THEORY OF EDGE

User guide

Studio 1.2.0 for Windows, with MetaTrader 5, cTrader and NinjaTrader 8 · November 2026

From the first launch to a strategy running in MetaTrader 5, cTrader or NinjaTrader 8: one Studio for CFDs and forex (indices, gold, currency pairs) and for CME futures (MNQ, MES, MYM, MGC...). New to automated trading? Read it in order. Experienced? Use the table of contents and the glossary at the end.

1. Requirements
2. Install and activate
3. Install the experts and cBots
4. Export your 1-minute data
5. Your first run
6. The split: IS, Val, OOS
7. Reading the databank
8. Robustness tests
9. First export to MetaTrader 5
10. First strategy in cTrader
11. Portfolio Builder
12. Save, share and re-test
13. Several assets and databank tools
14. Futures: data from NinjaTrader 8
15. Futures: contracts and costs
16. First strategy in NinjaTrader 8
17. Troubleshooting
18. Glossary
19. Limits, help and risk

At a glance

Theory of Edge searches documented strategy families on your own 1-minute data, checks every candidate on periods the search never saw, and hands the result to MetaTrader 5 (a compiled expert), cTrader (one line of text, the genome) or NinjaTrader 8 (a NinjaScript strategy). The data file decides the rest: a CFD export (MT5, cTrader) is traded in lots, in your account currency; a futures export (NinjaTrader 8) is traded in whole contracts, in USD.

Part	What you do there
Export	One expert (MT5), cBot (cTrader) or indicator (NinjaTrader 8) writes the 1-minute bars in a file the Studio reads; MT5 and cTrader add the symbol's costs, futures take theirs from the Studio's CME table.
Training	Pick a data file, one strategy family, a validation split and a budget, start. A genetic search builds the databank.
Databank	The strategies kept at the end of the run, ranked on regularity, with their in-sample (IS), validation (Val) and out-of-sample (OOS) figures.
Robustness tests	Five tests per strategy: noise, against random entries, delays, Monte Carlo on the trades, parameter grid.

Portfolio Builder	Combine strategies, size them in fixed lots (whole contracts for futures) or in % risk, check correlation and a prop-firm challenge, export.
MT5 / cTrader / NT8	A compiled expert per strategy (or one for the portfolio) in MT5; the TheoryOfEdgeAlgo cBot with the genome in cTrader; a NinjaScript strategy per futures strategy in NinjaTrader 8, with its import zip.

The usual path: export your data (section 04, futures: section 14), run (05 to 07), test (08), export (09, 10 or 16), backtest in your platform, then a demo or simulation account, then live.

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01 Requirements

Item	Minimum	Recommended
System	Windows 10, 64-bit	Windows 11, 64-bit
Processor	4 cores	8 cores or more: the engine uses every core
Memory (RAM)	8 GB	16 GB or more
Disk	1 GB free	2 GB or more: a 1-minute export of several years takes 100 MB or more (the XAUUSD file of this guide, April 2017 to November 2026: 170 MB)
Platform	CFD: MetaTrader 5 (desktop) or cTrader (desktop), with 1-minute history for your symbols; a demo account is enough to export and to backtest, and the MT5 export of a strategy compiles it with the MetaEditor of an installed MT5. Futures: NinjaTrader 8 with historical 1-minute data for the contracts you trade (a free NinjaTrader license is enough to export and to backtest).	
Internet	Needed to activate, to rank the databank (the score comes from the license server) and about once an hour; without a connection the license stays valid 72 hours	

No GPU, no .NET installation: everything the Studio needs is in its folder.

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02 Install and activate

1. Download the zip from the link in your e-mail and unzip it anywhere, for example in `Documents`. Do not run it from inside the zip.
2. Run **TheoryOfEdge.exe**. If Windows shows "Windows protected your PC", click **More info**, then **Run anyway**.
3. On the license screen, paste the key from your e-mail (`TOE-XXXX-XXXX-XXXX-XXXX`), read and tick the box, then click **Activate**. Activate stays grey until the box is ticked.

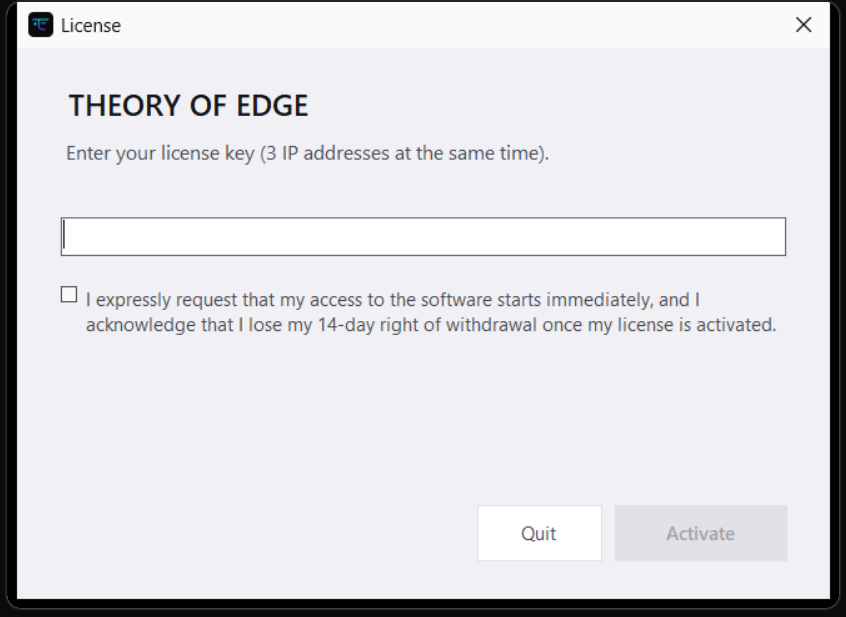


Figure 1. The license screen: the key, the withdrawal box, Activate. The same screen for CFD and futures keys.

- **3 IP addresses at the same time.** A fourth one is refused until another stops; a computer that stopped without closing frees its place after about 2 hours.
- **72 hours offline**, then the Studio asks to reconnect.
- **Change of computer:** click the license in the status bar (bottom right), then **Deactivate this computer**, and activate the key on the new one.

The Studio keeps its results, portfolios, exports and layout in `Documents\Theory of Edge CFD` (the folder of the CFD Studio, kept for every subscriber). To update, unzip the new version and run it: your results stay where they are. The version is shown at the right of the status bar (**Theory of Edge 1.2.0**).

One Studio for CFD and futures subscribers

Since version 1.2.0 there is one Studio and one download. It trains on CFD exports (MT5, cTrader) and on futures exports (NinjaTrader 8), and exports to the three platforms, whatever your subscription.

You are	What to do
A CFD subscriber (Studio CFD 1.1.x)	Unzip 1.2.0 and run it: it reads the license of the CFD Studio, nothing to activate again. Your results and portfolios stay in `Documents\Theory of Edge CFD`.
A futures subscriber (Studio 6.0.0)	Unzip 1.2.0 and run it: on its first start it reads the license of the futures Studio on this computer, same key, nothing to activate again (on another computer, paste your key as usual). Your old runs and portfolio stay in `Documents\Theory of Edge` : databank **…** menu (or the Portfolio Builder's **More** menu), **Import from the previous futures Studio…** copies them in. That folder is only read; nothing is overwritten.
A new subscriber	Paste the key from your e-mail on the license screen.

The previous Studios can stay on the computer; you no longer need them. Your strategies already running in NinjaTrader 8 keep working: the 1.2.0 exports add new ones beside them (section 16).

03 Install the experts and cBots

MetaTrader 5

1. In MetaTrader 5: **File > Open Data Folder**, then `MQL5\Experts`; create a folder `TheoryOfEdge`.
2. Copy into it the two files of the zip's `MetaTrader 5` folder: `TheoryOfEdgeEA.ex5` (runs a genome) and `TheoryOfEdgeExport.ex5` (exports the data).
3. In the **Navigator**, right-click **Expert Advisors > Refresh**.

cTrader

1. Double-click `TheoryOfEdgeAlgo.algo`, then `TheoryOfEdgeExport.algo` (zip folder `cTrader`). cTrader installs each one in **Algo > cBots**.

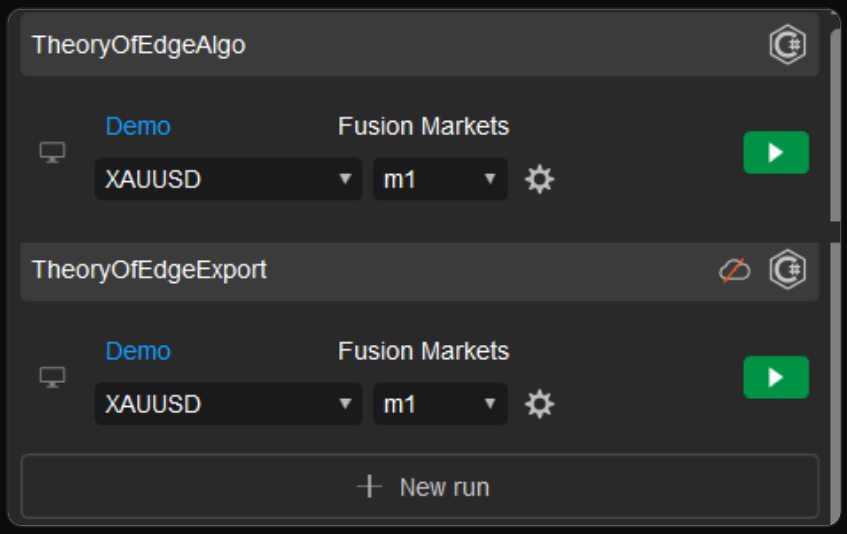


Figure 2. The two cBots in cTrader, Algo > cBots, each with one instance on XAUUSD m1 (account numbers hidden).

> **Updating a cBot.** cTrader can lose a cBot it is asked to overwrite. To install a new version: close cTrader, delete the old `.algo` in `Documents\cAlgo\Sources\Robots`, start cTrader, then double-click the new file.

NinjaTrader 8

The zip's `NinjaTrader 8` folder holds one file, `TheoryOfEdgeExport - NinjaScript import.zip`: the indicator that exports your futures data. Do not unzip it.

1. In NinjaTrader 8: **Control Center > Tools > Import > NinjaScript Add-On...**
2. Pick `TheoryOfEdgeExport - NinjaScript import.zip` and confirm. NinjaTrader compiles it by itself. If it says a file already exists (the indicator of the previous futures Studio), accept the replacement.

The strategies do not come with the zip: each one comes from the Studio's own NinjaTrader 8 export, with its own import zip (section 16).

