, but they perfectly reflect the problem of many optimizations:

"I've never seen a strategy that didn't work in backtests."

We don't know the future, we don't know future market conditions, but if we know that our strategy **has historically generated acceptable results** in various market conditions and across various parameter ranges, then we are **one step ahead of other** market participants.

Contents

Step 1: Formulate an investment strategy

Trading New Highs strategy is a short-term investment strategy invented by **Larry Connors** and based on research by professors **Thomas J. George and Chuan-Yang Hwang,** published in 2004 in The Journal of Finance. This research showed that **a stock's new 52-week high plays a key role in momentum investing, acting as an anchor point for investors.** The Trading New High strategy takes advantage of this phenomenon **by adding an element of fear via the RSI** (Relative Stability Index) indicator. Strength Index) to identify moments when it is worth entering a position after a short-term price correction.

Main assumptions of the strategy:

- **Anchoring Effect:** A new 52-week high attracts investor and media attention, but it can also lead to a short-term sell-off in the stock as investors take profits.
- **Post-Breakout Correction:** A new high is often followed by a correction, caused by profit-taking by institutional investors and disappointed "breakout buyers."
- **Using the RSI Indicator:** Low RSI values indicate a short-term oversold stock, which could signal a potential turning point and buying opportunity.

For the purposes of these tests, we have modified some of the assumptions that were tested in **Trading New Highs v.1. Parameters** have been **optimized using The Grid technique Search,** replaced the **ConnorsRSI indicator with the classic RSI,** changed the method of opening a position to **the opening price of the next day,** and **added a stop loss order.**

Characteristics of the strategy and its strengths and weaknesses:

- **Leveraging market psychology:** The strategy is based on an understanding of investor behavior, such as the anchoring effect and reactions to good news.
- **Clearly defined rules:** Specific entry and exit criteria make it easy to implement and automate your strategy.
- **High Profit Potential:** Entering a position after a correction in an uptrend can increase your profit potential.
- **Downside risk:** There is no guarantee that the stock price will return to growth after a correction.
- **Dependence on technical indicators:** The effectiveness of the strategy depends on the accuracy of the RSI readings and other indicators.
- **Loss Distance:** the strategy assumes the use of a stop loss order, but it only protects in the event of a very deep sell-off.
- **Simple implementation:** The strategy is easy to understand and implement, even for less experienced investors.
- **Flexibility:** Can be used on various markets and financial instruments.
- **Taking Advantage of Market Corrections:** Allows you to buy at a lower price within a long-term uptrend.
- **Requires discipline and patience:** Having to wait for all conditions to be met can be a challenge.
- **Limitations during periods of volatility:** The strategy may be less effective during periods of high volatility or trend changes.

Trading New Highs strategy takes advantage of the psychological behavior of stocks reaching **new 52-week highs.** By combining this with **a low RSI,** it identifies times when the stock is **short-term oversold** but **is still in a long-term uptrend.** This strategy allows for the potential profits from a continuation of the trend after a price correction.

Step 2: Define investment principles

Below is **the pseudo code** for the **Trading New Highs strategy** on daily data:

1. **Calculating Indicators:**
    a. **XX Day High:** Determine the XX day high of the instrument.
    b. **RSI (Relative Strength Index):** Calculate RSI for instrument.
2. **Generating Input Signals:**
    a. **Entry conditions:**
        i. The instrument reached a new XX-day high over the last YY days.
        ii. RSI < ZZ.
    b. **Entering a long position:** A position is opened for the opening of the next day on which the conditions are met.
3. **Generating Output Signals:**
    a. **Closing a long position:** CRSI > (100-ZZ), close the position the next day at open.
4. **Loss Management:** The stop loss order is set at the XX-day low of the instrument;
5. **Daily Monitoring - Calculation of indicators:**
    a. Check if the instruments meet the entry conditions (new XX-day high in the last YY days and RSI < ZZ).
    b. Calculate current RSI for open positions.
    c. Set a XX day low as your stop loss order.
6. **Additional Notes:**
    a. **No Short Positions:** The strategy focuses only on long positions in an uptrend.
    b. **Financial Instruments: A wide range of futures contracts** were used for the purposes of this test.

The above rules have been described in a way that allows them to be directly converted into a script in the selected testing platform, which ensures the accuracy of historical simulation and the reliability of test results.
Tests are carried out assuming that the risk of one position is **0.5% of the total capital,** with **a hypothetical stop loss order** distant from the position opening point by **2 x ATR (40 days).**

Step 3: Conduct a preliminary test of the investment strategy

Below are some purchase and sale transactions that allow you to verify the following aspects:

- **Correctness of generated signals;**
- **Direction of opening position;**
- **Moment of opening a position;**
- **Position opening price;**
- **Moment of closing the position;**
- **Closing price of the position;**
- **Compliance of the transaction with the theoretical assumptions of the investment strategy.**

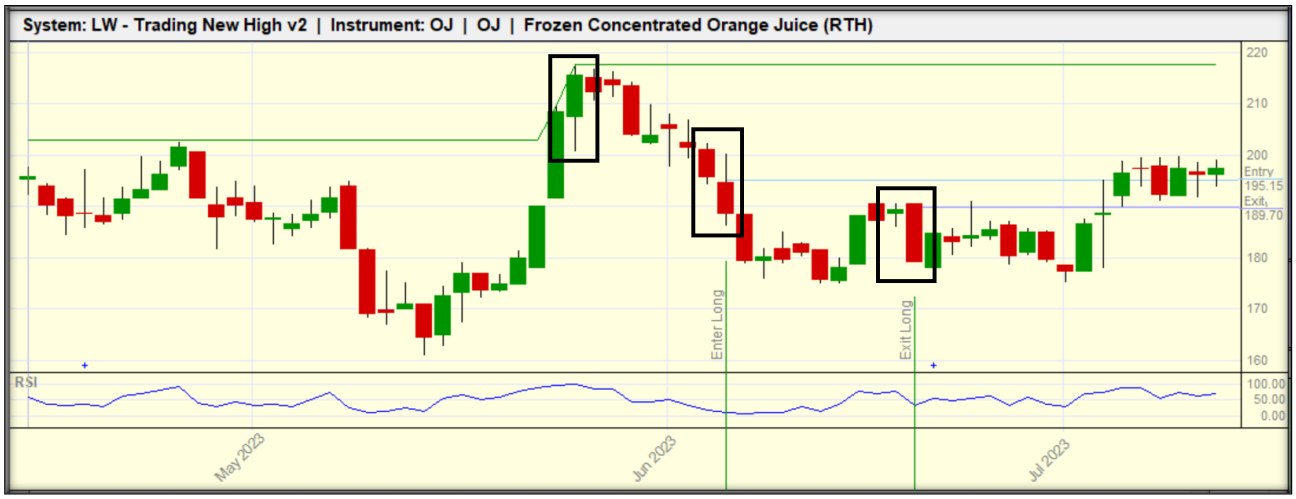
At this stage **it does not matter** whether the transactions are **profitable,** what **instrument was used** or whether they took place **recently** or **in the distant past.** The key is **to check whether the transactions are generated correctly** and in accordance with the assumptions described in the previous step.

The first transaction is on the **Nikkei225 futures contract.** At the beginning of July 2023, the quotes formed **a new 250-day high** (the first rectangle on the chart below). Then, **the quotes entered a downward correction phase,** during which the RSI(3) indicator **fell below 25** (the first candle in the second rectangle). This is a signal for us to **open a long position the next day at the opening.** This order was executed and **a long position was opened. The system worked correctly.**

Several days later, the **RSI(3) indicator rose to 75** (the first candle in the third rectangle), which is **a signal to close the position.** The position was closed the next day at the opening (the second candle in the third rectangle) and generated profit. **The system worked correctly.**

The second transaction is on the **orange juice futures contract.** At the end of May 2023, the quotes formed **a new 250-day high** (the first rectangle on the chart below). Then, **the quotes entered a downward correction phase,** during which the **RSI(3) indicator fell below 25** (first candle in the second rectangle). This is a signal for us to **open a long position the next day at the opening.** This order was executed and **a long position was opened. The system worked correctly.**

A few days later, the **RSI(3) indicator rose to 75** (the first candle in the third rectangle), which is **a signal to close the position.** The position was closed the next day at the opening (the second candle in the third rectangle) and generated a loss. **The system worked correctly.**



Once we are sure that the transactions are generated correctly, we can proceed to the first test of the strategy on the full **in-sample data set.** These tests are performed on **the basic parameters,** which – according to my assessment – should correspond to the assumed goals of the strategy.

First of all, **we reject strategies that linearly lose capital.** If a strategy exhibits such a pattern, it is a clear signal that any parameter optimization does not make sense.

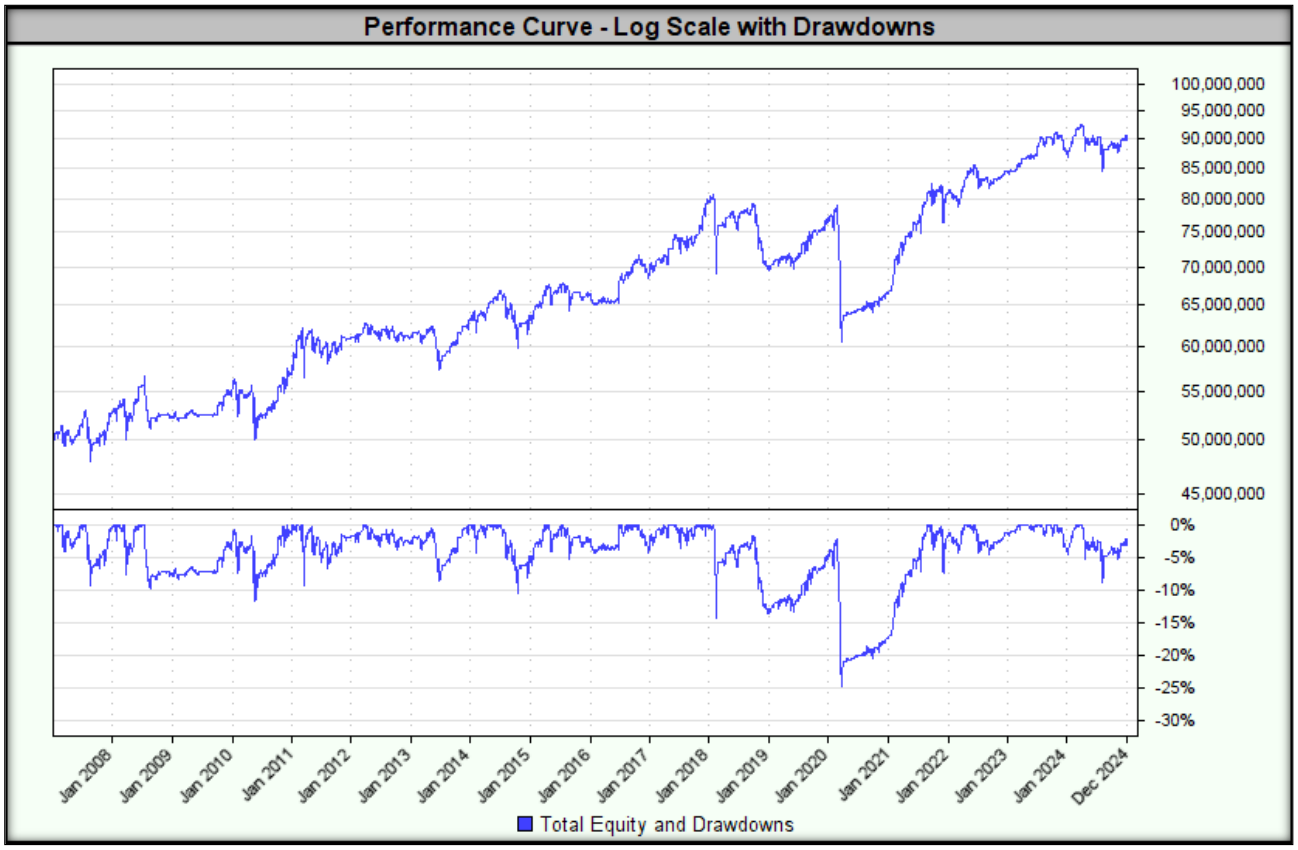
Our basic expectation is that the strategy generates **positive results,** even if they are at a low level.

Tested base parameters:

- **Upper/Lower Donchian Channel:** 250 days;
- **Days since last establishment of the upper Donchian channel:** 20 days;
- **EntryRSI:** 25;
- **Exit RSI (100 – Entry RSI):** 75;
- **RSI:** 3 days;
- **Method of opening a position:** at the opening price of the next day;
- **Stop loss:** the minimum price of the instrument will fall below the lower Donchian channel;
- **Position direction:** long positions (buy) only.
- **Position sizes:** corresponding to a risk of 0.5% of total capital, with a hypothetical stop loss order placed 2 x ATR (40 days) away from the position opening position.

The test result is shown below.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.



Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

Indicators/Measures	Concluding a transaction at the opening price
CAGR%	3.3%
MAR Ratio	0.13
RAR%	3.2%
R-Cubed	0.18
Robust Sharpe Ratio	0.44
Max Drawdown	24.8%
Wins	69.1%
Losses	30.9%
Average Win%	0.36%
Average Loss %	0.60%
Win/ Loss Ratio	0.60
Average Trade Duration (days)	16
Percent Profit Factor	1.33
SQN	-
Number of transactions	1041

In summary, the system works properly and generates signals as expected. Additionally, tests on basic parameters have yielded acceptable results. We can now move on to the most interesting stage of creating an investment strategy – **optimization.**

Step 4: Optimization and assessment of investment strategy stability

This stage of strategy creation and testing is **crucial,** as it determines how **effective** the strategy will be in **real conditions. I cannot** emphasize enough that for **a strategy to work** in real conditions, it must also work on **suboptimal parameters** and in **suboptimal conditions.** In a word – **it must be stable** to changing market conditions.

I don't know who said these words, but they perfectly reflect the problem of many optimizations:

"I've never seen a strategy that didn't work in backtests."

My goal is not to find **optimal parameter values** – **my goal** is to find **a wide range of parameters** for which the strategy will generate **acceptable results. We don't know the future,** we don't know future market conditions, but if we know that our strategy **has historically generated acceptable results** in various market conditions and across various parameter ranges, then we are **one step ahead of other** market participants.

What **parameters to choose** for the next period is the subject of considerations in **Step 5 of the "Walk Forward Analysis",** but before we get to that, **we need to know whether our strategy is stable** at all.

1. Stability across a wide range of optimized parameters

In the first step, we test the stability of the parameters on **the in-sample data.** For this purpose, we determine **the ranges of values** for all optimized parameters so that **the quotient of the highest and lowest values of the range was at least 150%.**

In the tested strategy, the ranges defined in this way are:

- **Upper/Lower Donchian Channel:** range **170-255 days (step: 5);**
- **Days since the last establishment of the upper Donchian channel:** range **15-23 days (step: 1);**
- **Entry RSI:** range **20-30 (step: 1);**
- **Exit RSI:** (100 – Entry RSI);
- **RSI: 3-4 day** range (step: 1).

The purpose of this test is to check whether **the strategy remains stable (robust)** over a wide range of parameters, which will allow to assess its usefulness in real market conditions. **The key evaluation criterion is that all test results show a positive MAR value, and the maximum drawdown does not exceed 250% of the drawdown value for the result with the highest MAR.** If any test generates a negative MAR value or if the drawdown exceeds 250% of the drawdown value for the result with the highest MAR, the strategy is completely rejected.

The lowest MAR value of 0.03 was achieved for the following parameters:

- **Donchian Channel:** 170;
- **Days since last establishment of the upper Donchian channel:** 15;
- **EntryRSI:** 20;
- **Exit RSI:** 80;

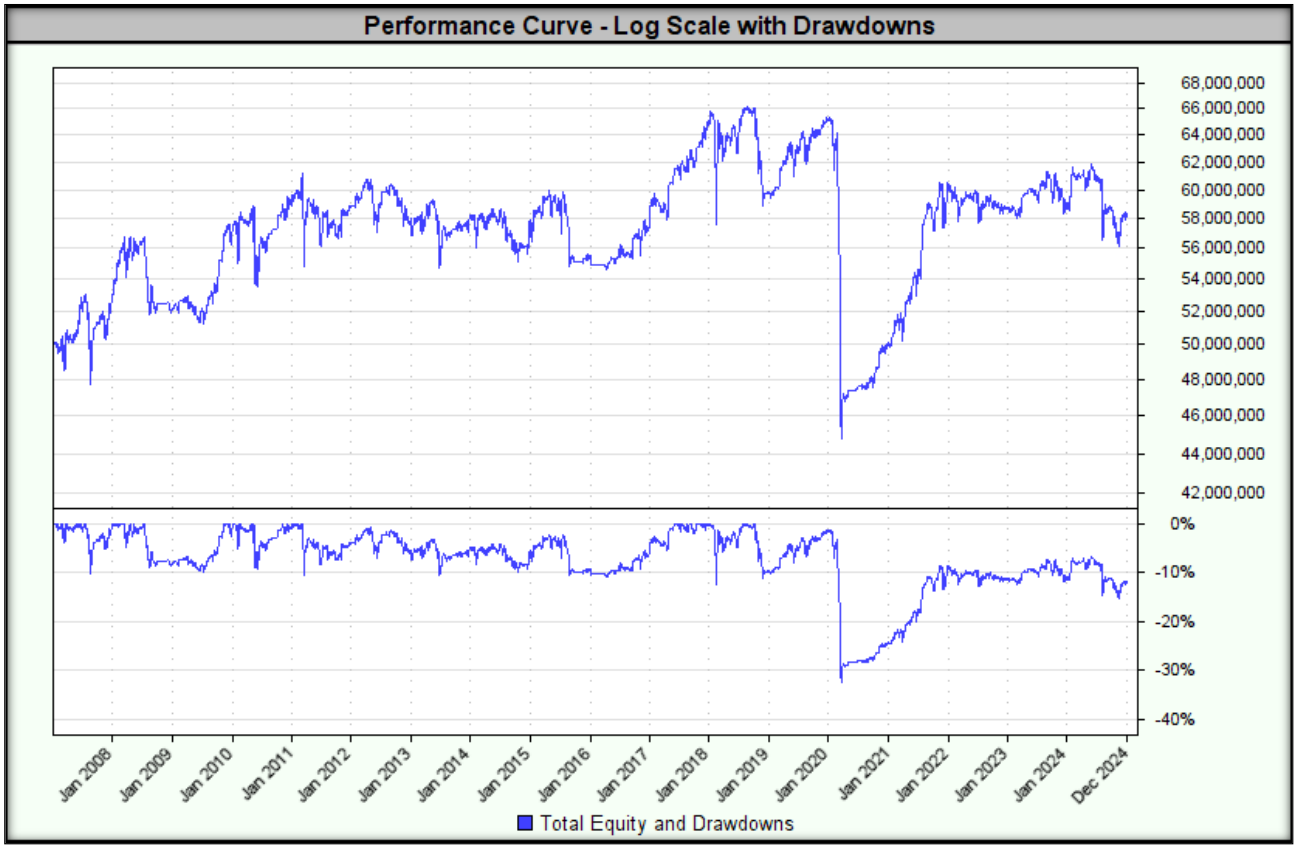
- **RSI:** 4.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSI	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades	R3	RAR [%]
2	170	15	20	4	$58,233,556.18	0.85%	0.03	0.15	0.10	32.3%	76.5	555	0.01	0.49
24	170	16	20	4	$58,380,402.74	0.86%	0.03	0.15	0.10	32.2%	76.5	569	0.02	0.79
46	170	17	20	4	$58,665,066.79	0.89%	0.03	0.15	0.10	32.4%	76.5	578	0.03	0.86
4	170	15	21	4	$59,402,430.08	0.96%	0.03	0.16	0.11	30.1%	78.1	602	0.02	0.79
26	170	16	21	4	$59,810,536.39	1.00%	0.03	0.17	0.12	30.1%	74.6	612	0.03	1.02
200	175	15	20	4	$60,177,478.61	1.03%	0.04	0.18	0.12	29.6%	76.5	544	0.02	0.75
244	175	17	20	4	$60,343,926.30	1.05%	0.04	0.18	0.12	29.7%	76.5	566	0.03	1.11
222	175	16	20	4	$60,373,332.85	1.05%	0.04	0.18	0.12	29.4%	76.5	558	0.03	1.06
48	170	17	21	4	$60,844,272.60	1.10%	0.04	0.18	0.12	30.1%	60.0	622	0.03	1.15
134	170	21	20	4	$63,222,694.25	1.31%	0.04	0.20	0.14	32.1%	83.7	621	0.03	1.12
178	170	23	20	4	$63,348,892.13	1.32%	0.04	0.20	0.14	32.1%	83.7	637	0.03	1.04

Below is a graph of the equity curve for **the strategy with the lowest MAR.**

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.



The highest MAR value of 0.25 was achieved for the following parameters:

- **Donchian Channel:** 225;
- **Days since last establishment of the upper Donchian channel:** 19;
- **EntryRSI:** 25;
- **Exit RSI:** 75;
- **RSI:** 4.

