Jack In The Box v.1

Investment Strategy Testing Summary

Jack In The Box v.1 strategy is Jeff Cooper's swing trading technique. In the long version, it combines **a trend filter based on the Donchian channel** with **a breakout above the widest-ranging candle** (from the last few sessions), which also marks **a new multi-week high.** This candle is followed by **one inside** session. **day** (consolidation within the previous candle). A position is entered when the high of the preceding candle – **the candle with the widest range – is broken.** The position has a pre-defined time horizon and a defensive stop loss level.

Jack In The Box v.1 strategy is **a variation of the Extended Level Boomers strategy** - the difference is the number of inside days: Jack In The Box requires **one** day inside, while **Extended Level Boomers** usually require **two or three.**

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

Jack In The Box v.1 strategy joins the **ongoing up/down trend** after a strong price impulse (the bar with the largest range over several sessions, establishing a new multi-week high/low) and **a one-day contraction** (a single inside day).

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 only during the next trading session.** The position is closed after several trading sessions (time-exit) after entry, if the stop hasn't been triggered previously.

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** – the next candle is between the Low and High of the reference candle;
- **Trigger T+1** – buy/sell stop 1 tick above/below the high/low of the reference candle;
- **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 the 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 Jack In The Box v.1 strategy, although rare, is a valuable addition to the "trend continuation" portfolio, allowing you to enter after a temporary market correction.

Step 2: Determine investment principles

Below is **the pseudocode** for **the Jack In The Box v.1 strategy** on daily data:

1. **Identifying the trend and reference candle**
    a. **Widest XX-session spread** – the 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 form 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 candle is 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 only during the next session.
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 only during the next session.
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

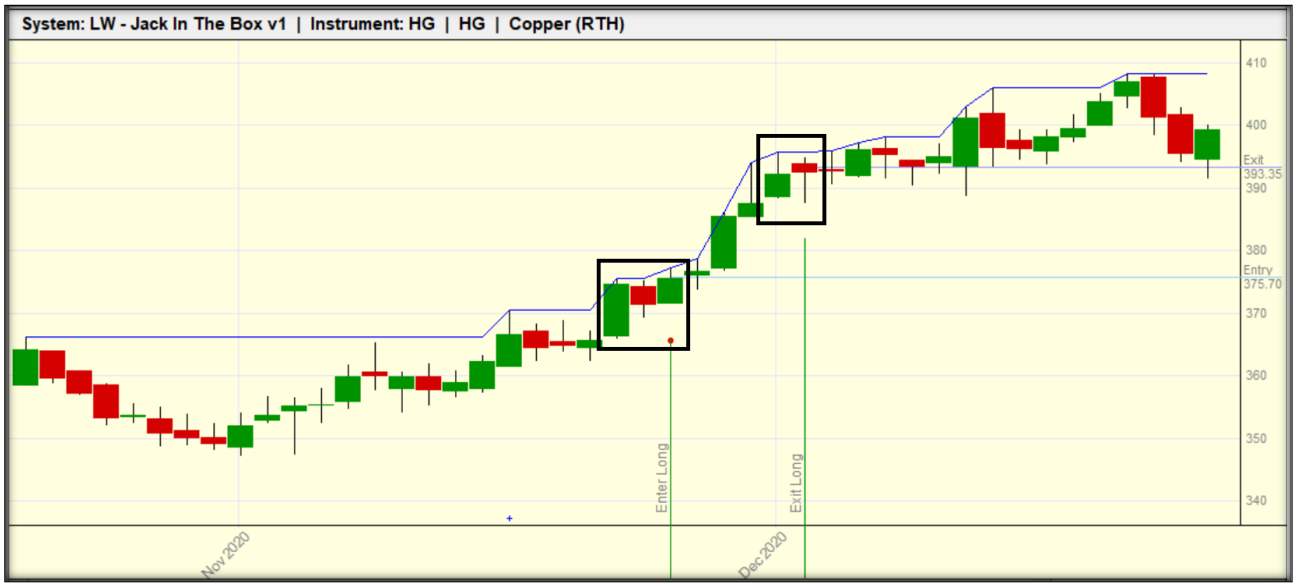
Below are some purchase and sale transactions that allow you to verify the following aspects:

- **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.

