



Trading New Highs v.1

Investment Strategy Testing Summary

Trading Strategy New Highs is a **swing trading** investment technique that uses the **Donchian channel** (52 weeks) and **the ConnorsRSI** (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**.

The strategy was tested on **parameters suggested by the strategy creator, Larry Connors**:

- **Donchian Channel: 250 days (52 weeks);**
- **Days since last establishment of Upper/Lower Donchian Channel: 20 days;**
- **Entries ConnorsRSI (CRSI): 15;**
- **Exit ConnorsRSI (CRSI): 70;**
- **ConnorsRSI (CRSI): RSI Bars (3), Streak Bars (2); Rank Bars (100);**
- **Position opening method: limit order 0.5 x ATR(40) away from the previous day's closing price;**
- **Stop loss: none;**
- **Position direction: only long positions (buy).**
- **Position sizes: corresponding to a risk of 1.0% of total capital, with a hypothetical stop loss order placed 2 x ATR (40 days) away from the position opening position.**

It should be noted that while the strategy results on in-sample data are acceptable, the strategy failed the stability test in a wide range of optimized parameters. This means that the strategy loses its profitability and generates a significantly larger drawdown when tests are conducted on suboptimal parameters. 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.



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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 study 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 ConnorsRSI (CRSI)** to identify times to enter 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 CRSI Indicator:** Low CRSI values indicate a short-term oversold stock, which could signal a potential turning point and buying opportunity.

The strategy developed by Larry Connors is based only on stocks. **We will test it on a wide range of futures contracts, slightly modifying the way we open a position** - we will not set a price limit for opening a position 7% or 10% away from the closing price, but we will use volatility calculated in **the Average True Range (ATR)**.

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 CRSI readings and other indicators.
- **Loss Defined:** May lead to uncontrolled losses in case of a sharp price drop.
- **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 leverages the psychological behavior of stocks hitting **new 52-week highs**. By combining this with a **low CRSI**, it identifies times when stocks are **short-term oversold** but still **in a long-term uptrend**. **This** strategy allows for 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. **52-Week High:** Determine the 52-week high (250 days) of the instrument.
 - b. **ConnorsRSI (CRSI):** Calculate CRSI for the instrument.
2. **Generating Input Signals:**
 - a. **Entry conditions:**
 - i. The instrument has reached a new 52-week high in the last 20 days.
 - ii. $CRSI < 15$.
 - b. **Entering a long position:** The day after the entry conditions are met, set a buy limit order at $0.5 \times ATR$ below the previous day's closing price.
 - c. **If the instrument price drops to the order level, open a long position.**
3. **Generating Output Signals:**
 - a. **Closing a long position:** $CRSI > 70$, close the position the next day at opening.
4. **Loss Management: No Stop Loss** defined;
5. **Daily Monitoring - Calculation of indicators:**
 - a. Check if the instruments meet the entry conditions (new 52-week high in the last 20 days and $CRSI < 15$).
 - b. Calculate current CRSI for open positions.
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 **1.0% 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

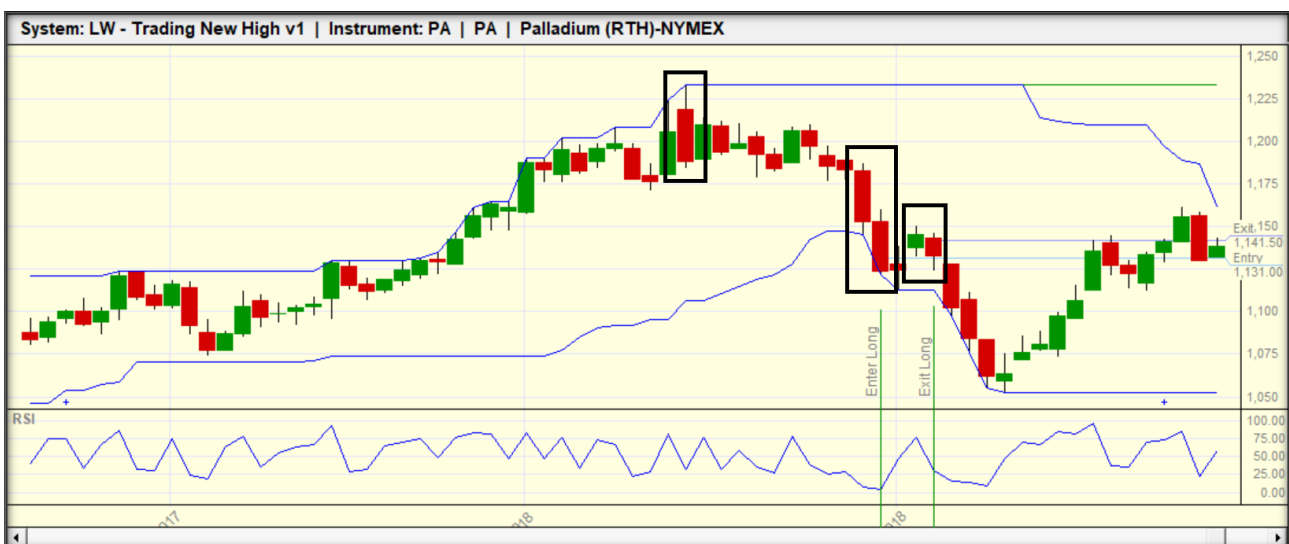
Below are some purchase and sale transactions that allow you to verify the following aspects:

- **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 a **Palladium futures contract**. At the beginning of 2018, 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 **ConnorRSI indicator fell below 15** (the first candle in the second rectangle). This is a signal for us to set a **buy order for the next day** (the second candle in the rectangle), **distant from the previous day's close by 0.5 x ATR**. This order was activated and **a long position was opened**. **The system worked correctly**.

Two days later, the **ConnorsRSI indicator rose to 70** (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 a **dollar index futures contract**. At the end of 2007, the quotes formed a **new low from a 250-day period** (the first rectangle on the chart below). Then, the quotes entered an **upward correction phase**, during which the **ConnorRSI indicator rose above 85** (the first candle in the second



rectangle). This is a signal for us to **set a sell order for the next day** (the second candle in the rectangle), **distant from the previous day's close by 0.5 x ATR**. This order was activated and a short position was opened. **The system worked correctly.**



A few days later, the **ConnorsRSI indicator fell to 30** (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 conducted on **the basic parameters** that were **proposed by the creator, Larry Connors**.

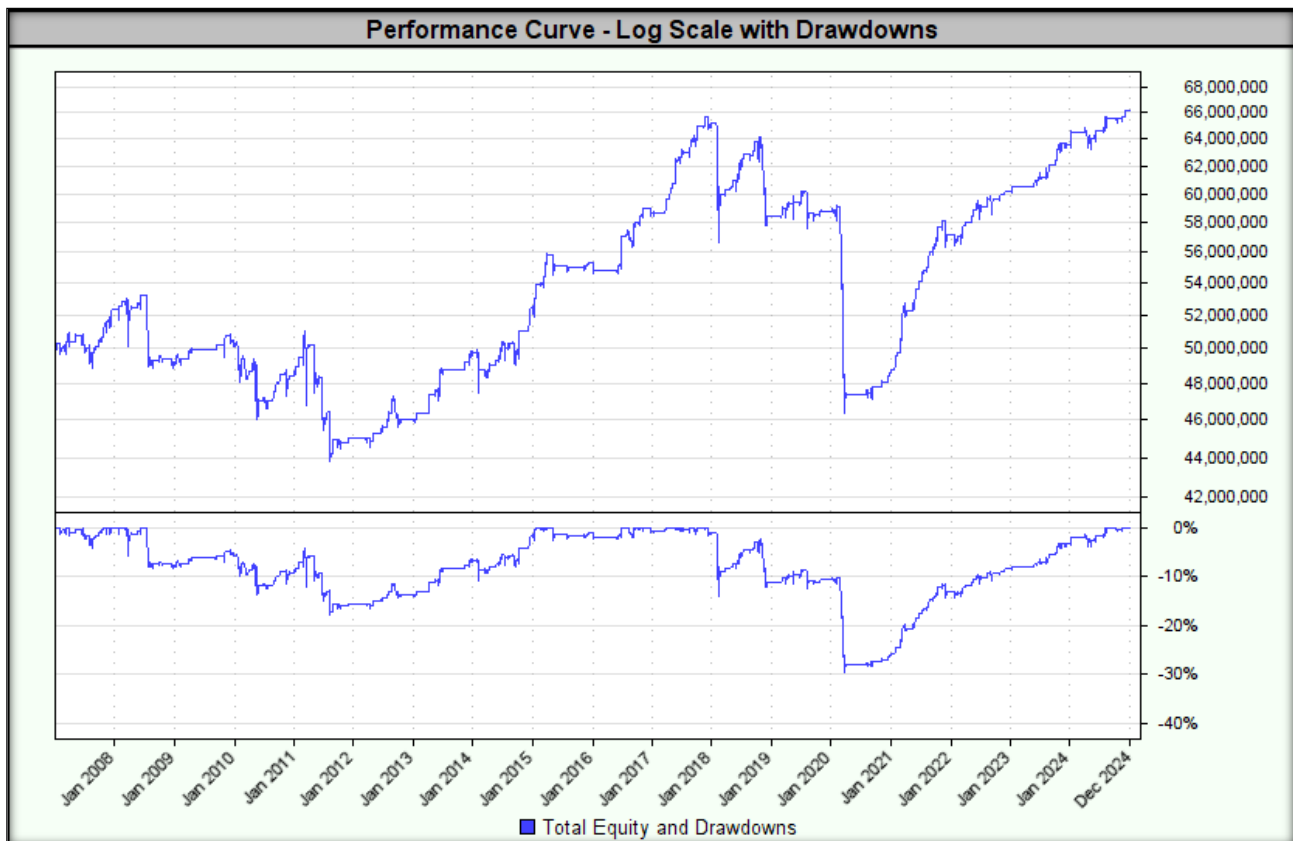
First of all, **we reject strategies that linearly lose capital**. If a strategy exhibits such a pattern, it is a clear signal that any parameter optimization does not make sense.

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

Tested base parameters:

- **Donchian Channel:** 250 days (52 weeks);
- **Days since last establishment of Upper/Lower Donchian Channel:** 20 days;
- **Entries ConnorsRSI (CRSI):** 15;
- **Exit ConnorsRSI (CRSI):** 70;
- **ConnorsRSI (CRSI):** RSI Bars (3), Streak Bars (2); Rank Bars (100);
- **Position opening method:** limit order 0.5 x ATR(40) away from the previous day's closing price;
- **Stop loss:** none;
- **Position direction:** long positions (buy) only.
- **Position sizes:** corresponding to a risk of 1.0% 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.



Indicators/Measures	Concluding a transaction at the opening price
CAGR%	1.6%
MAR Ratio	0.05
RAR%	1.5%
R-Cubed	0.05
Robust Sharpe Ratio	0.23
Max Drawdown	29.5%
Wins	66.5%
Losses	33.5%
Average Win%	0.57%
Average Loss %	0.92%
Win/ Loss Ratio	0.63
Average Trade Duration (days)	7
Percent Profit Factor	1.24
SQN	-
Number of transactions	433

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

Highs v.1 strategy assumes the use of parameters optimized by Larry Connors. This means that we do not optimize the parameters themselves, but only examine whether the strategy behaves stably on in-sample and out-of-sample data.

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 200-300 days (step: 25);
- **Days since the last establishment of the upper Donchian channel:** range 16-24 days (step: 2);
- **Entries ConnorsRSI (CRSI):** range 15-25 (step: 1);
- **Exit ConnorsRSI (CRSI):** range 50-75 (step: 2.5);
- **Limit order:** range 0.0-1.0 x ATR (step: 0.5).

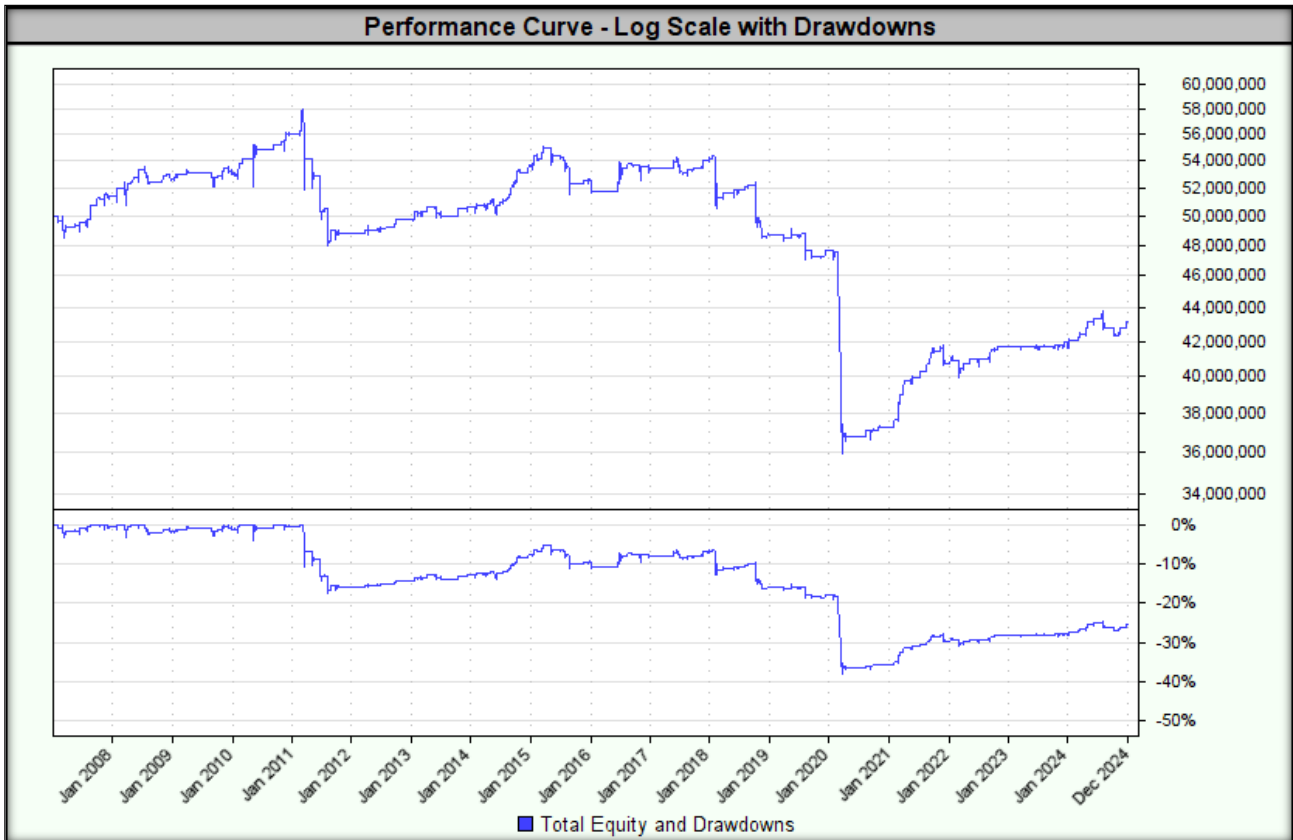
The purpose of this test is to check whether the strategy remains stable (robust) over a wide range of parameters, which will allow to assess its usefulness in real market conditions. The key evaluation criterion is that all test results show a positive MAR value, and the maximum drawdown does not exceed 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 -0.02 was achieved for the following parameters:

- **Donchian Channel:** 200;
- **Days since last establishment of the upper Donchian channel:** 22;
- **Entries ConnorsRSI (CRSI):** 18;
- **Exit ConnorsRSI (CRSI):** 52.5;
- **Limit order:** 1.0 x ATR(40).

Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSIClose	ATR (Limit)	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades
1194	200	22	18	52.5	1.0	\$43,147,182.20	-0.82%	-0.02	-0.12	-0.11	37.9%	165.7	368
1191	200	22	18	50.0	1.0	\$43,266,466.33	-0.80%	-0.02	-0.12	-0.11	37.4%	165.7	370
1557	200	24	18	52.5	1.0	\$43,313,958.59	-0.79%	-0.02	-0.11	-0.11	38.1%	165.7	383
1554	200	24	18	50.0	1.0	\$43,527,697.14	-0.77%	-0.02	-0.11	-0.11	37.5%	165.7	385
1257	200	22	20	50.0	1.0	\$43,483,930.00	-0.77%	-0.02	-0.10	-0.11	38.6%	165.7	471
1560	200	24	18	55.0	1.0	\$43,808,455.66	-0.73%	-0.02	-0.10	-0.10	38.6%	165.7	382
1197	200	22	18	55.0	1.0	\$44,094,661.61	-0.70%	-0.02	-0.09	-0.09	38.5%	165.7	367
1491	200	24	16	52.5	1.0	\$44,891,372.78	-0.60%	-0.02	-0.10	-0.10	33.7%	165.7	293
1260	200	22	20	52.5	1.0	\$44,371,827.82	-0.66%	-0.02	-0.08	-0.09	37.6%	165.7	468
831	200	20	18	52.5	1.0	\$44,726,887.23	-0.62%	-0.02	-0.08	-0.09	35.3%	165.7	347
468	200	18	18	52.5	1.0	\$44,884,336.70	-0.60%	-0.02	-0.08	-0.09	34.2%	165.7	335
828	200	20	18	50.0	1.0	\$44,849,379.56	-0.60%	-0.02	-0.08	-0.08	34.8%	165.7	349
465	200	18	18	50.0	1.0	\$45,133,694.96	-0.57%	-0.02	-0.08	-0.08	33.5%	165.7	337

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



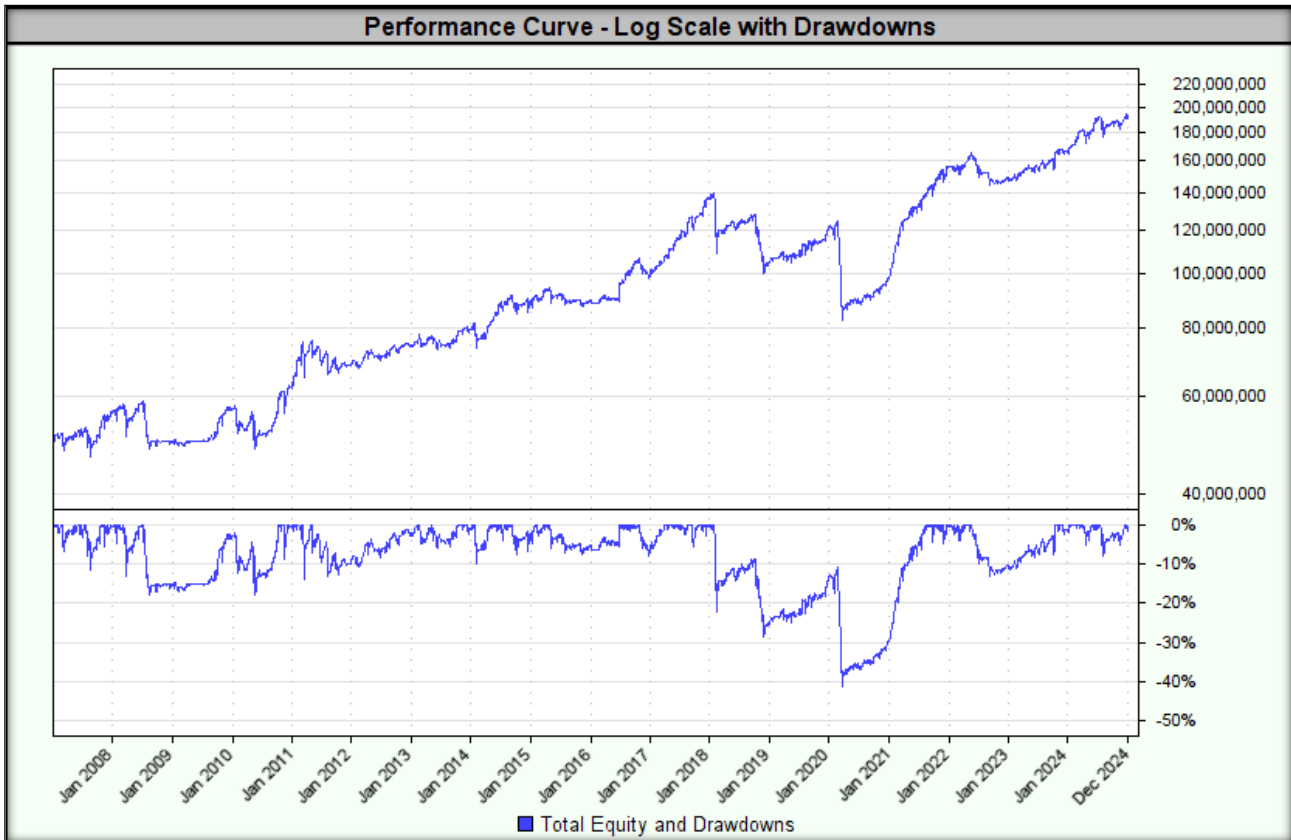
The highest MAR value of 0.21 was achieved for the following parameters:

- Donchian Channel: 225;
- Days since last establishment of the upper Donchian channel: 18;
- Entries ConnorsRSI (CRSI): 21;
- Exit ConnorsRSI (CRSI): 70;
- Limit order: 0,0 x ATR(40).

The highest MAR value was accompanied by a drawdown of 32.8%.

Test	Highest/Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSIClose	ATR (Limit)	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades
2401	225	18	21	70.0	0.0	\$167,778,695.31	6.96%	0.21	0.66	0.46	32.8%	30.5	1486
4216	250	18	21	70.0	0.0	\$156,336,193.06	6.54%	0.20	0.63	0.42	32.9%	29.4	1429
2434	225	18	22	70.0	0.0	\$161,882,260.87	6.75%	0.20	0.61	0.43	34.3%	32.2	1625
2038	225	16	21	70.0	0.0	\$152,710,031.42	6.40%	0.19	0.62	0.44	32.8%	27.2	1419
6031	275	18	21	70.0	0.0	\$153,744,264.75	6.44%	0.19	0.63	0.44	33.2%	42.6	1385
2368	225	18	20	70.0	0.0	\$151,395,861.07	6.35%	0.19	0.63	0.46	32.9%	31.1	1375
2335	225	18	19	70.0	0.0	\$145,555,476.67	6.12%	0.19	0.64	0.51	31.7%	30.5	1259
586	200	18	21	70.0	0.0	\$150,588,333.79	6.32%	0.19	0.60	0.41	32.8%	37.7	1554
2764	225	20	21	70.0	0.0	\$151,334,966.74	6.35%	0.19	0.59	0.42	33.5%	33.2	1569
2437	225	18	22	72.5	0.0	\$191,004,854.84	7.73%	0.19	0.66	0.42	41.2%	42.8	1552
2467	225	18	23	70.0	0.0	\$164,796,158.24	6.85%	0.19	0.60	0.43	36.5%	33.0	1750
2071	225	16	22	70.0	0.0	\$151,351,991.41	6.35%	0.19	0.59	0.43	34.3%	31.5	1543
4150	250	18	19	70.0	0.0	\$139,041,675.78	5.85%	0.18	0.62	0.48	31.7%	30.3	1204

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



For all combinations of tested parameter ranges, **the highest drawdown was 57.9%.**