The highest MAR value was accompanied by **a drawdown of 18.8%.**

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSI	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades	R3	RAR [%]
2278	225	19	25	4	$113,814,772.69	4.68%	0.25	0.69	0.63	18.8%	22.1	717	0.38	4.64
2476	230	19	25	4	$113,549,742.27	4.66%	0.25	0.69	0.63	18.8%	21.5	708	0.38	4.62
3268	250	19	25	4	$112,842,746.72	4.63%	0.25	0.70	0.61	18.8%	21.5	683	0.37	4.65
2872	240	19	25	4	$112,997,964.64	4.63%	0.25	0.69	0.63	18.9%	21.5	695	0.37	4.55
2674	235	19	25	4	$112,686,850.35	4.62%	0.24	0.69	0.63	18.9%	21.5	698	0.36	4.53
1684	210	19	25	4	$112,224,855.97	4.59%	0.24	0.67	0.60	18.8%	21.5	737	0.38	4.61
1882	215	19	25	4	$111,666,149.94	4.57%	0.24	0.66	0.60	18.9%	22.1	730	0.36	4.50
2282	225	19	27	4	$107,656,910.43	4.35%	0.24	0.65	0.56	18.0%	26.1	800	0.29	4.10
1486	205	19	25	4	$111,126,656.87	4.54%	0.24	0.66	0.60	18.8%	21.5	747	0.36	4.52
2280	225	19	26	4	$111,370,053.95	4.55%	0.24	0.67	0.63	18.9%	25.3	756	0.29	4.25
3070	245	19	25	4	$110,991,614.97	4.53%	0.24	0.68	0.62	18.9%	21.5	690	0.36	4.49

Below is a graph of the equity curve for **the strategy with the highest MAR.**

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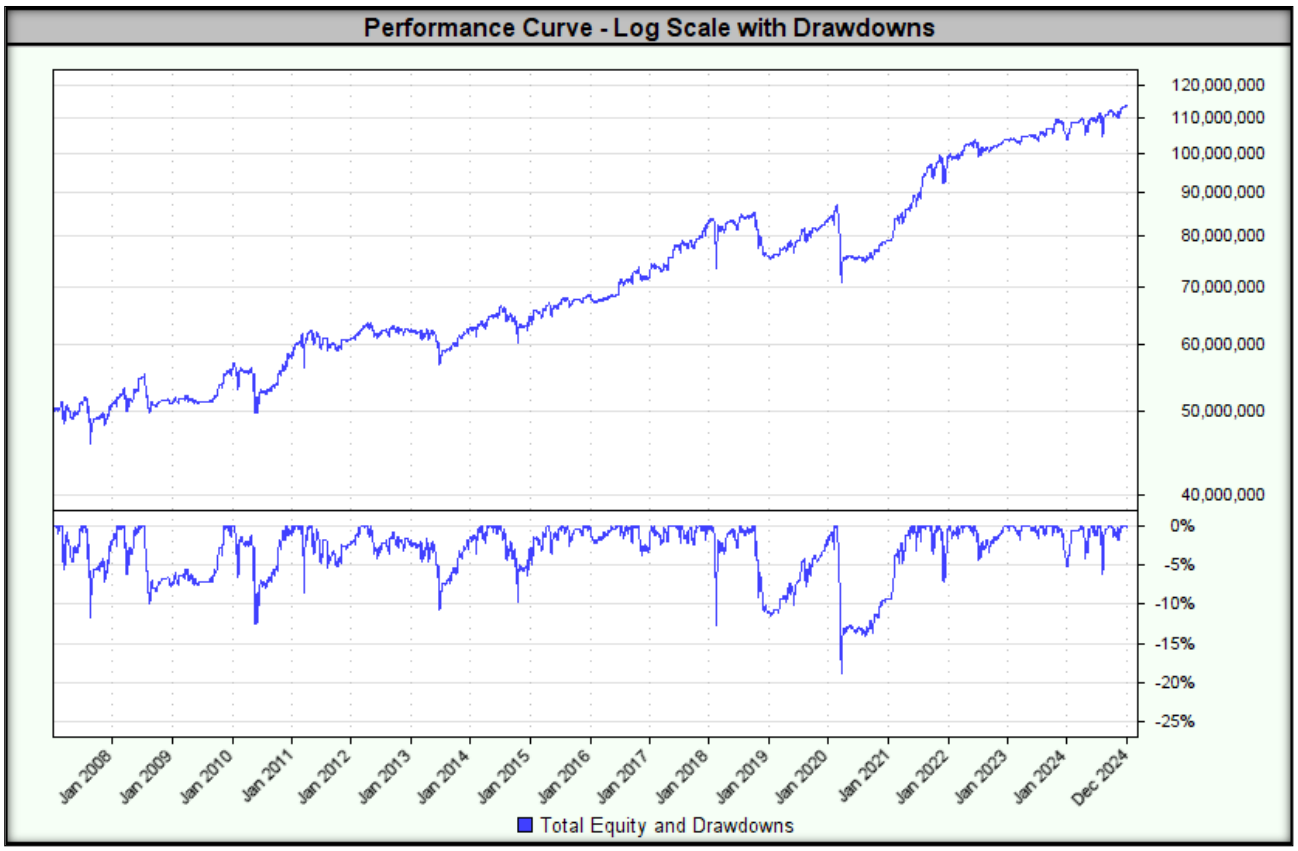


For all combinations of tested parameter ranges, **the highest drawdown was 37.0%.**

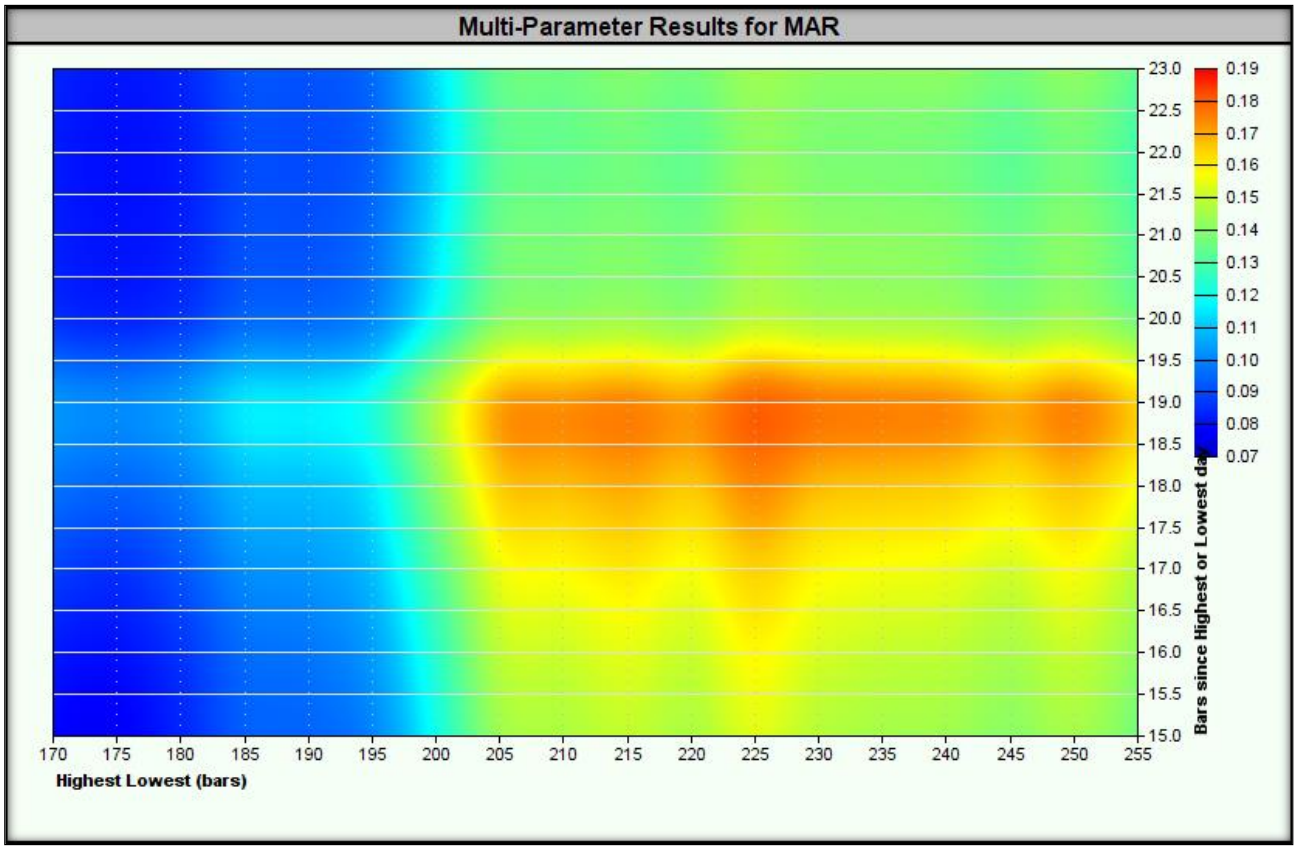
Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

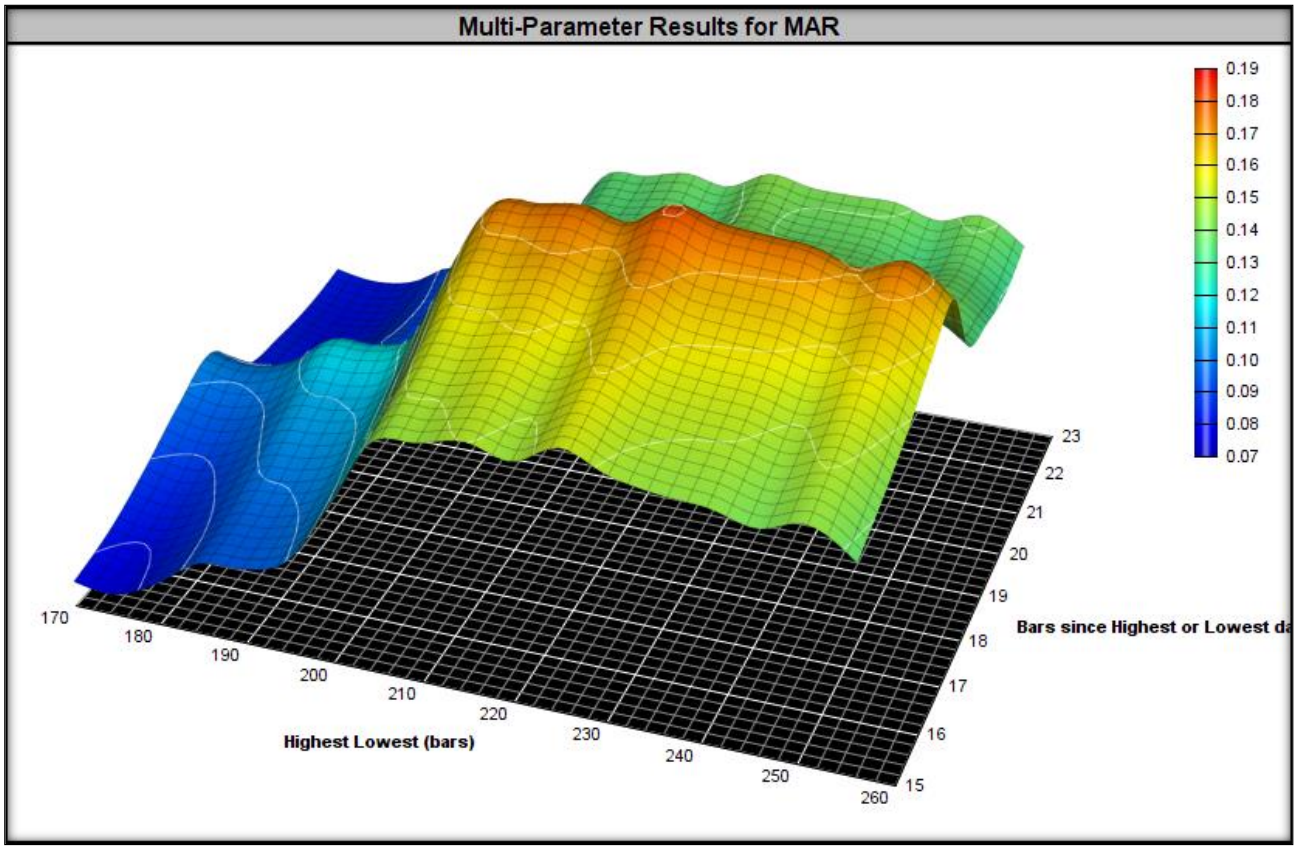
Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSI	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max T...	Longest DD	Trades	R3	RAR [%]
153	170	21	30	3	$70,292,785.92	1.91%	0.05	0.26	0.22	37.0%	83.2	1612	0.05	1.94
109	170	19	30	3	$71,441,925.79	2.00%	0.05	0.27	0.22	36.9%	83.2	1553	0.05	1.96
307	175	19	30	3	$68,973,907.33	1.80%	0.05	0.25	0.20	36.8%	83.2	1520	0.04	1.72
131	170	20	30	3	$71,532,571.19	2.01%	0.05	0.27	0.23	36.7%	83.2	1586	0.05	2.05
351	175	21	30	3	$67,997,867.48	1.72%	0.05	0.24	0.20	36.7%	83.2	1579	0.04	1.72
329	175	20	30	3	$68,961,684.49	1.80%	0.05	0.25	0.20	36.6%	83.2	1553	0.04	1.82
505	180	19	30	3	$69,526,691.21	1.85%	0.05	0.26	0.21	36.2%	83.2	1499	0.04	1.76
549	180	21	30	3	$68,337,278.54	1.75%	0.05	0.24	0.21	36.2%	83.2	1557	0.04	1.73
175	170	22	30	3	$69,987,475.49	1.89%	0.05	0.26	0.22	36.1%	83.2	1655	0.04	1.70
197	170	23	30	3	$70,387,818.79	1.92%	0.05	0.26	0.22	36.1%	83.2	1685	0.04	1.77
373	175	22	30	3	$67,531,721.27	1.68%	0.05	0.23	0.19	36.1%	83.2	1622	0.03	1.47

In summary, the strategy **passed the stability test** in a wide range of optimized parameters on in-sample data because:

- **MAR value** – which indicates the stability of the strategy in various market conditions.
- **The maximum drawdown did not exceed 250% of the drawdown value** for the result with the highest MAR (**37.0% vs. 18.8%)** – which means an acceptable risk of deep capital drawdowns.

Heatmaps for the tested ranges are presented below.




Multi-Parameter Results for MAR
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Highest Lowest (bars)
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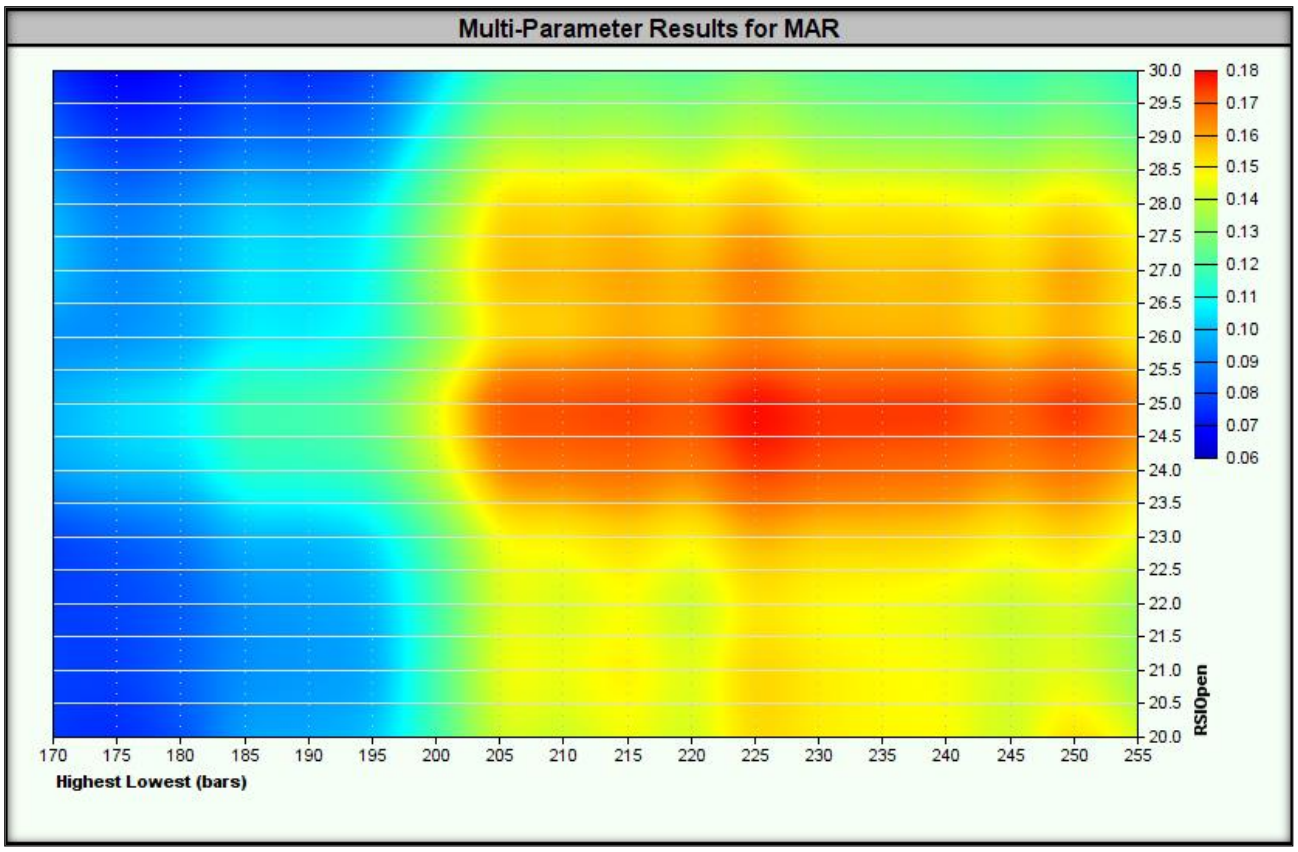
Multi-Parameter Results for MAR
0.18
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0.11
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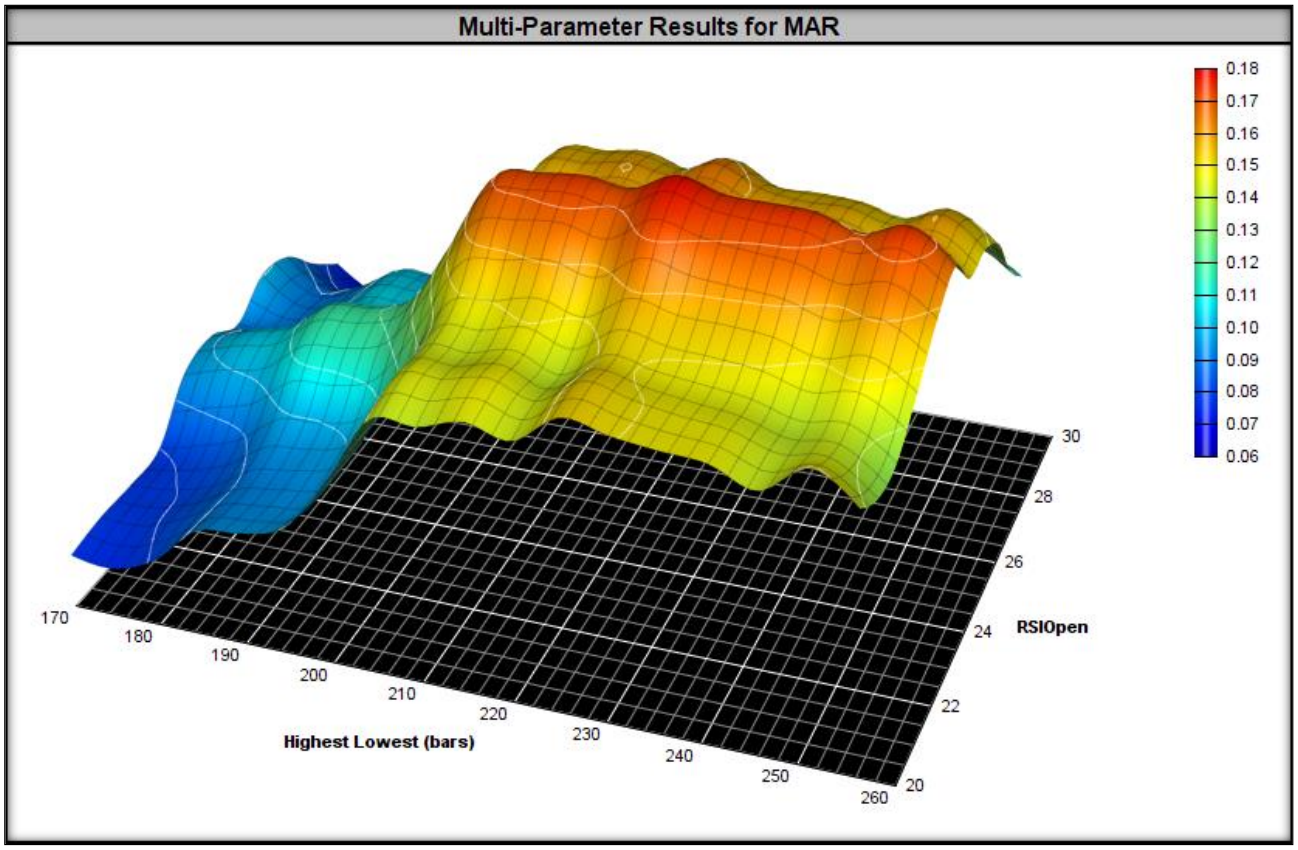
255
Highest Lowest (bars)