04 Export your 1-minute data

Each export plays a period in your platform's tester and writes two files: `SYMBOL_M1_date.csv` (every 1-minute bid bar, close time converted to Chicago time, the engine's clock) and `SYMBOL_M1_date.spec.json` (tick size, value of one point for one lot, commission, median spread of the period). Export from the broker you will trade with: a strategy depends on its data.

MetaTrader 5: Strategy Tester

1. Open the **Strategy Tester** (Ctrl+R), expert **TheoryOfEdge\TheoryOfEdgeExport**, your symbol (for example XAUUSD), the dates you want.
2. Modelling: **Every tick based on real ticks** gives the real, varying spread. "1 minute OHLC" is faster but feeds the tester's fixed spread: the Studio then flags the spread and asks for yours.
3. Input **ServerMinusChicago**: **8** for the usual servers on New York time + 7 (GMT+2 in winter, GMT+3 in summer). Check with your broker if its server uses another clock.
4. Click **Start**. At the end, the Journal shows the number of bars, the first bar and the median spread.

Files go to `%APPDATA%\MetaQuotes\Terminal\Common\Files\TheoryOfEdge\data`, where the Studio looks. MetaTrader 5 does not give the commission of a symbol: the file says "not exposed by MT5", the Studio shows **Commission unknown** and asks you to enter yours (Costs). Attached to a normal chart, TheoryOfEdgeExport does nothing and prints "run it in the Strategy Tester, over the period to export".

cTrader: Backtesting

1. In **Algo**, select **TheoryOfEdgeExport**, open its **Backtesting** tab, choose the symbol and the dates (any timeframe: the export always reads 1-minute bars).
2. Data **Tick data** gives the real spread; "m1 bars" feeds a fixed spread, flagged in the same way.
3. Parameter **Output folder**: empty = `Documents\TheoryOfEdge\data`, where the Studio looks.
4. Click **Start**. At the end, the log shows the file.

cTrader gives the commission: it is in the file. Some brokers keep 1-minute bars only from a given year: start the export where 1-minute bars exist.

Futures (NinjaTrader 8): the TheoryOfEdgeExport indicator on a 1-minute chart, section 14.

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05 Your first run

The **Training** page has the **Setup** panel on the left, the strategy sheet at the top and the databank below. The setup has eight sections; each shows its summary when closed.

Data

Every export of the three data folders, one card each: instrument, platform tag (**MT5**, **cTrader** or **NT8**), export date, size, and warnings such as **Commission unknown** (a futures export shows **Built-in costs**, section 15). The refresh button reads the folders again after a new export; **Remove older exports** keeps the newest export of each instrument and platform and sends the others to the Recycle Bin.

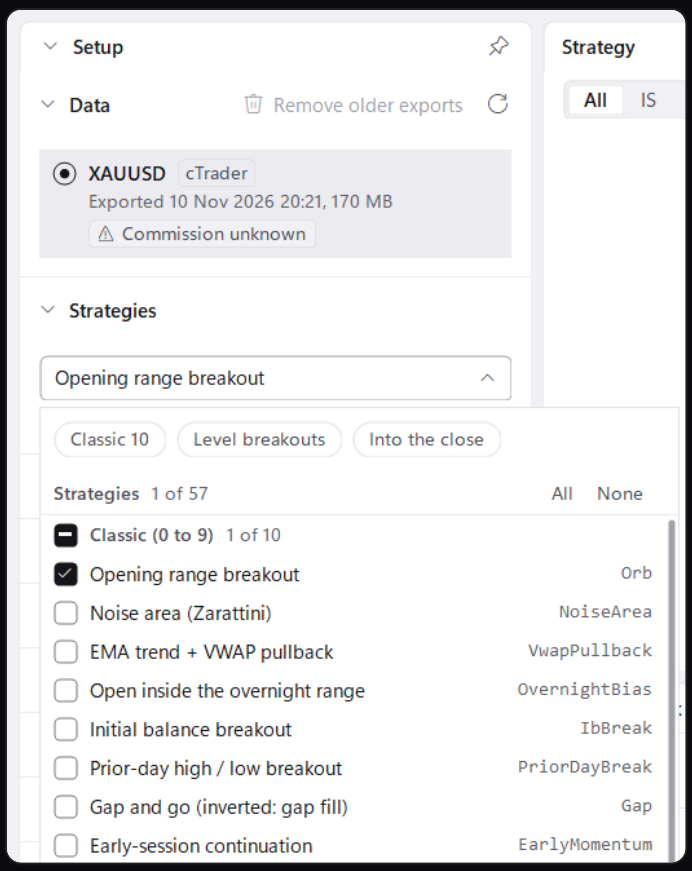


Figure 3. Data and Strategies: one family checked, Opening range breakout (Orb).

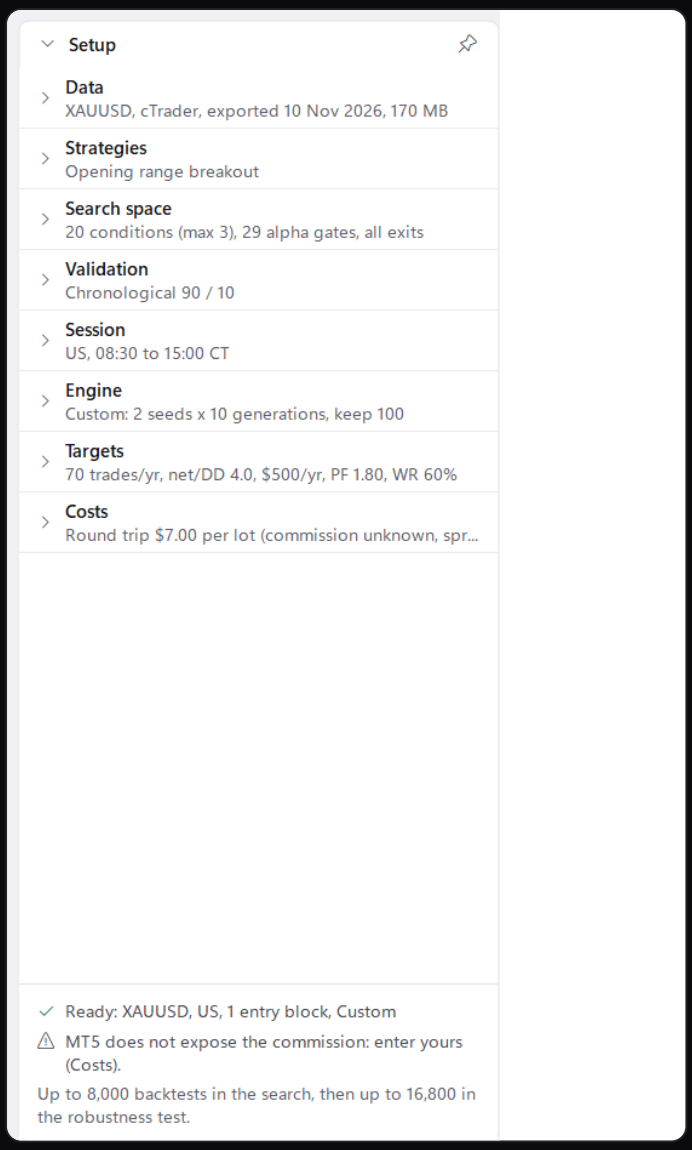


Figure 4. The setup of the demonstration run, closed sections and the readiness footer.

Strategies

The documented entry families the search works on: **57 entry blocks** in four groups, Classic (0 to 9), Extended (10 to 16), Added (17 to 27) and Patterns (28 to 56), each with its code on the right. Three presets fill the list (**Classic 10**, **Level breakouts**, **Into the close**). **Check one family to start**: it is the fastest way to a databank; try the others afterwards, one by one. Nothing is checked by default, and Start stays disabled until one is.

Search space

What the search may add to an entry: conditions (20, at most 3 per strategy by default), alpha gates (29), exits, trailing stops, stop and limit entry orders, trades per day. **Edit search space** (Ctrl+Shift+S) opens the list.

Validation

How the history is split. Section 06 explains it; the defaults are the recommended ones.

Session

US 08:30 to 15:00, **EU** 02:00 to 10:30, **ASIA** 18:00 to 00:30, Chicago time (CT). Each session is its own market.

Engine

Preset	Seeds x generations, strategies kept
Fast	1 x 20, keep 50
Standard (default)	3 x 40, keep 100
Deep	5 x 80, keep 100
Custom	Seeds 1 to 20, Generations 1 to 1,000, Strategies kept 1 to 1,000

Each seed is an independent genetic run (4 islands of 50 strategies); after each seed, 10 waves keep the best strategy of each kind (the map of strategy kinds). The section shows the budget before you start.

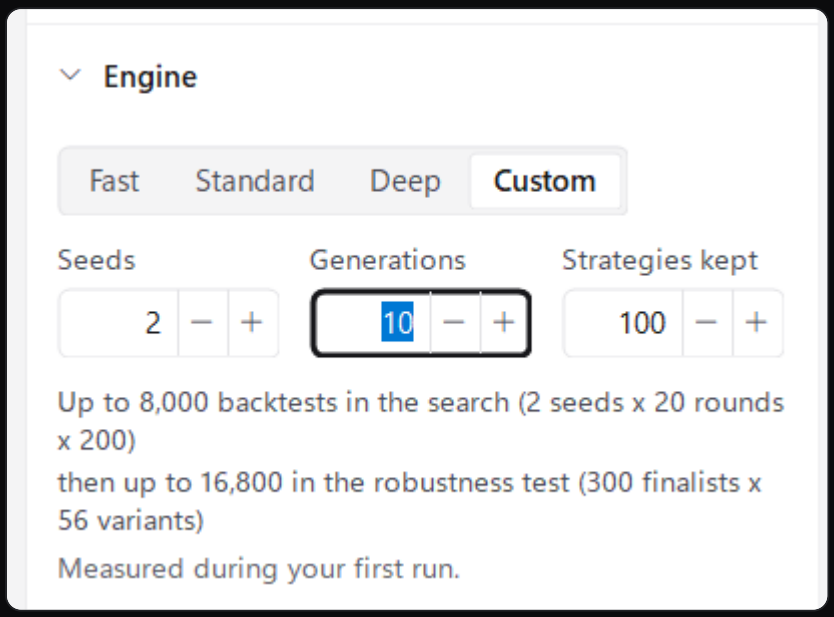


Figure 5. Engine, Custom: 2 seeds x 10 generations, keep 100, "up to 8,000 backtests in the search (2 seeds x 20 rounds x 200), then up to 16,800 in the robustness test (300 finalists x 56 variants)".