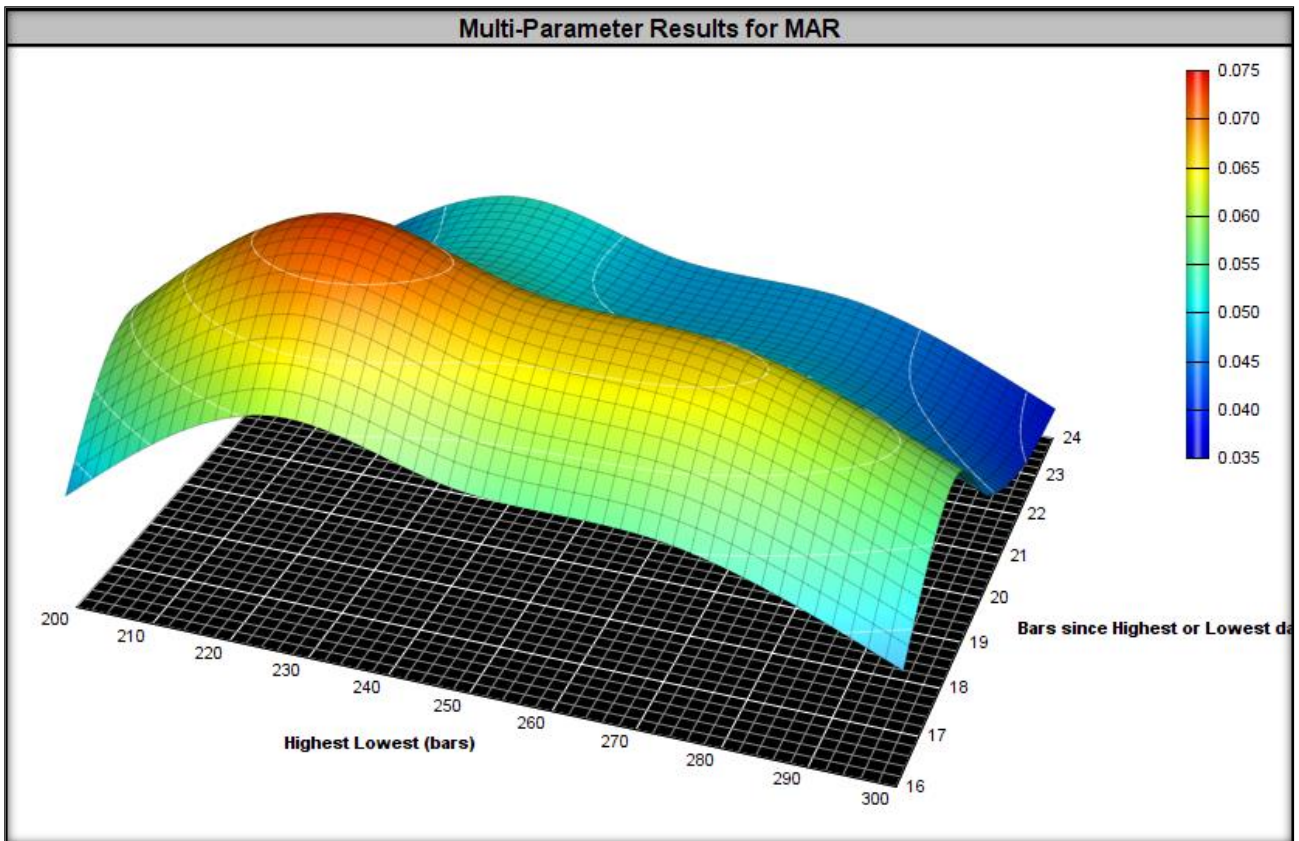
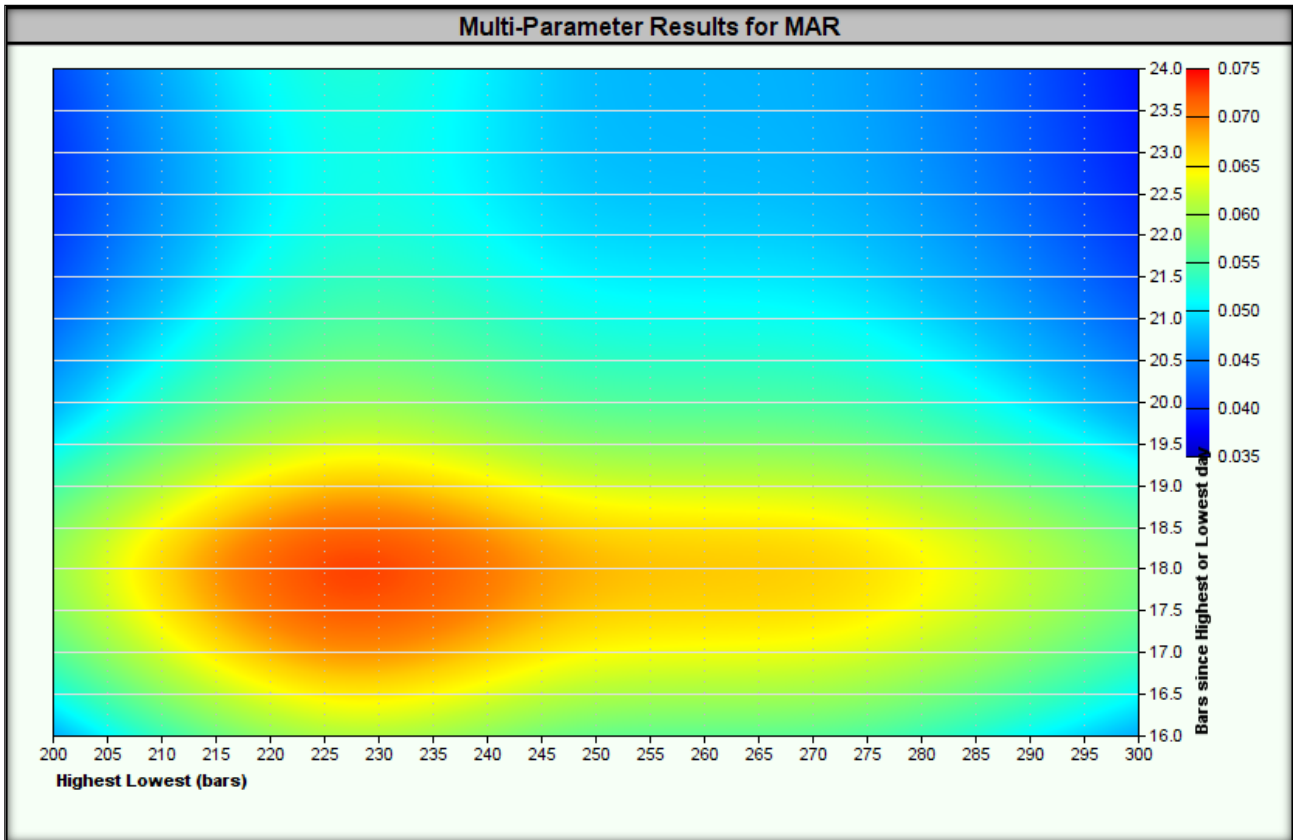
Test	Highest Lowest (bars)	Bars since Highest or Lowest day	RSIOpen	RSIClose	ATR (Limit)	End Balance	CAGR%	MAR	Sharpe	Ann. Sharpe	Max TE DD	Longest DD	Trades
1813	200	24	25	75.0	0.0	\$136,939,060.32	5.76%	0.10	0.42	0.31	57.9%	77.6	1961
1780	200	24	24	75.0	0.0	\$150,476,128.61	6.31%	0.11	0.45	0.33	57.8%	73.7	1878
1747	200	24	23	75.0	0.0	\$145,182,954.68	6.10%	0.11	0.45	0.32	57.2%	73.8	1792
7225	275	24	24	75.0	0.0	\$135,899,912.47	5.71%	0.10	0.43	0.30	56.7%	82.6	1688
3628	225	24	25	75.0	0.0	\$145,923,365.78	6.13%	0.11	0.45	0.33	56.7%	77.5	1888
1714	200	24	22	75.0	0.0	\$143,948,390.60	6.05%	0.11	0.46	0.31	56.6%	68.6	1684
3595	225	24	24	75.0	0.0	\$151,915,461.69	6.37%	0.11	0.46	0.34	56.4%	76.9	1807
7192	275	24	23	75.0	0.0	\$128,250,465.37	5.37%	0.10	0.41	0.29	56.3%	83.2	1592
5410	250	24	24	75.0	0.0	\$142,827,664.79	6.01%	0.11	0.44	0.32	56.2%	81.0	1722
7258	275	24	25	75.0	0.0	\$131,385,874.45	5.51%	0.10	0.41	0.30	56.2%	83.2	1742
3562	225	24	23	75.0	0.0	\$146,251,437.34	6.14%	0.11	0.46	0.32	56.1%	74.0	1724
5443	250	24	25	75.0	0.0	\$138,052,566.45	5.80%	0.10	0.43	0.32	56.0%	83.2	1798
5377	250	24	23	75.0	0.0	\$138,099,219.33	5.81%	0.10	0.44	0.30	55.8%	77.2	1642

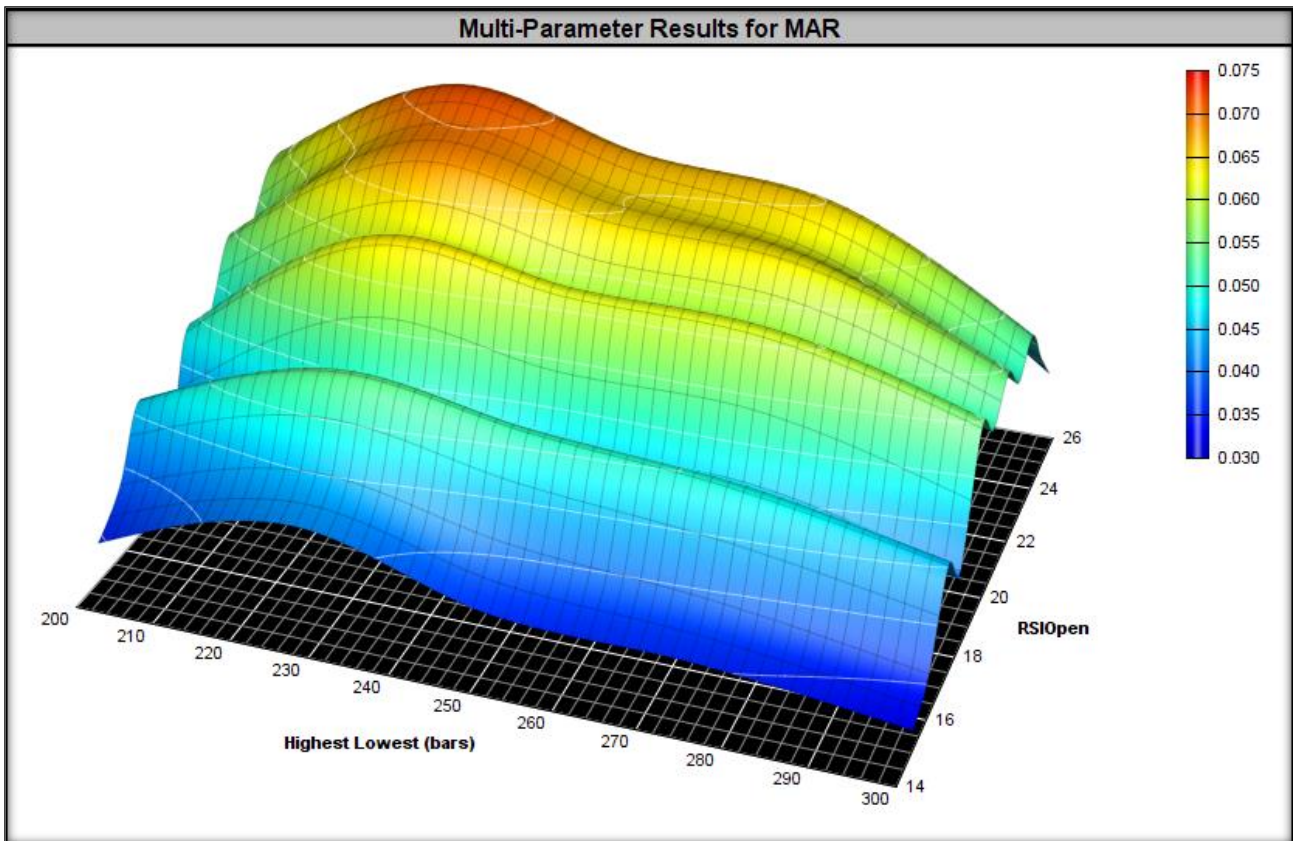
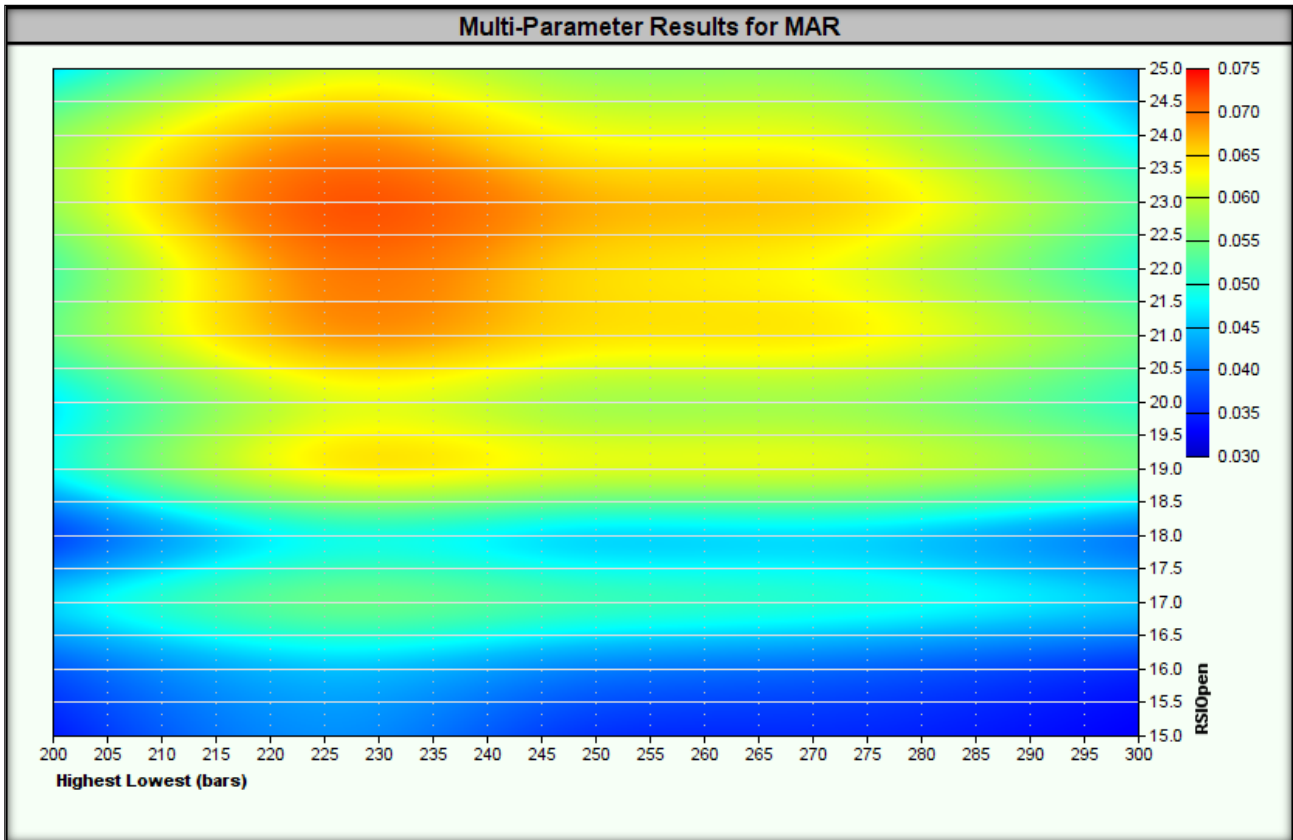
In summary, the strategy failed the stability test over a wide range of optimized parameters because:

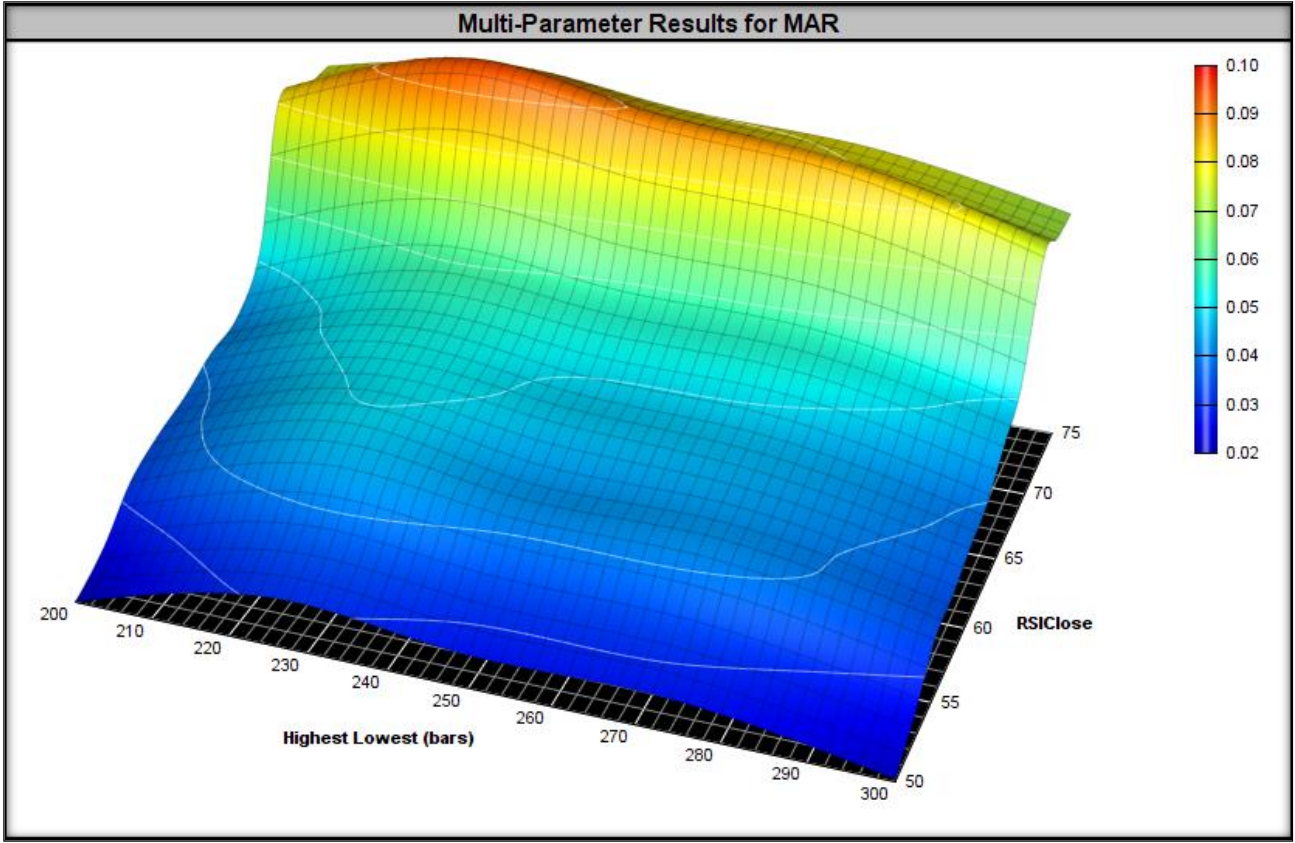
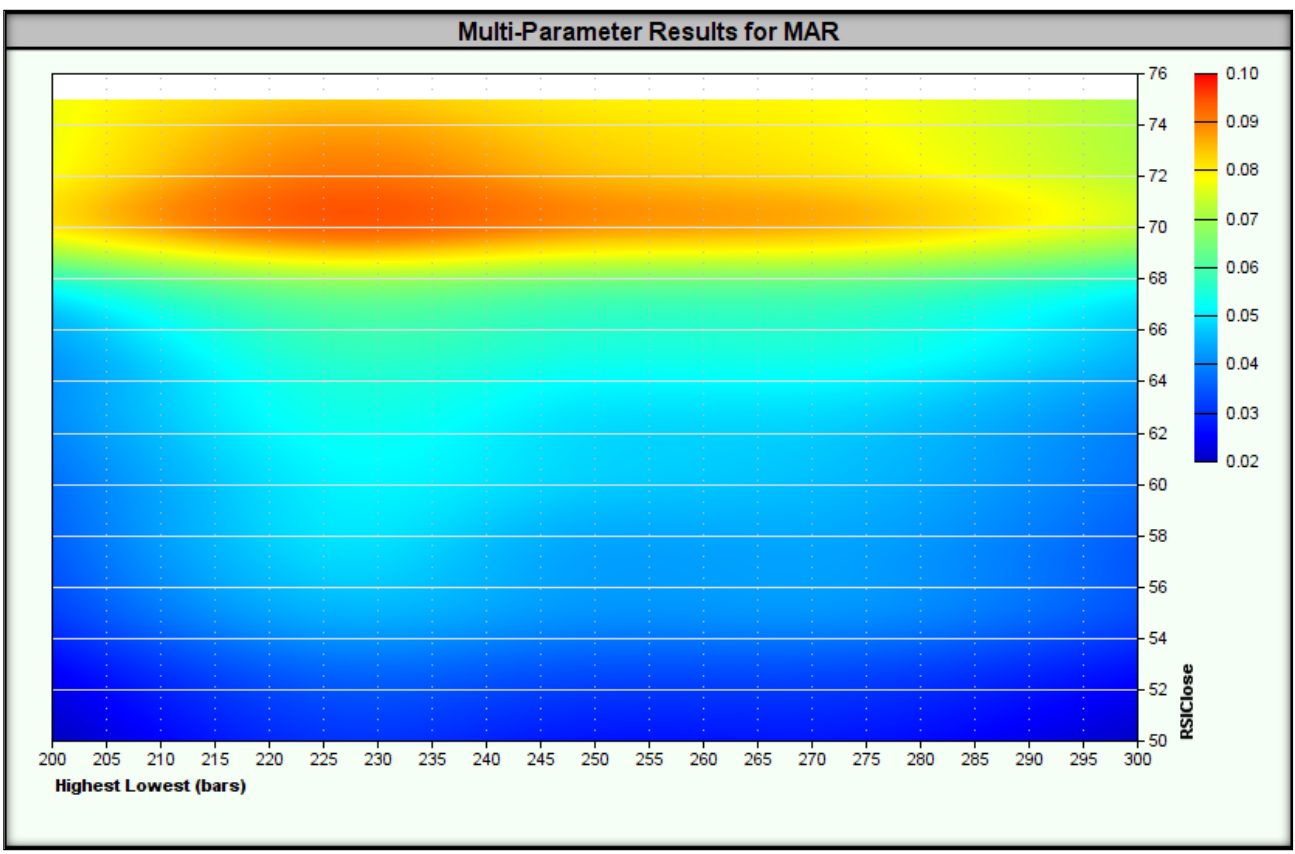
- **MAR value** – which indicates the instability of the strategy in different market conditions.

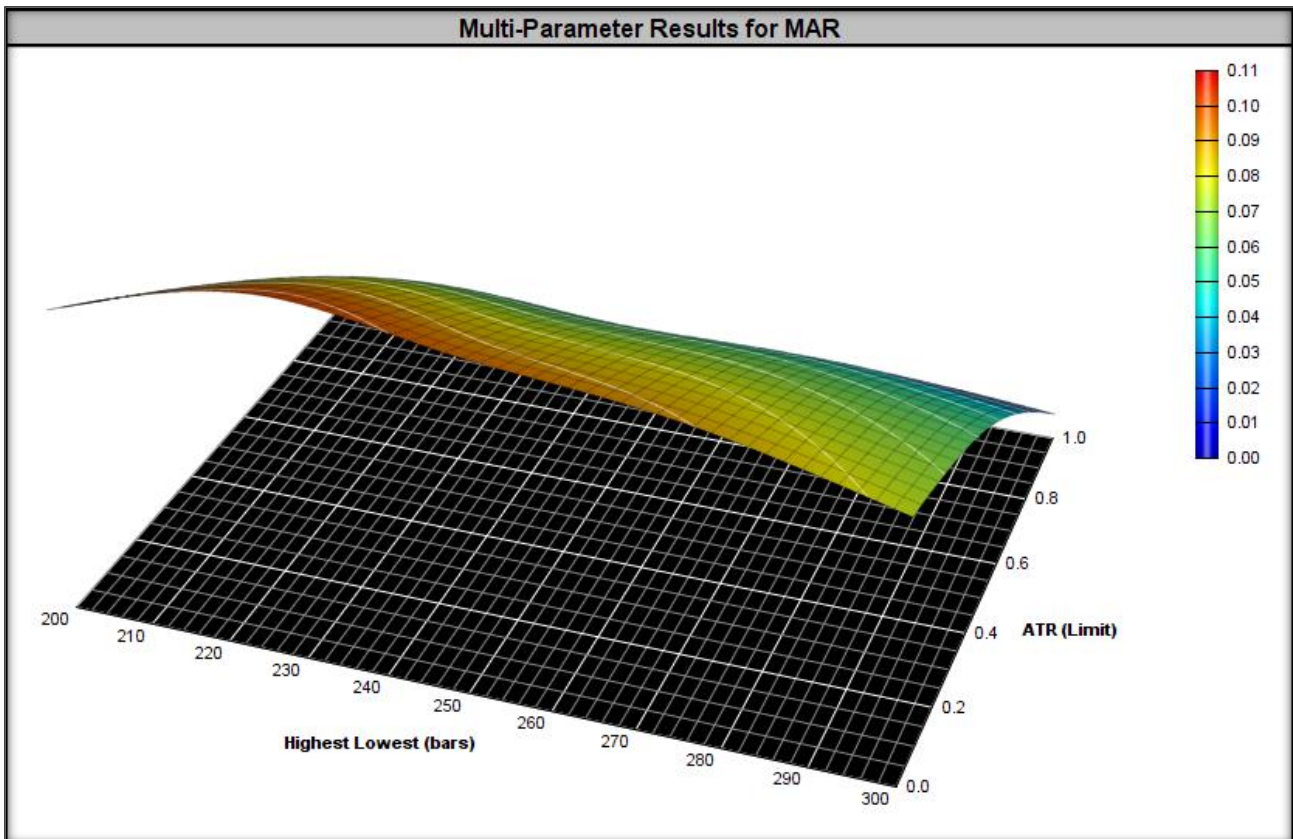
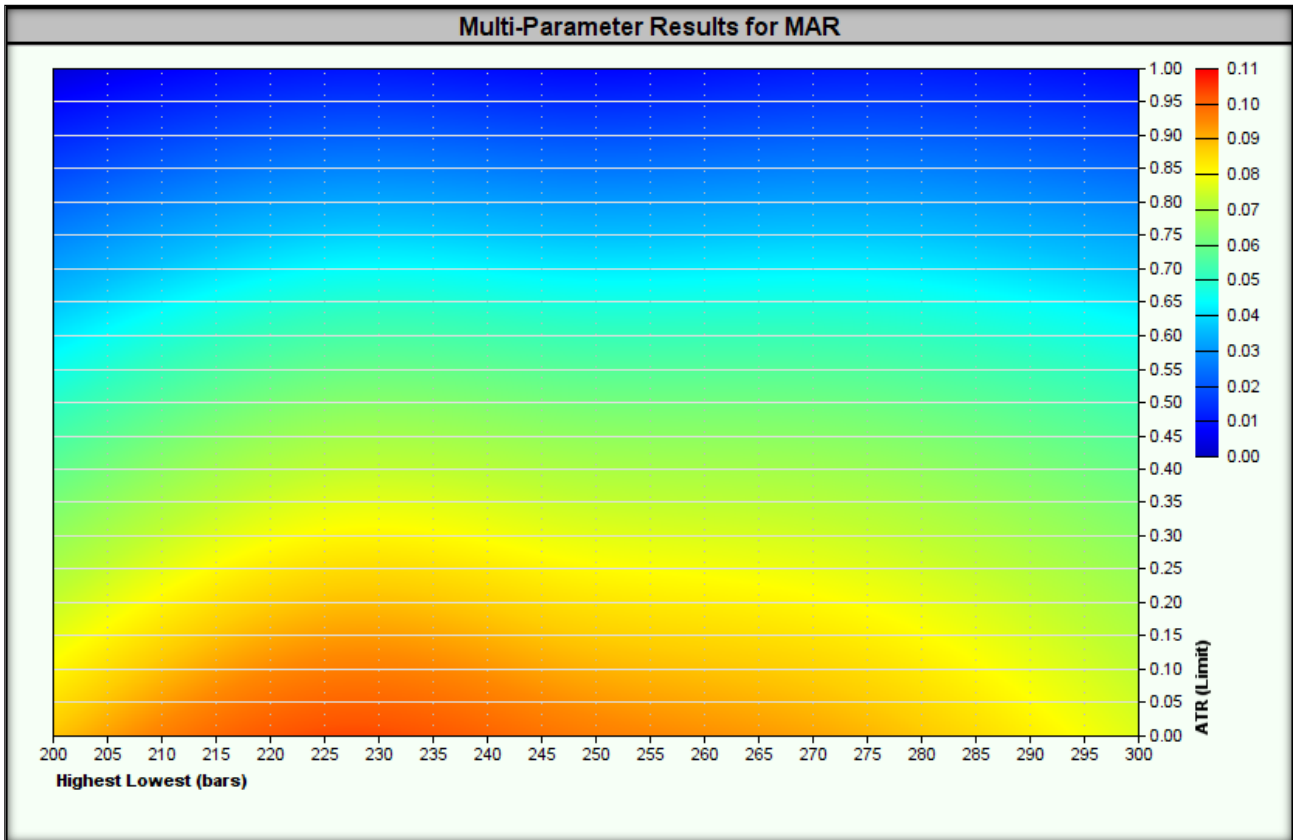
Therefore, **further testing of the strategy is not justified**, as its use in real transactions is **highly questionable**.

