Spent Market Trading Pattern v.1

Investment Strategy Testing Summary

The Spent Market Trading Pattern (SMTP) v.1 strategy is a swing trading strategy developed by **Larry Connors.** At its core are **three "short-term exhaustion" conditions: (1) Y-periodic extremum** (for long: Y-day low), **(2) the largest daily range over the last X bars,** (3) **a close within the upper Q%** of the daily range (the opposite is true for shorts). Entry is achieved **by buying a breakout** above the high of the signal candle, with **an initial stop at the low** of that candle. This is a formalized, filtered version of a "reversal day," designed to limit false signals.

Although the strategy's logic seems sound, **it hasn't even passed initial testing, as it linearly loses capital on in-sample data.** This means **it's not recommended for use in real-world trading.**

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

The Spent Market Trading Pattern (SMTP) v.1 strategy looks for the moment when **a dynamic reversal candle** signals **the exhaustion of the current short-term movement.** For a long position, the signal candle must **establish a Y-period low,** have **the widest range of X sessions,** and **close** within **the upper Q%** of the daily range. Entry is executed **with a buy stop order.** 1 tick **above the high of** the signal candle, and the order itself is active for several sessions. After activating the order, we set **the initial stop** at the low of the signal candle, and close the position after a few days. The short version is **a mirror image of** the long version (Y-period high, the largest range of X, closing at the lower Q% of the range, sell stop below the low).

The strategy uses:

- **"Exhaustion" filter** – combination of Y-day low/high, largest X-day range and closing position within Q% of the daily range;
- **Precise trigger** – buy/sell stop relative to the signal candle;
- **Defined initial stop** – low initial risk and profit protection;
- **Asset class versatility** – Connors' examples include stocks, bonds and index futures;
- **Timed exit** – closing a position after several sessions.

Characteristics of the strategy and its strengths and weaknesses:

- **Minimalistic, easy to program** – a few simple rules ensure transparency and low computational costs;
- **A signal of increased quality** – requires three conditions to be met simultaneously before entering the market;
- **Low frequency** – the combination of all conditions occurs rarely;
- **High correction amplitude increases nominal stop distances** – strict control of position size is necessary.

Spent Market Trading Pattern (SMTP) v.1, while simple, provides **a solid foundation for building algorithmic portfolios.** However, it requires **discipline and strict adherence to risk management methods.**

Step 2: Determine investment principles

Below is **the pseudocode** for the **Spent Market Trading Pattern (SMTP) v.1 strategy** on daily data:

1. **Calculating Indicators:**
    a. **Y-DayLowestLow/Y-DayHighestHigh** – the lowest low/highest high of the last Y sessions (including the current one).
    b. **X-DayMaxRange** – the largest daily range (high–low) in the last X sessions.
    c. **Q%-CloseTop/Bottom** – information whether today's close falls within the top Q% (for long) or the bottom Q% (for short) of the daily range.
2. **Generating Entry Signals – Long Position:**
    a. **Y-DayLowestLow:** Today's candle forms the lowest low of the last Y sessions ("Y-DayLowestLow" condition).
    b. **X-DayMaxRange:** today's candle range is the largest among the last X sessions ("X-DayMaxRange" condition).
    c. **Q%-CloseTop:** Today's close falls within the upper Q% of the daily range ("Q%-CloseTop/Bottom" condition).
    d. **Entry:** Once these conditions are met, set a buy stop order one tick above today's high; the order is valid for W-days.
3. **Generating Entry Signals – Short Position:**
    a. **DayHighestHigh:** Today's candle forms the lowest high of the last Y sessions ("Y-DayHighestHigh" condition).
    b. **DayMaxRange:** today's candle range is the largest among the last X sessions ("X-DayMaxRange" condition).
    c. **CloseBottom:** Today's close falls within the lower Q% of the daily range ("Q%-CloseTop/Bottom" condition).
    d. **Entry:** Once these conditions are met, set a sell stop order one tick below today's low; the order is valid for W-days.
4. **Stop Loss Management:**
    a. **Long position:** set initial stop loss one tick below the low of the signal candle;
    b. **Short position:** set an initial stop loss one tick above the high of the signal candle.
5. **Generating Output Signals:**
    a. **Timed exit:** if the stop loss has not been activated earlier, close the position after the WW sessions from the entry date (closing the position at the opening price of the next day after the WW session has expired).
6. **Daily Monitoring:**
    a. Each day, determine the values: Y-DayLowestLow, Y-DayHighestHigh, X-DayMaxRange and check if the close is within the upper/lower Q% of the daily range.
    b. The system verifies entry/exit conditions and sets appropriate buy stop/sell stop orders for the following day; keeps a day counter to the WW session for active positions.