Multi-Parameter Results for MAR
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Highest Lowest (bars)
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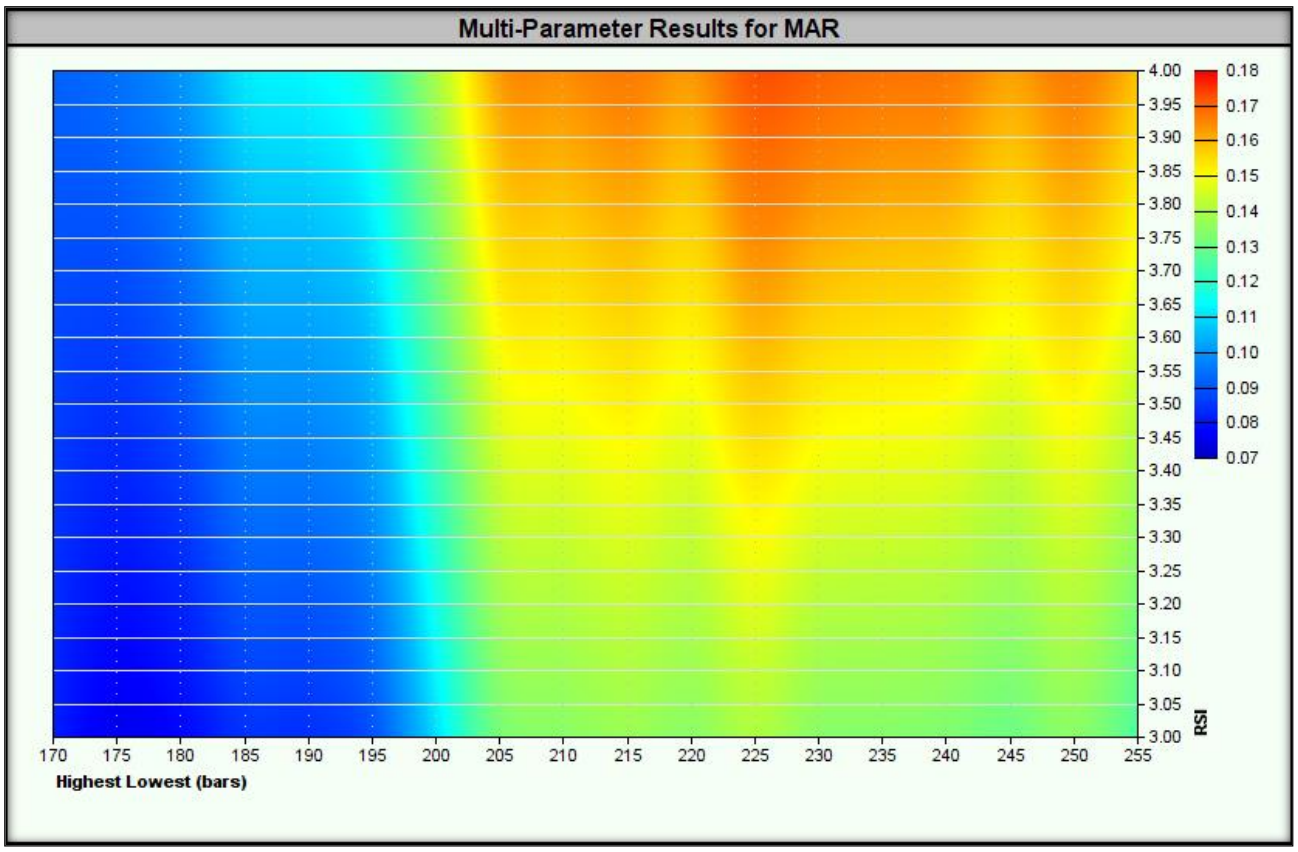
20
RSIOpen


Multi-Parameter Results for MAR
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3.20
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3.10
3.05
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RSI
170
175
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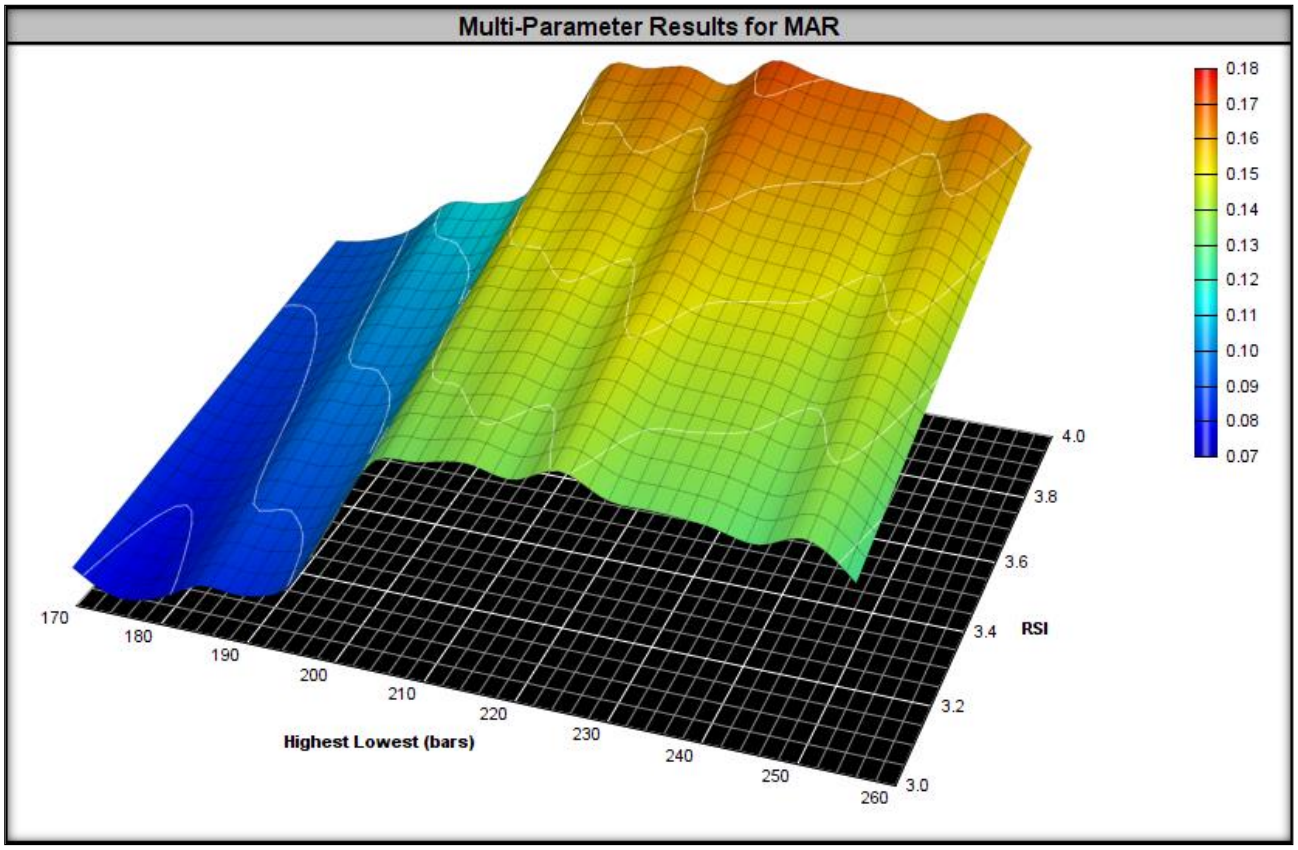
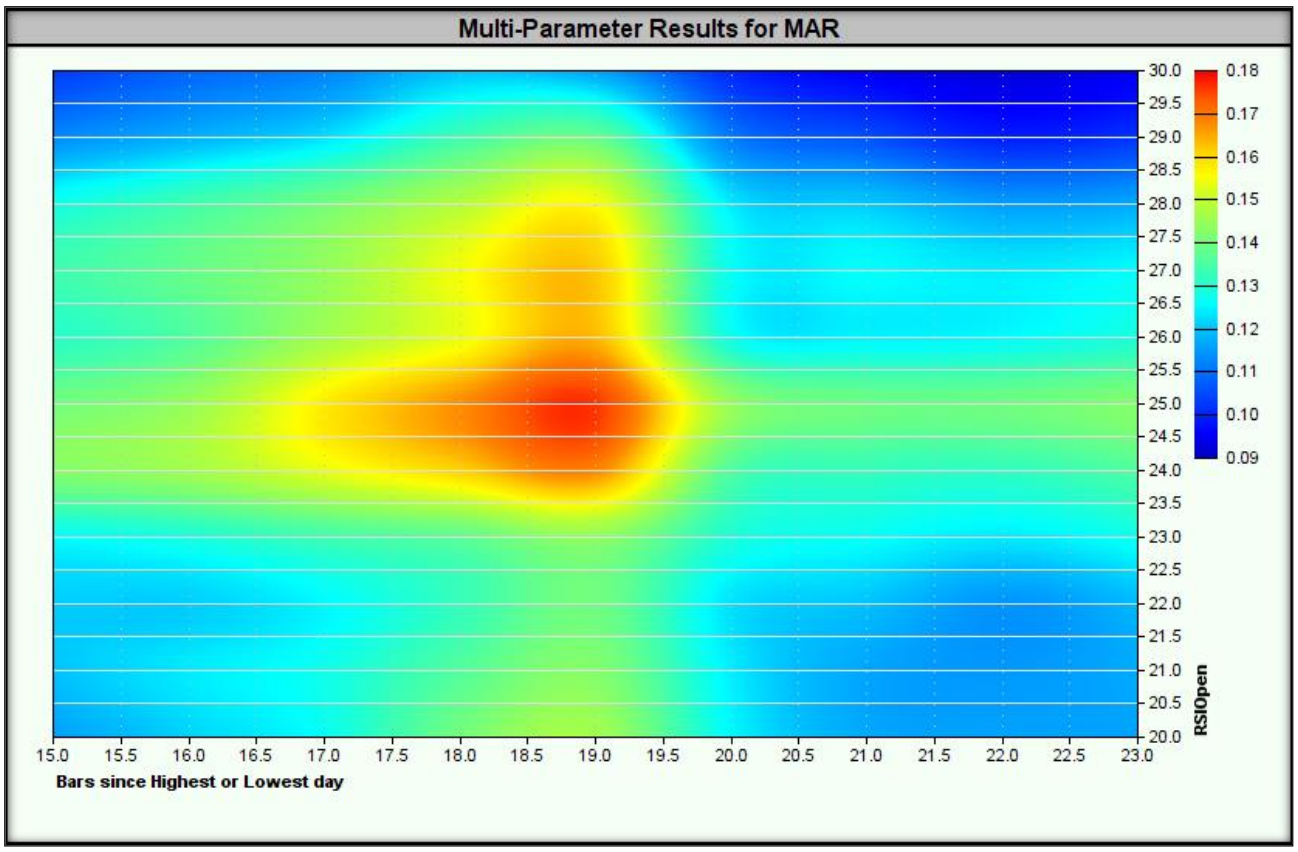
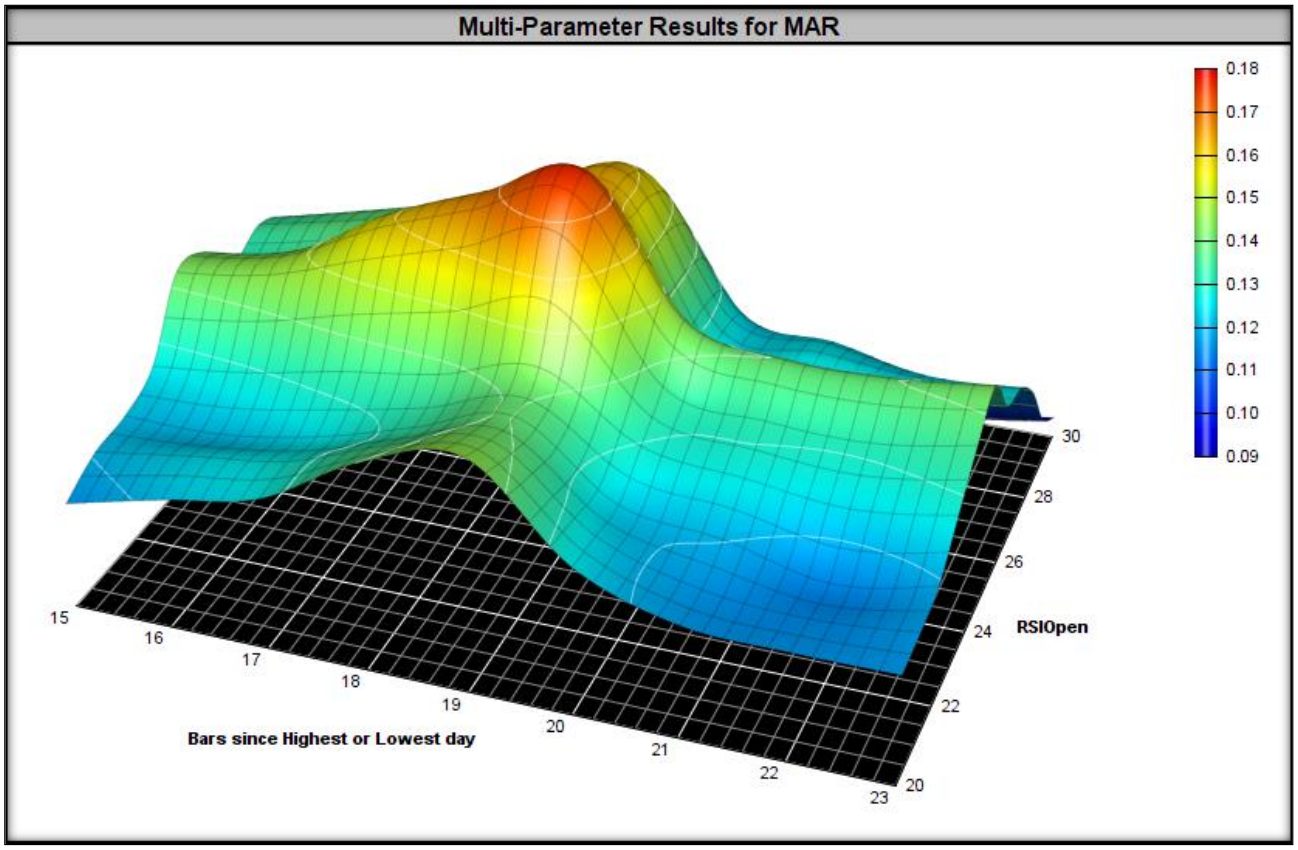
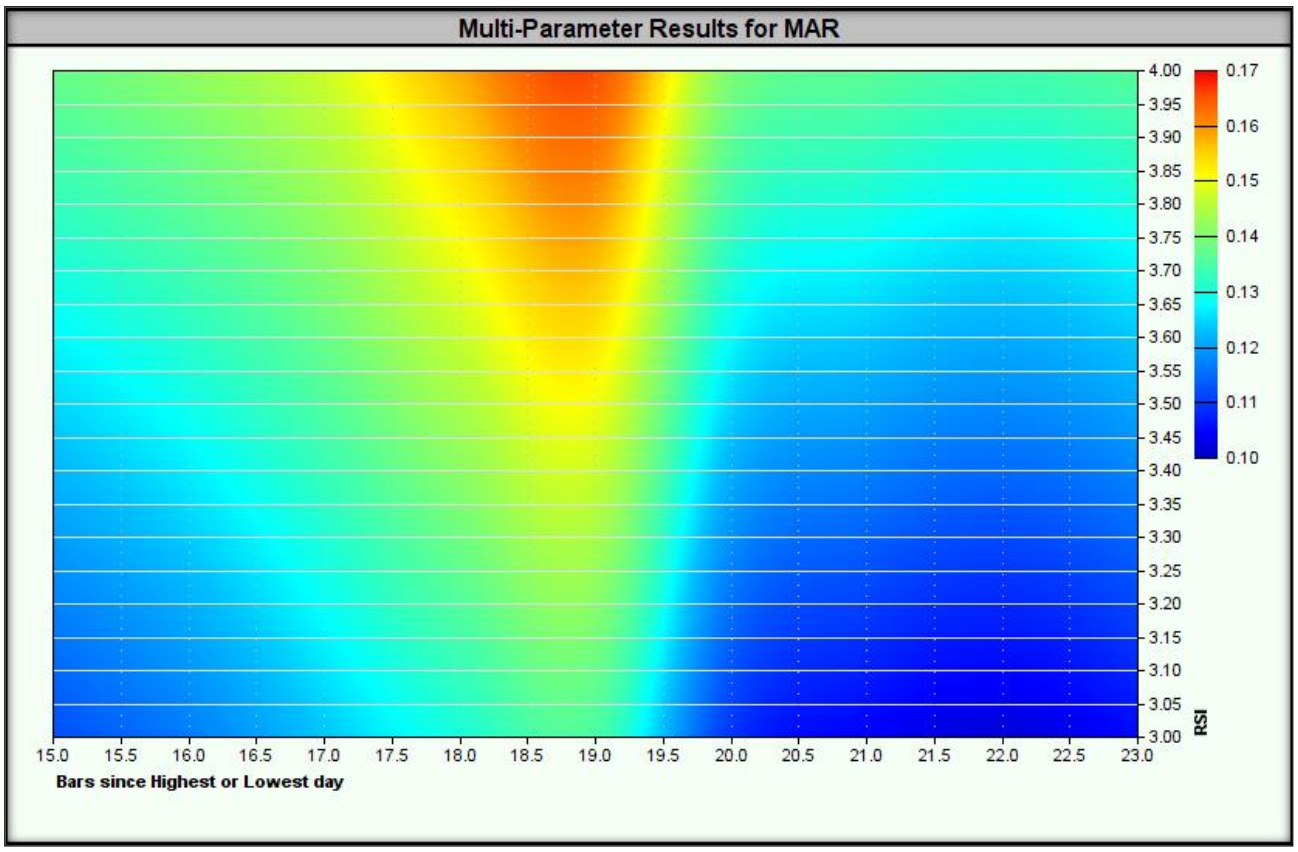
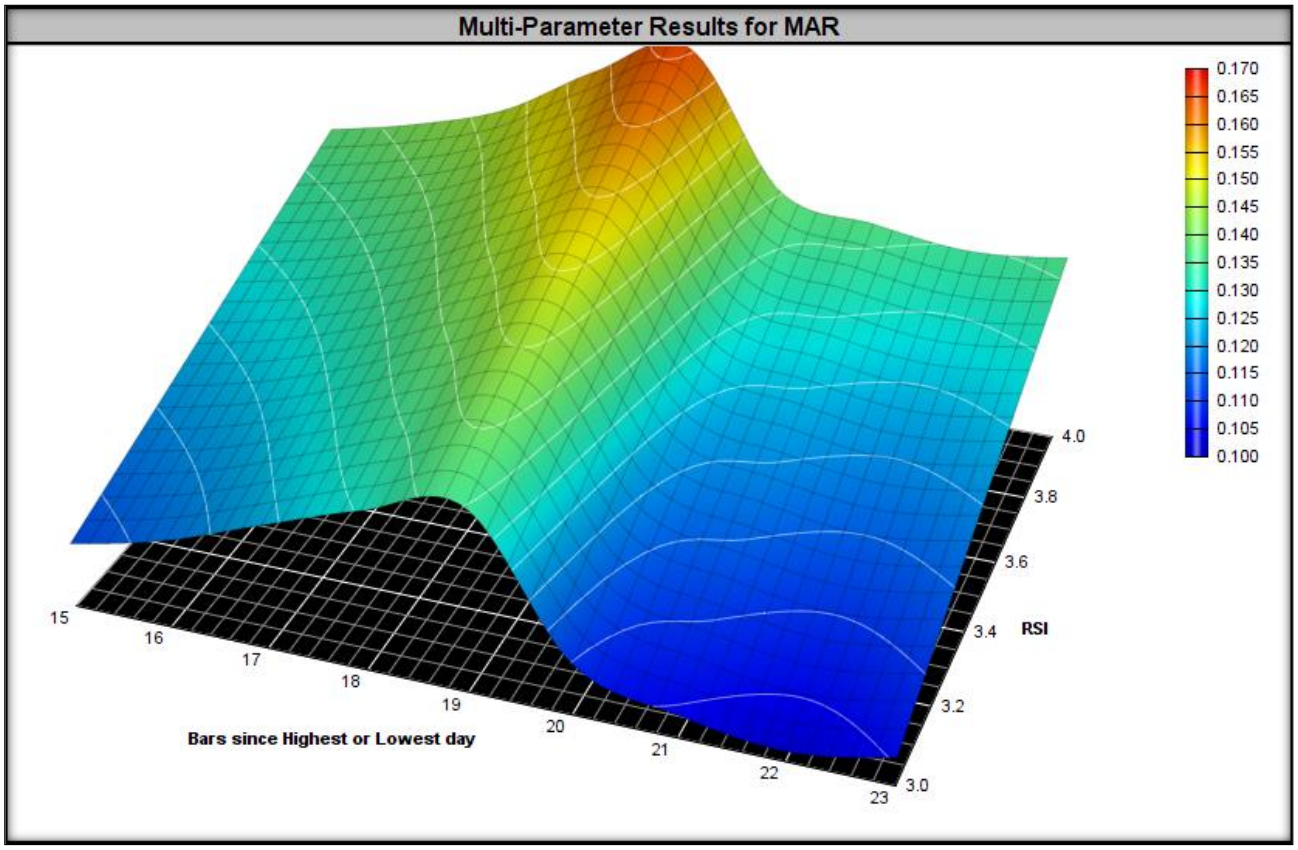
255
Highest Lowest (bars)