Targets

What the search's fitness aims at, on the in-sample sessions only: trades per year (70), net / max drawdown (4.0), net $ per year (500), profit factor (1.80), win rate (60%). **Reset to Studio defaults** brings these values back. Scores of runs with different targets are not comparable.

Costs

Commission per lot per side (account currency; empty = the export's value, which MT5 does not give) and **Spread (price units)** (empty = the export's measured spread; written next to the data file at Start). Slippage is fixed at 1 tick per side. The section shows the round trip per lot: on the XAUUSD export of this guide, $7.00 per lot (spread 0.05, slippage 2 ticks, commission not entered).

Start

The footer lists what is missing (red) and the warnings (orange). When it reads **Ready**, click **Start training** (F5). The databank fills while the engine runs; **Stop** (Shift+F5) ends the run early.

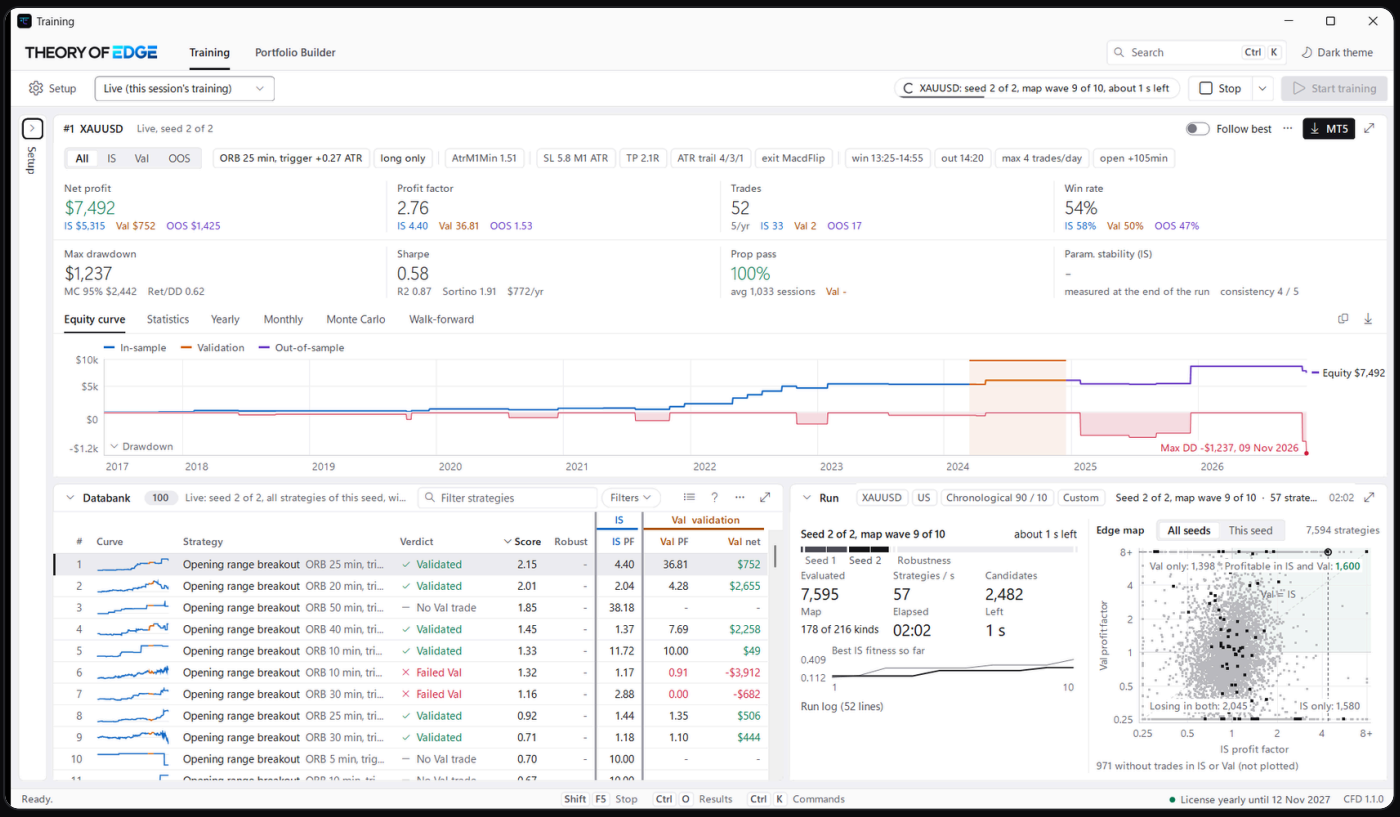


Figure 6. A run in progress (demonstration run: XAUUSD, US, Orb, 2 seeds x 10 generations). Top bar: seed 2 of 2, map wave 9 of 10. Run pane: evaluated, strategies per second, candidates, elapsed, best IS fitness, and the edge map (IS against Val profit factor of every strategy evaluated). During the run the databank lists all strategies of the seed, winners and losers. Hypothetical backtest.

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06 The split: IS, Val, OOS

The Studio cuts your history into three periods, in time order:

Period	Colour	Role
IS, in-sample	blue	The sessions the search optimizes on. The fitness reads only them.
Val, validation	orange	Held out from the search. Gives each strategy its verdict and enters the databank score at the end of the run.
OOS, out-of-sample	purple	The last sessions of the study (20% by default), or the first ones with **OOS at the start**. Never read to search, filter, rank or select: shown for information, a test the databank has never seen.

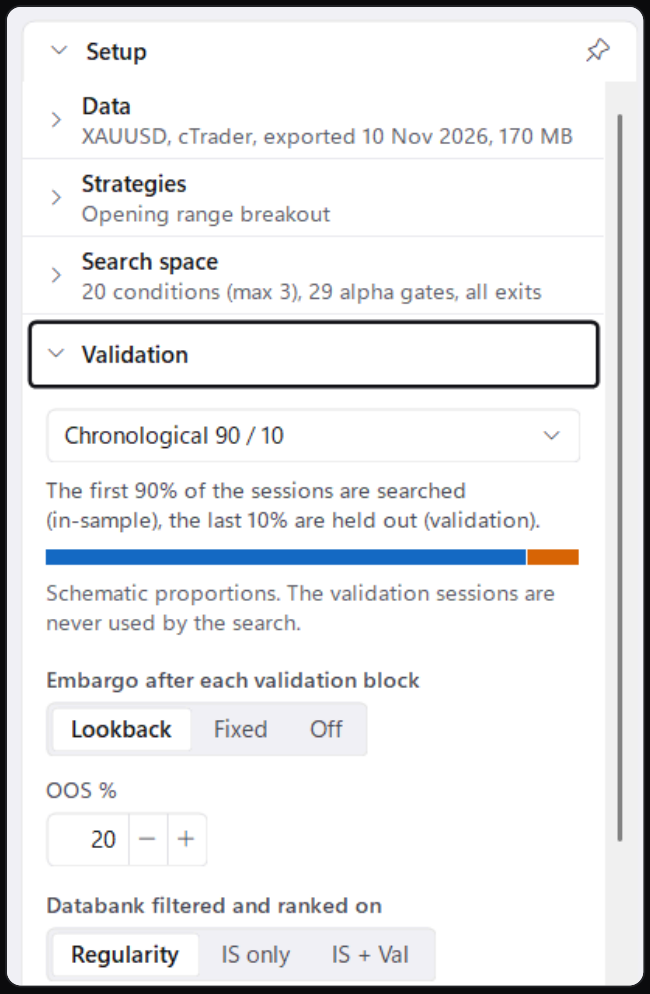


Figure 7. Validation, the defaults: Chronological 90 / 10, embargo Lookback, OOS 20%, ranked on Regularity.

Validation scheme

Chronological 90 / 10 (default) or **70 / 30**: the first part searched, the rest validation. **Interleaved 15 / 5** or **25 / 5**: searched and held-out blocks alternate. Two custom schemes: a chronological split with your IS % (10 to 90), or 2 to 20 interleaved Val blocks totalling 10 to 50%.

Embargo

Lookback (default): an in-sample session whose indicators read a validation session is left out of that strategy's in-sample figures, so no in-sample decision sees validation prices (Lopez de Prado 2018, ch. 7). **Fixed**: the same number of sessions (0 to 500) after each validation block. **Off**: no embargo.

OOS %

0 to 50. The section measures the split on your file: for the XAUUSD export of this guide, "IS 1760 sessions, Val 196, OOS 489", the embargo leaving out 0 IS sessions.

OOS position

OOS at the end (default) or **OOS at the start**: with the OOS at the start, the first sessions of the history are the OOS, IS and Val come after them, and the IS and Val sessions whose indicators would read OOS prices are left out (at least each strategy's lookback), so the purple band sits on the left of every curve.

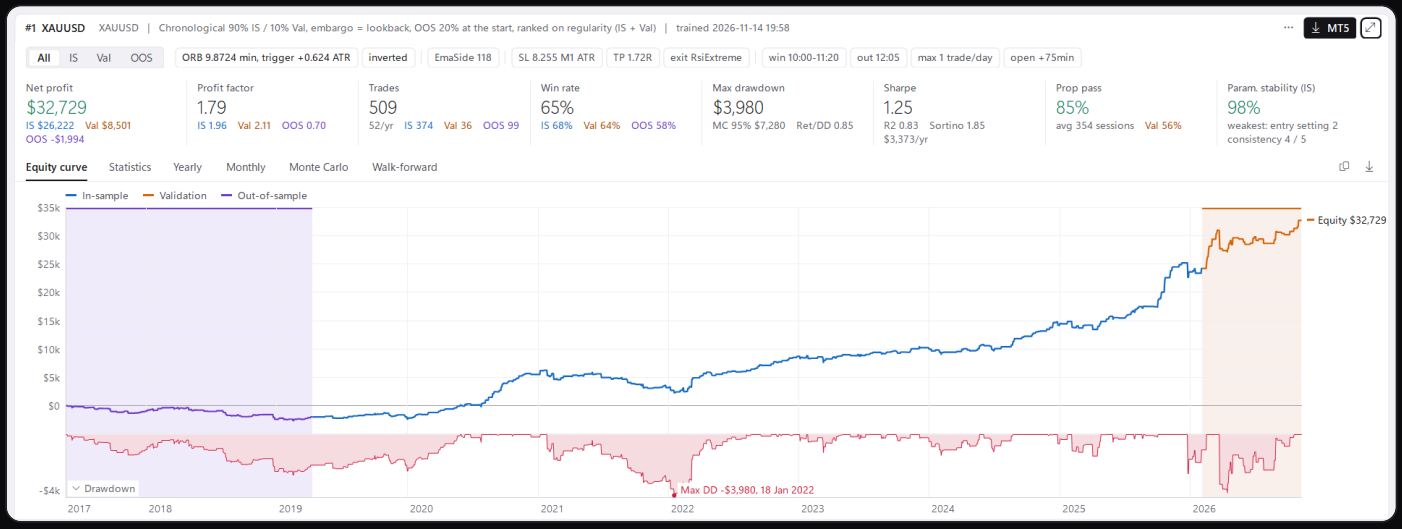


Figure 8. OOS at the start (demonstration run: XAUUSD, US, Orb, 1 seed x 5 generations, OOS 20%): the purple OOS band on the left of the curve, 2017 to 2019, then IS in blue and Val in orange. Hypothetical backtest.

