Extended Level Boomers v.1

Investment Strategy Testing Summary

Extended Level Boomers v.1 strategy is a swing trading technique that combines **a trend filter based on the Donchian channel** with **a breakout above the widest-range candle** (from the last few sessions). The **widest-range candle** simultaneously marks **a new multi-week high/low (for long and short positions, respectively).** Once it forms, **subsequent candles remain within its range (consolidation)** in anticipation of a return to increased volatility. Entry occurs only after the high/low (long/short position) of the widest-range candlestick is exceeded, creating an increased probability of a sharp continuation of the trend in the following days.

Although the strategy's logic seems sound, **it has not even passed the initial test because, on the one hand, its results do not indicate a market advantage, and on the other, the number of test transactions is low, which further prevents drawing reliable conclusions. Therefore, it is not recommended to use it in real transactions.**

Our goal is to have a strategy that remains **profitable and effective across a wide range of parameters,** because the market is a volatile organism, and optimal parameters can change over time. **I can't** emphasize enough that for **a strategy to work** in real-world conditions, it must also perform under **suboptimal parameters** and **conditions.** In short, **it must be stable** to changing market conditions.

I don't know who said these words, but they perfectly capture 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

Extended Level Boomers Strategy **v.1** is a swing trading system that **joins an ongoing uptrend/downtrend when,** following a strong impulse, a volatility contraction occurs: **several consecutive sessions close within the range of the largest-span candlestick** (high - low) from the previous few days. The candlestick with the larger range is also a new multi-week high/low. This allows **for added context to the trend by placing the price within the upper/lower band of the Donchian channel,** confirming the buyer/seller advantage.

Entry is executed with a buy/sell stop order 1 tick above/below the high/low **of the candle with the largest range;** the stop loss is set 1 tick above/below its low/high. **The order to open a position remains active as long as the market remains in consolidation.** The position is closed several sessions after entry (time-exit), if the stop hasn't been triggered earlier.

The strategy uses:

- **Direction filter (Donchian channel)** – price in the upper/lower band of the channel;
- **Widest-range reference candle** – the largest range over several sessions and a new multi-week high/low;
- **Consolidation within the range** – subsequent candles are between the Low and High of the reference candle;
- **Trigger T+1** – buy/sell stop 1 tick above/below the candle high/low reference;
- **Constant risk management** – stop loss 1 tick below/above the low/high of the reference candle;
- **Timed exit** – closing a position after several sessions.

The strategy encompasses **both long (buy) and short (sell) positions.** The key element is precise placement of trigger orders and **strict risk management through stop loss orders.**

Characteristics of the strategy and its strengths and weaknesses:

- **Clearly defined** trend, entry and risk criteria;
- **Favorable reward/risk ratio** thanks to narrow consolidation over a wide range;
- **Selectivity resulting from the accumulation of filters** (Donchian + largest span);
- **Less frequent signals** due to strict criteria;
- **Risk of price gaps** at opening;
- **Strong momentum context** as new highs filter instruments with real strength.

The Extended Level Boomers v.1 strategy, although rare, is a valuable addition to the "trend continuation" portfolio, allowing you to enter after a temporary market shakeout, when many players have already capitulated from their positions.

Step 2: Determine investment principles

Below is **the pseudocode** for **the Extended Level Boomers v.1 strategy** on daily data:

1. **Identifying the trend and reference candle**
    a. **Widest XX-session spread** – daily high - low must be the largest compared to the last XX sessions.
    b. **New YY-day high/low (Donchian channel)** – The high/low of the candle with the widest spread must create a new YY day high (for a long position) or YY day low (for a short position).
    c. **Consolidation** – after the day with the widest spread, the next candles (at least two; possibly more) fall within the high - low range of that candle.
2. **Entry – long position**
    a. **Order** – Set a buy stop order one tick above the high of the candle with the widest spread.
    b. **Order validity** – the order remains active as long as the daily low does not fall below the low of the candle with the widest spread.
3. **Entry – short position**
    a. **Order** – Set a sell stop order one tick below the low of the candle with the widest spread.
    b. **Order validity** – the order remains active as long as the daily high does not rise below the high of the candle with the widest spread.
4. **Risk management**
    a. **Initial stop for long position:** 1 tick below the low of the candle with the widest spread.
    b. **Initial stop for a short position:** 1 tick above the high of the candle with the widest spread.
5. **Closing a position**
    a. **Timed exit** – if the stop loss has not been activated earlier, close the position after ZZ sessions from the entry date (the next day for opening).
6. **Daily monitoring**
    a. After each session, check whether the conditions described in "**Identifying the trend and reference candle**" are met.
    b. Once all conditions for a long or short position are met, set appropriate orders (buy stop or sell stop) for the next trading day.