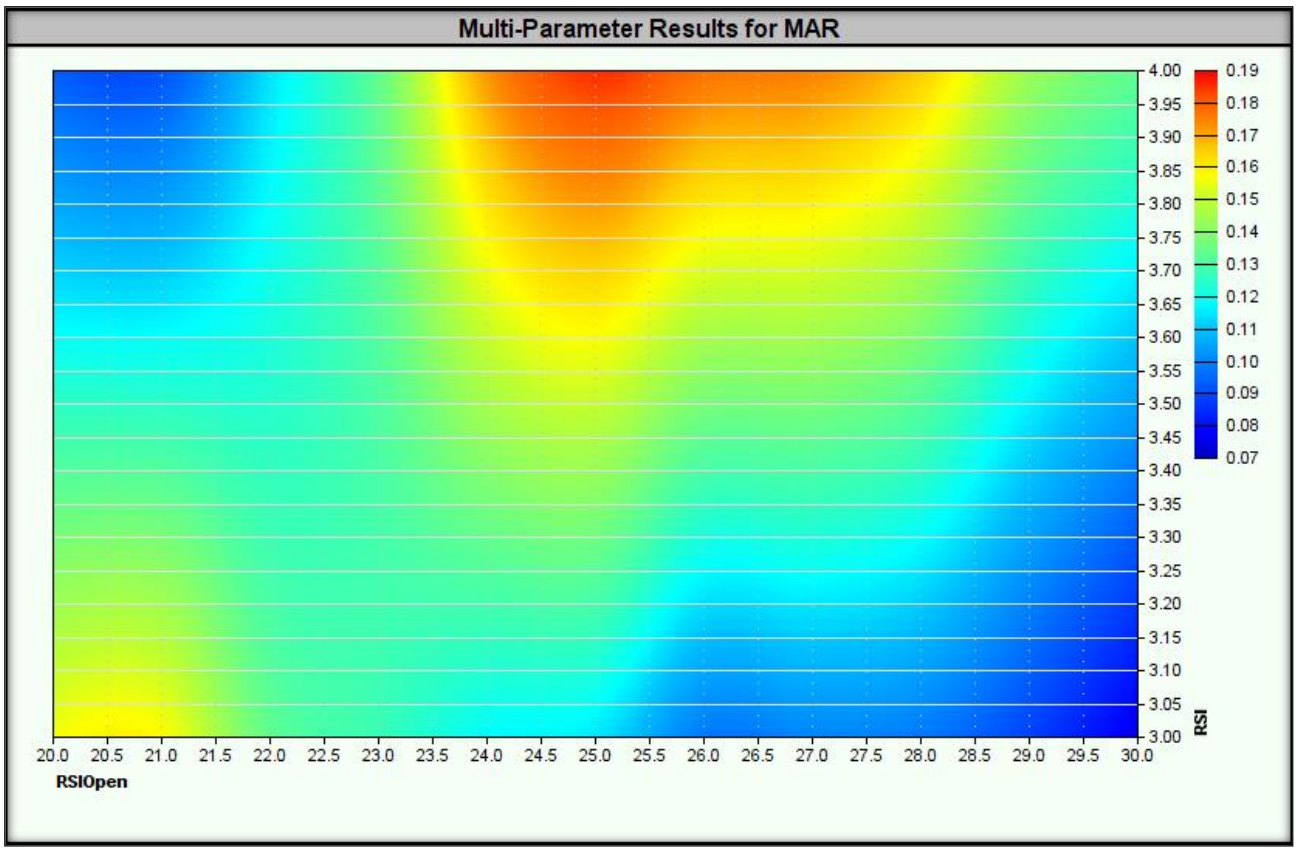

Multi-Parameter Results for MAR
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
4.0
3.8
3.6
3.4
3.2
3.0
RSI
170
180
190
200
210
220
230
240
250
260
Highest Lowest (bars)

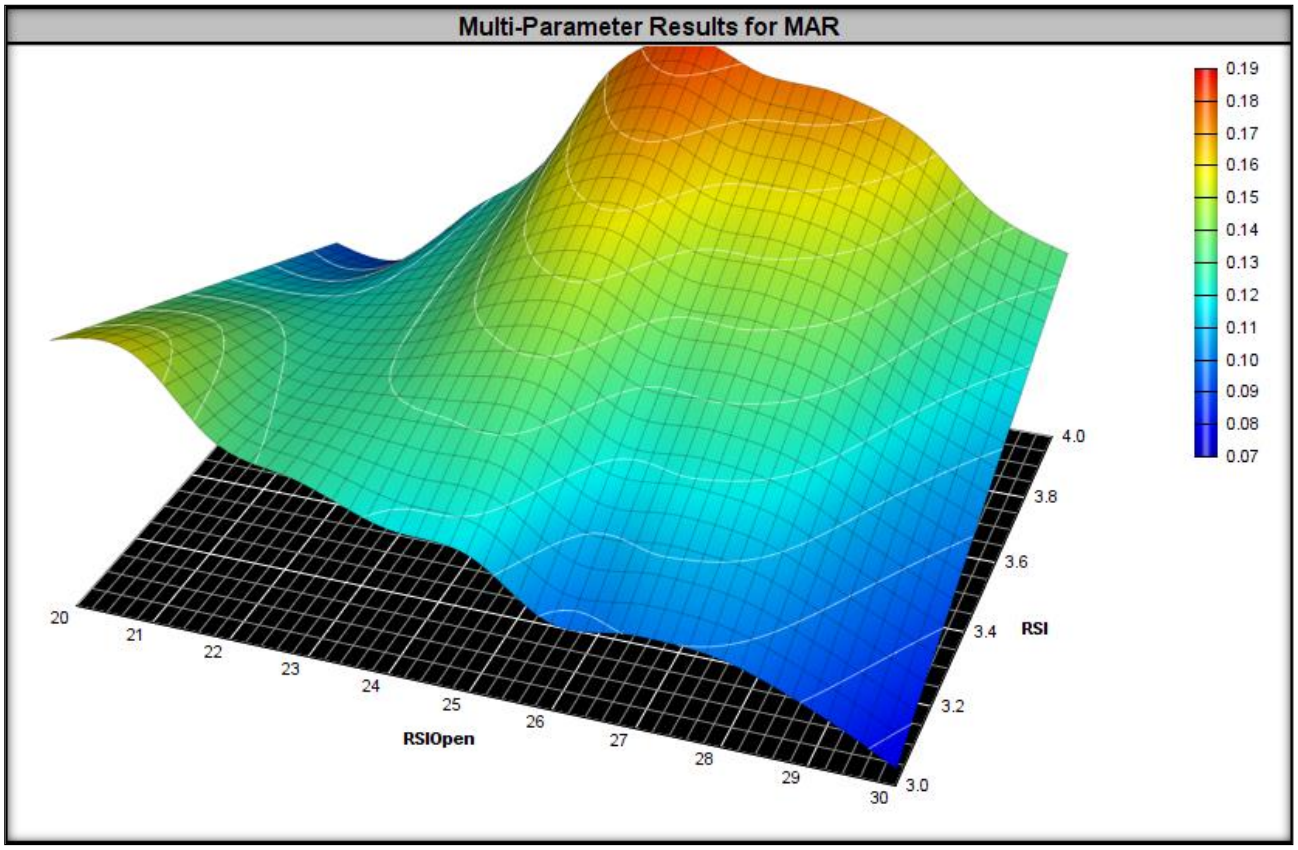

Multi-Parameter Results for MAR
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
30.0
29.5
29.0
28.5
28.0
27.5
27.0
26.5
26.0
25.5
25.0
24.5
24.0
23.5
23.0
22.5
22.0
21.5
21.0
20.5
20.0
RSIOpen
15.0
15.5
16.0
16.5
17.0
17.5
18.0
18.5
19.0
19.5
20.0
20.5
21.0
21.5
22.0
22.5
23.0
Bars since Highest or Lowest day


Multi-Parameter Results for MAR
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
15
16
17
18
19
20
21
22
23
Bars since Highest or Lowest day
20
22
24
26
28
30
RSIOpen


Multi-Parameter Results for MAR
4.00
3.95
3.90
3.85
3.80
3.75
3.70
3.65
3.60
3.55
3.50
3.45
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
RSI
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
15.0
15.5
16.0
16.5
17.0
17.5
18.0
18.5
19.0
19.5
20.0
20.5
21.0
21.5
22.0
22.5
23.0
Bars since Highest or Lowest day


Multi-Parameter Results for MAR
0.170
0.165
0.160
0.155
0.150
0.145
0.140
0.135
0.130
0.125
0.120
0.115
0.110
0.105
0.100
15
16
17
18
19
20
21
22
23
Bars since Highest or Lowest day
4.0
3.8
3.6
3.4
3.2
3.0
RSI


Multi-Parameter Results for MAR
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
4.00
3.95
3.90
3.85
3.80
3.75
3.70
3.65
3.60
3.55
3.50
3.45
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
RSI
20.0
20.5
21.0
21.5
22.0
22.5
23.0
23.5
24.0
24.5
25.0
25.5
26.0
26.5
27.0
27.5
28.0
28.5
29.0
29.5
30.0
RSIOpen


Multi-Parameter Results for MAR
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
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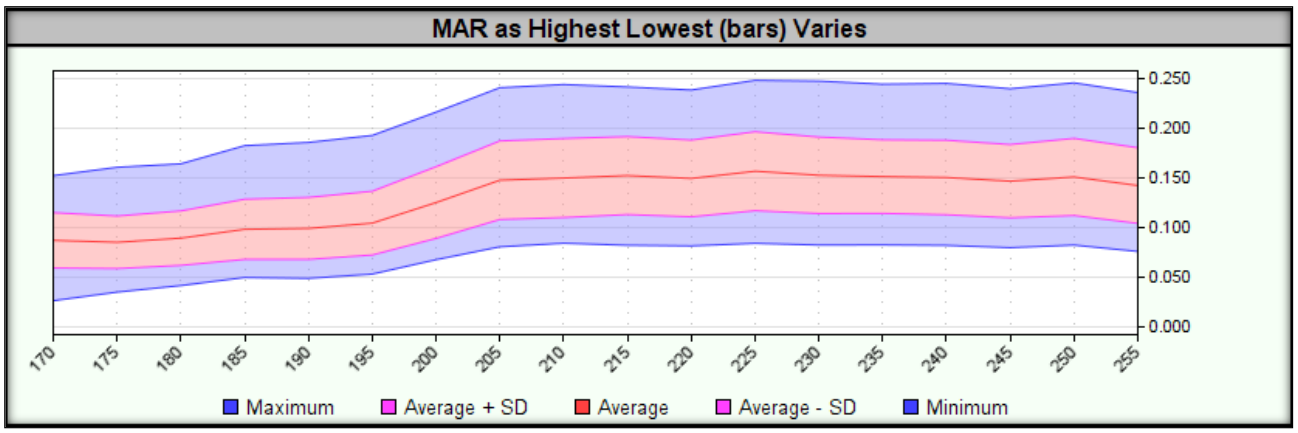
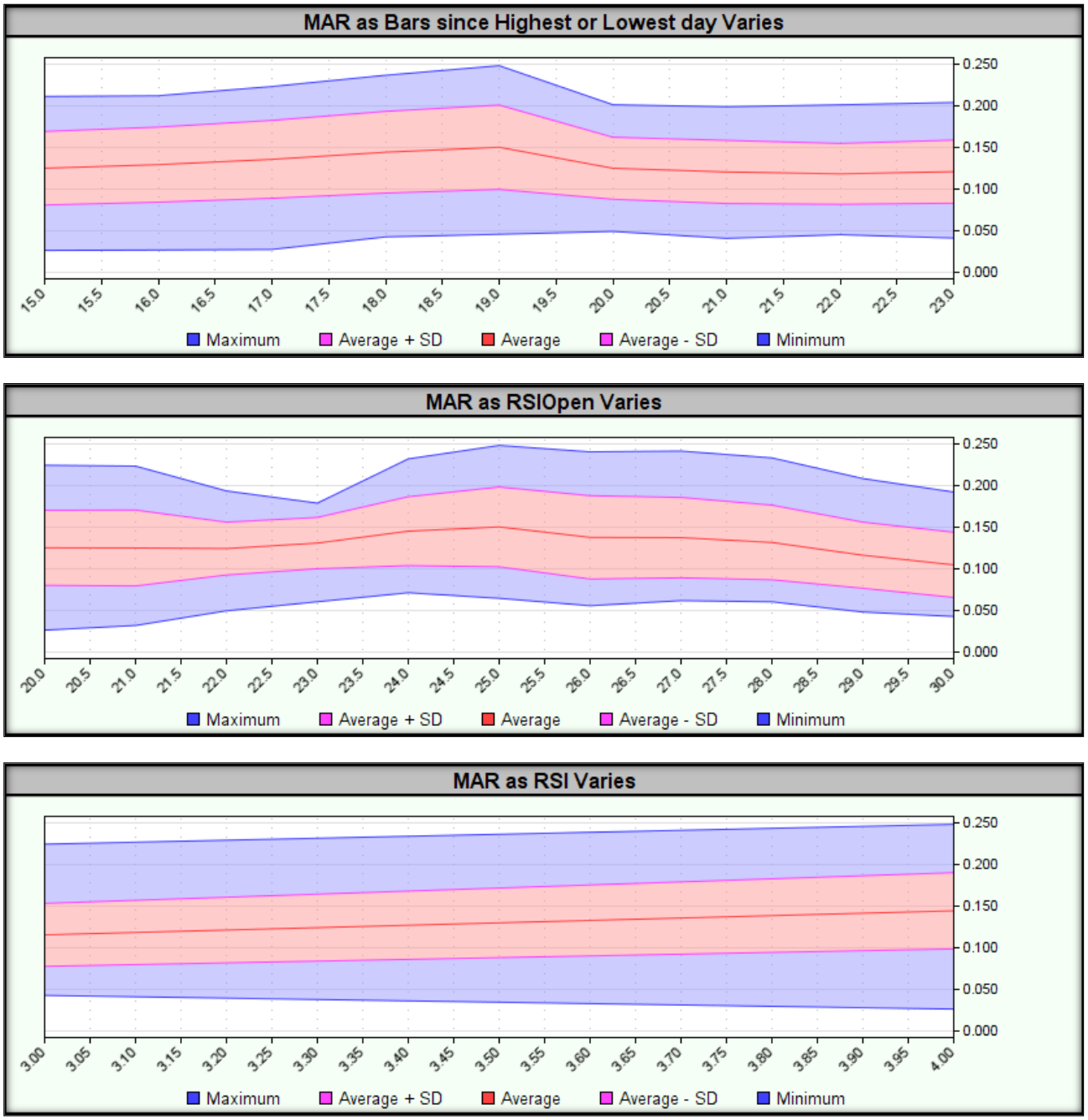
RSIOpen
3.0
3.2
3.4
3.6
3.8
4.0
RSI


MAR as Highest Lowest (bars) Varies
0.250
0.200
0.150
0.100
0.050
0.000
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
Maximum
Average + SD
Average
Average - SD
Minimum



After passing the stability tests on **the in-sample data,** it is time perform the same on **the out-of-sample data.** For this purpose, we use **the same range of parameters** as on the in-sample data:

- **Upper/Lower Donchian Channel:** range **170-255 days (step: 5);**
- **Days since the last establishment of the upper Donchian channel:** range **15-23 days (step: 1);**
- **Entry RSI:** range **20-30 (step: 1);**
- **Exit RSI:** (100 – Entry RSI);
- **RSI: 3-4 day** range (step: 1).

The lowest MAR value of 0.18 was achieved for the following parameters:

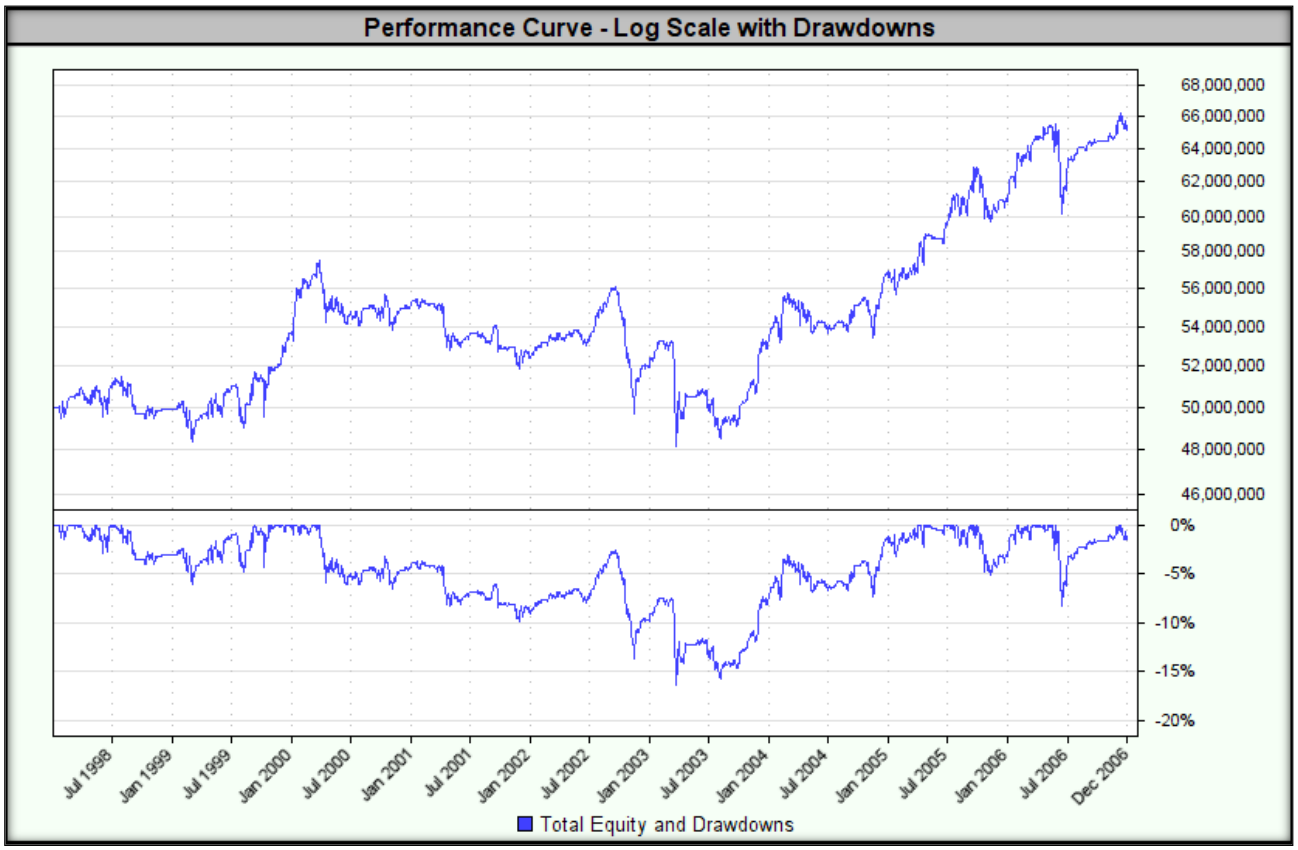
- **Upper /Lower Donchian Channel:** 170;
- **Days since last establishment of the upper Donchian channel:** 15;
- **Entry RSI:** 27;
- **Exit RSI:** 73;
- **RSI:** 4.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSI	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades	R3	RAR [%]
16	170	15	27	4	$65,179,610.14	2.99%	0.18	0.52	0.73	16.3%	60.2	355	0.28	2.33
38	170	16	27	4	$65,328,328.77	3.02%	0.19	0.52	0.73	16.3%	60.2	357	0.28	2.33
214	175	15	27	4	$65,028,440.08	2.97%	0.19	0.52	0.73	15.6%	60.2	353	0.28	2.30
26	170	16	21	4	$65,626,447.51	3.07%	0.19	0.54	0.65	16.2%	53.3	251	0.23	2.06
60	170	17	27	4	$65,600,022.31	3.07%	0.19	0.53	0.74	16.0%	60.2	360	0.29	2.38
236	175	16	27	4	$65,178,065.85	2.99%	0.19	0.53	0.73	15.6%	60.2	355	0.28	2.31
48	170	17	21	4	$66,082,733.84	3.15%	0.19	0.55	0.65	16.2%	53.3	253	0.23	2.10
258	175	17	27	4	$65,453,870.11	3.04%	0.20	0.54	0.74	15.4%	60.2	358	0.29	2.35
224	175	16	21	4	$65,680,551.63	3.08%	0.20	0.54	0.67	15.4%	53.1	250	0.24	2.09
24	170	16	20	4	$67,885,000.36	3.46%	0.20	0.60	0.59	17.3%	55.4	239	0.24	2.06
808	190	15	27	4	$65,678,247.14	3.08%	0.20	0.55	0.72	15.3%	60.2	343	0.29	2.32
830	190	16	27	4	$65,833,831.19	3.11%	0.20	0.56	0.72	15.3%	60.2	345	0.29	2.33

Below is a graph of the equity curve for **the strategy with the lowest MAR.**

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.



The highest MAR value of 0.69 was achieved for the following parameters:

- **Donchian Channel:** 255;
- **Days since last establishment of the upper Donchian channel:** 21;
- **EntryRSI:** 20;

- **Exit RSI:** 80;
- **RSI:** 4.