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.

Tests are performed assuming that the risk of one position is **2.0% of total capital.**

Step 3: Pre-test your investment strategy

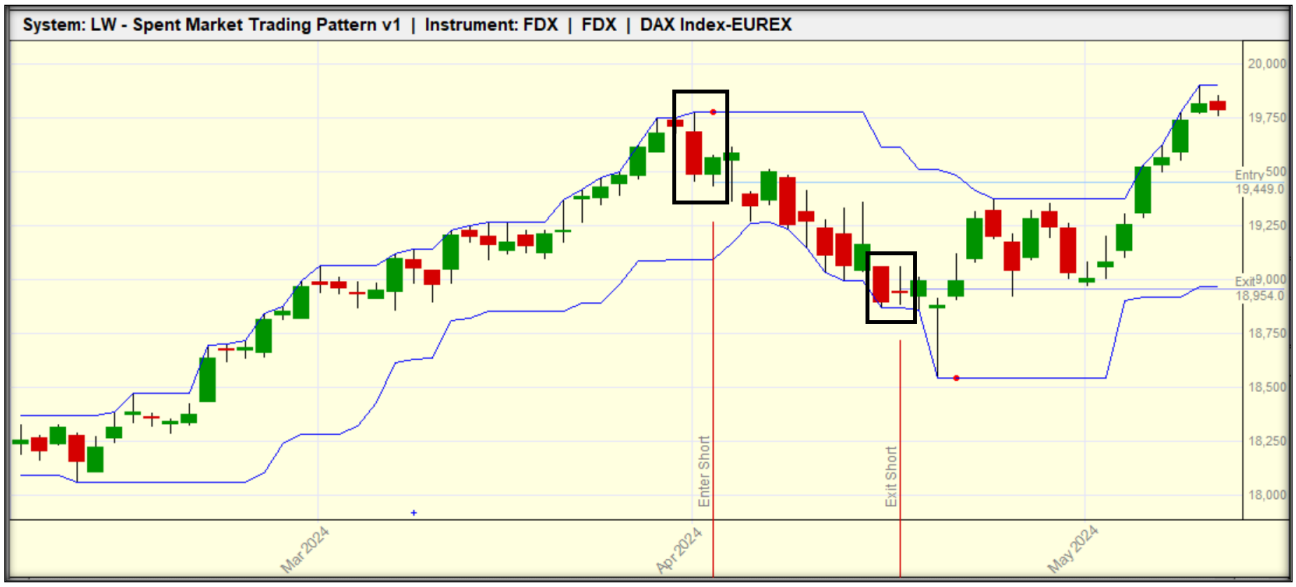
Below are some purchase and sale transactions that allow you to verify the following aspects:

- **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.

The first transaction was executed on a DAX index futures contract. In early April 2024, an SMTP short sell signal appeared (first candle in the left-hand rectangle): **the daily candle formed a 10-session high** (Y-DayHighestHigh), **had the largest range of the last 10 sessions** (X-DayMaxRange), and **closed within the lower 25% of its daily range (Q%-CloseTop/Bottom).** According to the strategy's rules, **a sell stop order was set for the next session, one tick below the signal candle's low,** and an initial stop order, one tick above its high. **The position was opened the next day** (second candle in the left-hand rectangle). **The system worked correctly.**

The strategy assumes **closing the position after 10 days or when a defensive order is triggered.** Since the stop loss order wasn't reached within the ten-day period, we close the position on the eleventh day at the opening (the second candle in the right-hand rectangle). **The system worked correctly.**



