1-2-3 Pullbacks v.1

Investment Strategy Testing Summary

The 1-2-3 Pullbacks v.1 strategy is a **swing trading** technique developed by **Jeff Cooper** that looks for **short-term corrections (pullbacks) in a very strong uptrend** or downtrend, as measured by a high ADX indicator value. The key assumption of the strategy is to **open a position after the three-day pause in the movement ends** - exactly when the price is preparing to return to the dominant trend.

Although the strategy logic seems correct, **it did not pass even the initial test, because on in-sample data it linearly loses capital.** This means that **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

The 1-2-3 Pullbacks v.1 strategy was developed by **Jeff Cooper** as a short-term system based on **the ADX (Average Directional Index)** and the formation of **three consecutive corrective candles.** Its purpose is to enable the trader **joining an already existing, strong trend** at a time when the instrument **is temporarily "resting".**

The strategy uses:

- **ADX** to confirm trend strength (filter: ADX > 30),
- **+DI/-DI relationship** to determine direction (predominance of +DI for longs, -DI for shorts),
- **Price formation 1-2-3** (three-day pullback or 2 days + inside day) to the precise moment of entry.

The strategy includes both **long (buy) and short (sell) positions,** depending on whether the instrument is moving in an upward trend (+DI advantage for longs) or downward (-DI advantage for shorts). An important aspect is the precise selection of the entry moment and securing the position through defined stop loss levels.

Characteristics of the strategy and its strengths and weaknesses:

- **Combines trend strength with price formation** – filtering trend signals reduces the number of false entries.
- **Simple, unambiguous implementation** – three clear criteria (ADX, DI, candlestick pattern).
- **Limited risk** – stop loss below/above minimum/maximum of day 2 or 3.
- **False signals in turbulence** – sudden turns with high volatility can quickly activate stop losses.
- **Daily observation required** – formation takes place in just a few sessions.
- **Lack of effectiveness in consolidations** – at low ADX the strategy generates little or no signals.

The 1-2-3 Pullbacks strategy uses simple but effective rules to allow traders to enter a position after a short-term correction while minimizing risk through the use of a stop loss. While it can be effective in the short term, it requires discipline and regular market observation to avoid false signals.

Step 2: Define investment principles

Below is **the pseudocode** for the **1-2-3 Pullbacks v.1 strategy** on daily data:

1. **Calculation of indicators**
    a. **ADX(14)** – if ADX > 30, the market is in a strong trend.
    b. **+DI/-DI(14)** – determine the dominant direction:
        i. **Long,** when +DI > -DI;
        ii. **Short** when -DI > +DI.
2. **Generating entry signals – long position**
    a. **Trend conditions:** ADX > 30 and +DI > -DI.
    b. **1-2-3 Pullback Formation:**
        i. Three consecutive days of lower lows, or
        ii. Two days of lower lows + third day inside day.
    c. **Entry:** On day 4, set buy stop 1 tick above day 3 high.
    d. **Stop loss:** 1 tick below the lower of day 2 or 3 lows.
3. **Generating entry signals – short position**
    a. **Trend conditions:** ADX > 30 and -DI > +DI.
    b. **1-2-3 Rally Formation:**
        i. Three consecutive days with higher highs, or
        ii. Two days with higher highs + third day inside day.
    c. **Entry:** On day 4, set sell stop 1 tick below day 3 low.
    d. **Stop loss:** 1 tick above the higher of day 2 or day 3 highs.
4. **Closing the position –** if the stop loss has not been activated, close the trade at the open of the eleventh day from entry.
5. **Daily monitoring**
    a. After each session, calculate ADX, +DI, -DI and check the 1-2-3 formation.
    b. Once conditions are met, set the appropriate trigger order for the next session.

The above rules have been 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: Conduct a preliminary test of the investment strategy