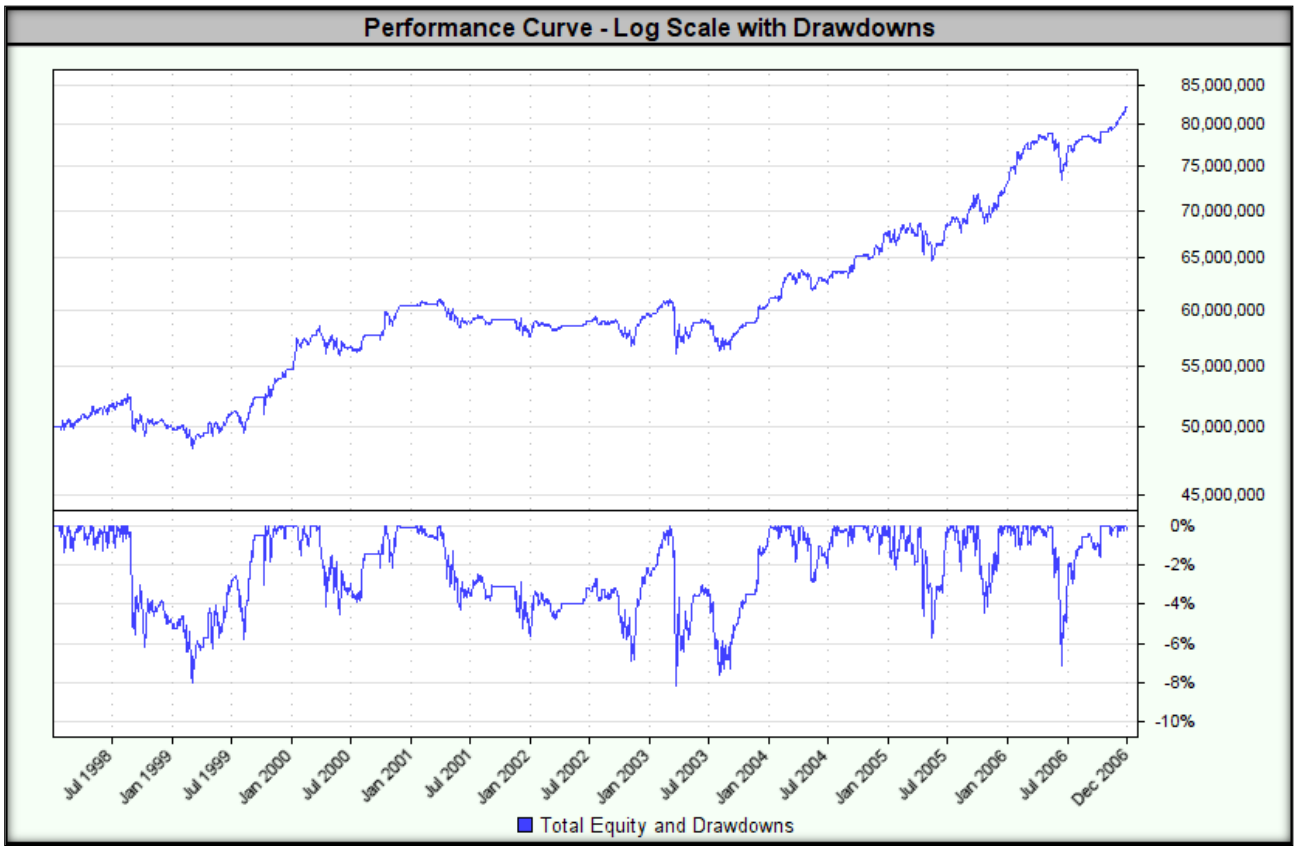
The highest MAR value was accompanied by **a drawdown of 8.2%.**

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSI	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades	R3	RAR [%]
3500	255	21	20	4	$82,083,392.26	5.67%	0.69	0.99	1.02	8.2%	33.1	226	0.89	4.78
3478	255	20	20	4	$82,001,151.91	5.66%	0.69	0.99	1.02	8.2%	33.1	225	0.88	4.77
3522	255	22	20	4	$81,097,866.24	5.53%	0.68	0.95	0.90	8.2%	33.1	229	0.89	4.83
1904	215	20	25	4	$83,898,722.71	5.93%	0.63	0.99	1.38	9.3%	15.3	322	1.35	5.59
3104	245	21	20	4	$82,295,762.50	5.70%	0.63	0.99	1.01	9.1%	33.7	231	0.85	4.76
2300	225	20	25	4	$83,336,192.95	5.85%	0.63	1.00	1.30	9.4%	14.7	314	1.27	5.43
3082	245	20	20	4	$82,214,372.22	5.69%	0.62	0.99	1.01	9.1%	33.7	230	0.85	4.75
1706	210	20	25	4	$83,251,257.90	5.83%	0.62	0.97	1.36	9.4%	15.3	325	1.30	5.49
3126	245	22	20	4	$81,700,947.93	5.61%	0.61	0.97	0.92	9.1%	33.7	234	0.88	4.80
1508	205	20	25	4	$82,431,384.27	5.72%	0.61	0.96	1.28	9.4%	15.3	326	1.24	5.44
1926	215	21	25	4	$82,408,932.11	5.71%	0.61	0.97	1.29	9.4%	15.3	326	1.33	5.53
2102	220	20	25	4	$82,333,609.05	5.70%	0.61	0.96	1.31	9.4%	15.3	319	1.26	5.37

Below is a graph of the equity curve for **the strategy with the highest MAR.**

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.



For all combinations of tested parameter ranges, **the highest drawdown was 17.3%.**

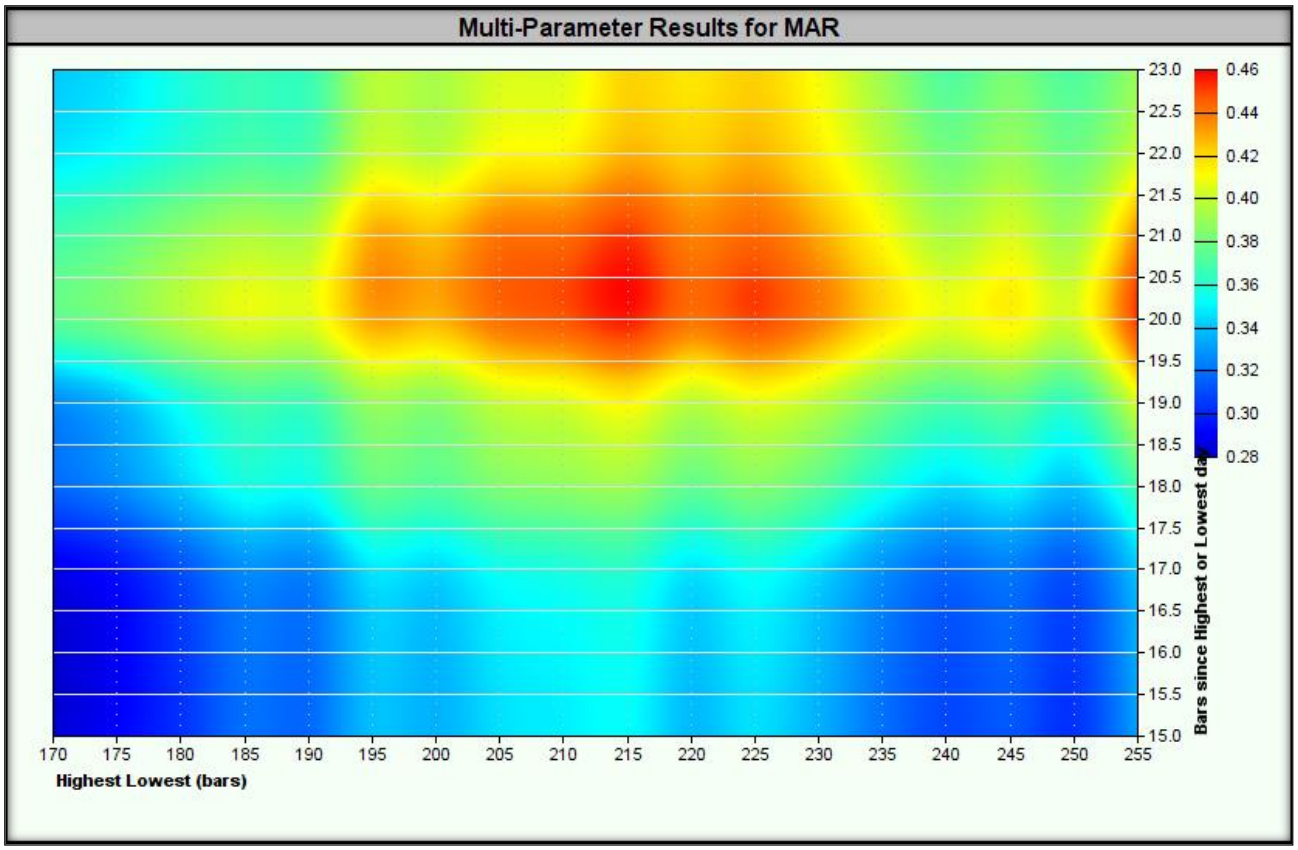
Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

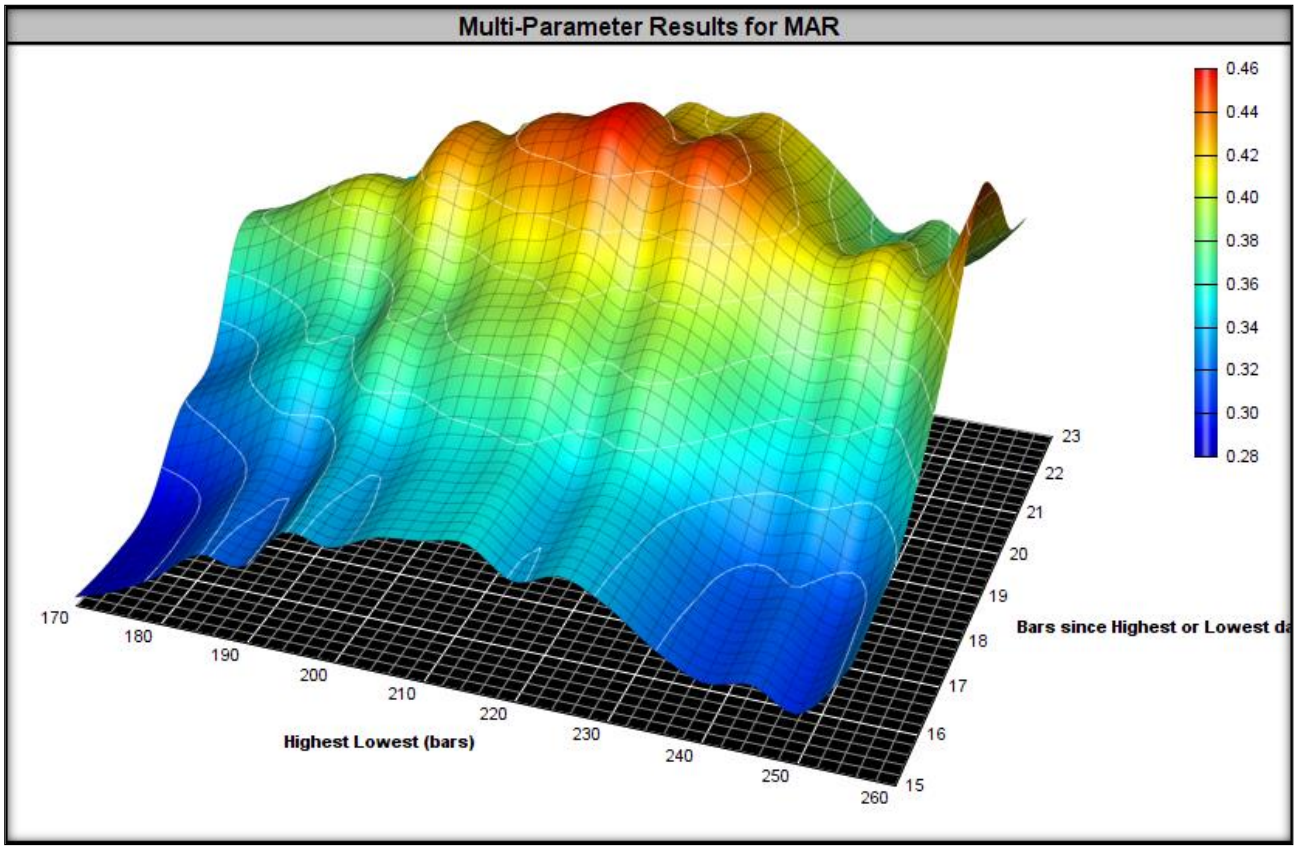
Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSI	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max T...	Longest DD	Trades	R3	RAR [%]
24	170	16	20	4	$67,885,000.36	3.46%	0.20	0.60	0.59	17.3%	55.4	239	0.24	2.06
46	170	17	20	4	$68,814,527.99	3.62%	0.21	0.63	0.60	17.3%	55.4	242	0.25	2.19
2	170	15	20	4	$69,225,743.16	3.68%	0.22	0.65	0.62	17.1%	55.4	233	0.27	2.23
222	175	16	20	4	$67,786,579.72	3.44%	0.21	0.60	0.59	16.8%	55.4	238	0.24	2.06
244	175	17	20	4	$68,727,059.23	3.60%	0.22	0.63	0.60	16.7%	55.4	241	0.25	2.18
200	175	15	20	4	$69,125,394.59	3.67%	0.22	0.65	0.62	16.5%	55.8	232	0.27	2.22
442	180	17	20	4	$69,635,721.65	3.75%	0.23	0.65	0.62	16.5%	55.4	239	0.29	2.37
420	180	16	20	4	$68,720,056.91	3.60%	0.22	0.63	0.61	16.5%	55.3	236	0.27	2.25
398	180	15	20	4	$69,341,504.20	3.70%	0.23	0.65	0.63	16.3%	55.4	231	0.28	2.27
38	170	16	27	4	$65,328,328.77	3.02%	0.19	0.52	0.73	16.3%	60.2	357	0.28	2.33
16	170	15	27	4	$65,179,610.14	2.99%	0.18	0.52	0.73	16.3%	60.2	355	0.28	2.33
26	170	16	21	4	$65,626,447.51	3.07%	0.19	0.54	0.65	16.2%	53.3	251	0.23	2.06

In summary, the strategy **passed the stability test** over a wide range of optimized parameters on out-of-sample data because:

- **All test results showed a positive MAR value** – which indicates the stability of the strategy in various market conditions.
- **Maximum drawdown on out-of-sample data did not exceed 150% of the maximum drawdown value on in-sample data (17.3% vs. 37.0%)** – which means an acceptable risk of capital drawdown.
- **The decrease in the maximum MAR value on the out-of-sample data was less than 50% relative to the in-sample test results (0.69 vs. 0.25)** – indicating that the strategy can perform well in a variety of market conditions.

Heatmaps for the tested ranges are presented below.




Multi-Parameter Results for MAR
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
170
180
190
200
210
220
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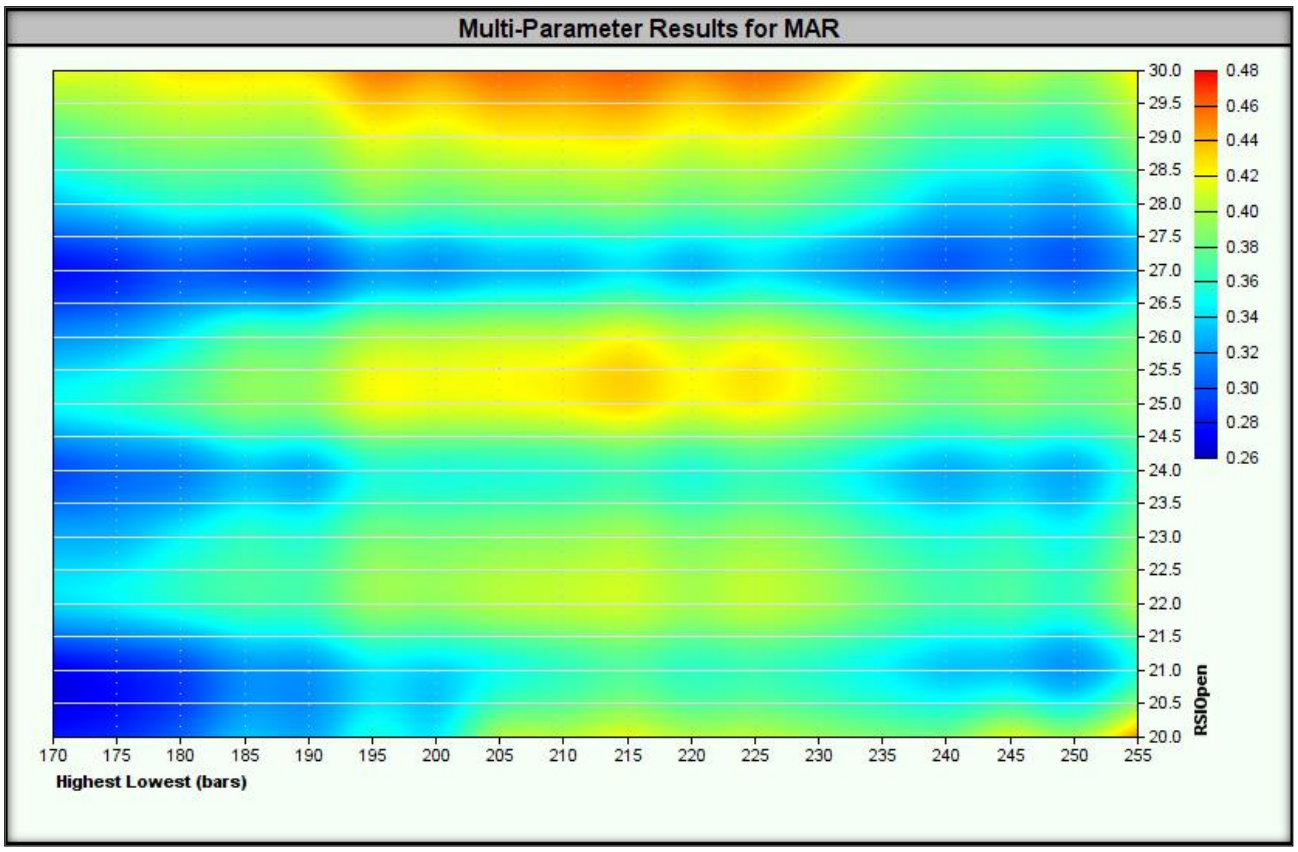
240
250
260
Highest Lowest (bars)
23
22
21
20
19
18
17
16
15
Bars since Highest or Lowest da