The second transaction was executed a few days later, also on a DAX futures contract. In mid-April 2024, a long SMTP position signal appeared (first candle in the left-hand rectangle): **the daily candle formed a 10-session low** (Y-DayLowestLow), **had the largest range of the last 10 sessions** (X-DayMaxRange), and **closed within the upper 25% of its daily range (Q%-CloseTop/Bottom).** According to the strategy's rules, **a buy stop order was set for the next session, one tick above the signal candle's high,** and an initial stop order, one tick below its low. **The position was opened the next day** (second candle in the left-hand rectangle). **The system worked correctly.**

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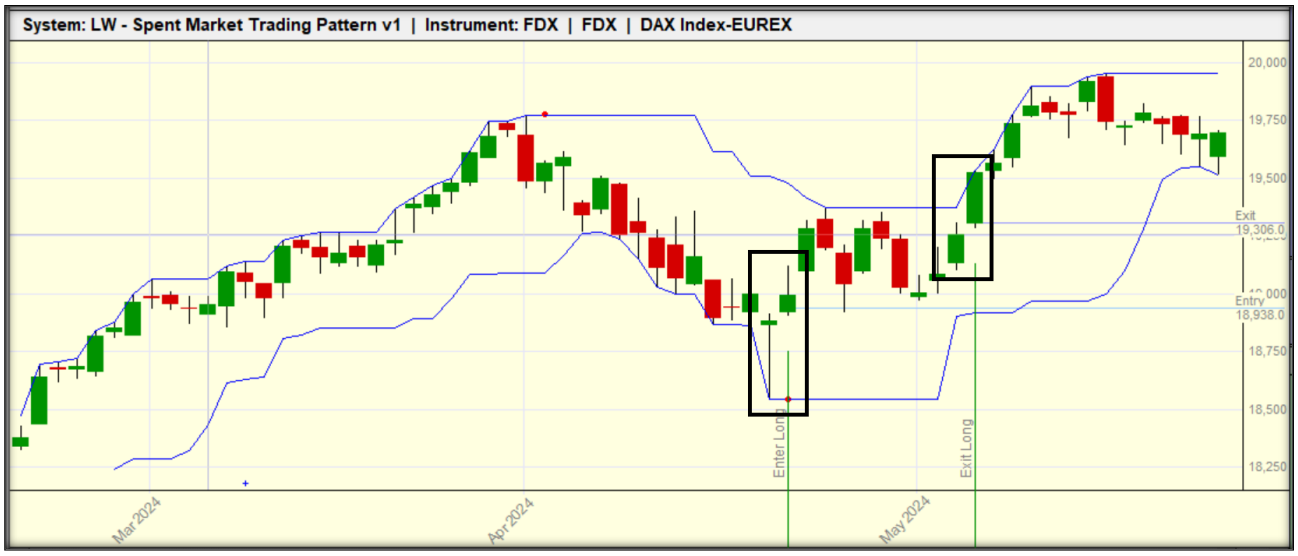


Once we are sure that the transactions are generated correctly, we can proceed to the first test of the strategy on the full **in-sample data set.** These tests are conducted on **baseline parameters** that, in my opinion, should align with the strategy's stated goals.

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.