The above rules are described in a way that allows them to be directly converted into a script in the chosen testing platform, which ensures the accuracy of the historical simulation and the reliability of the test results.

Testing is performed assuming that **the risk of one position is 1.0% of total capital.**

Step 3: Pre-test your investment strategy

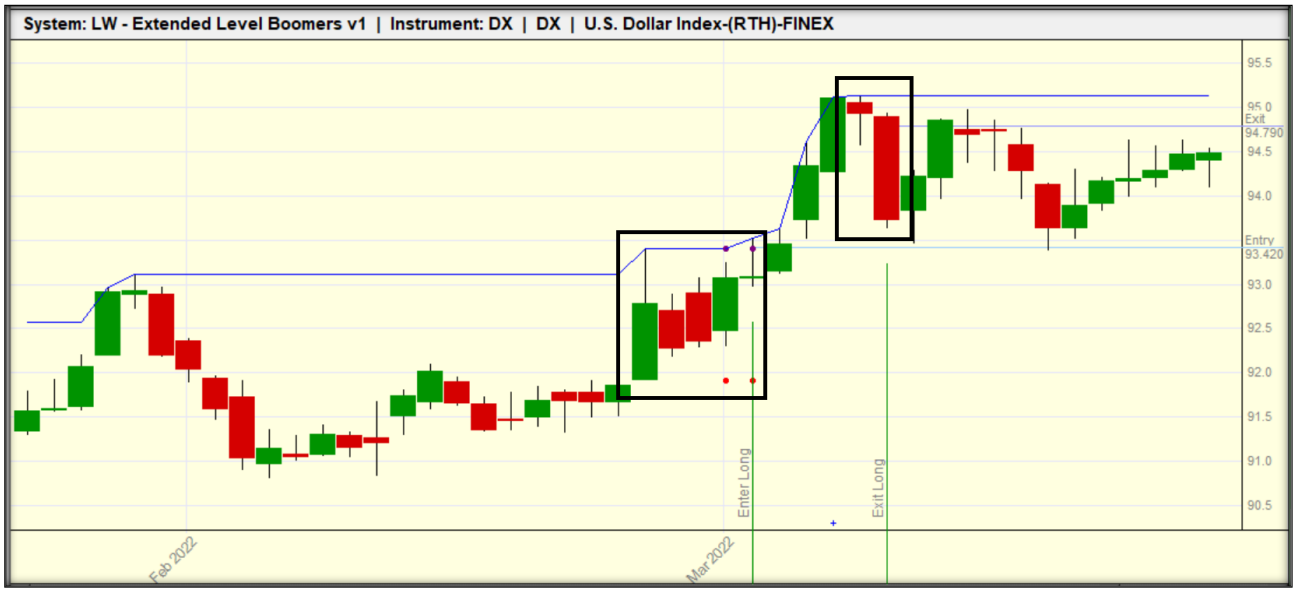
Below are some purchase and sale transactions that allow you to verify the following aspects:

- **Correctness of generated signals;**
- **Direction of opening a position;**
- **Moment of opening the position;**
- **The opening price of the position;**
- **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 doesn't matter** whether the trades are **profitable,** what **instrument was used,** or whether they occurred **recently** or **in the distant past.** The key is **to verify that the trades are generated correctly** and in line with the assumptions described in the previous step.