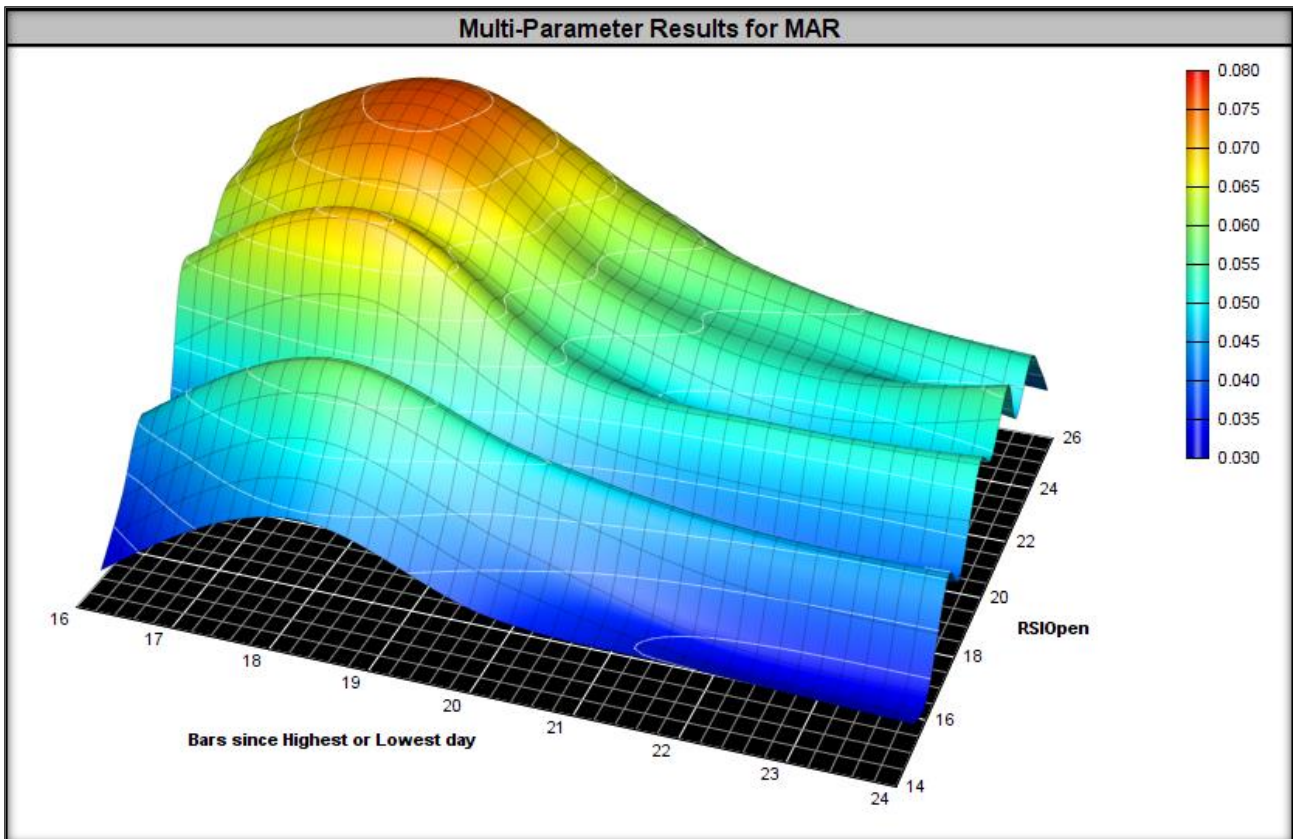
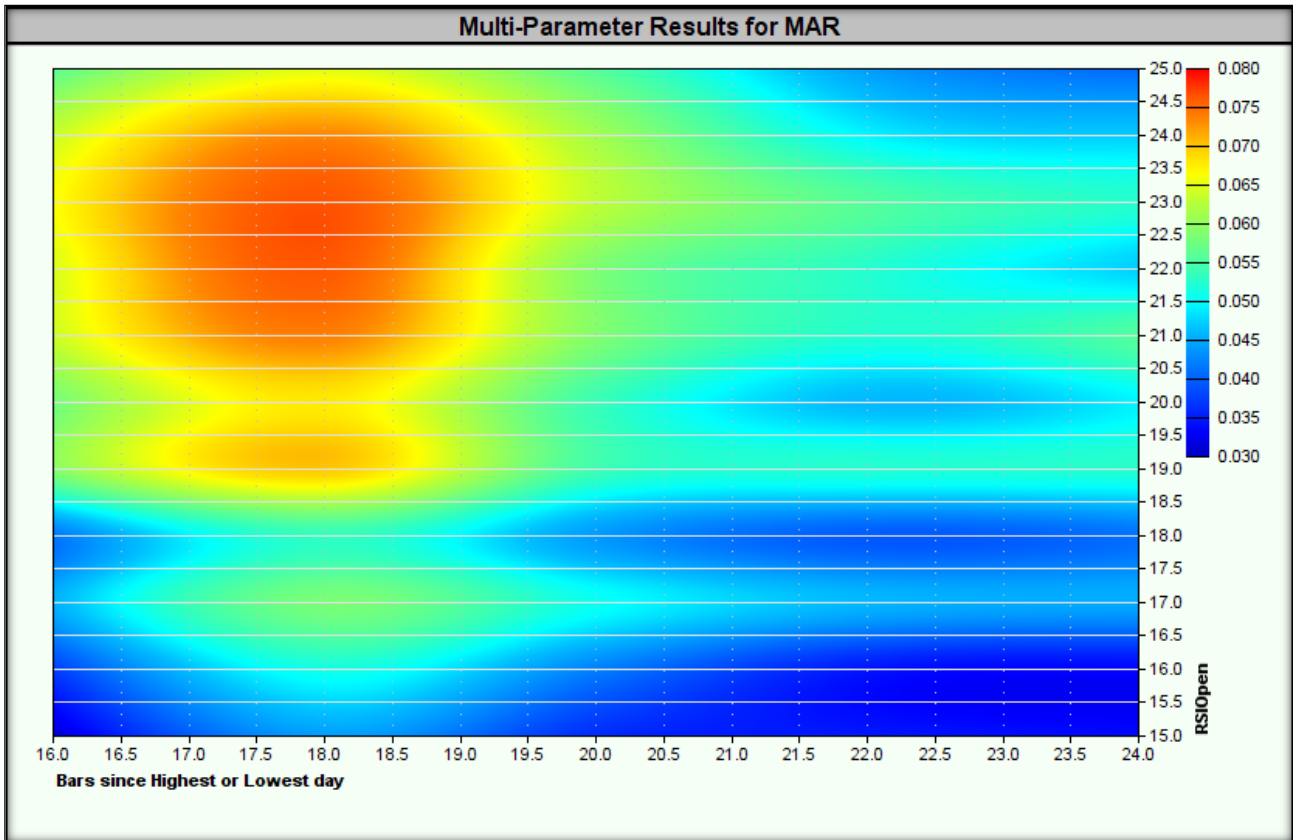
Heatmaps for the tested ranges are presented below.

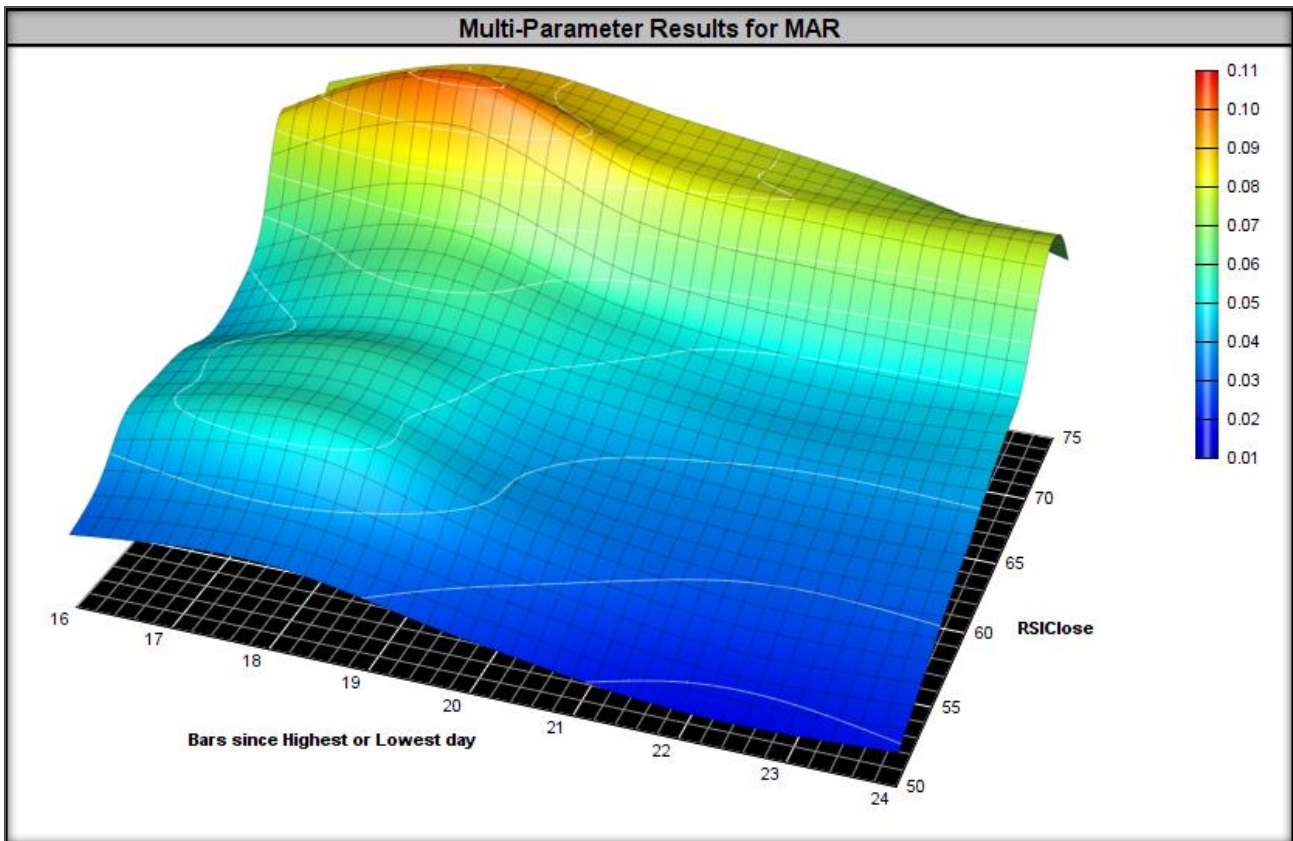
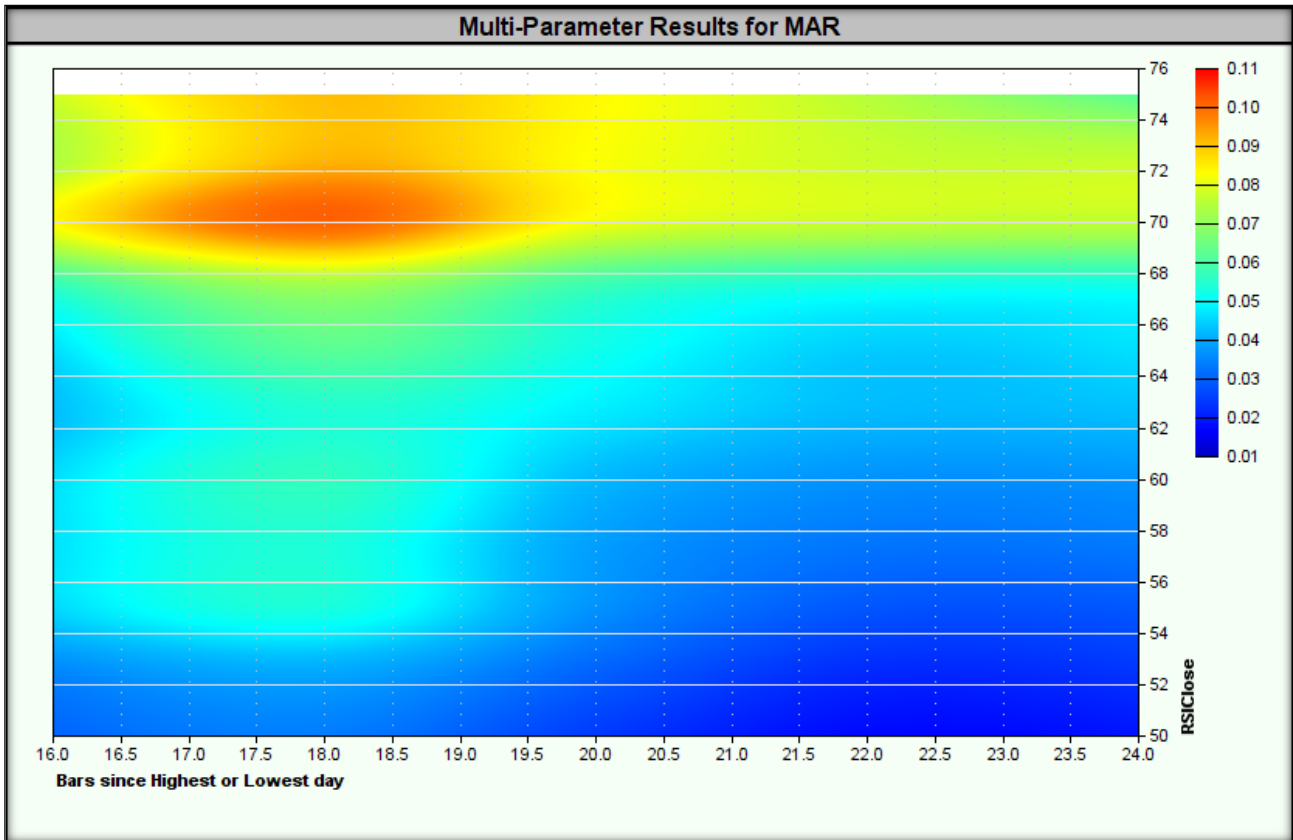