Databank filtered and ranked on

- **Regularity** (default). Strategies profitable in-sample, ranked at the end of the run on the regularity of the IS + Val curve: the t of its daily results times its R2. The OOS is never read to rank or select.
- **IS only**: profitable in-sample, ranked on the in-sample score; Val is shown, never used.
- **IS + Val**: profitable in-sample and in validation, ranked on the full IS + Val curve (the historical behaviour).

> The OOS stays a test the databank has never seen: compare its figures with the IS and Val ones. The robustness tests (section 08), a backtest on real ticks in your platform and a demo account are the checks that come after.

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07 Reading the databank

At the end of the run the databank shows the strategies kept (100 here), ranked on the regularity of the IS + Val curve; the OOS figures are shown, never used to choose. The run is saved in `results`; the list at the top (Ctrl+O) reopens any run.

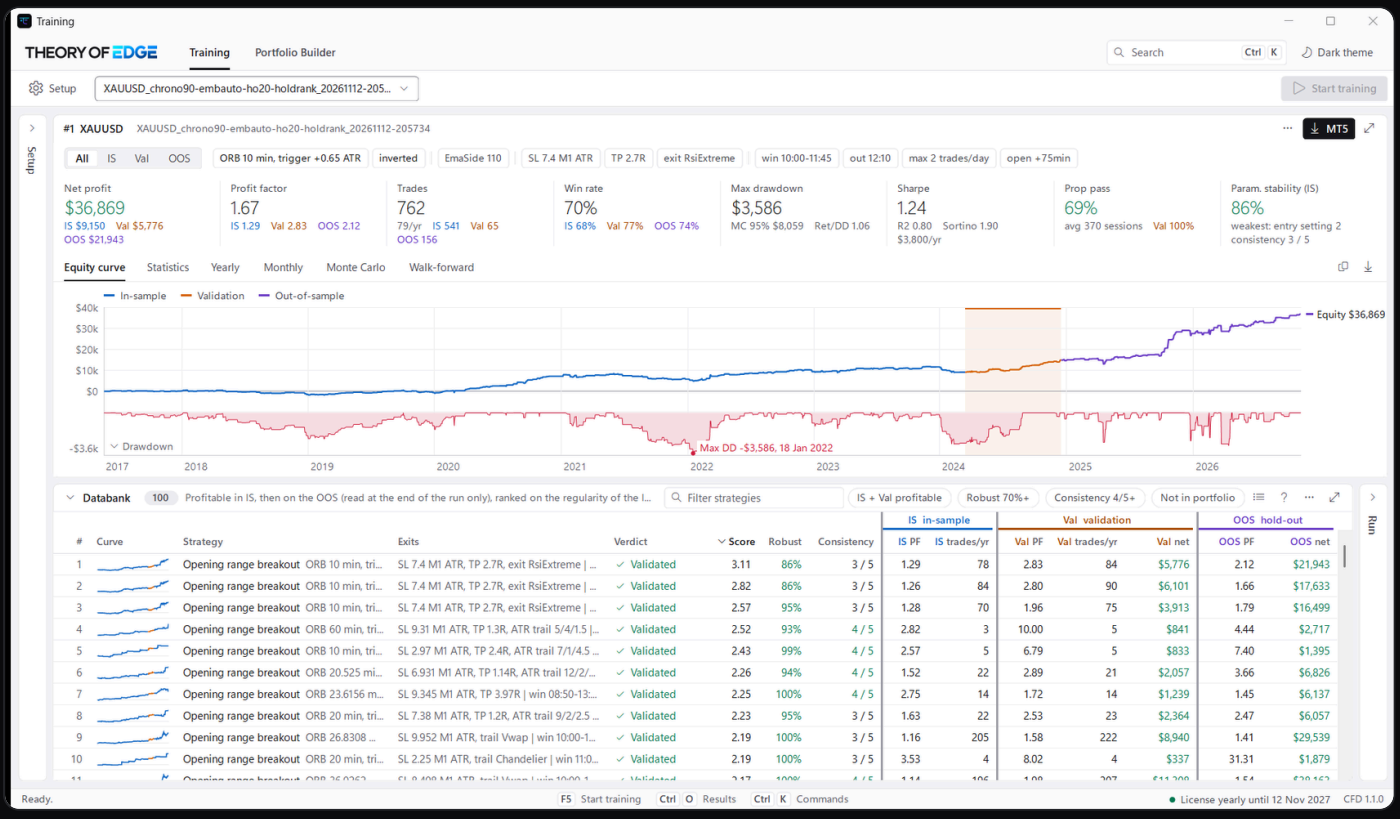


Figure 9. The end of the demonstration run, setup hidden: strategy #1 on top, the databank below with the IS, Val and OOS column bands. Hypothetical backtest on historical data.

The strategy sheet

Click a row to show it above. The chips are the strategy's rules (entry, conditions, stop, target, trail, exit, window). **All / IS / Val / OOS** switches the period of every figure. Each figure shows its IS, Val and OOS parts underneath. Tabs: **Equity curve** (IS blue, Val orange, OOS purple, drawdown below), **Statistics**, **Yearly**, **Monthly**, **Monte Carlo**, **Walk-forward**. The **...** menu: Add to portfolio, Robustness tests..., Copy genome, Pin this curve. **MT5** exports the strategy (section 09).

Columns

Column	Meaning
Verdict	**Validated** = profitable in Val; **Failed Val** = lost money in Val; **No Val trade** = no trade in Val (not validated).
Score	Regularity of the IS + Val curve: the t of its daily results (average day over the spread of the days, times the square root of the sessions) times the R2 of the curve. Computed by the license server at the end of the run; "..." while it is pending.
Robust	Median in-sample score of the neighbouring settings, divided by the strategy's own (end of the run). 100% = the settings around it do as well.
Consistency	Profitable periods out of 5 equal chronological slices of the study.
IS PF, trades/yr, R2	Profit factor, trades per year and R2 of the curve, in-sample.
Val PF, trades/yr, t-stat, net	The same on the validation period, its t-statistic and its net.
OOS PF, OOS net	Profit factor and net on the out-of-sample (hold-out).
Net, Max DD, DSR	Hidden by default (Columns button): full net, max drawdown, deflated Sharpe ratio.

Filters: **IS + Val profitable**, **Robust 70%+**, **Consistency 4/5+**, **Not in portfolio**; the **?** button explains every column. Select rows to **Compare** (2 to 8), **Copy genomes**, **Add to portfolio** (Enter) or **Remove**; right-click for **Export to MT5 (.ex5)...**.

> What to look for: Val and OOS figures that look like the IS ones, enough trades per year, a high Robust, a consistency of 4 or 5 out of 5, and a curve without one lucky jump. The demonstration run is short (2 seeds x 10 generations): its databank holds near copies (rows 1 to 3 are the same entry with close settings).

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08 Robustness tests

Strategy sheet, **... > Robustness tests...** (in the Portfolio Builder: on the selection or the whole portfolio). **Run all** runs the five tests; **Settings...** changes the runs, the seed and every threshold. No test changes the strategy: they backtest it again or re-price its trades.

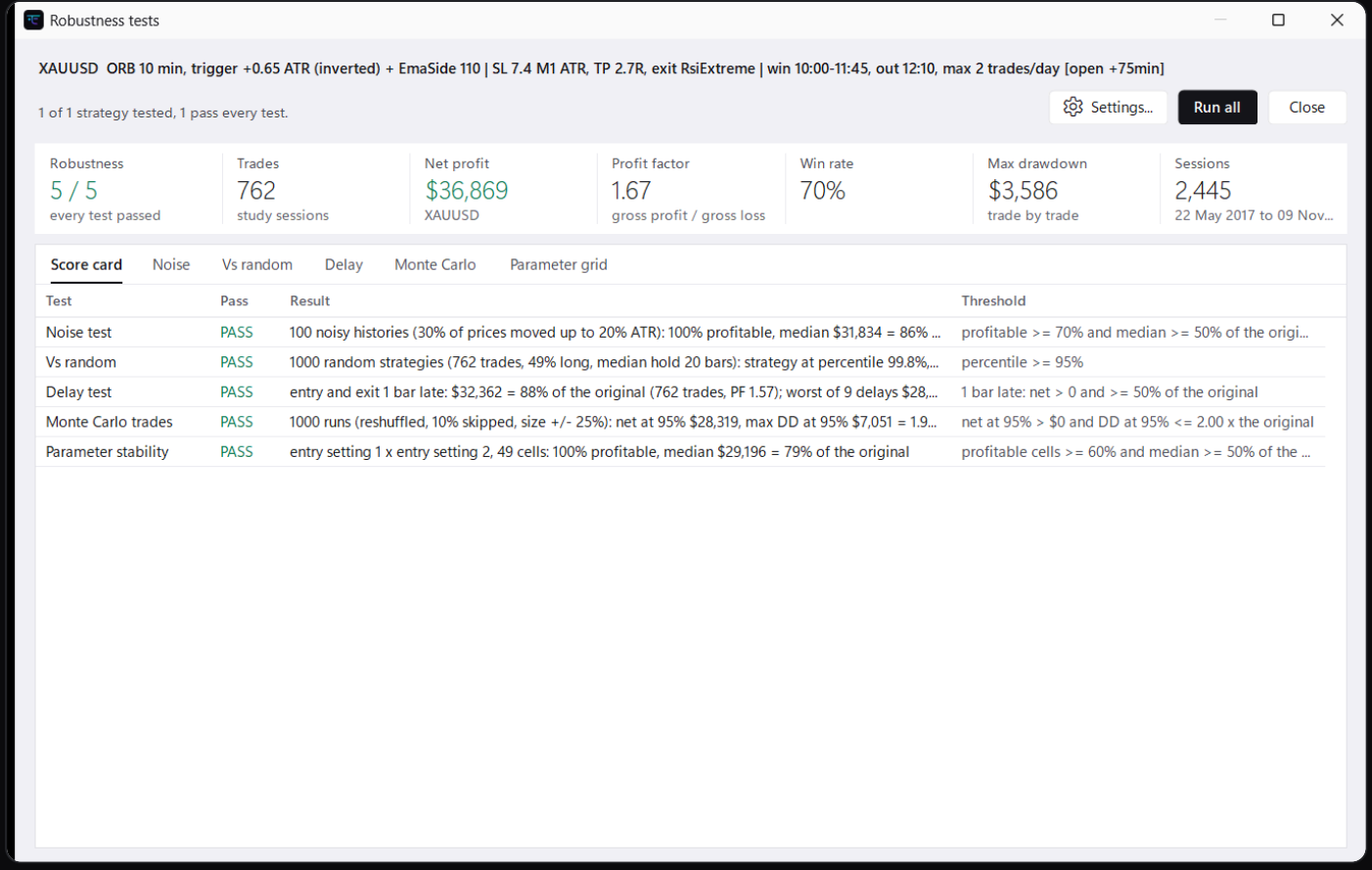


Figure 10. The score card of strategy #1 of the demonstration run: 5 / 5, every test passed.