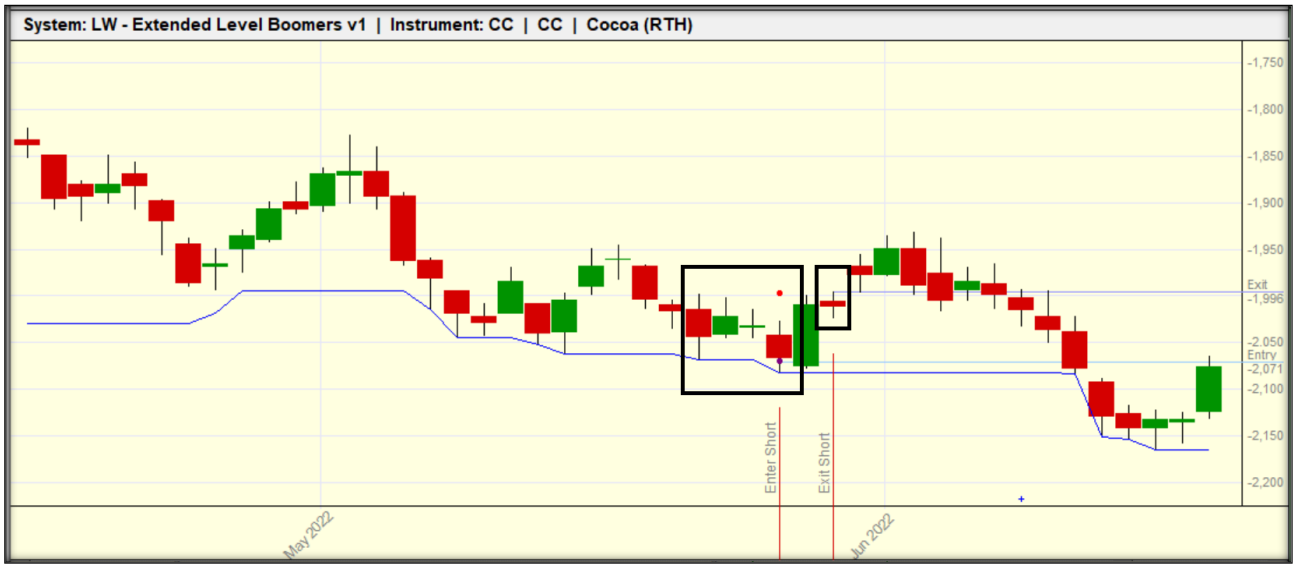
Our first transaction is on a US dollar index futures contract. At the end of February 2022, prices **were in an uptrend, creating the largest candle in 10 days** (the first candle in the left-hand rectangle). This candle also formed **the highest high in 100 days (**Donchian channel). For **the next two days, prices moved within the price range of the candle with the largest price range** (the second and third candles in the left-hand rectangle), thus **meeting the conditions for setting an order to open a long position.** The following day (the fourth candle in the left-hand rectangle), a **buy stop order was placed one tick above the high of the candle with the largest price range** (the first candle in the left-hand rectangle). This order is marked with a blue dot. A defensive **sell stop order (red dots) was also automatically set** in case a long position was opened. **The position was opened on the second day after a buy signal was generated** (the fifth candle in the left-hand rectangle). **The system worked correctly.**

The strategy assumes **closing the position after five days or when a defensive order is triggered. Since the stop** loss order wasn't reached within five days, we close the position on the sixth day at the opening (the second candle in the right-hand rectangle). **The system worked correctly.**



The second transaction is on the cocoa futures contract. At the end of May 2022, prices **were in a downward trend, creating the largest candle in 10 days** (the first candle in the rectangle on the left). This candle also formed **the lowest low in 100 days (**Donchian channel). For **the next two days, prices moved within the price range of the candle with the largest price range** (the second and third candles in the left-hand rectangle), thus **meeting the conditions for setting an order to open a short position.** The following day (the fourth candle in the left-hand rectangle), a **sell stop order was placed one tick below the low of the candle with the largest price range** (the first candle in the left-hand rectangle). This order is marked with a blue dot. A defensive **buy stop order (red dots) was also automatically set** in case a short position was opened. **The position was opened on the day a sell signal was generated** (the fourth candle in the left-hand rectangle). **The system worked correctly.**

The strategy assumes **closing the position after 5 days or when a defensive stop loss order is triggered. On the third day after opening the position, a defensive stop** loss order was triggered and the short position was closed. **The system worked correctly.**



Once we are sure that the trades are generated correctly, **we can move on to the first test of the strategy on the full in-sample dataset**. These tests are conducted on **baseline parameters** that, in my opinion, should align with the strategy's stated goals.