Multi-Parameter Results for MAR
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
30.0
29.5
29.0
28.5
28.0
27.5
27.0
26.5
26.0
25.5
25.0
24.5
24.0
23.5
23.0
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22.0
21.5
21.0
20.5
20.0
RSIOpen
170
175
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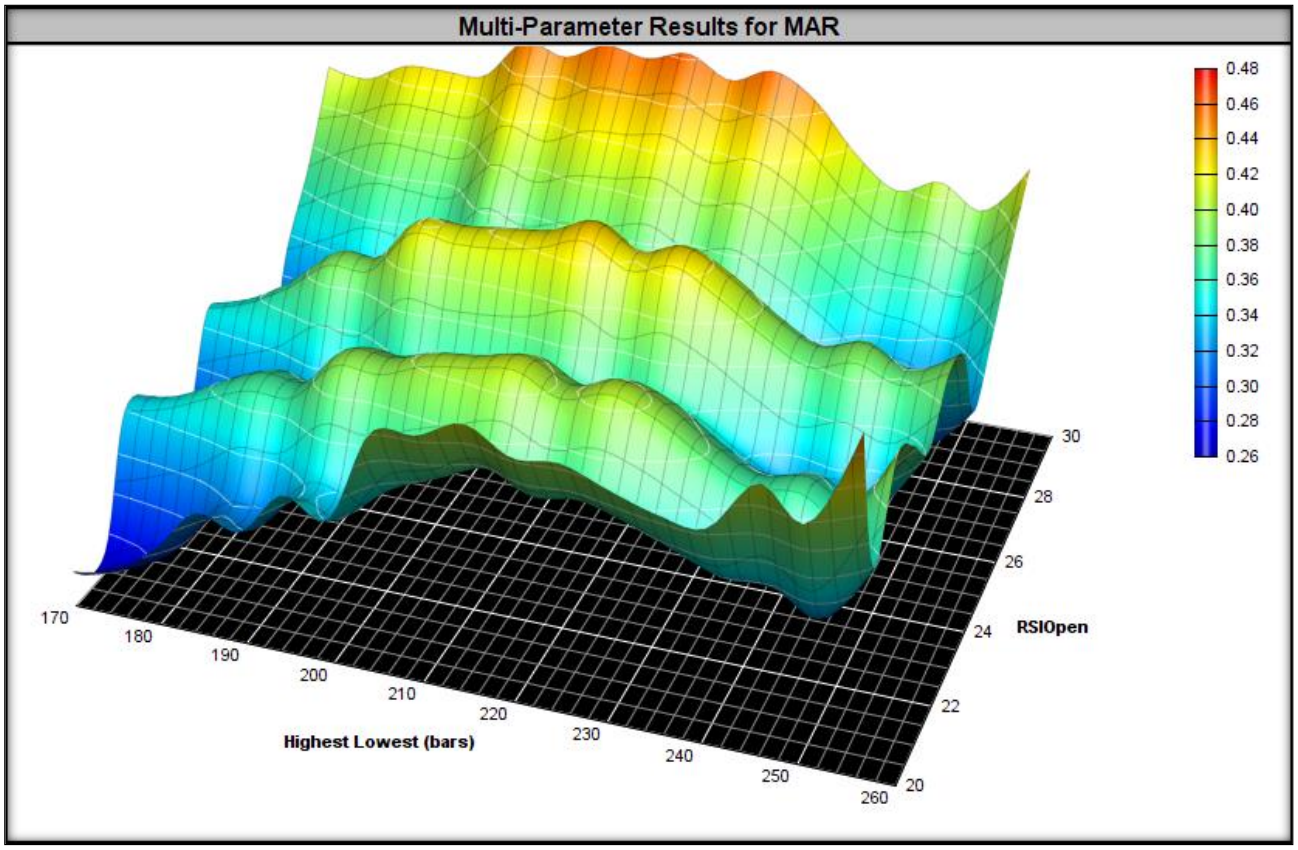
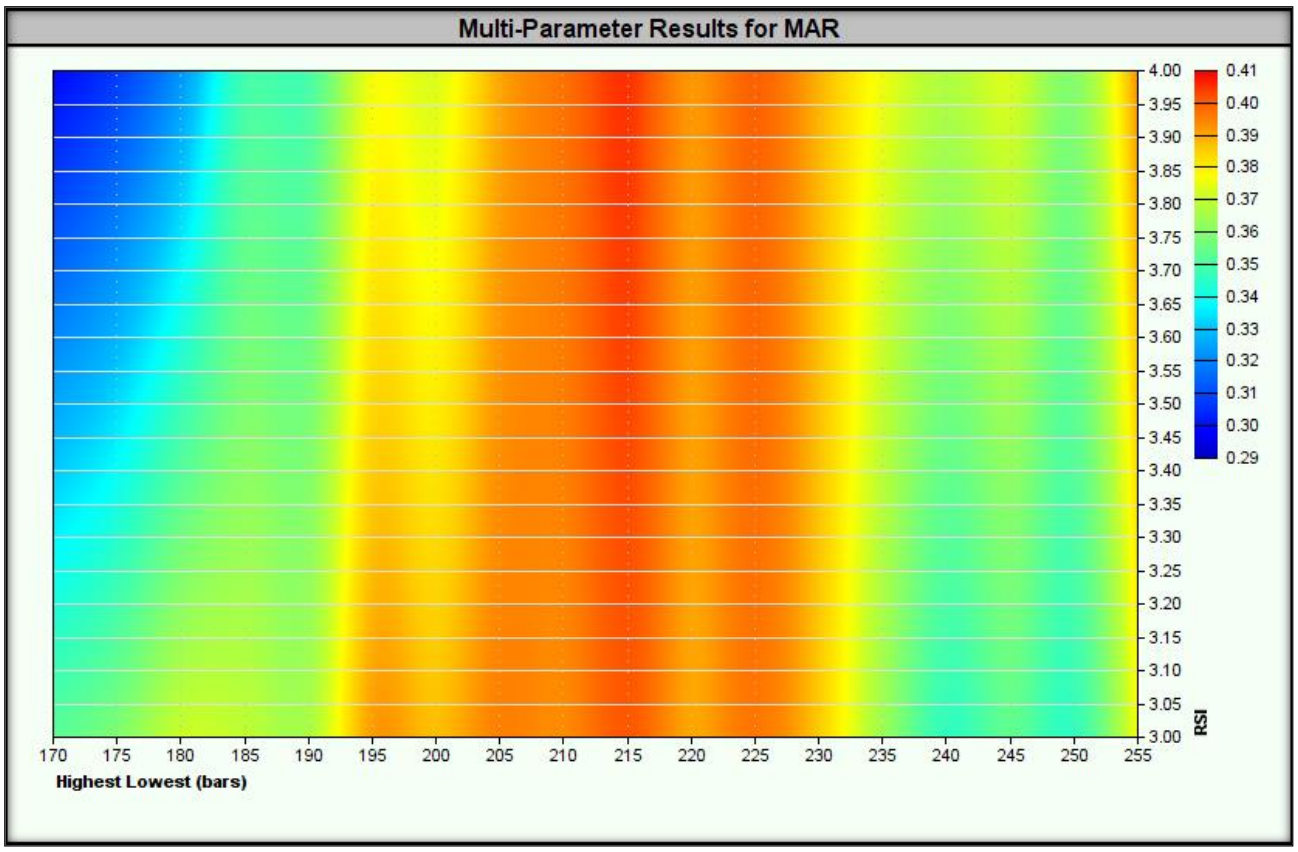
190
195
200
205
210
215
220
225
230
235
240
245
250
255
Highest Lowest (bars)


Multi-Parameter Results for MAR
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
170
180
190
200
210
220
230
240
250
260
Highest Lowest (bars)
30
28
26
24
22
20
RSIOpen


Multi-Parameter Results for MAR
4.00
3.95
3.90
3.85
3.80
3.75
3.70
3.65
3.60
3.55
3.50
3.45
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
RSI
0.41
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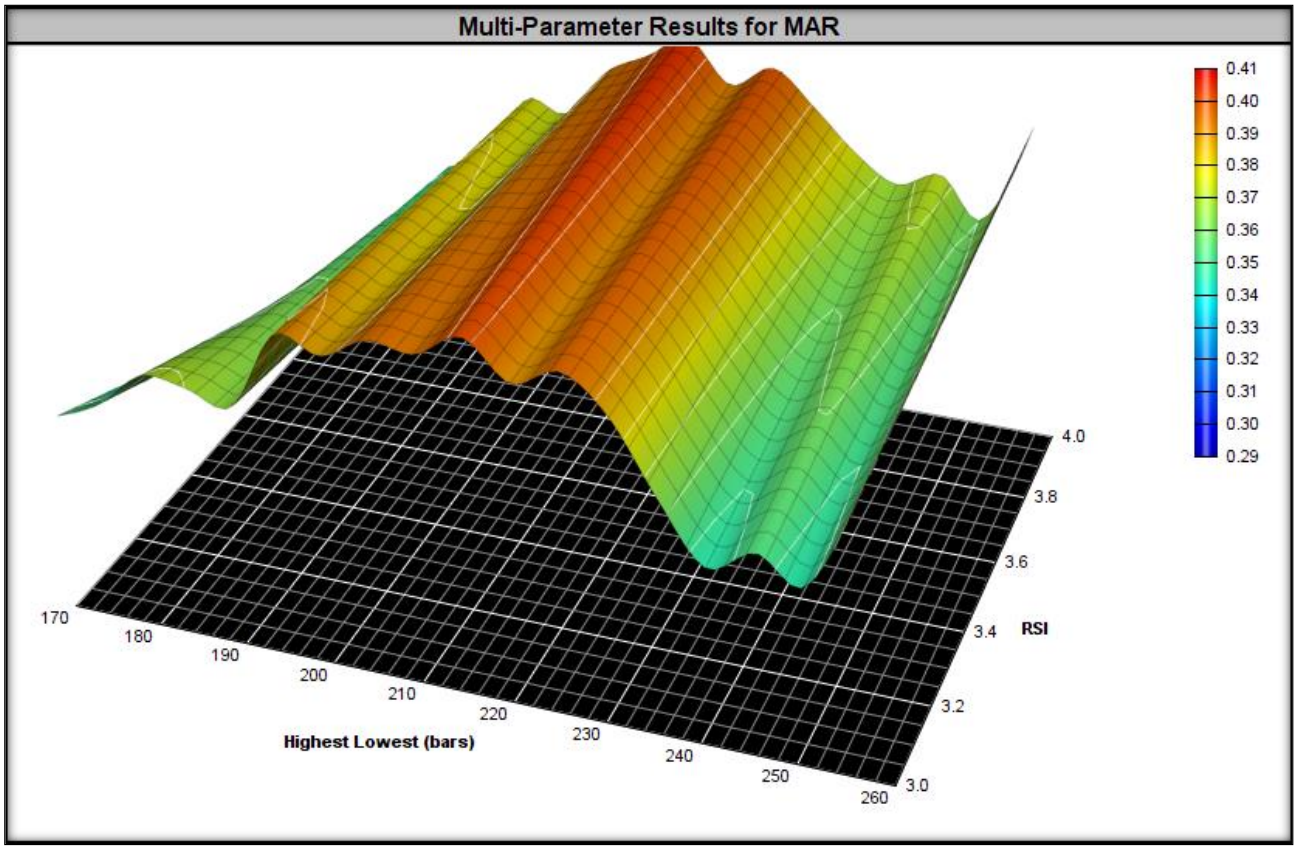
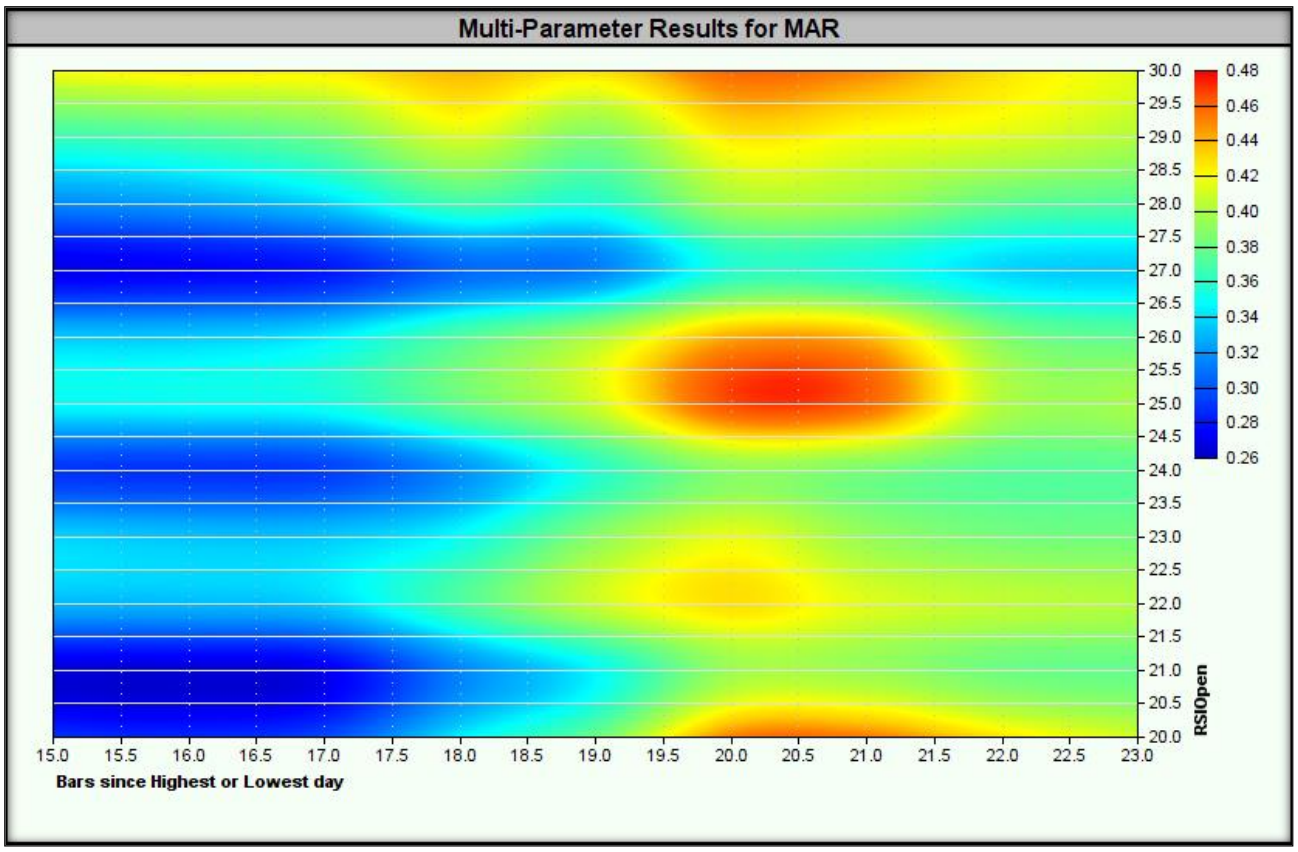
215
220
225
230
235
240
245
250
255
Highest Lowest (bars)


Multi-Parameter Results for MAR
0.41
0.40
0.39
0.38
0.37
0.36
0.35
0.34
0.33
0.32
0.31
0.30
0.29
170
180
190
200
210
220
230
240
250
260
Highest Lowest (bars)
4.0
3.8
3.6
3.4
3.2
3.0
RSI


Multi-Parameter Results for MAR
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
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0.28
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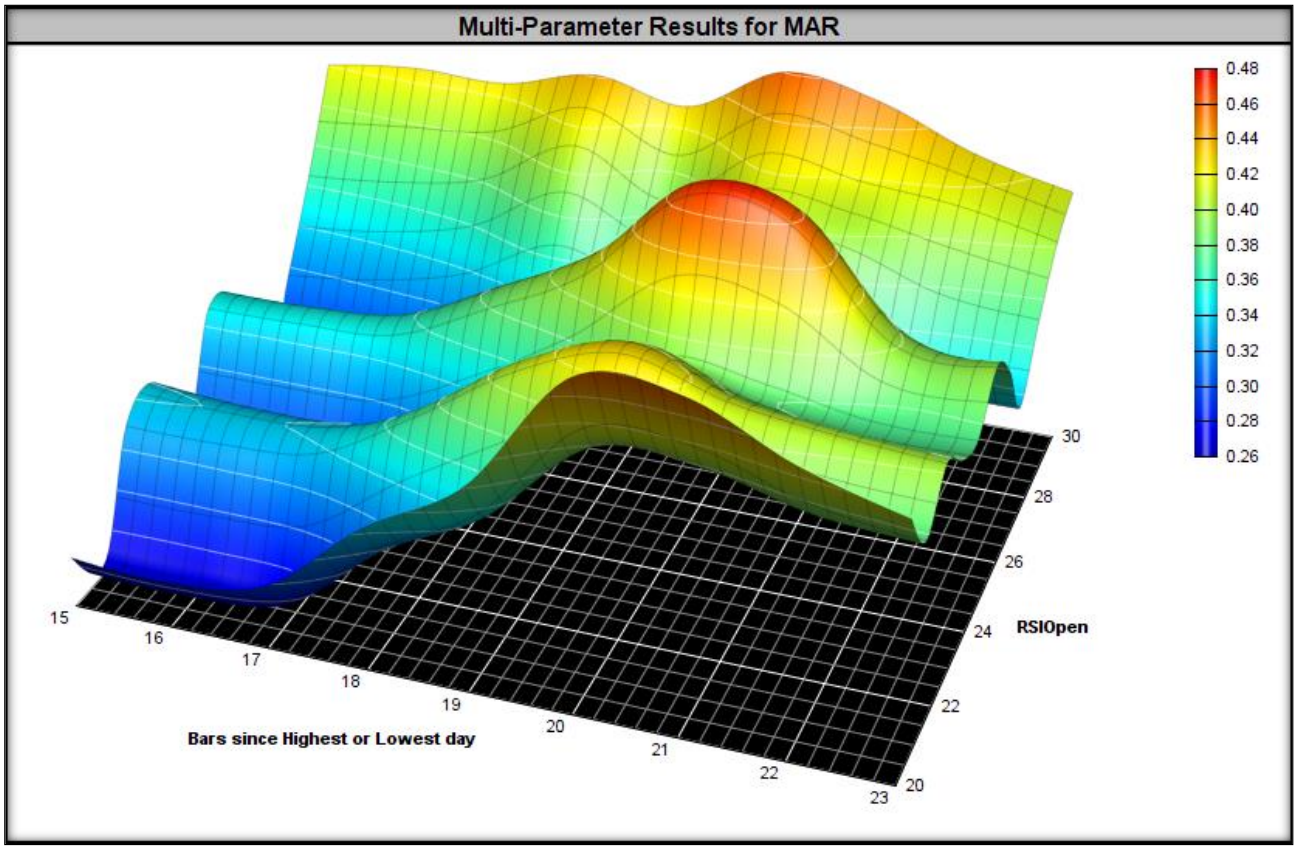
21.0
20.5
20.0
RSIOpen
15.0
15.5
16.0
16.5
17.0
17.5
18.0
18.5
19.0
19.5
20.0
20.5
21.0
21.5
22.0
22.5
23.0
Bars since Highest or Lowest day