Test	What it does (default settings)	Passes when
Noise	100 noisy histories: 30% of the open / high / low / close prices moved by up to 20% of the 1-minute ATR (Build Alpha Noise Test)	70% or more profitable and median 50% or more of the original
Vs random	1,000 random strategies with the same trade count, long share and holding time (Aronson 2007, ch. 5)	the strategy at percentile 95% or more
Delay	entry and / or exit 1 to 3 bars late (9 delays)	1 bar late: net above 0 and 50% or more of the original
Monte Carlo	1,000 runs: trades reshuffled, 10% skipped, size +/- 25% (StrategyQuant X)	net at 95% above $0 and drawdown at 95% at most 2.00 x the original
Parameter grid	two settings around the strategy's own, 7 x 7 = 49 backtests (Walton 2014)	60% or more of the cells profitable and median 50% or more of the original

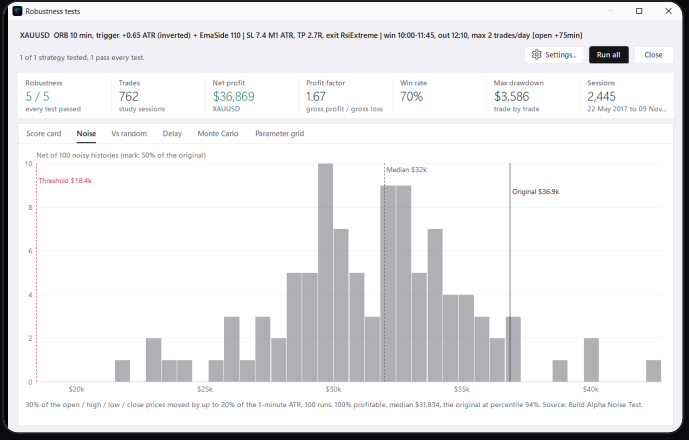


Figure 11. Noise: the net of 100 noisy histories, the threshold, the median and the original.

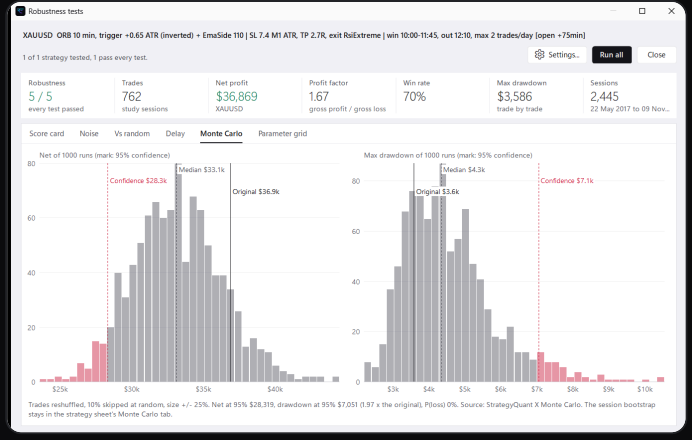


Figure 12. Monte Carlo: net and max drawdown of 1,000 runs, 95% confidence marks.



Figure 13. Parameter grid: entry setting 1 x entry setting 2, the strategy framed in the centre. Columns and Rows choose the two settings, Recompute backtests the grid again.

Size your account on the Monte Carlo drawdown at 95%, not on the drawdown of the single backtest.

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09 First export to MetaTrader 5

1. Select a strategy, click **MT5** on the strategy sheet (or right-click rows of the databank, **Export to MT5 (.ex5)...**).
2. Check the **Folder** (default: `exports\mt5` of the Studio's folder; the Studio never writes into a terminal folder), the **Magic base** (strategy Sn trades with Magic + n; every expert on one account needs its own numbers), **Server time minus Chicago time** (8 for most MT5 brokers) and **Close before the market close** (30 s).
3. Optional: Product info (name, author, link, version, description, icon), written in the expert's `#property` lines.
4. Click **Export**. The Studio writes the files listed under "Will be written" and compiles the expert with the MetaEditor of your MT5.

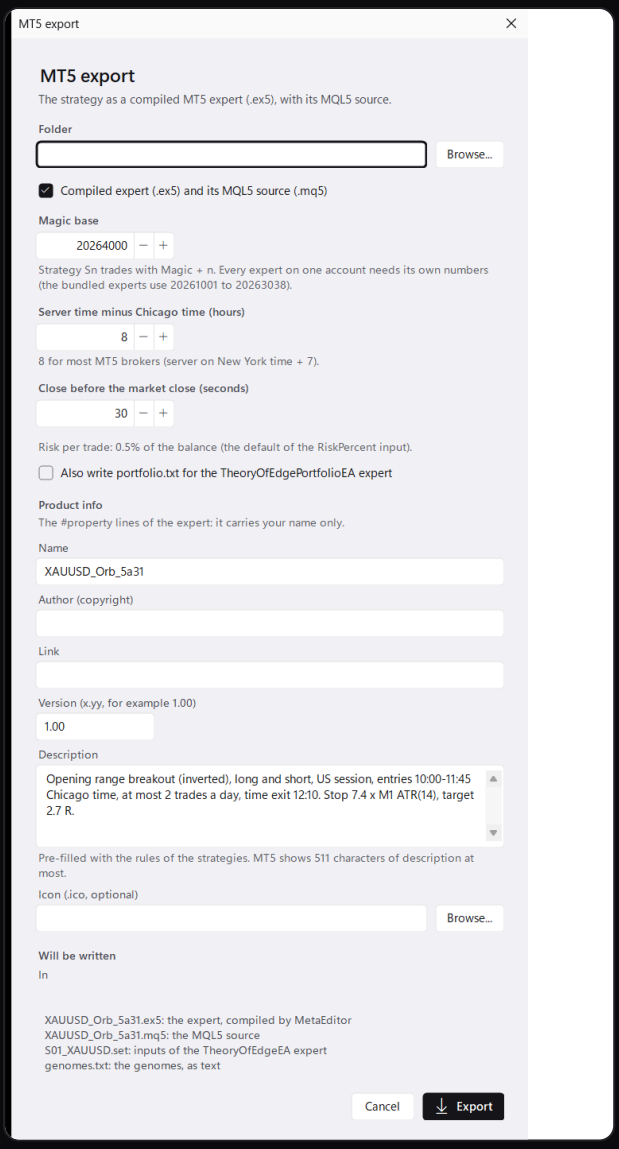


Figure 14. The MT5 export of strategy #1 (folder path hidden).

What you get

File	Content
XAUUSD_Orb_5a31.ex5	The expert, compiled by MetaEditor (here: 0 errors, 0 warnings)
XAUUSD_Orb_5a31.mq5	Its MQL5 source, self-contained, with the rules in plain English at the top
S01_XAUUSD.set	Inputs for the generic TheoryOfEdgeEA expert
genomes.txt	The genome, as text

The name is symbol, entry block and a hash of the genome. If no MetaEditor is found, the Studio writes the .mq5 and says so: open it in MetaEditor and compile it.

In MetaTrader 5

1. Copy the `.ex5` into `MQL5\Experts` (File > Open Data Folder), Navigator > Refresh.
2. Open an **M1** chart of the symbol the strategy was trained on, at the broker of the data, drag the expert onto it, enable **Algo Trading**.
3. Inputs: **LotMode** *Fixed* (**FixedLot**, 0.01 by default) or *Auto (% risk)* (**RiskPercent** of the balance at the strategy's stop, 0.5 by default, at least the minimum lot), **Magic**, the USD news filter, the equity curve filter.

On start the expert loads the history it needs and replays it without trading. Several strategies on the same symbol need a **hedging** account. The generic **TheoryOfEdgeEA** of the zip runs any genome: paste it in **Genome**, plus ServerMinusChicago (8) and the close before the market close (30 s).

> **Backtest first, on real ticks.** In the MT5 tester choose **Every tick based on real ticks**. "1 minute OHLC" fills stops at the worst price of the bar.

10 First strategy in cTrader

cTrader runs the genome through the **TheoryOfEdgeAlgo** cBot (the Studio's own core is compiled into it; it needs no file access and runs locally or in the cTrader cloud).

1. In the databank, select the strategy and press **Ctrl+C** (Copy genome), or use **... > Copy genome** on the strategy sheet. The genome is one line, for example `E=Orb;P1=10;P2=0.65;INV=1;DIR=Both;F1=EmaSide:110;...;U=Atr`.
2. In cTrader, add an instance of **TheoryOfEdgeAlgo** on the symbol the strategy was trained on, timeframe **m1**.
3. Parameters: **Genome** (paste), **Lot mode** *Fixed* or *AutoRisk* (% risk), **Fixed lot** (0.01 by default), **Risk per trade, % of the balance** (0.5 by default), **Label** (a different one per strategy), **Close before market close** (30 s).
4. Backtest it first (data **Tick data**), then press Play on a demo account.

---

11 Portfolio Builder

1. In the databank, select strategies and click **Add to portfolio** (Enter). The tab shows their count.
2. In **Portfolio Builder**, switch each strategy on or off and set its lots.
3. Read the band: return, risk (max drawdown and its Monte Carlo 95%), diversification (average correlation, drawdown against the sum of the drawdowns) and the prop-firm pass rate.