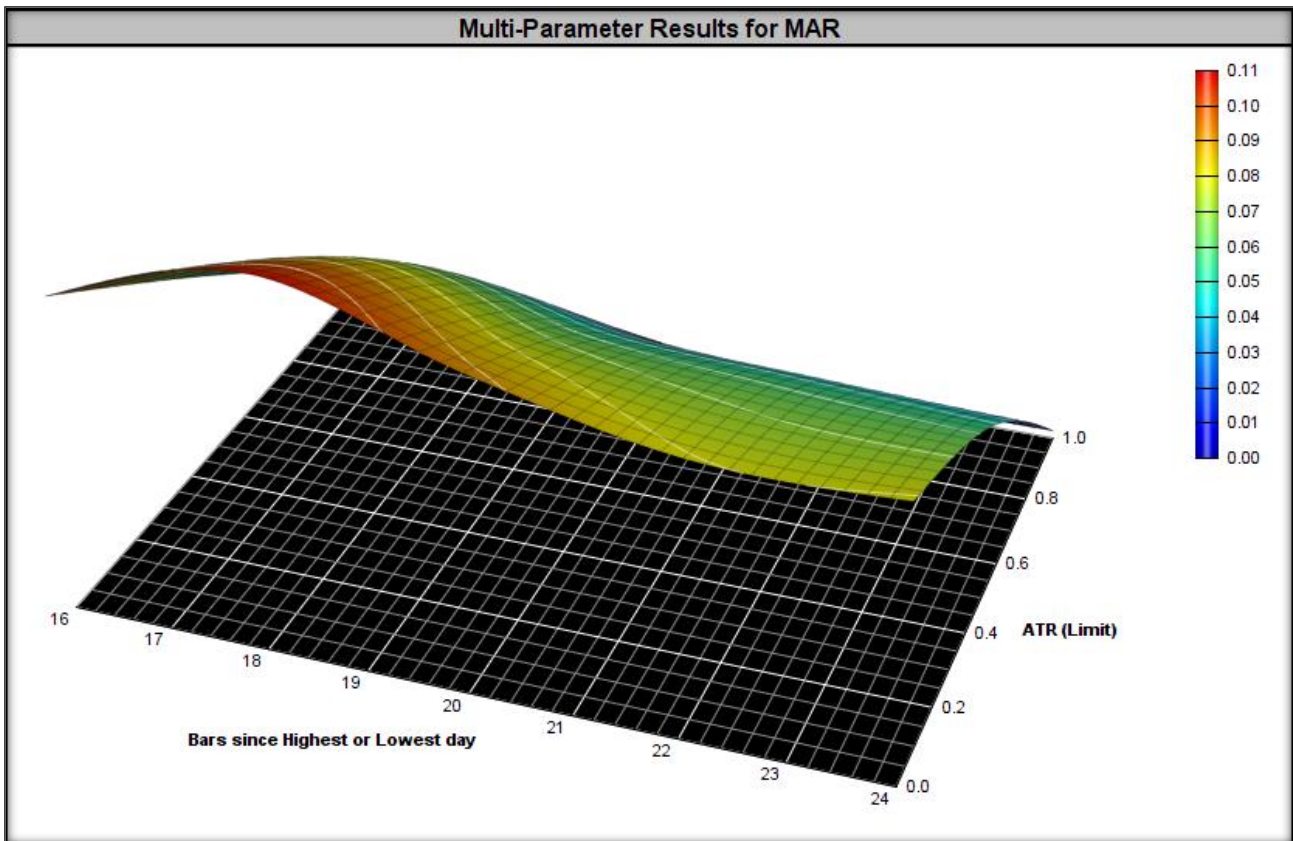
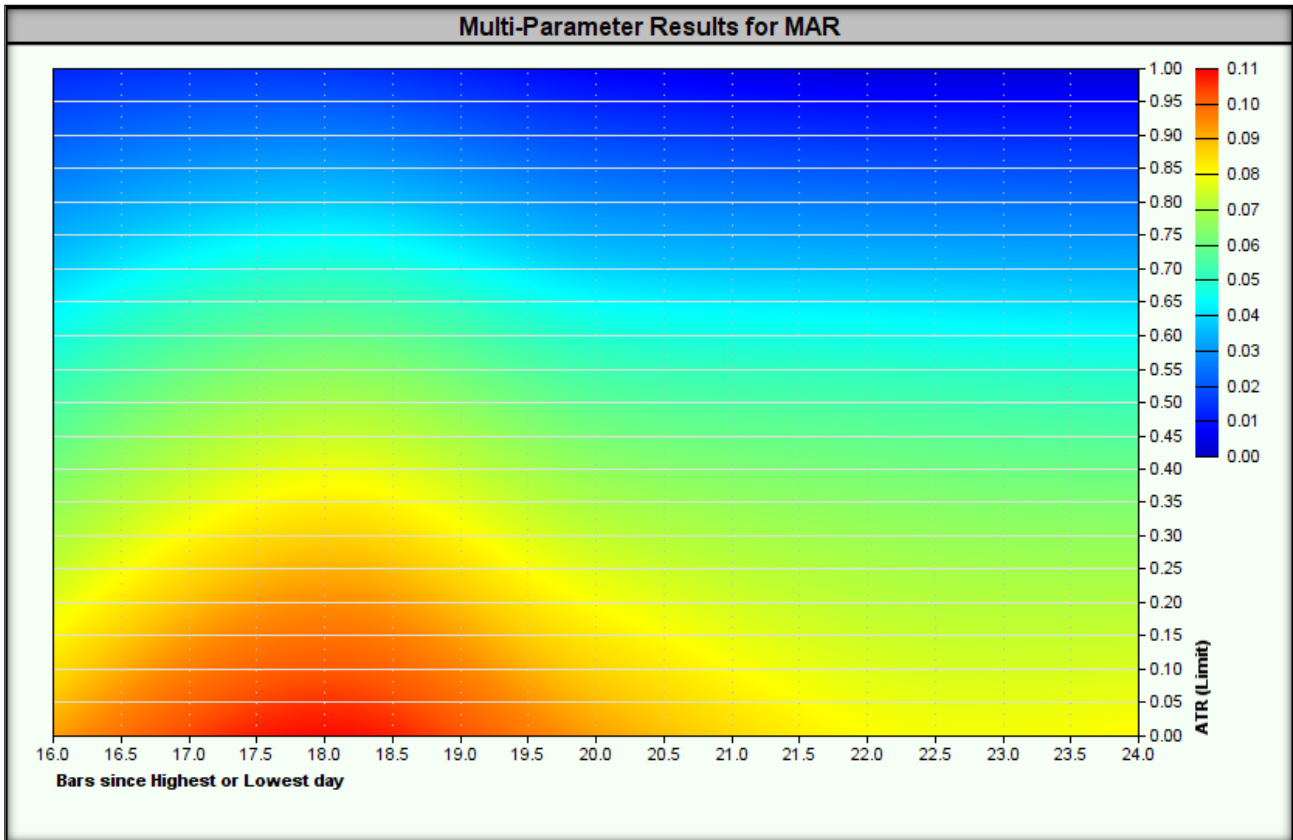


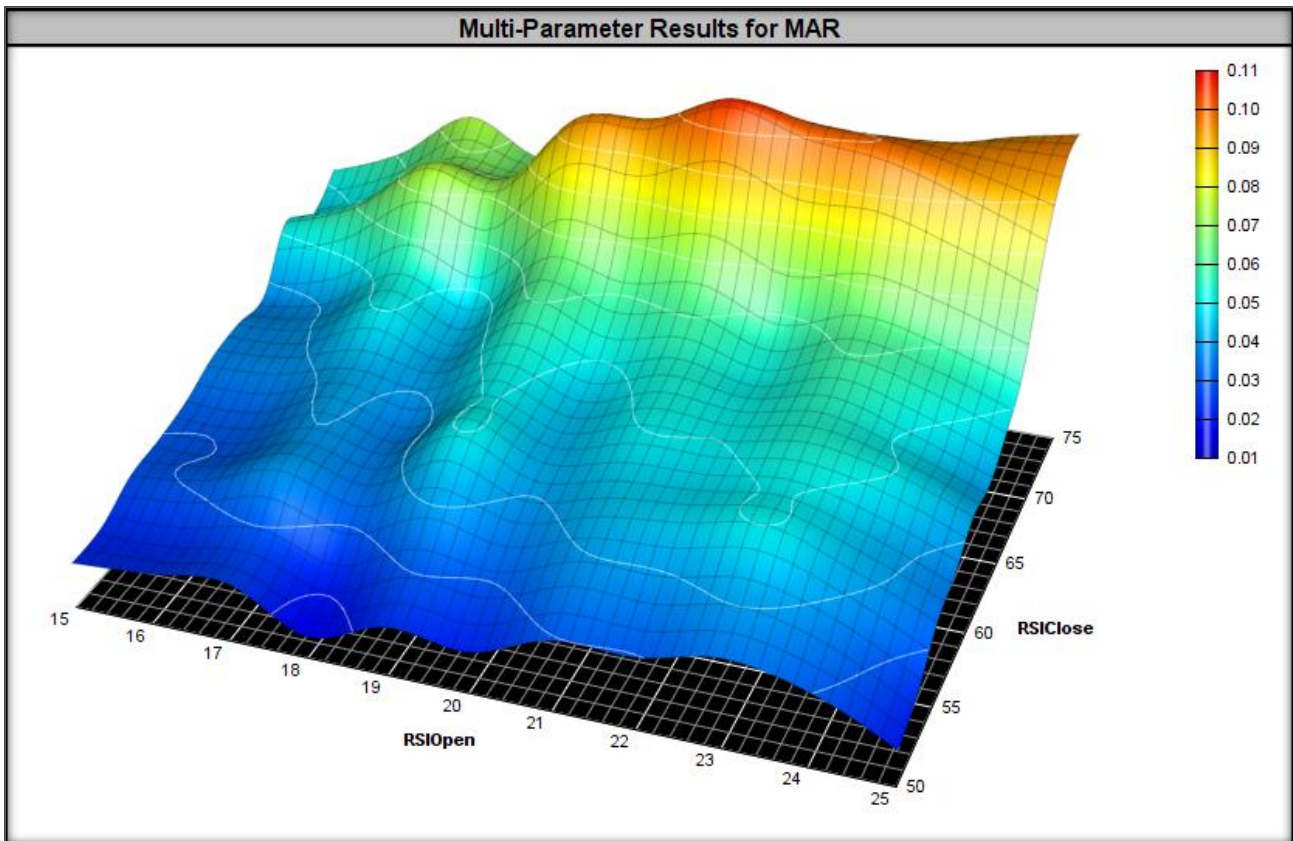
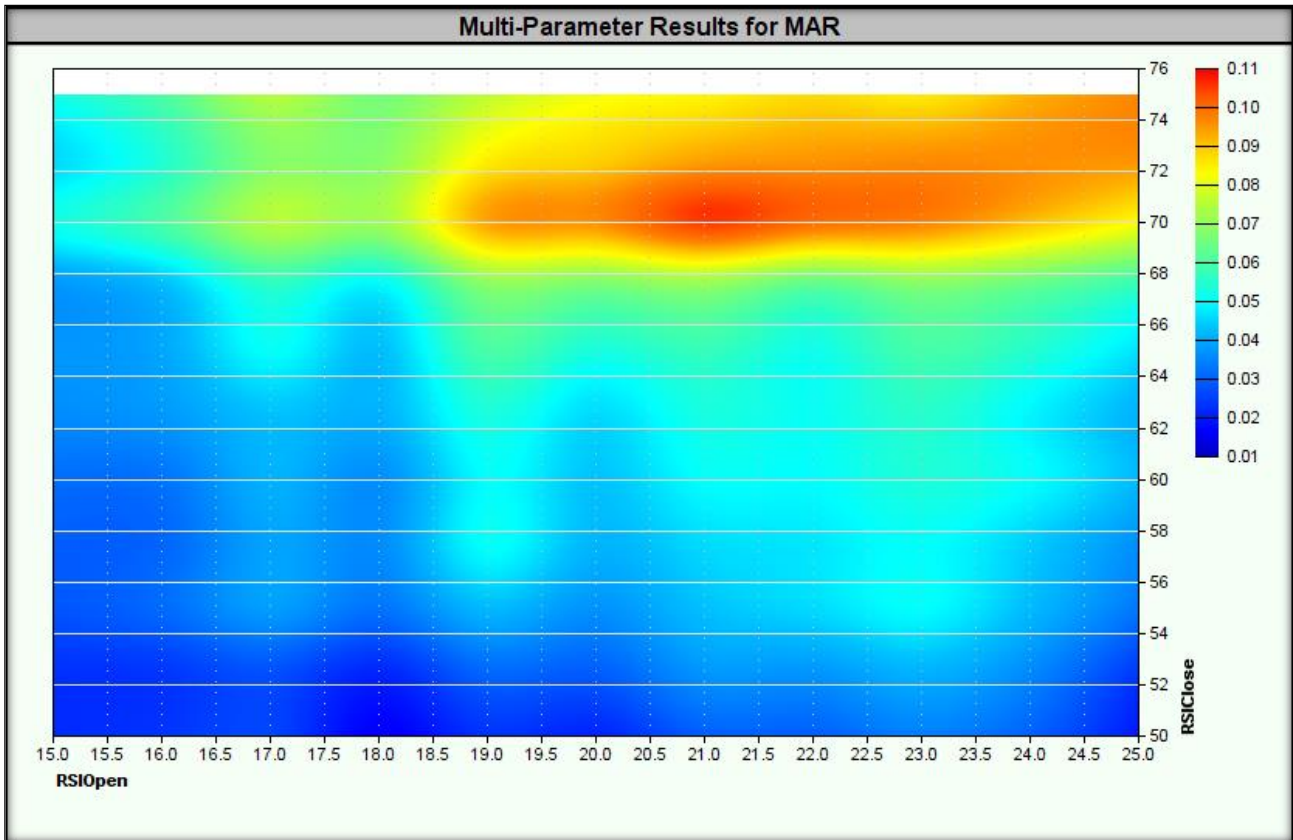