Multi-Parameter Results for MAR
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
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16
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Bars since Highest or Lowest day
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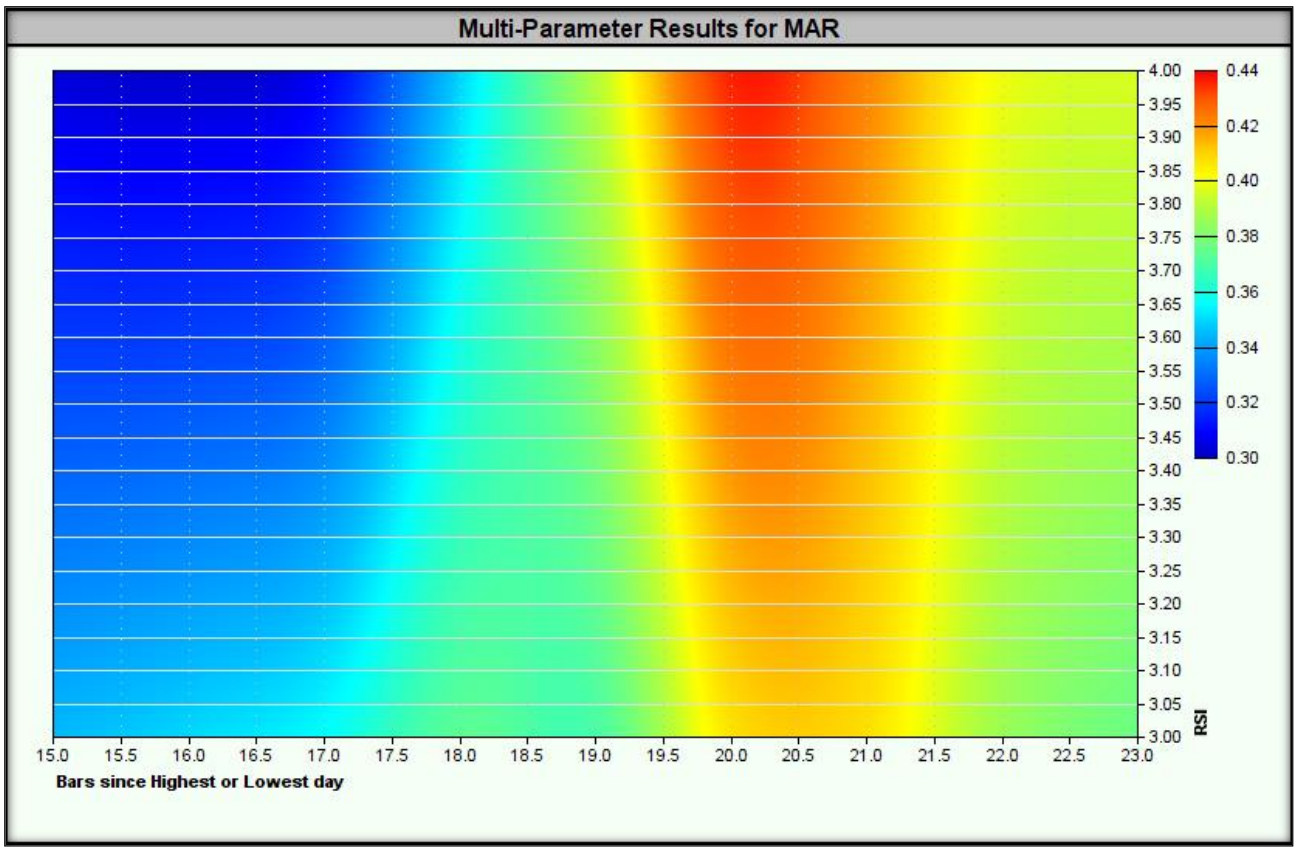
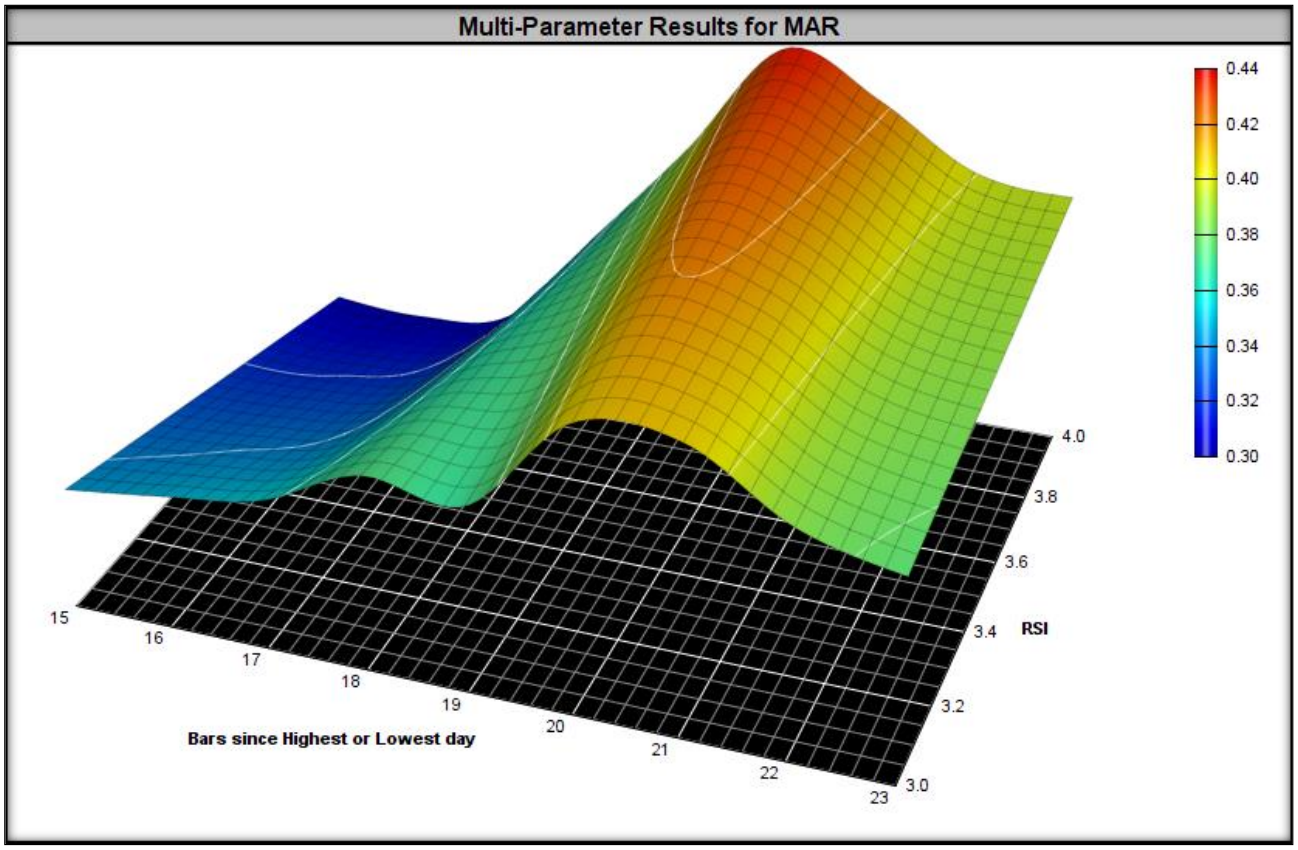
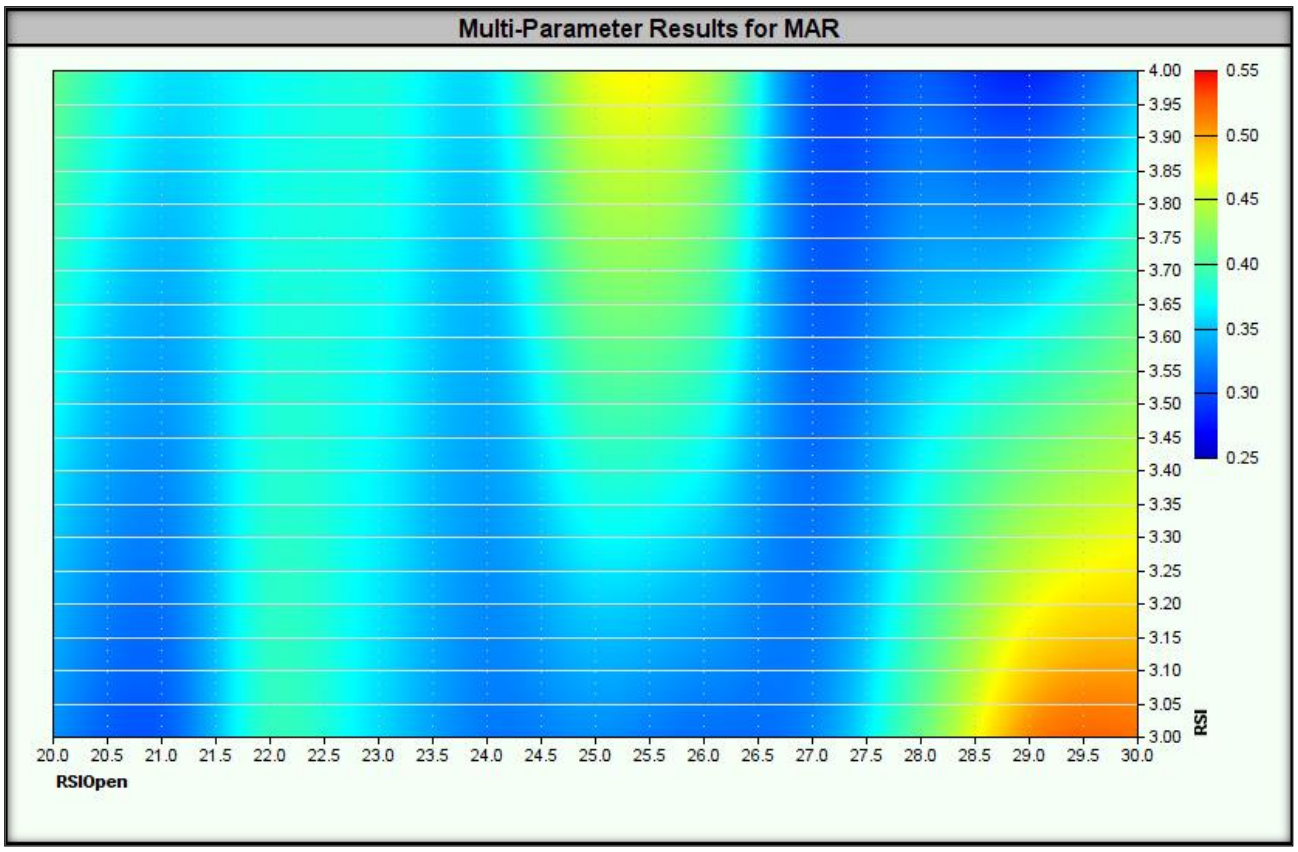
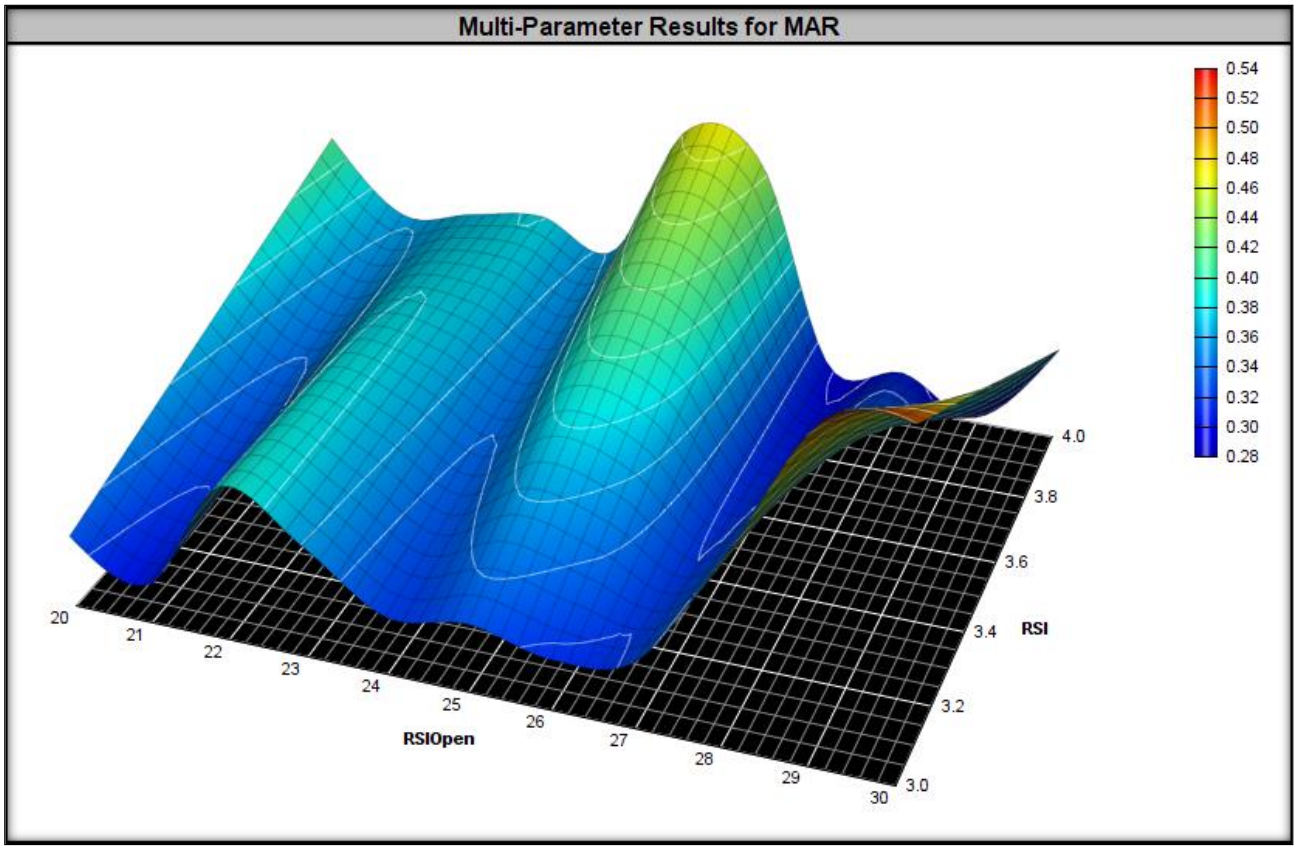
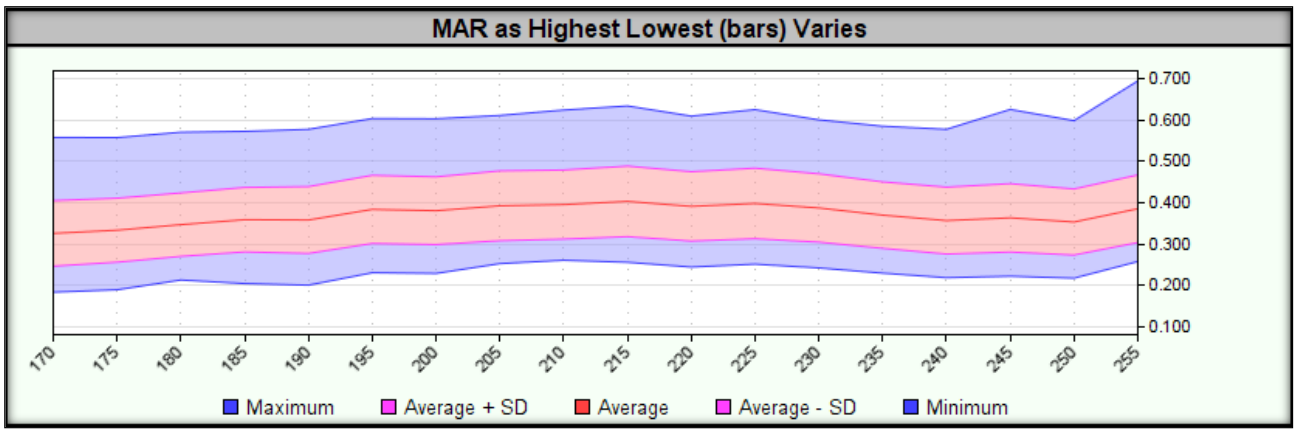
28
30
RSIOpen

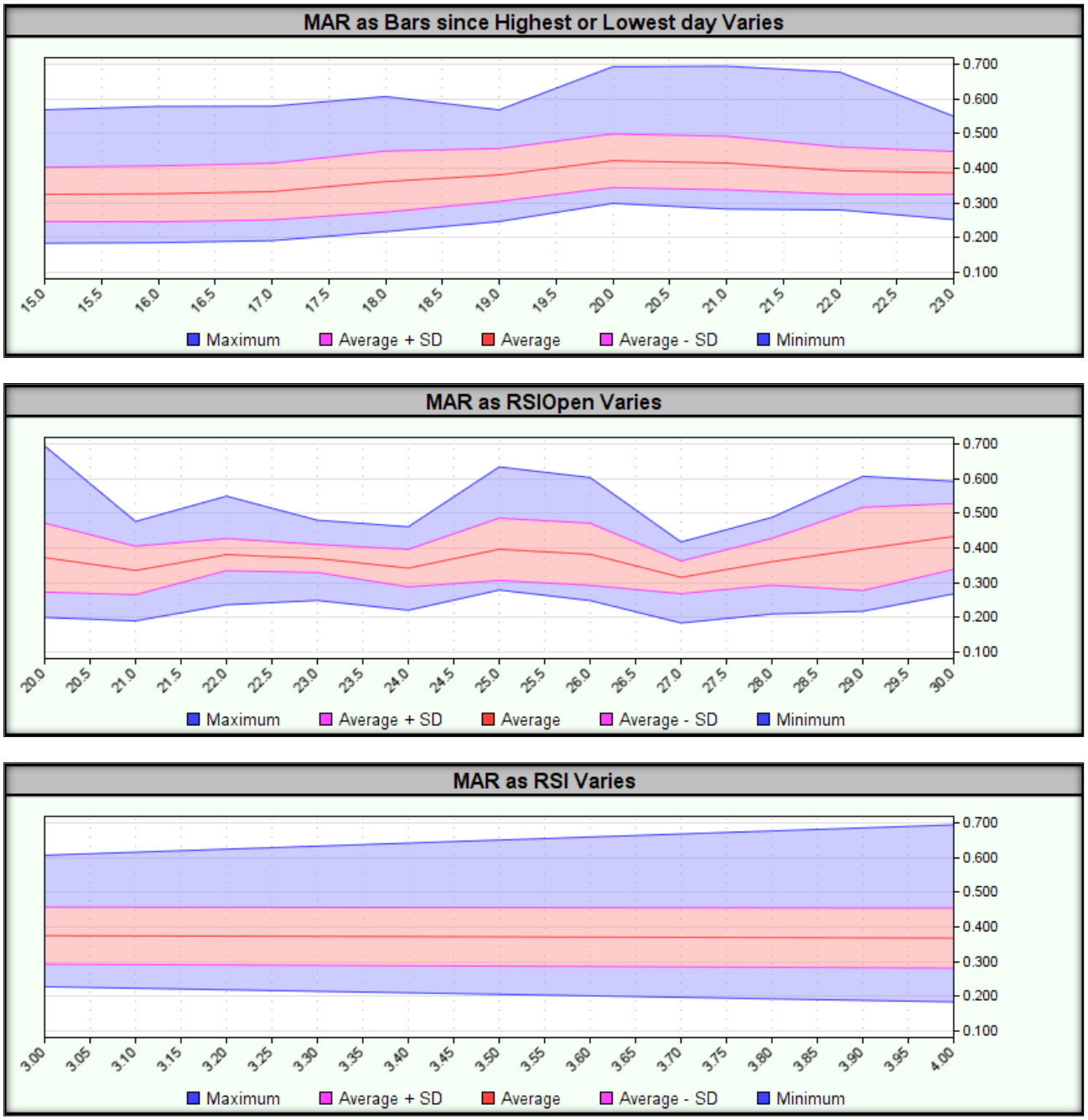

Multi-Parameter Results for MAR
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
4.00
3.95
3.90
3.85
3.80
3.75
3.70
3.65
3.60
3.55
3.50
3.45
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
RSI
15.0
15.5
16.0
16.5
17.0
17.5
18.0
18.5
19.0
19.5
20.0
20.5
21.0
21.5
22.0
22.5
23.0
Bars since Highest or Lowest day


Multi-Parameter Results for MAR
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
4.0
3.8
3.6
3.4
3.2
3.0
RSI
15
16
17
18
19
20
21
22
23
Bars since Highest or Lowest day


Multi-Parameter Results for MAR
0.55
0.50
0.45
0.40
0.35
0.30
0.25
4.00
3.95
3.90
3.85
3.80
3.75
3.70
3.65
3.60
3.55
3.50
3.45
3.40
3.35
3.30
3.25
3.20
3.15
3.10
3.05
3.00
RSI
20.0
20.5
21.0
21.5
22.0
22.5
23.0
23.5
24.0
24.5
25.0
25.5
26.0
26.5
27.0
27.5
28.0
28.5
29.0
29.5
30.0
RSIOpen


Multi-Parameter Results for MAR
0.54
0.52
0.50
0.48
0.46
0.44
0.42
0.40
0.38
0.36
0.34
0.32
0.30
0.28
20
21
22
23
24
25
26
27
28
29
30
RSIOpen
4.0
3.8
3.6
3.4
3.2
3.0
RSI


MAR as Highest Lowest (bars) Varies
0.700
0.600
0.500
0.400
0.300
0.200
0.100
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
Maximum
Average + SD
Average
Average - SD
Minimum



After passing **the stability test in a wide range of optimized parameters,** we can proceed to **stability testing using Monte Carlo simulation.** The conditions for passing this test are similar to those required in the above step.

2. Monte Carlo simulation

Monte Carlo simulation involves running multiple simulations to examine how a strategy might perform in different market scenarios. The key objective of this method is to assess the potential **drawdown** of an optimized strategy. **Monte Carlo simulation** better reflects the possible swings of the equity curve and the depth of the potential **drawdown,** allowing for a more realistic risk assessment. It is also an ideal opportunity

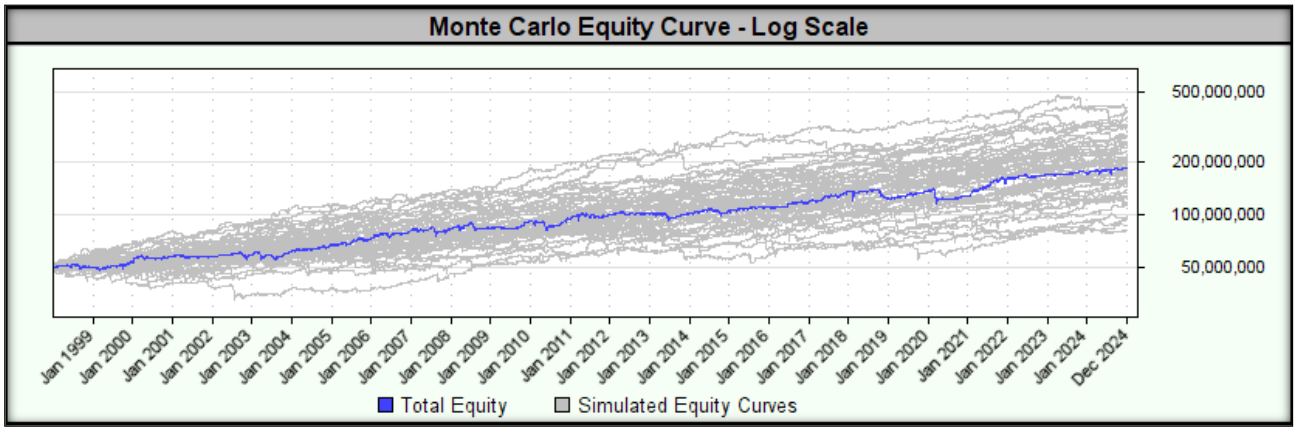
to compare **the drawdown** obtained in tests on optimized parameter ranges with the results of **the Monte Carlo simulation,** using **a 99% confidence interval.**

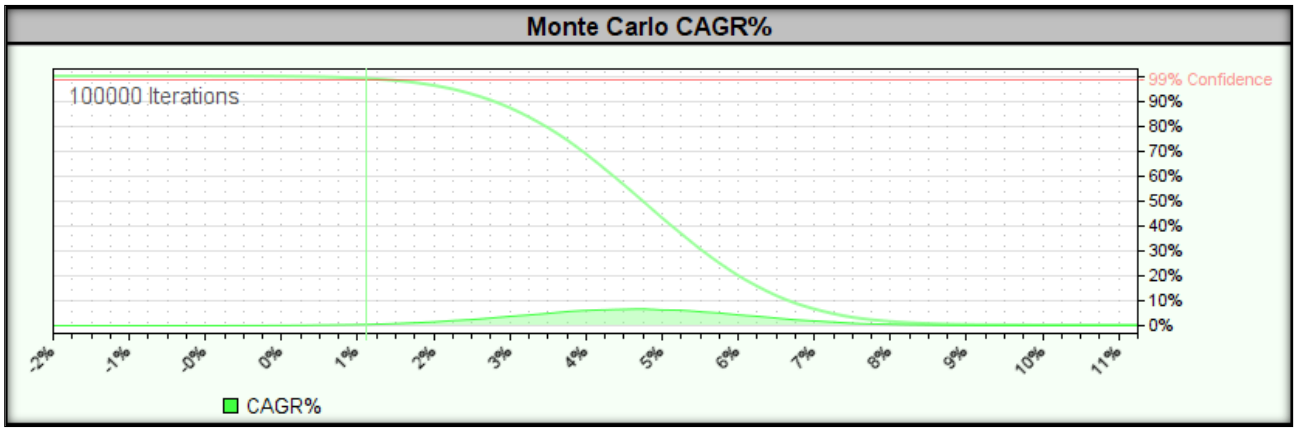
A strategy considered to be **stable (robust)** should achieve **a drawdown in a Monte Carlo simulation** that does not exceed **250% of the drawdown** size **from total tests in-sample and out-of-sample** (for parameters optimized on IS data). Furthermore, the **MAR indicator** should remain positive within the chosen confidence interval.