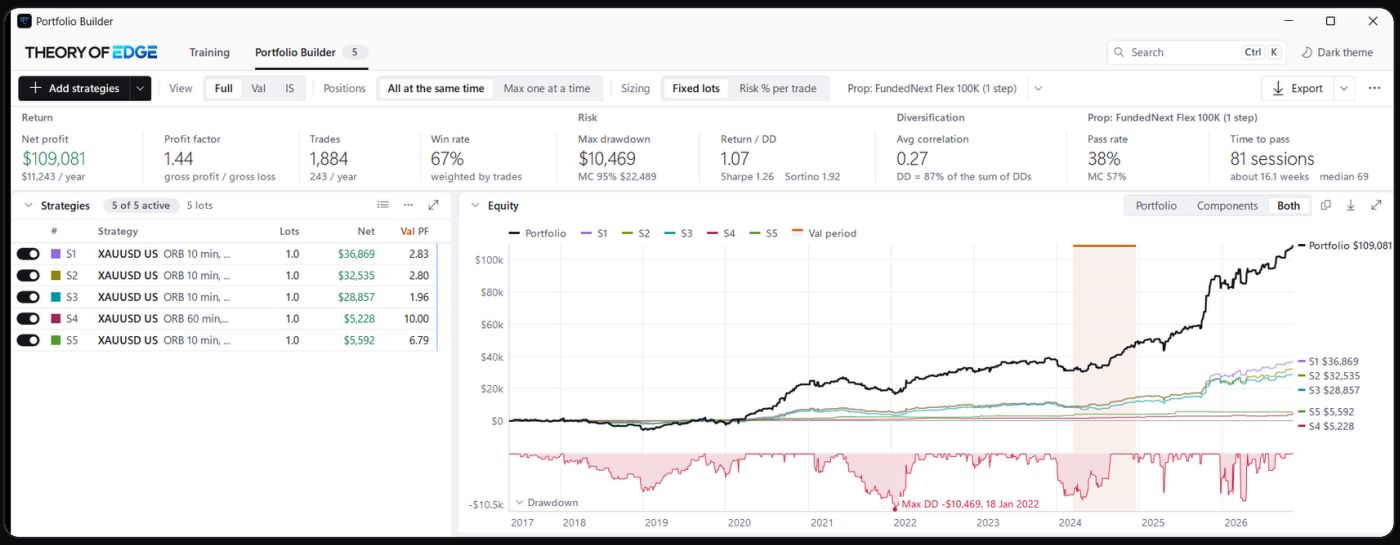


Figure 15. The five first strategies of the demonstration databank, fixed lots. Rows 1 to 3 are near copies of one strategy: the Analysis > Correlation tab shows r = 0.86 to 0.94 between them. Hypothetical backtest.

Control	What it does
View	Full, Val or IS period.
Curves	Portfolio, Components or Both. In Components, a click on a curve selects its strategy in the list and shows its number on the curve; a click beside the curves releases the selection.
Positions	**All at the same time**, or **Max one at a time**.

Sizing	**Fixed lots**, or **Risk % per trade** with a starting capital: each trade risks that % of the balance at its stop. This risk becomes the default RiskPercent of the exported MT5 experts.
Prop	A prop-firm preset or **Custom** rules: the Studio replays the challenge from many past start dates and shows the pass rate and the time to pass.
Analysis	Correlation, Statistics, Yearly, Monthly, Monte Carlo, Prop.
Export	CSV, Equity PNG, Copy image, **MT5 expert (.ex5, .mq5, .set)**, Copy all genomes.

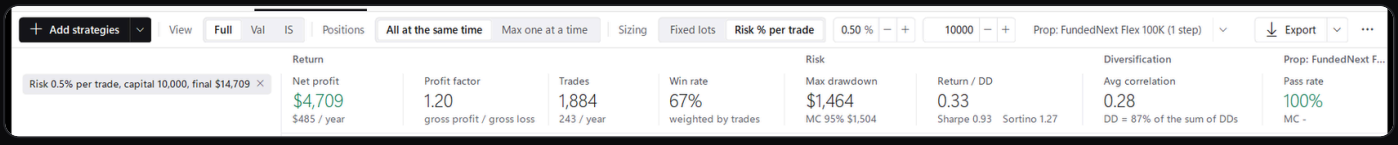


Figure 16. Sizing: Risk % per trade, 0.50% of a 10,000 capital.

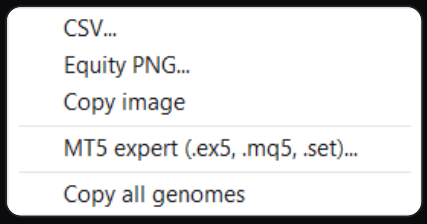


Figure 17. The Export menu of the portfolio.

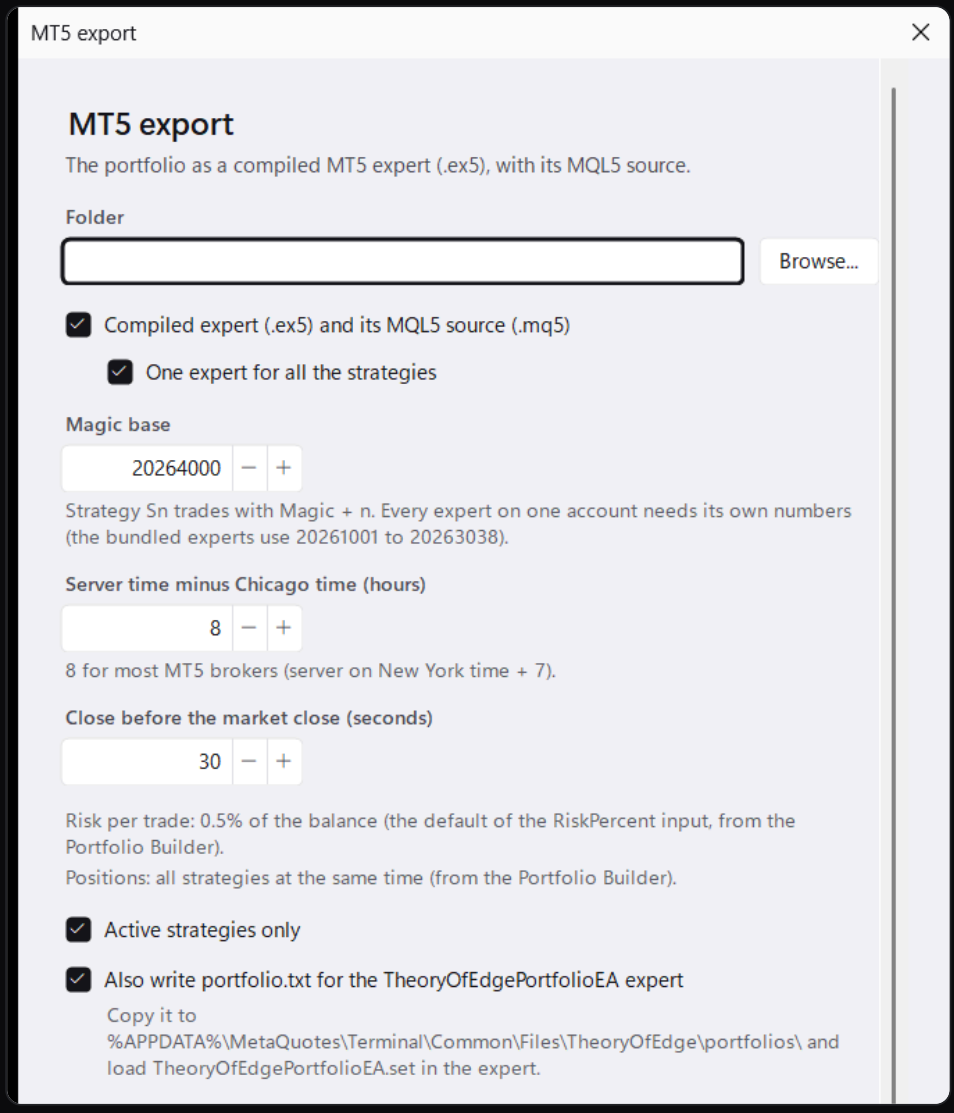


Figure 18. MT5 export of the portfolio: one expert for all the strategies, active strategies only, and portfolio.txt for the TheoryOfEdgePortfolioEA expert (folder path hidden).

12 Save, share and re-test

A databank or a portfolio fits in one **.toebank** file: keep it, open it later or on another computer, and re-test its strategies on newer data.

Command	Where	What it does
Export databank...	Databank, **...** menu	The results file of the run shown: every strategy and its genome, the settings, the split, the costs and the creation dates.
Export portfolio (.toebank)...	Portfolio Builder, **Export** menu	The portfolio: strategies, lots, curves, creation dates and the costs of each strategy's run.
Import...	Databank **...** menu; Portfolio Builder **More** menu	The run goes to your results folder and opens like your own runs (Ctrl+O); the portfolio goes to your portfolios folder and the Portfolio Builder offers to add its strategies. Nothing is overwritten: a name already taken gets -2, -3.
Re-test all on the latest data	Databank **...** menu; Portfolio Builder **More** menu	Every strategy backtested again on the newest data file of its instrument, with the costs of its run.

A .toebank file holds no prices, no license and no key. To train another model on the same settings, open the run and click **Use these settings** in the run pane.

Re-test two weeks later

1. Export the bars of the instrument again (section 04). The Studio always uses the newest data file of each instrument.
2. Open the run (Ctrl+O), or the Portfolio Builder, then **Re-test all on the latest data**.
3. Read the curve. IS, Val and OOS stay on the dates the strategies were created on. The grey band, **After creation**, is the new data: it was never used to create, filter or rank them. Every figure is computed on the whole test.