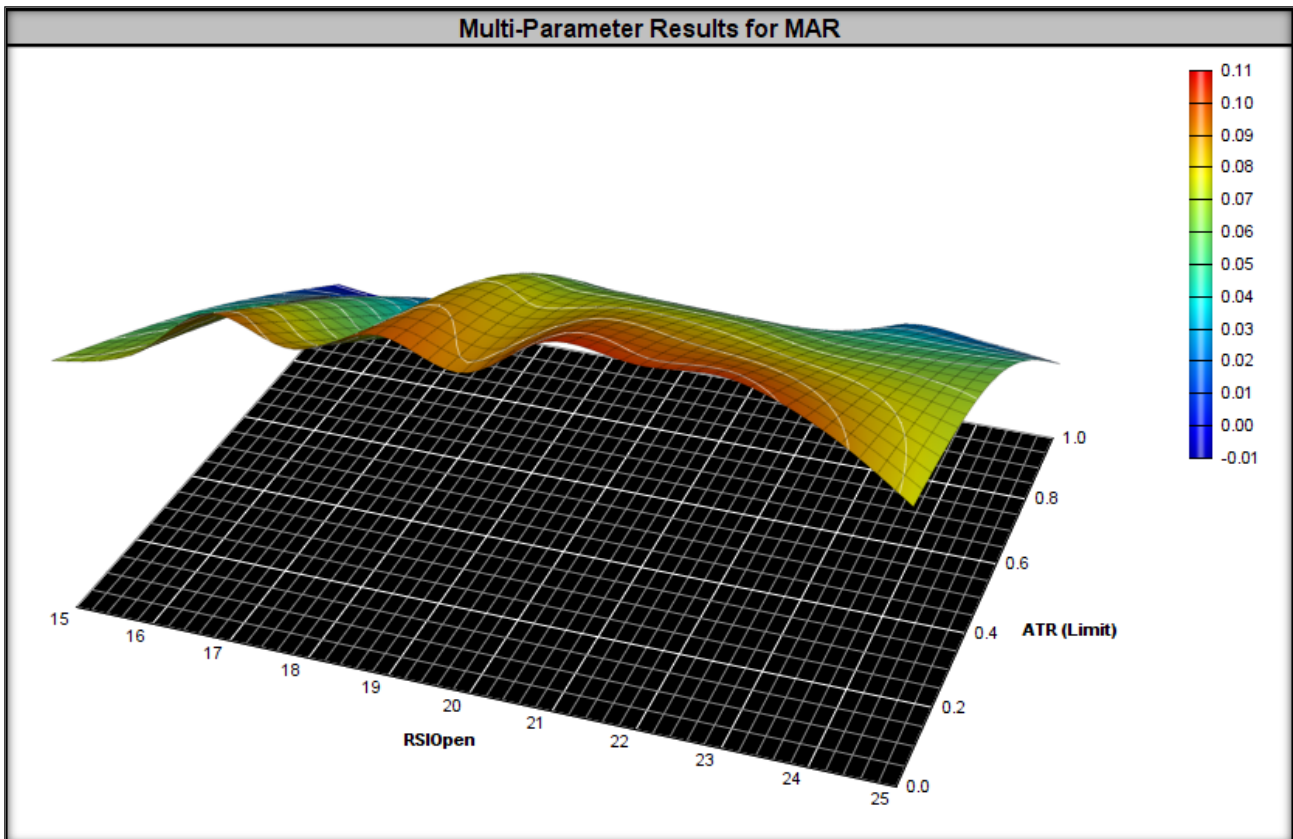
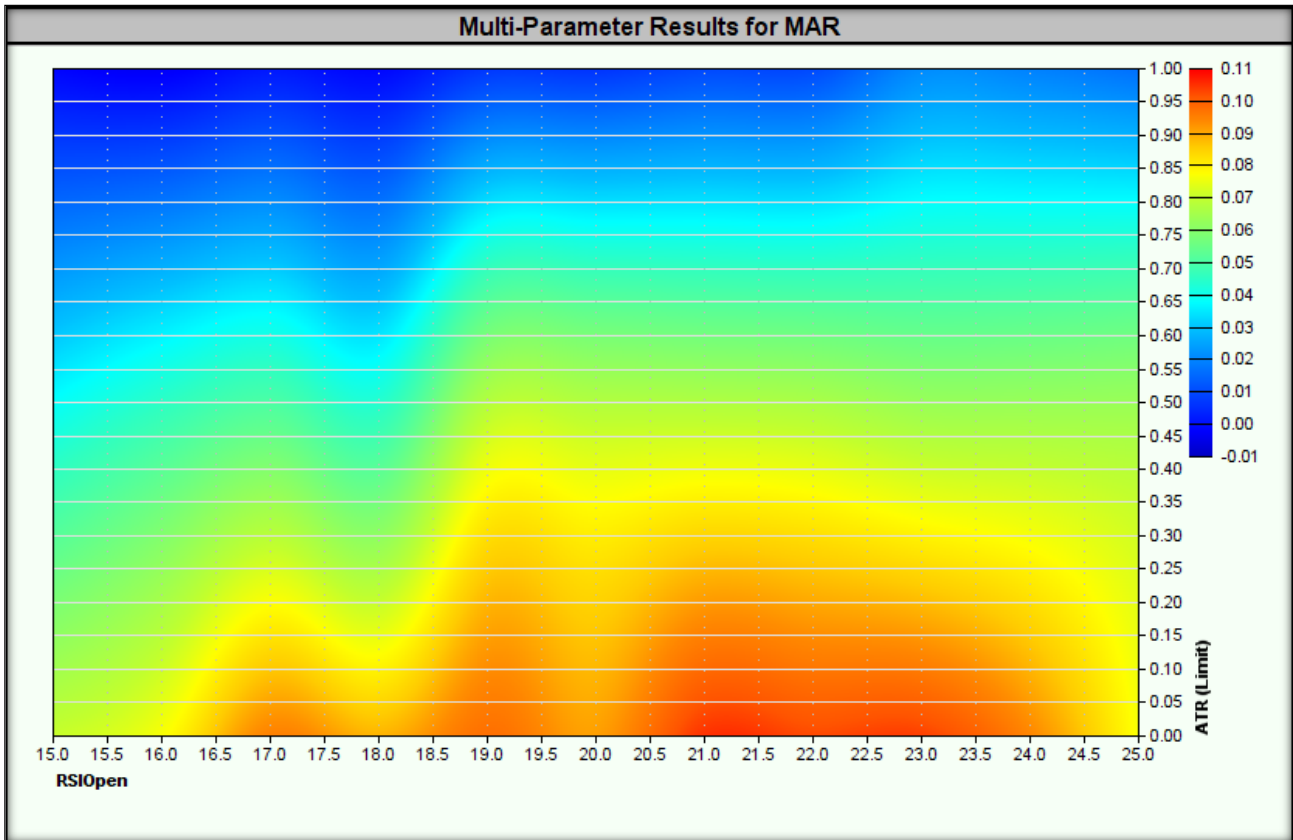


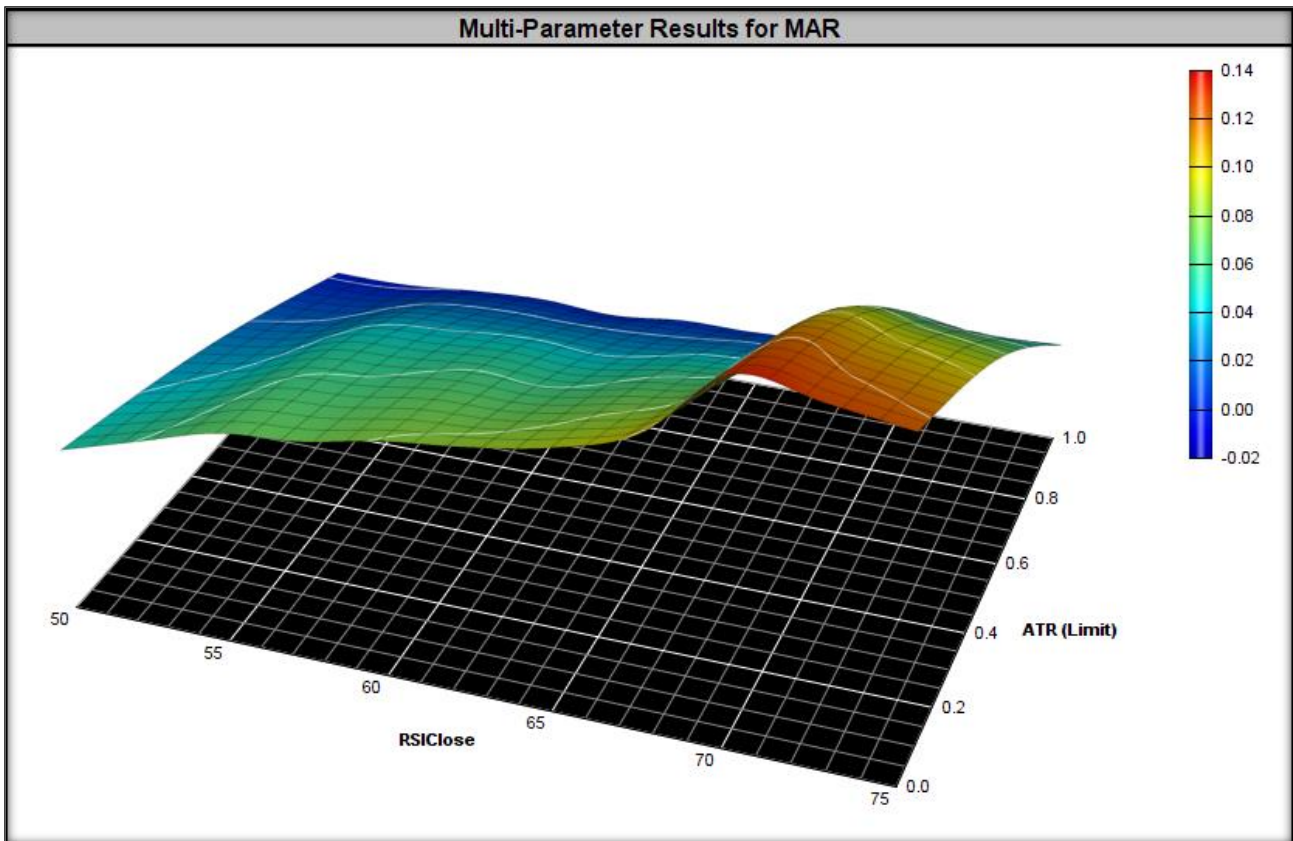
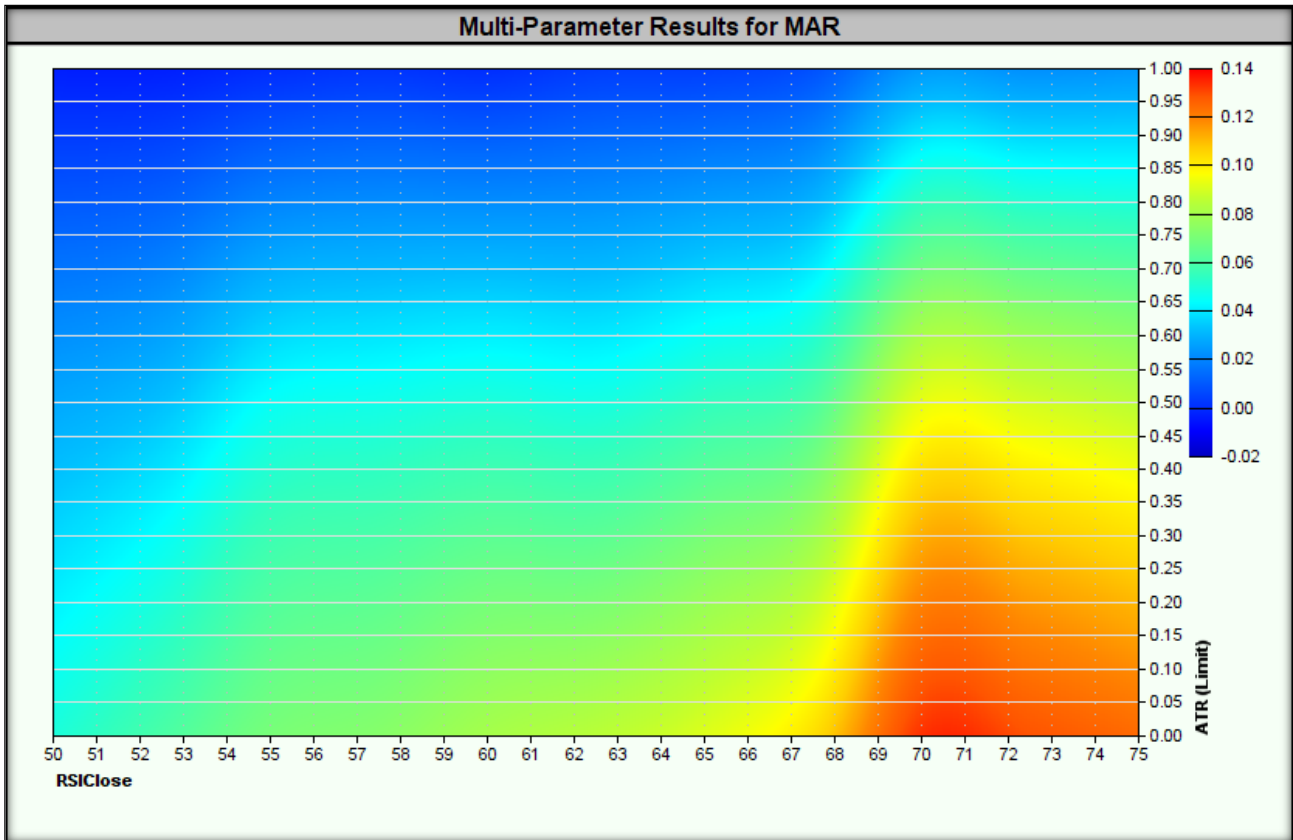