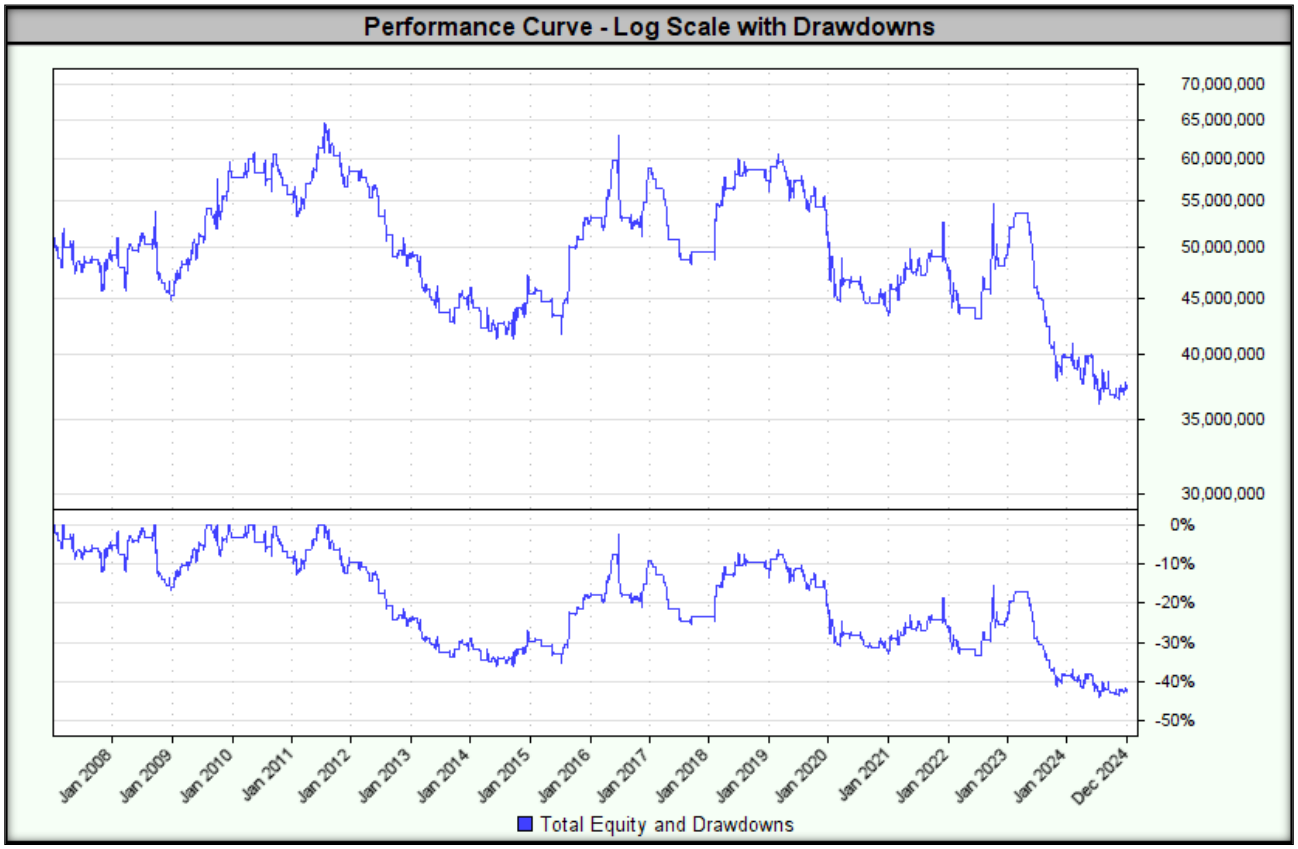
Our basic expectation is that the strategy generates **positive results,** even if they are at a low level.

Tested base parameters:

- **X-DayLowestLow/DayHighestHigh:** lowest/highest price in the last 10 days;
- **Q%-CloseTop/Bottom:** candle close at 25% of the upper/lower range;
- **Y-DayMaxRange:** the candle with the largest range over the last 10 days;
- **Position opening method:** buy/sell stop one tick above/below the high/low of the signal candle (for long/short position respectively);
- **Order validity:** the order remains active for the next 4 sessions;
- **Stop loss:** one tick below/above the low/high of the signal candle (for long/short position respectively);
- **Closing the position:** 10 days after opening (11th day for opening);

- **Position direction:** long and short;
- **Position sizes:** corresponding to a risk of 2.0% of total capital.

The test result is shown below.



Indicators/Measures	Concluding a transaction at the opening price
CAGR%	1.59%
MAR Ratio	-0.04
RAR%	-0.89%
R-Cubed	-0.01
Robust Sharpe Ratio	-0.08
Max Drawdown	44.1%
Wins	43.7%
Losses	56.3%
Average Win%	2.06%
Average Loss%	1.68%
Win/Loss Ratio	1.23
Average Trade Duration (days)	11
Percent Profit Factor	0.95
SQN	-0.09
Number of transactions	373

In summary, the system performed well and is generating signals as expected. **However, the initial parameters are weak (generating a loss), so we will end testing at this stage and discard 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 even **stable.**

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 in real-world market conditions.** It provides **reliable measures of reward 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 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 running 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 ≥ 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 execution** is **consistent execution of all signals, without exception. As 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.