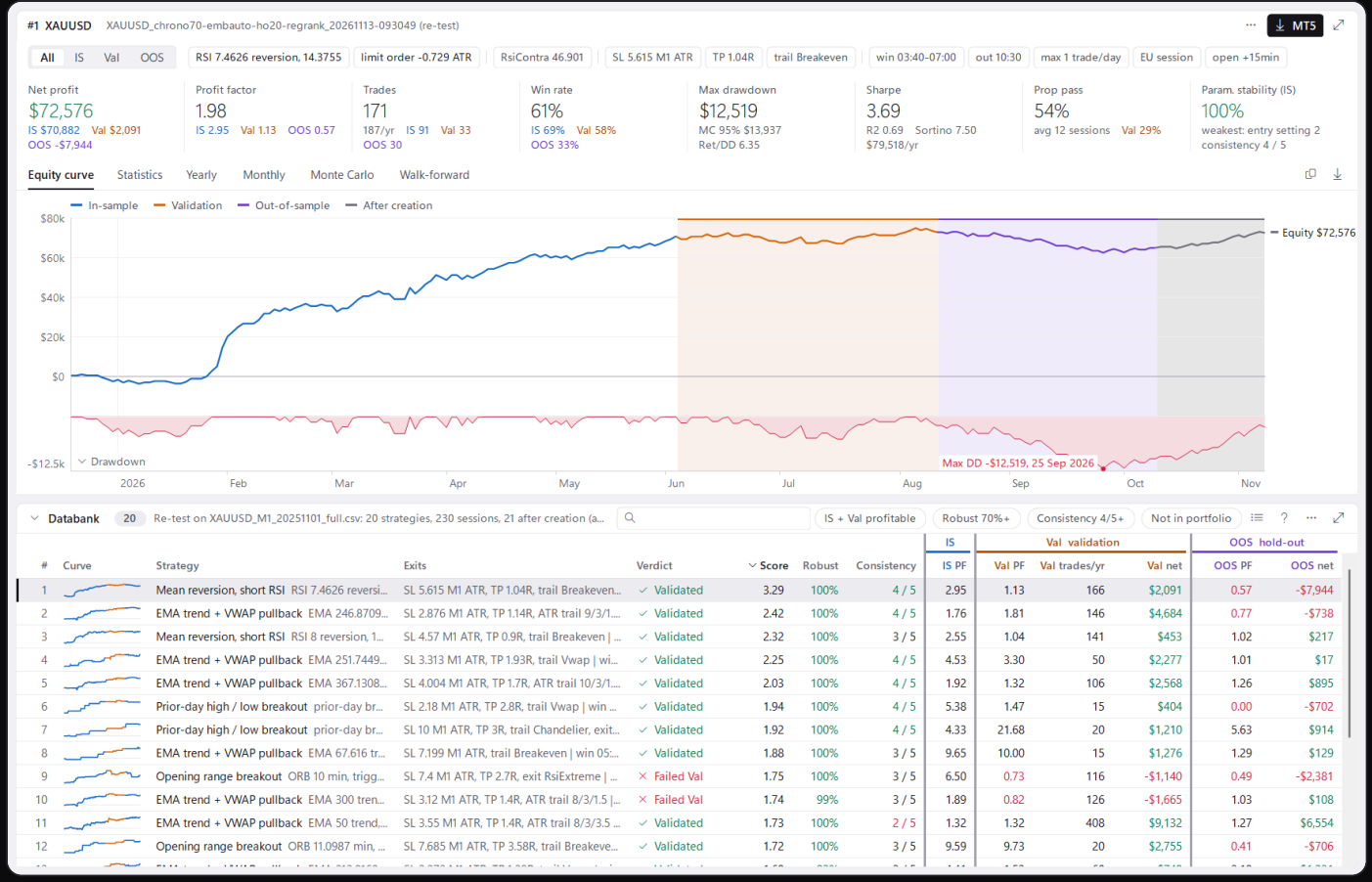


Figure 19. Re-test of a demonstration run (XAUUSD, EU session, created up to 9 Oct 2026) on a data file 21 sessions longer: Val in the orange band, OOS in the purple band, the new data in the grey band. Hypothetical backtest.

The re-test does not change the results file: open the run again to see it as saved. In the Portfolio Builder the strategies keep the re-tested curve. If the data file has no session after the creation dates, the Studio says so and the curves are those of the run.

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13 Several assets and databank tools

Train on several assets together

Setup, **Data**: select the main file, then check other assets in **Train together with** (the newest export of each, 4 assets at most per run; an export without its .spec.json is greyed out). Each genome is backtested on every asset with the costs of its own export, on one common calendar (from the latest start to the earliest end) and one split. The fitness and the ranking read the **combined** curve: the P&L of the assets added session by session. The section summary and the Ready line name every asset, for example **GBPJPY + USDJPY**; orange warnings tell when the assets are in different account currencies (their P&L are added as they are) or when an export has no commission.

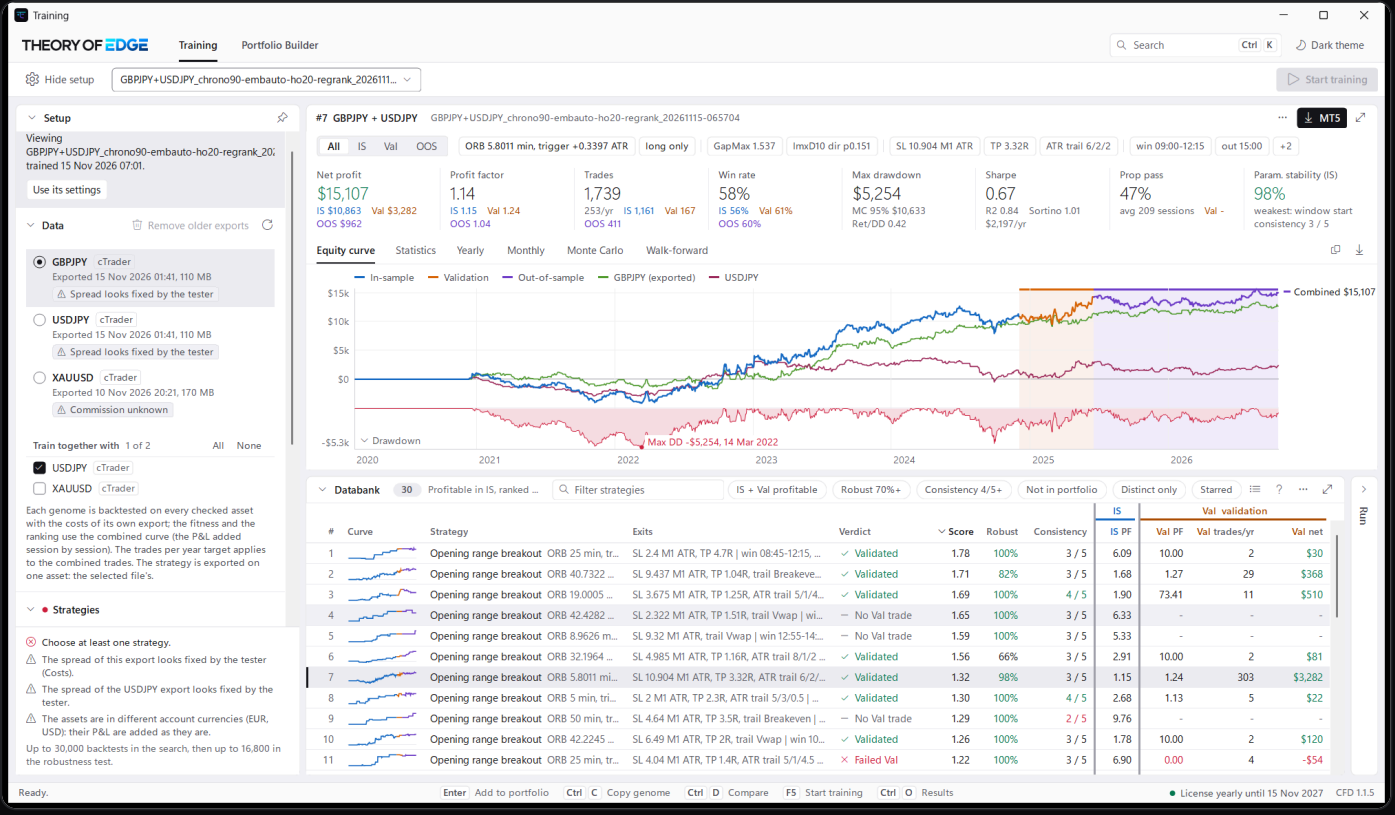


Figure 20. A run trained on GBPJPY and USDJPY together (demonstration run: US, Orb, 1 seed x 8 generations). Left, Data: GBPJPY selected, USDJPY checked in Train together with, and the warnings of the footer. Right, strategy #7: the combined curve with its IS, Val and OOS colours and bands, a thin curve for each asset, "GBPJPY (exported)" and "USDJPY". Hypothetical backtest.

A strategy is still exported on **one asset**. **MT5** (and Export to MT5 in the databank) exports it on the selected file's asset, marked **(exported)** on the sheet; the genome is the same, so the code is the one a single-asset run would give. **Add to portfolio** adds one strategy per asset, each with its own curve, costs and symbol: the Portfolio Builder shows them apart and its total is the combined curve. **Re-test all on the latest data** re-tests each asset on its newest file with its own costs, then rebuilds the combined curve.

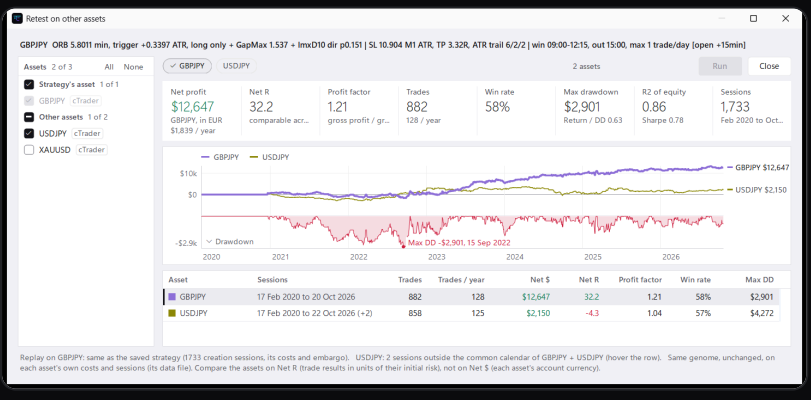


Figure 21. Retest on other assets: GBPJPY (the strategy's asset, always replayed) and USDJPY checked, XAUUSD left out. Hypothetical backtest.

Retest on other assets: choose them

Portfolio Builder, right-click a strategy, **Retest on other assets...**. The **Assets** list on the left has two groups, **Strategy's asset** (always checked: its replay is compared with the saved curve) and **Other assets**, with **All** and **None**. Check the assets you want, then **Run**. The Studio remembers the assets you left out; a new export comes in checked. Same genome, unchanged, on each asset's own costs: compare the assets on **Net R**, not on Net $ (each asset's account currency; hover a figure to read it). **(+2)** in Sessions: sessions outside the common calendar of a multi-asset strategy, which the portfolio uses.

Databank tools

Tool	Where	What it does
Filter by values...	**...** menu	A minimum or a maximum on Score, IS PF, IS trades/yr, Val PF, Val t-stat, Val net, Max DD and DSR. Empty = no limit; the OOS is never filtered. A **Values (n)** chip shows while a limit is set; its x, or **Clear filters**, removes them.
Distinct only	Chip; **...** menu for the limit	Hides the near copies: going down the list, a strategy whose daily P&L on the IS and Val sessions correlates at the limit or more with one kept above it is hidden. Limit 0.9 by default (0.7, 0.8, 0.95).
Star	Ctrl+S, right-click, sheet **...** menu	Marks a strategy (a star before its name); the **Starred** chip shows only them.
Edit note...	Right-click, sheet **...** menu	One line of your own (200 characters at most), shown in the Note column (hidden by default), the tooltip and the sheet. Stars and notes are kept apart from the results file: they change no score and no export.
Filter box	Databank	Plain text finds the formula, the genome or the note. Words such as `entry:orb`, `exit:trail`, `inst:XAUUSD`, `verdict:validated`, `note:keep` and `-word` (exclude) must all match; quotes keep spaces.
Export as CSV...	**...** menu (the shown), right-click (the selected)	The visible columns as shown, then the assets and the genome, figures as plain numbers.
Copy stats	Right-click, sheet **...** menu	The figures of the strategy as a Markdown table, ready to paste.