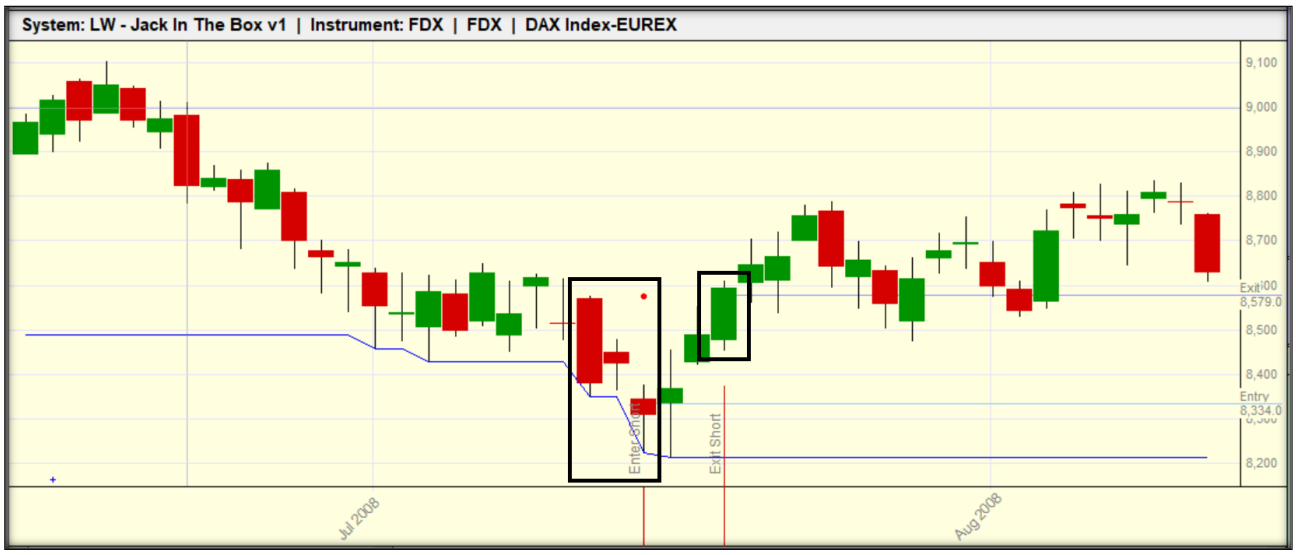
Our first transaction is on a copper futures contract. At the end of November 2020, prices **were in an uptrend, creating the largest candle in 10 days** (the first candle in the left-hand rectangle). This candle also formed **the highest high in 100 days** (Donchian channel). The following day, **prices traded within the price range of the previous candle** (the second candle in the left-hand rectangle), thus **meeting the conditions for setting an order to open a long position.** The following day (the third candle in the left-hand rectangle), **we set a buy stop order one tick above the high of the candle with the largest price range** (the first candle in the left-hand rectangle). **A defensive sell stop order (red dots) was also automatically set** in case a long position was opened. **The position was opened on the day a buy signal was generated** (the third 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 a futures contract for the DAX index. In mid-July 2008, 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). The following day, **prices traded within the price range of the previous candle** (the second candle in the left-hand rectangle), thus **meeting the conditions for setting an order to open a short position.** The following day (the third candle in the left-hand rectangle), **we set a sell stop order one tick below the low of the candle with the largest price range** (the first candle in the left-hand rectangle). **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 the order was placed** (the third candle in the left-hand rectangle). **The system worked correctly.**

The strategy assumes **closing the position after 5 days or when a defensive order is triggered.** The stop loss was triggered on the fourth day after the position was opened (the candle in the right-hand rectangle). **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.