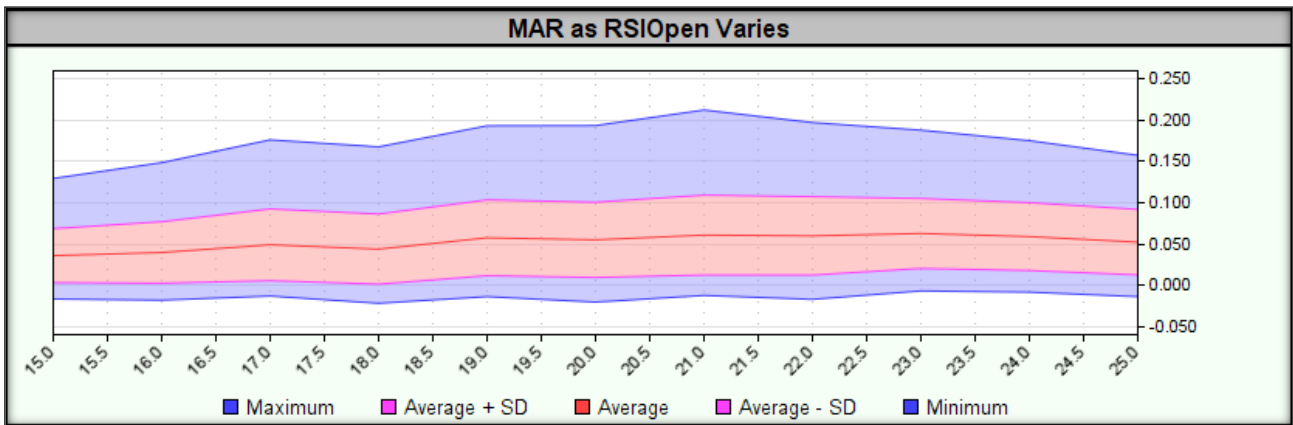
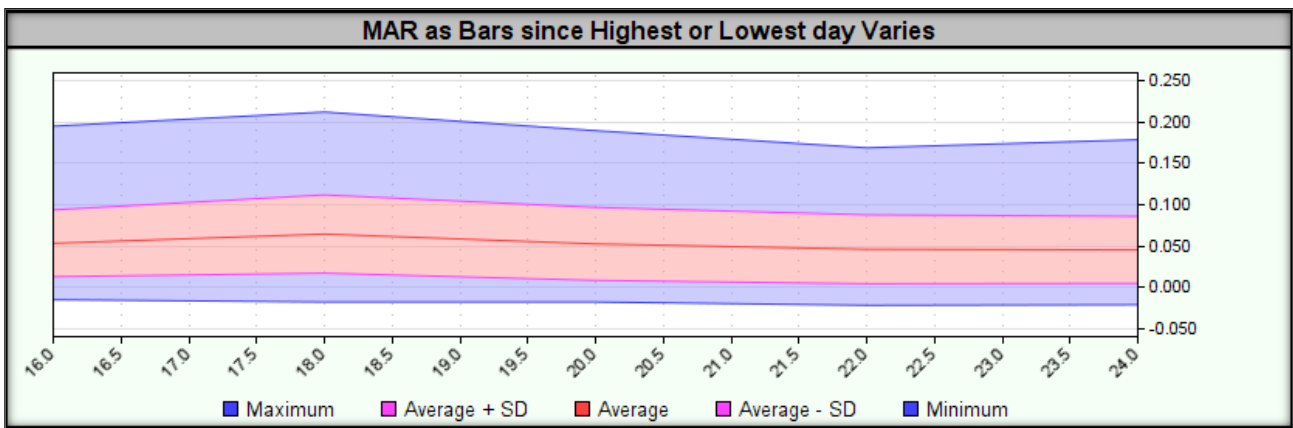
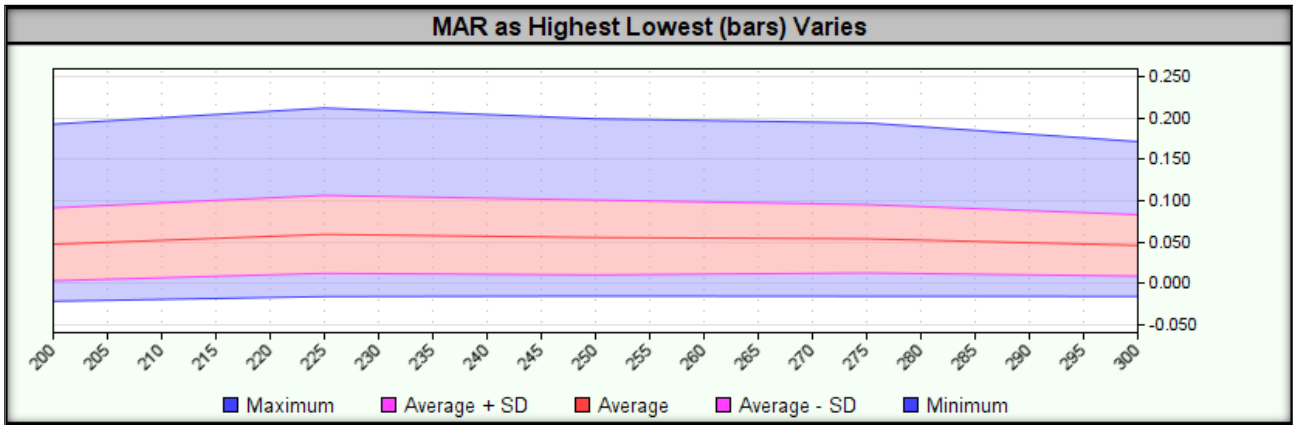


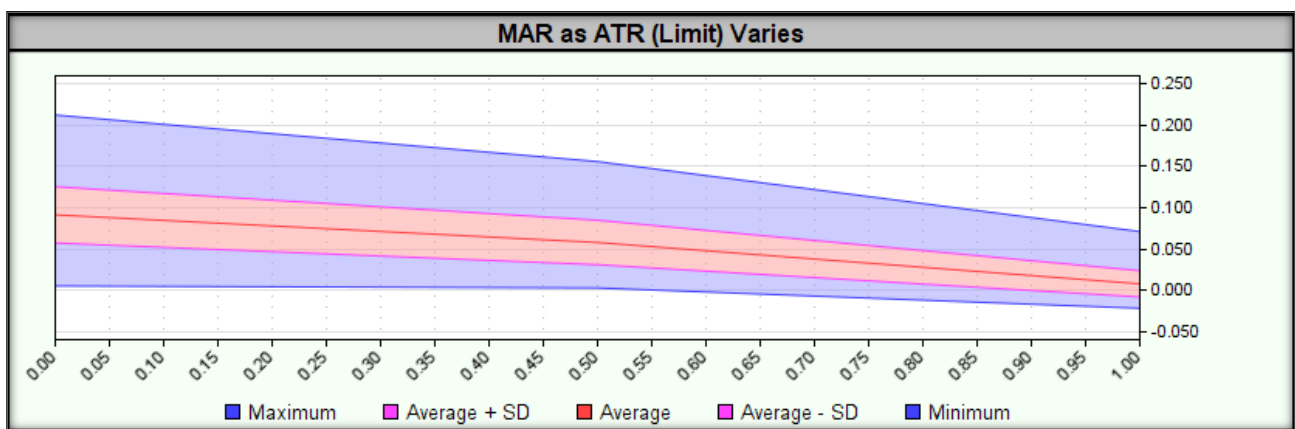
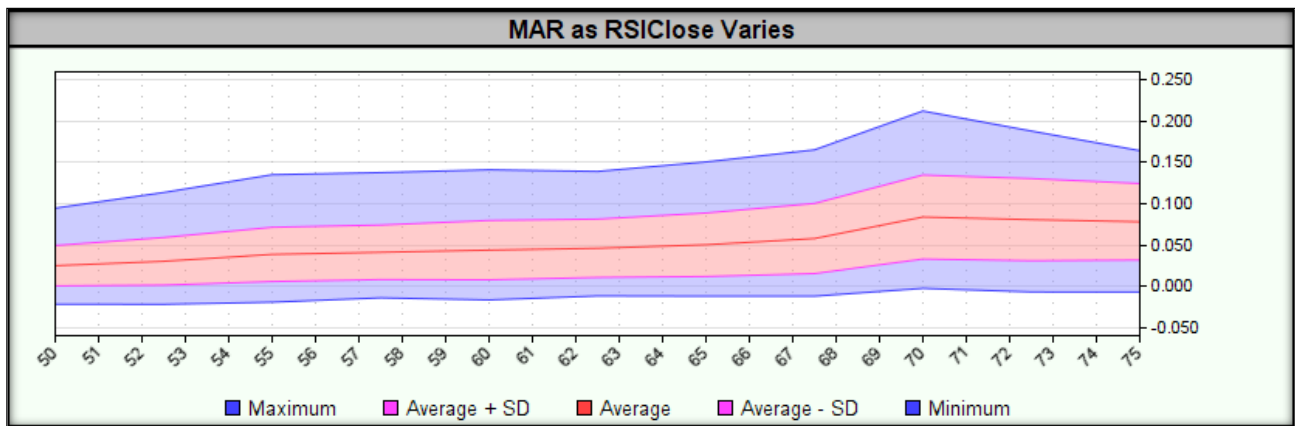












Observations for potential inclusion in future versions of the strategy, resulting from the analysis of stability test results and heatmap:

- **Opening a position at the opening price, instead of the limit price** – heatmaps show that the strategy achieves the best results when the opening limit of the position is 0 ATR away from the closing price. In addition, we reduce the number of parameters to optimize.
- **ConnorsRSI swap on classic RSI.**
- **Creating a stop loss order that will limit losses in the event of a dynamic trend change.**
- **Donchian Channel Parameter Optimization** and verify whether a shorter channel will improve results.

These and other changes will be tested in Trading New Highs v.2.

2. Monte Carlo simulation

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

3. Stability over a moving time window

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

4. Stability long/short

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



5. Stability in the portfolio of financial instruments

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

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

Walk Forward Analysis (WFA) is a key tool for assessing a **strategy's ability to perform under real market conditions**. It provides **reliable measures of profit and risk** after the optimization process and allows for answering several key questions:

- 1. What rate of return can you expect from the strategy?**
 - The optimization result often overestimates the expected rate of return, which can lead to unrealistic forecasts.
 - WFA provides a more **reliable and realistic measure of return** by minimizing the impact of overfitting to historical data.
- 2. What set of parameters should be used in the next period?**
 - Thanks to **WFA**, it is possible **to dynamically adjust the strategy parameters to the latest market changes**, increasing its adaptability.

WFA tests the strategy over multiple time periods, which helps **minimize the risk of overfitting** (overfitting the strategy to historical data). The WFA process consists of **two repeated steps**:

- 1. Optimization (In-sample):**
 - The strategy is optimized over a specific **training period (in-sample)**.
 - In this step, parameters are adjusted to obtain **the best results**.
- 2. Testing (Out-of-sample):**
 - The strategy, using **the parameters optimized in Step 1**, is tested on a **test period (out-of-sample)**.
 - This stage verifies the effectiveness of the strategy in new market conditions that **were not used** during optimization.

Walk Forward Efficiency (WFE) is a key measure that assesses whether a strategy has the potential to perform under real market conditions. WFE compares:

- **The rate of return achieved in the in-sample window** (where parameters were optimized)
- **The rate of return in the out-of-sample window** (where the strategy was operating on unknown data)

Similarly, **for the drawdown value**, WFE checks whether the strategy does not lose significant stability outside the optimization period.

A strategy considered **stable (robust) should meet the following conditions**:

- **WFE \geq 50% for the rate of return** – means that the strategy retains at least half of its effectiveness outside the optimization period.
- **WFE \leq 150% for drawdown** – means that the drawdown outside the optimization period is not significantly higher than during the optimization period.

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



Step 6: Using the strategy in real time

After **extensive testing**, **implementing a real-time** trading strategy becomes **relatively easy**. Buy/sell signals and stop **loss orders are generated automatically** by the computer based on previously established rules and formulas.

The most important element of **strategy implementation** is **consistent enforcement of all signals, without exceptions**. **How Larry Williams noted:** *"Trading strategies work. Traders do not."*

Before making a **final decision to implement a strategy**, it is necessary to check **whether it really adds value** to the results of the entire portfolio. It does not make sense to implement a strategy that **generates similar signals** or is **characterized by a similar course of the equity curve**.

Key criteria for evaluating the strategy before implementation:

- 1. Daily Return Correlation**
 - The **lower the correlation** with other strategies, the better.
 - **Optimal values:** Correlation close to zero or negative.
- 2. Reducing maximum drawdown**
 - If adding a strategy to a portfolio results in a **lower maximum drawdown**, this is a **strong positive signal**.
- 3. Objective Function Improvement (MAR)**
 - If adding a strategy causes **the MAR to increase**, this indicates that **it has added value** to the portfolio.
- 4. Better results in Monte Carlo simulation**
 - Monte Carlo simulation determines the potential **maximum drawdown**.
 - If Monte Carlo results **improve** after adding a strategy, this is a **strong positive signal**.

The above elements are often interrelated – usually **all of them are met** or **none of them are met**.

Once you decide to add a strategy to your portfolio, **the question arises:** *Should you implement your strategy right away or is it better to wait?*

Some studies suggest **an incubation period** of **3-6 months**, during which:

- The strategy is **monitored** but **does not execute real transactions**.
- **Generated signals, positions and results** are observed to identify **potential anomalies**.

In our case, **the incubation period** lasts from the moment **the strategy is launched in a live environment** until a **drawdown occurs at a level of about half of the maximum drawdown** observed in historical data. **Only after reaching this threshold does the strategy begin to be used with real funds.**

Thanks to this:

- **We avoid investing real money in an untested environment.**
- **We wait for a drawdown to occur** before launching the strategy, which **reduces the risk of starting at an unfavorable moment.**



The final decision to fully implement it should be based on **thorough testing and analysis of the value added to the portfolio**, so that the strategy actually supports long-term investment goals and does not increase unnecessary risk.