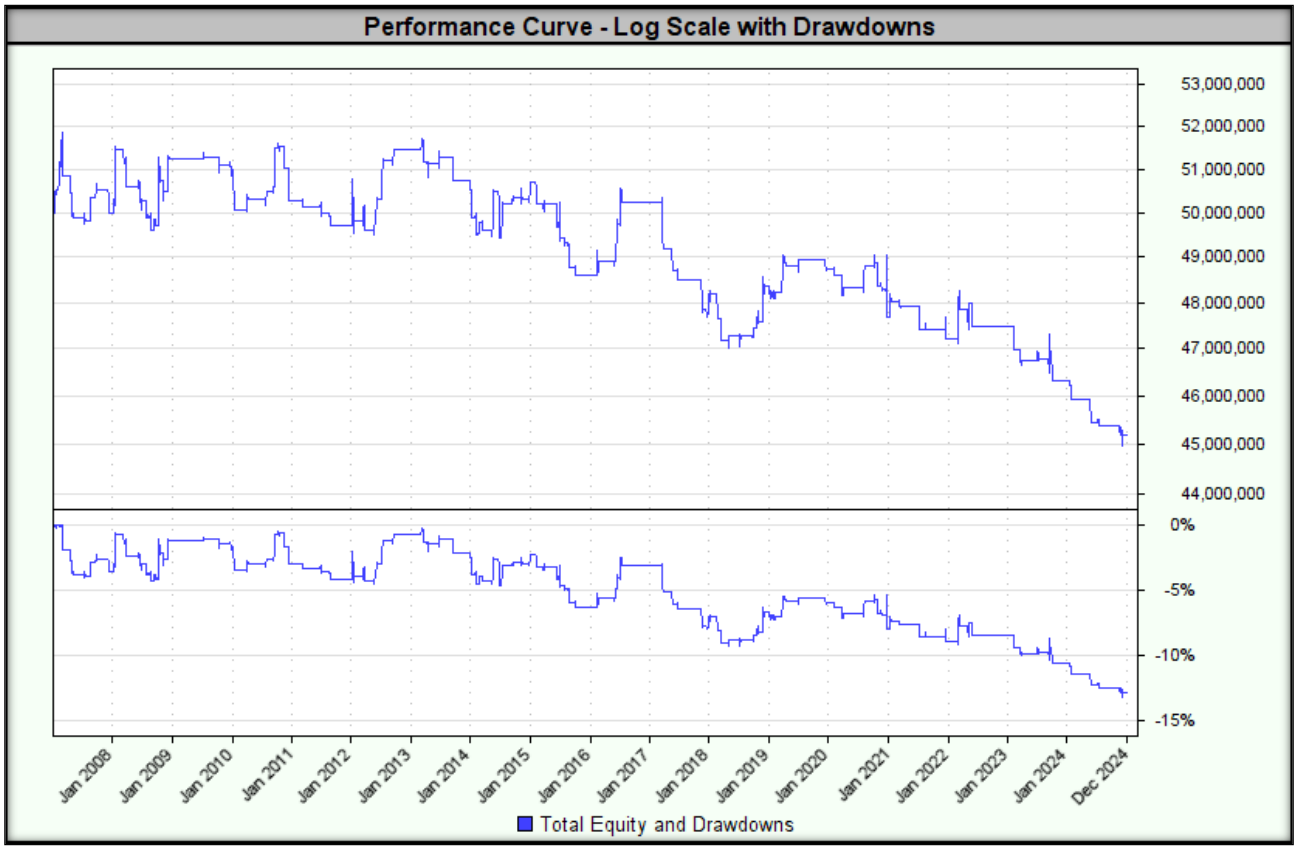
First, **we reject strategies that linearly lose capital.** If a strategy exhibits this pattern, it's a clear signal that any parameter optimization is pointless.