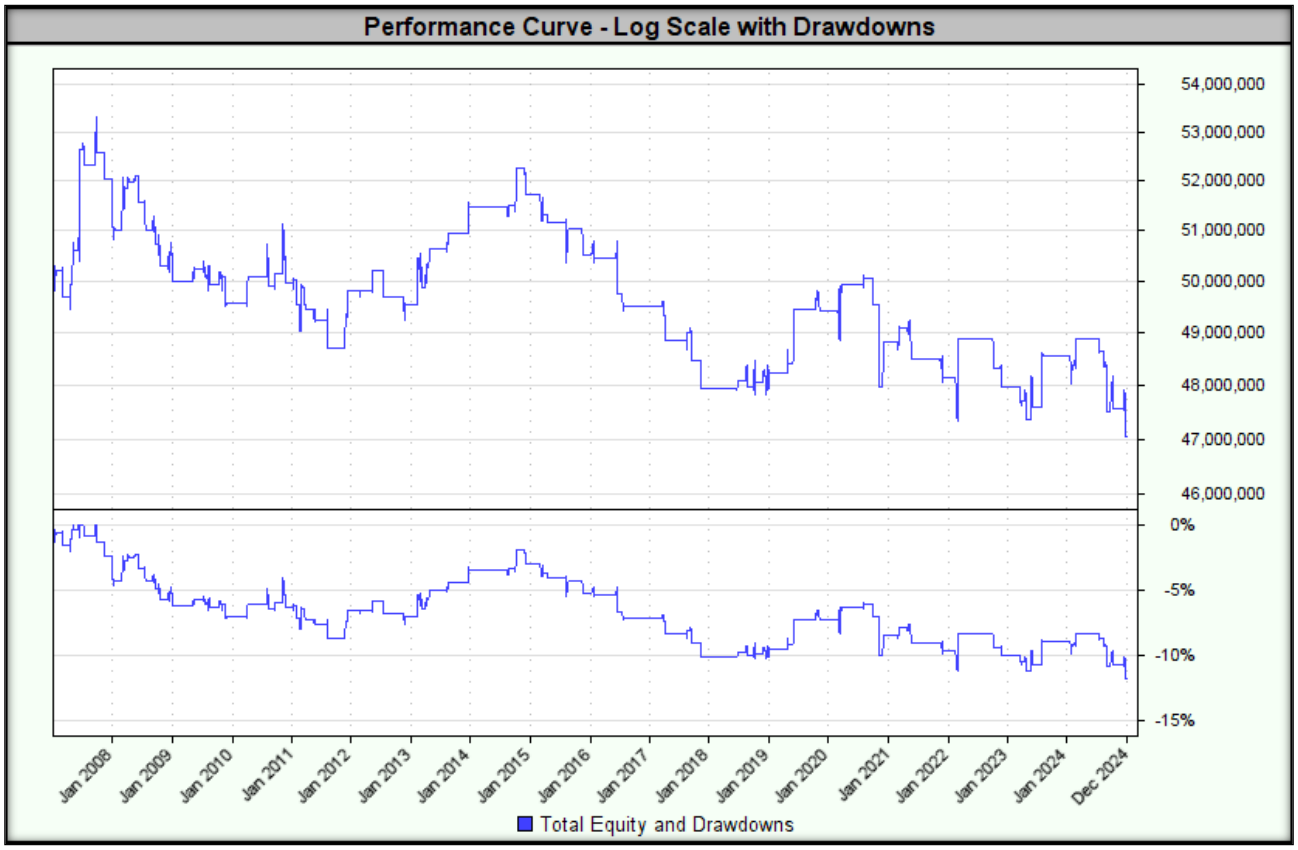
First, **we reject strategies that linearly lose capital.** If a strategy exhibits this pattern, it's a clear signal that any parameter optimization is pointless.

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:** yesterday's high-low must be the largest compared to the last 10 sessions;
- **New Local Top/Bottom:** Yesterday the high/low must form a new 100-day high (for a long position) or low (for a short position);
- **Inside bar candle:** today's candle's quotes move within the price range of the previous candle;
- **Position opening method:** buy/sell stop one tick above/below the high/low of the candle with the widest spread;
- **Order validity:** the order remains active only on the day it is placed;
- **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%	-0.34%
MAR Ratio	-0.03
RAR%	-0.33%
R-Cubed	-0.03
Robust Sharpe Ratio	-0.14
Max Drawdown	11.7%
Wins	46.0%
Losses	54.0%
Average Win%	0.74%
Average Loss%	0.70%
Win/Loss Ratio	1.05
Average Trade Duration (days)	6
Percent Profit Factor	0.89
SQN	-0.12
Number of transactions	137

In summary, the system performed well and generated signals as expected. **However, the strategy's performance was poor, and the number of test transactions was low, making it impossible to draw reliable conclusions. This means that the reliability of this strategy leaves much to be desired, and we are ending testing at this stage and refraining from 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 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.