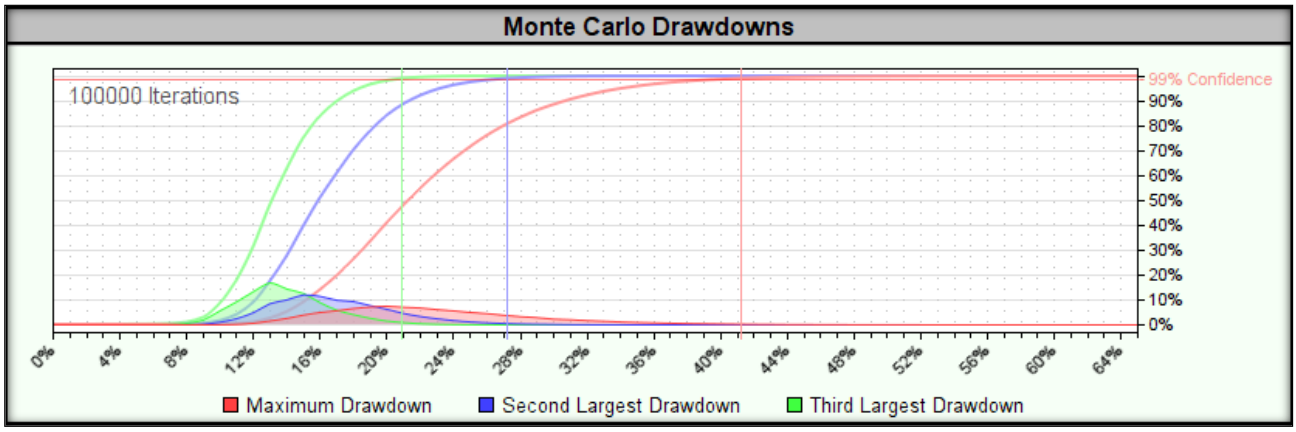
For data covering the period from **01.01.1998 to 31.12.2024** was carried out **Monte Carlo simulation** on **optimal strategy parameters.** The Monte Carlo simulation was performed **100,000 times,** testing **the variant with replacement (more conservative),** and **the confidence interval was set to 99%.**

The simulation with sample replacement are presented below.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.







- **CAGR%** – In 99% of simulations achieved **a return rate equal to or higher than 1%.**
- **Drawdown** – in 99% of simulations, **drawdown equal to or lower than 41% was achieved.** For parameters optimized on in-sample data, drawdown was 18.9%.

The strategy stability criteria were met, as **the drawdown** in **the Monte Carlo simulation** did not exceed **250% of the drawdown** value from tests on **optimized parameters.** In addition, the **MAR indicator** remained positive in **99%** of tests, which was also a condition for the strategy stability.

Now that we know the strategy is **stable** across **wide data ranges** and **a changing environment,** it's time to test its **stability** over **different time periods.**

3. Stability over a moving time window

Rolling window stability testing involves **estimating one- and three-year returns in time windows that move by one year** (for both in-sample and out-of-sample data). This process involves applying **strategy parameters optimized on the in-sample data,** setting a one- or three-year trading window, and moving it by one year.

We then analyze what portion of these one- and three-year periods showed positive returns. **A strategy considered stable (robust) should achieve profitable results in at least 70% of the one- and three-year periods.**

For data covering the period from **01.01.1998 to 31.12.2024** was carried out **testing optimized parameters** on **a moving data window.**

Two variants of test windows were tested:

- **Annual testing window (365 days),** tested **every 365 days** – this means that **we measure the annual rate of return every year.**
- **Three-year testing window (1095 days),** tested **every 365 days** – this means **we measure a three-year rate of return every year.**

A one-year (365/365) testing window are shown below.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

	Test Start Date	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades	R3	RAR [%]	%PF	Expectancy	Long	Short
1	19980101	$49,466,234.36	-1.07%	-0.20	-0.16	-2.01	5.3%	5.1	20	-3.73	-0.77	0.84	0.00	0.00	0.00
2	19990101	$54,156,100.45	8.34%	1.77	1.46	NA	4.7%	2.6	31	49.05	7.61	3.14	0.00	0.00	0.00
3	20000101	$53,698,510.14	7.49%	1.44	1.20	NA	5.2%	9.1	40	9.40	1.96	2.20	0.00	0.00	0.00
4	20010101	$49,246,209.50	-1.51%	-0.38	-0.30	-2.00	4.0%	10.9	16	-10.91	-1.25	0.70	0.00	0.00	0.00
5	20020101	$51,160,280.90	2.32%	0.28	0.59	2.00	8.2%	3.5	26	27.41	3.71	1.39	0.00	0.00	0.00
6	20030101	$52,302,499.99	4.61%	0.46	0.54	2.00	10.0%	9.9	42	1.65	0.51	1.42	0.00	0.00	0.00
7	20040101	$54,259,001.74	8.52%	2.68	1.85	NA	3.2%	3.3	41	30.92	5.90	2.38	0.00	0.00	0.00
8	20050101	$53,987,710.58	8.07%	1.73	1.24	NA	4.7%	3.1	59	38.10	10.66	1.77	0.00	0.00	0.00
9	20060101	$55,621,330.05	11.28%	1.56	2.31	2.01	7.2%	6.0	37	34.52	5.48	3.86	0.00	0.00	0.00
10	20070101	$51,043,492.95	2.09%	0.18	0.35	2.00	11.6%	5.7	46	-5.13	-1.57	1.24	0.00	0.00	0.00
11	20080101	$49,973,635.65	-0.05%	-0.01	0.04	NA	10.0%	5.7	41	-5.09	-1.81	1.03	0.00	0.00	0.00
12	20090101	$54,640,622.28	9.29%	4.09	1.77	2.00	2.3%	5.9	30	96.37	6.83	6.39	0.00	0.00	0.00
13	20100101	$51,646,524.96	3.30%	0.26	0.35	NA	12.8%	10.3	56	-0.01	-0.01	1.26	0.00	0.00	0.00
14	20110101	$51,544,752.46	3.13%	0.36	0.52	NA	8.6%	8.0	47	-0.35	-0.09	1.31	0.00	0.00	0.00
15	20120101	$51,051,843.21	2.11%	0.50	0.56	NA	4.2%	8.2	27	6.70	1.44	1.40	0.00	0.00	0.00
16	20130101	$50,604,199.99	1.21%	0.13	0.21	2.00	9.4%	8.6	39	-8.09	-2.30	1.13	0.00	0.00	0.00
17	20140101	$51,238,552.45	2.48%	0.26	0.42	2.00	9.6%	6.0	44	5.54	1.46	1.24	0.00	0.00	0.00
18	20150101	$53,235,046.41	6.47%	1.82	2.35	2.00	3.6%	3.3	31	32.77	5.25	2.35	0.00	0.00	0.00
19	20160101	$52,801,104.76	5.62%	1.48	1.06	NA	3.8%	4.0	40	49.79	11.76	1.71	0.00	0.00	0.00
20	20170101	$57,057,375.03	14.17%	5.98	2.92	2.01	2.4%	2.8	51	94.74	13.05	3.51	0.00	0.00	0.00
21	20180101	$45,517,974.06	-8.97%	-0.72	-1.01	-2.00	12.5%	5.8	44	-6.45	-3.55	0.51	0.00	0.00	0.00
22	20190101	$55,686,347.54	11.38%	3.05	2.27	2.00	3.7%	2.0	38	366.64	11.03	7.42	0.00	0.00	0.00
23	20200101	$46,667,031.96	-6.67%	-0.35	-0.76	NA	18.8%	10.4	38	-13.02	-7.47	0.67	0.00	0.00	0.00
24	20210101	$62,539,615.41	25.18%	3.53	2.34	NA	7.1%	1.7	62	274.17	27.65	8.22	0.00	0.00	0.00
25	20220101	$52,044,173.13	4.14%	0.96	1.69	NA	4.3%	5.7	28	37.46	4.04	1.90	0.00	0.00	0.00
26	20230101	$50,091,387.79	0.18%	0.04	0.06	1.97	5.1%	2.0	27	34.36	6.16	1.05	0.00	0.00	0.00
27	20240101	$53,654,974.94	7.32%	1.19	1.30	NA	6.2%	1.9	37	40.32	5.98	2.44	0.00	0.00	0.00

A three-year testing window (1095/365) are shown below.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

	Test Start Date	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades	R3	RAR [%]	%PF	Expectancy	Long	Short
1	19980101	$57,452,962.52	4.75%	0.69	0.82	1.14	6.9%	14.7	91	4.78	5.54	1.88	0.00	0.00	0.00
2	19990101	$57,499,274.07	4.77%	0.92	0.86	1.13	5.2%	21.2	87	6.31	6.23	1.96	0.00	0.00	0.00
3	20000101	$54,782,749.66	3.10%	0.38	0.63	0.89	8.2%	25.1	82	1.35	1.77	1.58	0.00	0.00	0.00
4	20010101	$53,212,647.28	2.10%	0.21	0.36	0.85	10.0%	14.0	83	0.76	1.27	1.31	0.00	0.00	0.00
5	20020101	$58,495,740.66	5.37%	0.54	0.89	1.90	10.0%	9.9	108	3.35	4.16	1.69	0.00	0.00	0.00
6	20030101	$61,420,769.25	7.11%	0.71	1.05	3.77	10.0%	9.9	141	6.60	8.38	1.75	0.00	0.00	0.00
7	20040101	$65,468,680.78	9.43%	1.31	1.70	4.80	7.2%	6.0	134	12.12	9.60	2.36	0.00	0.00	0.00
8	20050101	$61,906,553.29	7.40%	0.64	1.20	1.55	11.6%	6.0	139	6.29	7.75	1.96	0.00	0.00	0.00
9	20060101	$57,021,647.05	4.48%	0.39	0.64	0.94	11.6%	6.6	122	2.71	4.50	1.56	0.00	0.00	0.00
10	20070101	$56,090,057.97	3.91%	0.34	0.56	0.97	11.6%	16.0	116	1.07	1.94	1.54	0.00	0.00	0.00
11	20080101	$56,918,119.54	4.42%	0.35	0.53	1.12	12.6%	16.0	127	1.09	2.49	1.52	0.00	0.00	0.00
12	20090101	$59,371,806.56	5.91%	0.47	0.77	2.48	12.6%	10.3	133	4.43	7.05	1.71	0.00	0.00	0.00
13	20100101	$55,157,338.74	3.33%	0.26	0.46	3.64	12.8%	10.3	130	2.83	5.64	1.35	0.00	0.00	0.00
14	20110101	$52,993,637.19	1.96%	0.18	0.37	1.87	10.8%	20.2	112	0.16	0.30	1.24	0.00	0.00	0.00
15	20120101	$52,671,209.72	1.75%	0.16	0.34	2.00	10.8%	22.1	109	0.73	1.32	1.21	0.00	0.00	0.00
16	20130101	$55,152,061.80	3.33%	0.35	0.63	1.43	9.6%	9.5	113	2.69	4.19	1.39	0.00	0.00	0.00
17	20140101	$57,262,830.26	4.63%	0.48	0.95	2.94	9.6%	9.5	113	3.92	4.58	1.59	0.00	0.00	0.00
18	20150101	$64,720,058.82	9.01%	2.37	1.95	1.96	3.8%	4.8	119	14.92	7.82	2.50	0.00	0.00	0.00
19	20160101	$55,652,021.80	3.64%	0.29	0.55	0.36	12.6%	5.8	132	7.32	8.49	1.38	0.00	0.00	0.00
20	20170101	$57,734,705.66	4.92%	0.39	0.74	0.54	12.5%	14.9	131	1.17	2.04	1.62	0.00	0.00	0.00
21	20180101	$47,483,250.91	-1.71%	-0.09	-0.18	-0.19	18.8%	16.0	118	-0.78	-2.61	0.91	0.00	0.00	0.00
22	20190101	$65,525,049.95	9.44%	0.50	1.09	0.74	18.8%	15.0	137	4.64	6.69	2.25	0.00	0.00	0.00
23	20200101	$61,196,366.92	6.98%	0.37	0.85	0.53	18.8%	15.0	128	7.59	13.37	1.86	0.00	0.00	0.00
24	20210101	$65,699,195.83	9.54%	1.34	1.27	0.92	7.1%	5.7	117	18.12	8.86	2.97	0.00	0.00	0.00
25	20220101	$57,085,540.97	4.53%	0.73	0.86	1.19	6.2%	5.7	92	8.01	4.26	1.92	0.00	0.00	0.00

In both cases, **success** is completing at least **70% of the periods** (both **365-day** and **1095-day) with positive returns.**

- **For the one-year test window (365/365): 22 out of 27 periods** ended with a positive rate of return (**81%**).
- **For the three-year test window (1095/365): 24 out of 25 periods** ended with a positive rate of return (**96%**).

Thus, **the test of the strategy's stability on a moving data window was passed.**

4. **Stability long/short**

In the case of many instruments, markets have **a natural tendency** to move in an upward direction (so-called **Long Bias)**, which makes investing in bullish scenarios often easier than betting on bearish scenarios. **Optimizing a strategy** for a bullish scenario, which is usually implied by the data used for optimization, can

lead to **problems** when markets enter **long-term bearish trends.** In such conditions, the strategy can generate **significant losses.**

To check if **the strategy** shows a tendency to **Long Bias** or (less often) **Short Bias, the distribution of historical buy and sell transactions** should be verified. Ideally, this distribution should be around **50%/50%.** However, if one side is significantly favored (e.g. **70%/30%)**, the strategy may be **unstable** in a real market environment.

A strategy considered stable (robust) should show a maximum of **60% tendency (bias)** in one direction.

In the case of the Trading New Highs v.2 strategy testing **long/short stability** does not make sense because **the strategy** involves opening **only long positions.**

5. **Stability in the portfolio of financial instruments**

In this step, we want to examine **how the strategy's performance is distributed across different instruments in the portfolio.** Our goal is **to avoid a situation where the strategy's positive performance comes only from a small group of exceptionally well-performing instruments.**

To check this, for **the in-sample and out-of-sample data combined,** we analyze **what percentage of instruments achieved a profit factor value above 1** (which means a positive contribution to the strategy's result).

We expect that:

- **For the portfolio with the highest MAR** (obtained on IS data), the percentage of instruments with **profit factor > 1 will be at least 80%.**
- **For the portfolio with the lowest MAR** (obtained on IS data), the percentage of instruments with **profit factor > 1 will be at least 70%.**

If the above conditions are met, **we can consider that the strategy is stable on a wide basket of financial instruments.**

The profit factor for the instruments included in the portfolio using the highest MAR is presented below.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

Instrument Performance Summary													
Symbol	Wins	%	Losses	%	Trades	Win Months	%	Loss Months	%	Avg. Win %	Avg. Loss %	Avg. Trade %	% Profit Factor
C	19	70.4%	8	29.6%	27	308	95.1%	16	4.9%	0.54%	0.52%	0.23%	2.51
CC	25	64.1%	14	35.9%	39	293	90.4%	31	9.6%	0.52%	0.86%	0.03%	1.08
CFI	24	85.7%	4	14.3%	28	314	96.9%	10	3.1%	0.44%	1.17%	0.21%	2.25
CL	28	65.1%	15	34.9%	43	286	88.3%	38	11.7%	0.46%	0.90%	-0.02%	0.95
CT	14	56.0%	11	44.0%	25	305	94.1%	19	5.9%	0.47%	0.37%	0.10%	1.61
DX	28	66.7%	14	33.3%	42	293	90.4%	31	9.6%	0.47%	0.55%	0.13%	1.68
EBL	28	59.6%	19	40.4%	47	289	89.2%	35	10.8%	0.48%	0.65%	0.02%	1.08
ES	69	77.5%	20	22.5%	89	279	86.1%	45	13.9%	0.49%	0.50%	0.27%	3.39
FDX	46	68.7%	21	31.3%	67	286	88.3%	38	11.7%	0.51%	0.52%	0.18%	2.12
FLG	32	71.1%	13	28.9%	45	293	90.4%	31	9.6%	0.42%	0.74%	0.08%	1.39
GC	29	70.7%	12	29.3%	41	299	92.3%	25	7.7%	0.43%	0.33%	0.21%	3.18
HG	23	74.2%	8	25.8%	31	305	94.1%	19	5.9%	0.39%	0.48%	0.16%	2.30
HSI	32	71.1%	13	28.9%	45	300	92.6%	24	7.4%	0.55%	0.39%	0.28%	3.51
KC	17	65.4%	9	34.6%	26	306	94.4%	18	5.6%	0.44%	0.64%	0.06%	1.29
LCO	26	57.8%	19	42.2%	45	286	88.3%	38	11.7%	0.56%	0.73%	0.01%	1.04
LGO	24	63.2%	14	36.8%	38	291	89.8%	33	10.2%	0.47%	0.83%	-0.01%	0.96
NG	11	61.1%	7	38.9%	18	307	94.8%	17	5.2%	0.42%	0.98%	-0.12%	0.68
NIY	26	70.3%	11	29.7%	37	300	92.6%	24	7.4%	0.54%	0.94%	0.10%	1.36
NQ	66	78.6%	18	21.4%	84	282	87.0%	42	13.0%	0.47%	0.52%	0.26%	3.37
OJ	29	65.9%	15	34.1%	44	295	91.0%	29	9.0%	0.53%	0.67%	0.12%	1.54
PA	27	75.0%	9	25.0%	36	303	93.5%	21	6.5%	0.42%	0.41%	0.21%	3.06
S	24	70.6%	10	29.4%	34	302	93.2%	22	6.8%	0.49%	0.67%	0.15%	1.74
SB	18	62.1%	11	37.9%	29	308	95.1%	16	4.9%	0.43%	0.82%	-0.05%	0.85
TY	34	75.6%	11	24.4%	45	299	92.3%	25	7.7%	0.43%	0.89%	0.10%	1.47
W	12	63.2%	7	36.8%	19	306	94.4%	18	5.6%	0.43%	0.50%	0.09%	1.46

The profit factor for the instruments included in the portfolio **using the lowest MAR** is presented below.

Historical or simulated results do not guarantee that similar outcomes will be achieved in the future.

Instrument Performance Summary													
Symbol	Wins	%	Losses	%	Trades	Win Months	%	Loss Months	%	Avg. Win %	Avg. Loss %	Avg. Trade %	% Profit Factor
C	12	54.5%	10	45.5%	22	300	92.6%	24	7.4%	0.58%	0.80%	-0.05%	0.86
CC	19	67.9%	9	32.1%	28	299	92.3%	25	7.7%	0.49%	0.88%	0.05%	1.17
CFI	12	57.1%	9	42.9%	21	308	95.1%	16	4.9%	0.60%	0.68%	0.05%	1.19
CL	16	55.2%	13	44.8%	29	290	89.5%	34	10.5%	0.63%	0.84%	-0.03%	0.92
CT	13	72.2%	5	27.8%	18	305	94.1%	19	5.9%	0.37%	0.74%	0.06%	1.30
DX	23	65.7%	12	34.3%	35	288	88.9%	36	11.1%	0.53%	0.81%	0.07%	1.25
EBL	21	53.8%	18	46.2%	39	271	83.6%	53	16.4%	0.47%	0.77%	-0.10%	0.71
ES	50	76.9%	15	23.1%	65	279	86.1%	45	13.9%	0.58%	0.98%	0.22%	1.99
FDX	36	69.2%	16	30.8%	52	288	88.9%	36	11.1%	0.64%	0.72%	0.22%	2.00
FLG	24	61.5%	15	38.5%	39	287	88.6%	37	11.4%	0.57%	0.85%	0.02%	1.08
GC	17	70.8%	7	29.2%	24	301	92.9%	23	7.1%	0.39%	0.42%	0.15%	2.22
HG	17	68.0%	8	32.0%	25	301	92.9%	23	7.1%	0.48%	0.77%	0.08%	1.33
HSI	21	65.6%	11	34.4%	32	290	89.5%	34	10.5%	0.50%	0.94%	0.01%	1.02
KC	12	57.1%	9	42.9%	21	299	92.3%	25	7.7%	0.43%	0.72%	-0.06%	0.79
LCO	20	55.6%	16	44.4%	36	289	89.2%	35	10.8%	0.66%	0.80%	0.01%	1.03
LGO	20	58.8%	14	41.2%	34	290	89.5%	34	10.5%	0.56%	0.68%	0.05%	1.18
NG	9	47.4%	10	52.6%	19	303	93.5%	21	6.5%	0.60%	0.83%	-0.15%	0.65
NIY	18	62.1%	11	37.9%	29	297	91.7%	27	8.3%	0.63%	1.44%	-0.16%	0.72
NQ	53	85.5%	9	14.5%	62	285	88.0%	39	12.0%	0.56%	1.03%	0.33%	3.20
OJ	21	65.6%	11	34.4%	32	303	93.5%	21	6.5%	0.53%	0.37%	0.22%	2.75
PA	21	67.7%	10	32.3%	31	300	92.6%	24	7.4%	0.62%	0.63%	0.22%	2.08
S	15	60.0%	10	40.0%	25	297	91.7%	27	8.3%	0.57%	0.96%	-0.04%	0.89
SB	14	66.7%	7	33.3%	21	310	95.7%	14	4.3%	0.54%	1.15%	-0.02%	0.94
TY	21	67.7%	10	32.3%	31	300	92.6%	24	7.4%	0.45%	0.92%	0.01%	1.03
W	8	44.4%	10	55.6%	18	299	92.3%	25	7.7%	0.51%	0.67%	-0.15%	0.61

For our tested strategy:

- **The portfolio with the highest MAR** (obtained on IS data) has a percentage of instruments with **profit factor > 1 at the level of 87%.**
- **The portfolio with the lowest MAR** (obtained on IS data) has a percentage of instruments with **profit factor > 1 at the level of 64%.**

Thus, **the stability test of the strategy on the financial instruments portfolio was not passed.** Therefore, **further testing of the strategy is not justified,** because its use in real transactions **is highly doubtful.**

6. **Money Management (Position Sizing)**

This step was skipped due to **failure of previous stability tests.**

7. **Strategy Risk Management**

This step was skipped due to **failure of previous stability tests.**

Step 5: Walk Forward Analysis

This step was skipped due to **failure of previous stability tests.**

Step 6: Using the strategy in real time

This step was skipped due to **failure of previous stability tests.**