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

The tested output parameters are:

- **Widest spread:** the day before yesterday's high - low must be the largest compared to the last 10 sessions;
- **New local high/low:** the day before yesterday's high/low must form a new 100-day high (for a long position) or low (for a short position);
- **Inside bar candle:** today's and yesterday's quotes move within the price range of the candle with the widest spread;
- **How to open a position:** buy/sell stop one tick above/below the high/low of the candle with the widest spread;
- **Order validity:** the order remains active as long as:
  - for a long position – the daily low will not fall below the low of the candle with the widest spread;
  - for a short position – the daily high will not rise above the high of the candle with the widest spread;
- **Stop loss:** one tick below/above the low/high of the candle with the widest spread (for long/short position respectively);
- **Closing the position:** 5 days after opening (6 days for opening);
- **Position direction:** long and short;
- **Position sizes:** corresponding to a risk of 1.0% of total capital.

The test result is shown below.



Indicators/Measures	Concluding a transaction at the opening price
CAGR%	-0.56%
MAR Ratio	-0.04
RAR%	-0.56%
R-Cubed	-0.06
Robust Sharpe Ratio	-0.24
Max Drawdown	13.2%
Wins	41.5%
Losses	58.5%
Average Win%	0.70%
Average Loss%	0.62%
Win/Loss Ratio	1.13
Average Trade Duration (days)	6
Percent Profit Factor	0.80
SQN	-0.24
Number of transactions	135

In summary, the system worked well and generated signals as expected. **However, the strategy has poor results (drawdown in the last 10 years), and the number of test transactions is low, making it impossible to draw reliable conclusions. This means that the reliability of this strategy leaves much to be desired, and at this stage we are ending testing and abandoning further development of the strategy.**

Step 4: Optimizing and assessing the stability of the investment strategy

This stage of strategy development and testing is **crucial** because it determines how **effective** the strategy will be in **real-world conditions. I cannot** emphasize enough that for **a strategy to work** in real-world conditions, it must also perform under **suboptimal parameters** and **conditions.** In short, **it must be stable** to changing market conditions.

I don't know who said these words, but they perfectly capture 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 topic of consideration in **Step 5, "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**

The step was skipped due to **failure of the preliminary tests.**

2. **Monte Carlo simulation**

The step was skipped due to **failure of the preliminary tests.**

3. **Stability over a moving time window**

The step was skipped due to **failure of the preliminary tests.**

4. **Long/short stability**

The step was skipped due to **failure of the preliminary tests.**

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

The step was skipped due to **failure of the preliminary tests.**

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

The step was skipped due to **failure of the preliminary tests.**

7. **Strategy Risk Management**

The step was skipped due to **failure of the preliminary tests.**

Step 5: Walk-Forward Analysis

Walk-Forward Analysis (WFA) is a key tool for assessing **a strategy's ability to perform under real-world market conditions.** It provides **reliable measures of profit and risk** after the optimization process and allows you to answer 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 more **reliable and realistic measures 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, minimizing 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)**.
    - This step adjusts the parameters 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 Performance Efficiency (WFE) is a key metric that assesses a strategy's potential to perform under real-world market conditions. WFE compares:

- **The rate of return achieved in the in-sample window** (where parameters were optimized)
- **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 to be **stable (robust) should meet the following conditions:**

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

The step was skipped due to **failure of the preliminary tests.**

Step 6: Using the strategy in real time

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

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

Before making **a final decision to implement a strategy,** it's important to verify **whether it actually adds value** to the overall portfolio performance. It doesn't make sense to implement a strategy that **generates similar signals** or **has a similar equity curve.**

Key criteria for evaluating strategies 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** or **none of them are met.**

Once you decide to add a strategy to your portfolio, **the question arises:** *Should you implement the strategy immediately 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 detect **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 approximately half the maximum drawdown** observed in historical data. **Only after this threshold is reached 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 on its full implementation 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.