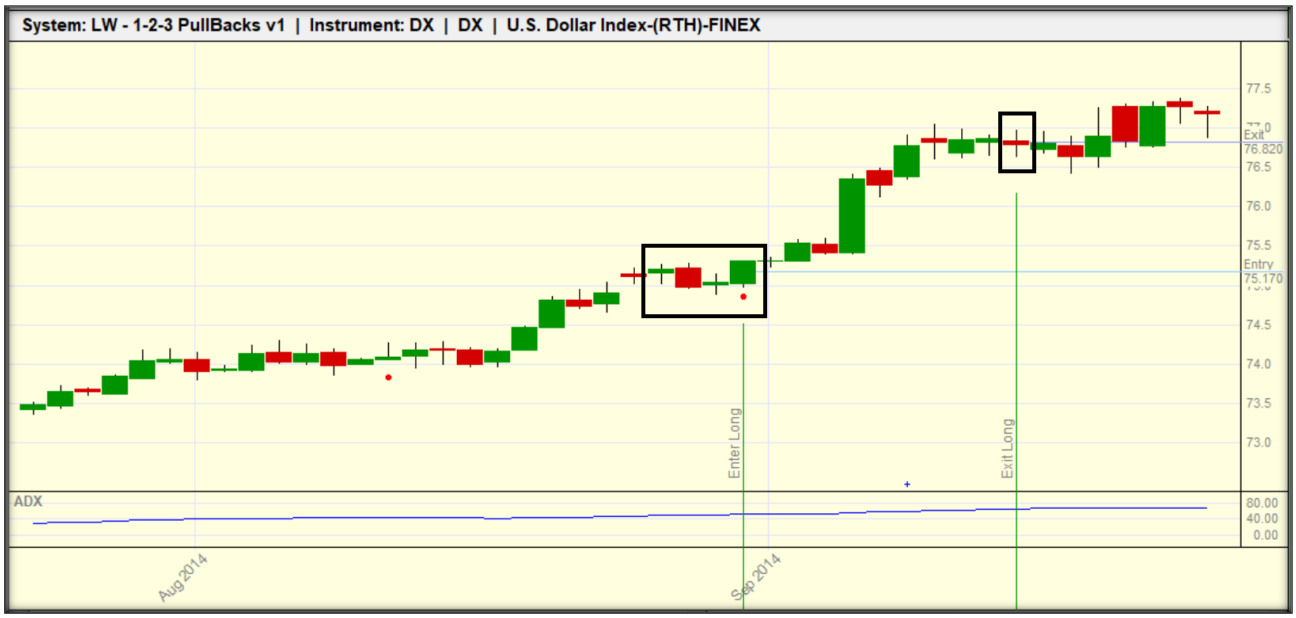
Below are some purchase and sale transactions that allow you to verify the following aspects:

- **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 dollar index futures contract. At the end of August 2014, the quotes formed **a 1-2-3 correction with three candles with lower and lower lows** (the first three candles in the rectangle on the left). Since **ADX is above 30,** we set a **buy stop order one tick above the high of the third candle.** The order was **activated the next day** (the fourth candle in the rectangle on the left), and the **stop loss order was set one tick below the low of the third candle** (the red dot). **The system worked correctly.**

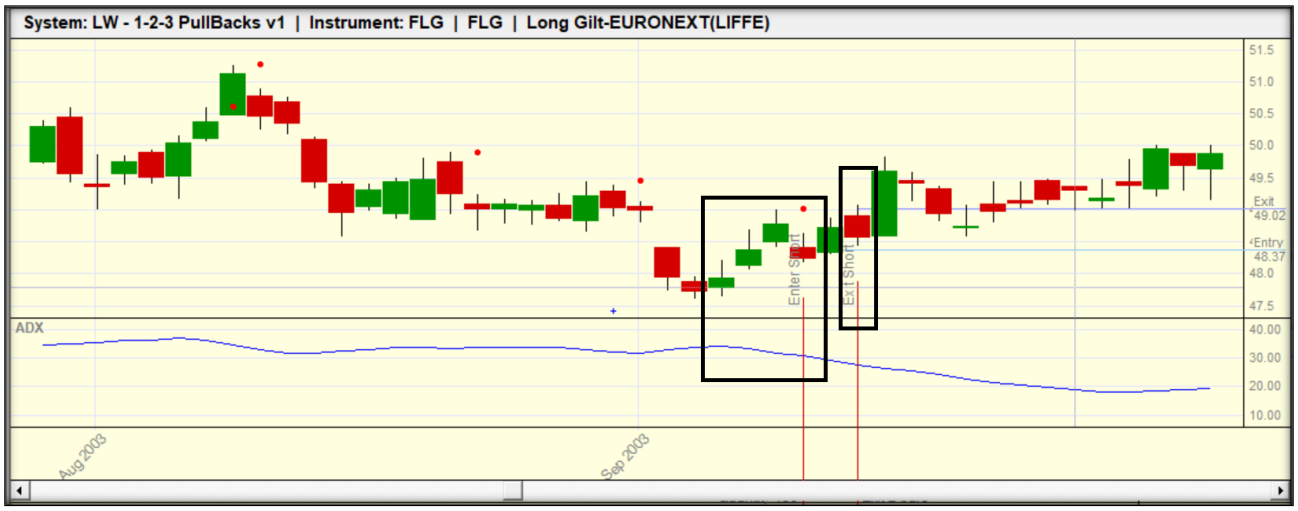
The dollar index quotes rose for the next few days, without activating the stop loss order during this time, and **the position was closed on the eleventh day at the opening** (the rectangle on the right). **The system worked correctly.**



The second transaction is on a British bond futures contract. At the beginning of September 2008, the quotes formed **a 1-2-3 correction with three candles with increasingly higher highs** (the first three candles

in the rectangle on the left). Since **ADX is above 30,** we set a **sell stop order one tick below the low of the third candle.** The order was **activated the next day** (the fourth candle in the rectangle on the left), and the **stop loss order was set one tick above the high of the third candle** (the red dot). **The system worked correctly.**

On the third day of having the position, **the quotes rose to the stop loss level and the position was closed at a loss** (the rectangle on the right). **The system worked correctly.**



Once we make sure that the trades 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** that were proposed by the creator, **Jeff Cooper.**

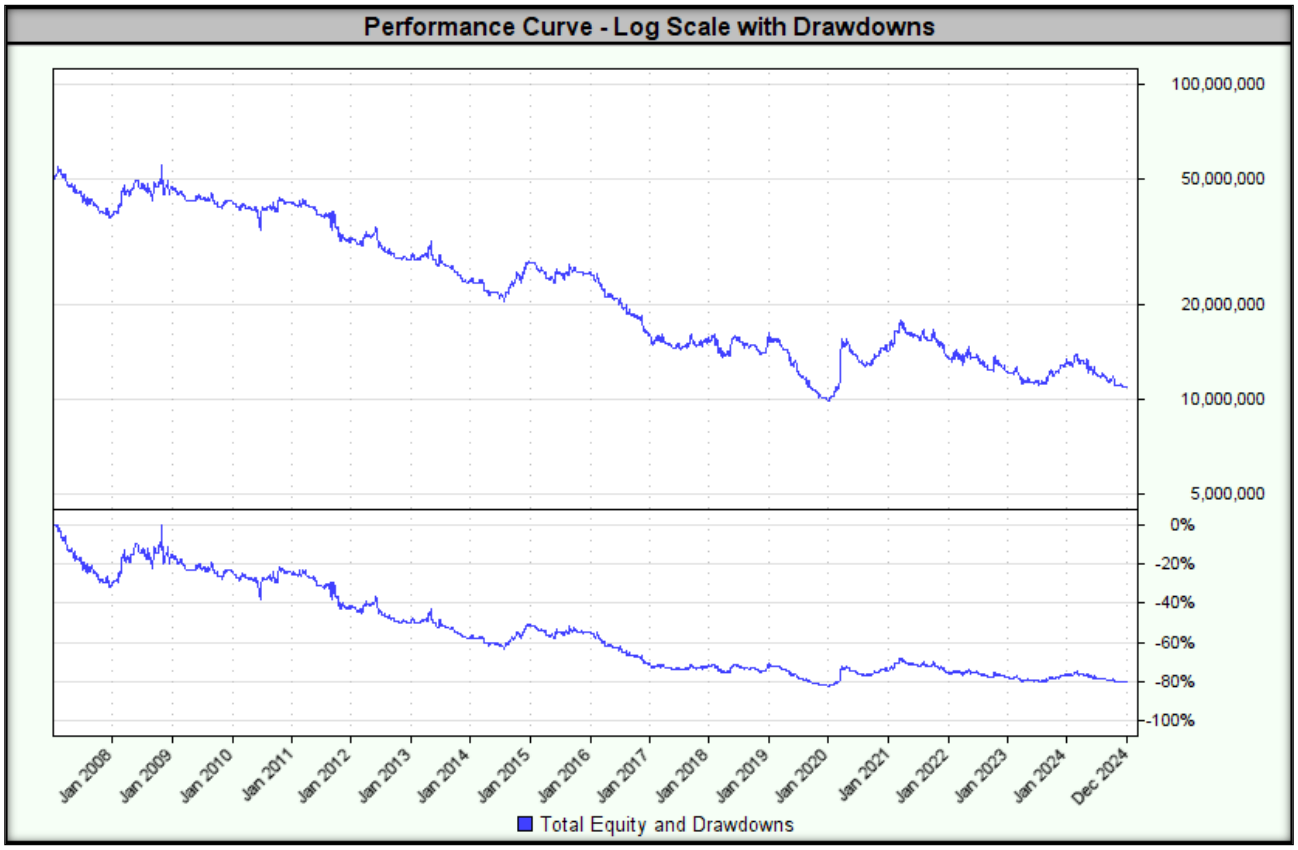
First of all, **we reject strategies that linearly lose capital.** If a strategy exhibits such a pattern, it is a clear signal that any parameter optimization does not make sense.

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

Tested base parameters:

- **Number of consecutive high/low forming a 1-2-3 correction (including inside bar):** 3 days;
- **ADX period:** 14 days;
- **Minimum ADX value:** 30;
- **How to open a position:** buy/sell stop one tick above/below the high/low of the previous candle;
- **Stop loss:** one tick below/above the low/high of candle 2 or 3 of the 1-2-3 formation, depending on which is lower/higher (for long/short position respectively);
- **Closing a position:** 10 days after opening (11 days after 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%	-8.1%
MAR Ratio	-0.10
RAR%	-8.7%
R-Cubed	-0.14
Robust Sharpe Ratio	-0.51
Max Drawdown	82.2%
Wins	31.3%
Losses	68.7%
Average Win%	1.93%
Average Loss%	1.05%
Win/Loss Ratio	1.84
Average Trade Duration (days)	8
Percent Profit Factor	0.84
SQN	-0.54
Number of transactions	1090

In summary, the system worked correctly and generates signals as expected. **However, the tests on the output parameters are weak (generate a loss), so at this stage we will end the tests and reject the strategy.**

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**

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

2. **Monte Carlo simulation**

This 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. **Stability long/short**

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**

This 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 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 ≥ 50% for the rate of return** – means that the strategy retains at least half of its effectiveness outside 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 easy. 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 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.