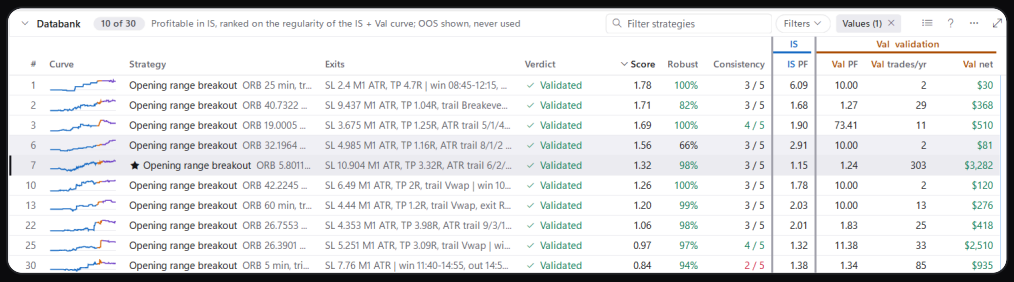


Figure 22. The databank with a Val PF limit of 1.20 (chip Values (1), 10 of 30 shown) and strategy #7 starred.

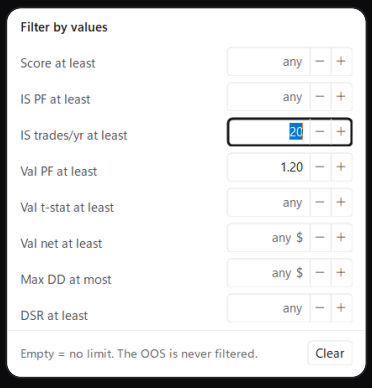


Figure 23. Filter by values: Val PF at least 1.20, a second limit being typed.

14 Futures: data from NinjaTrader 8

Futures are trained on the 1-minute bars of your NinjaTrader 8, exported by the TheoryOfEdgeExport indicator (installed in section 03).

1. Open a chart of the contract (for example MNQ 12-26), **1 Minute**, with the instrument's ETH trading hours template (for index futures: **CME US Index Futures ETH**).
2. In **Data Series**, load as much history as your data connection gives (**Days to load**). Several years is best: the Studio keeps part of the history apart to test its strategies.
3. Add the indicator **TheoryOfEdgeExport**. When the history is loaded, the Output window (**New > NinjaScript Output**) shows the number of bars and the file.

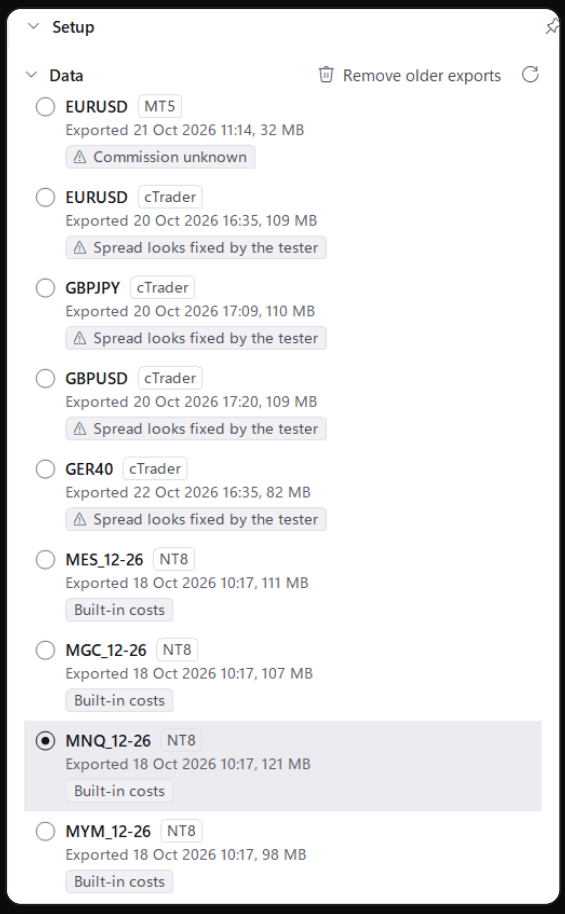


Figure 24. Data: the NinjaTrader 8 exports tagged **NT8** (MES, MGC, MNQ, MYM, each with **Built-in costs**) among the CFD exports, MNQ 12-26 selected.

Files go to `Documents\NinjaTrader 8\nqprop_data`, named `ROOT_EXPIRY_M1_date.csv` (for example `MNQ_12-26_M1_20261018_101741.csv`), where the Studio looks. Every bar is converted to Chicago time, the engine's clock, whatever the time zone of your platform. On a chart that is not 1 Minute, the indicator prints "the chart must be 1 Minute; nothing was exported." Export again whenever you want fresh data: the Studio uses the newest file of each contract. The files of the previous futures Studio, already in that folder, are read as they are.

Futures or CFD: the file decides

A file of the NinjaTrader 8 folder is a futures contract. So is a file whose root is in the Studio's CME table (NQ, MNQ, ES, MES, YM, MYM, RTY, M2K, GC, MGC, SI, SIL, HG, MHG, CL, MCL, NG, 6E, M6E, 6B, 6J, 6A, 6C, ZN, ZB, ZF) when it comes without a `.spec.json`. Every MT5 or cTrader export with its `.spec.json` is a CFD, as before: a CFD run of 1.2.0 gives exactly the results of 1.1.5.

Everything else of sections 05 to 13 works the same on futures: strategies, search space, validation (IS, Val, OOS), sessions in Chicago time (US, EU, ASIA), the databank and its regularity ranking, the robustness tests, .toebank files and Re-test all.

Train together with takes futures with futures, or CFDs with CFDs: a run that mixes both is refused, because USD per contract and an account currency per lot are not one account. Train them in separate runs.

15 Futures: contracts and costs

A futures strategy trades **whole contracts** (step 1, at least 1) and every amount is in **USD**.

- **Costs per contract:** the commission per side of the Studio's CME table (micro contracts 0.62 USD, full-size contracts 2.00 USD) plus **1 tick of slippage per side**. There is no spread: the bars are traded prices. Each contract has its tick and point value (MNQ: tick 0.25, 2 USD per point).

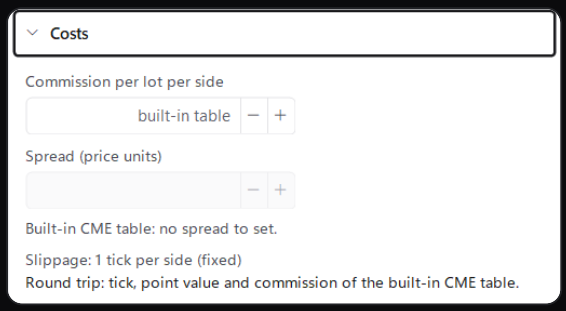


Figure 25. Costs of an MNQ run: built-in table, no spread, 1 tick of slippage per side.

The Costs section

The commission box shows **built-in table**; type your broker's commission per side to replace it (the label says per lot: for futures it is per contract, in USD). The spread box is disabled and reads "Built-in CME table: no spread to set." The round trip of MNQ: 2.24 USD per contract (2 x 0.62 commission + 2 ticks of 0.50 USD).

Sizing

In the Portfolio Builder, Lots counts contracts for a futures strategy: 1, 2, 3... (never 0.5), and the band says "3 contracts". With Risk % per trade, each trade is rounded to whole contracts, at least 1.

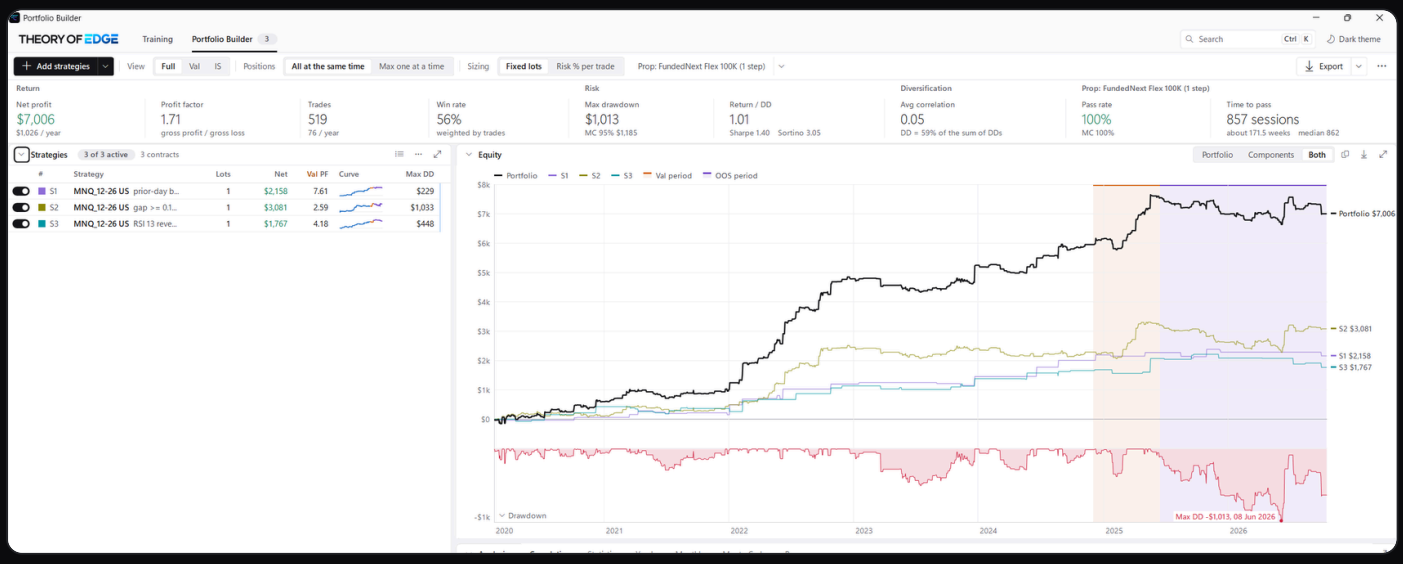


Figure 26. Three MNQ strategies of the demonstration run in the Portfolio Builder, 1 contract each ("3 contracts"), amounts in USD. Hypothetical backtest.

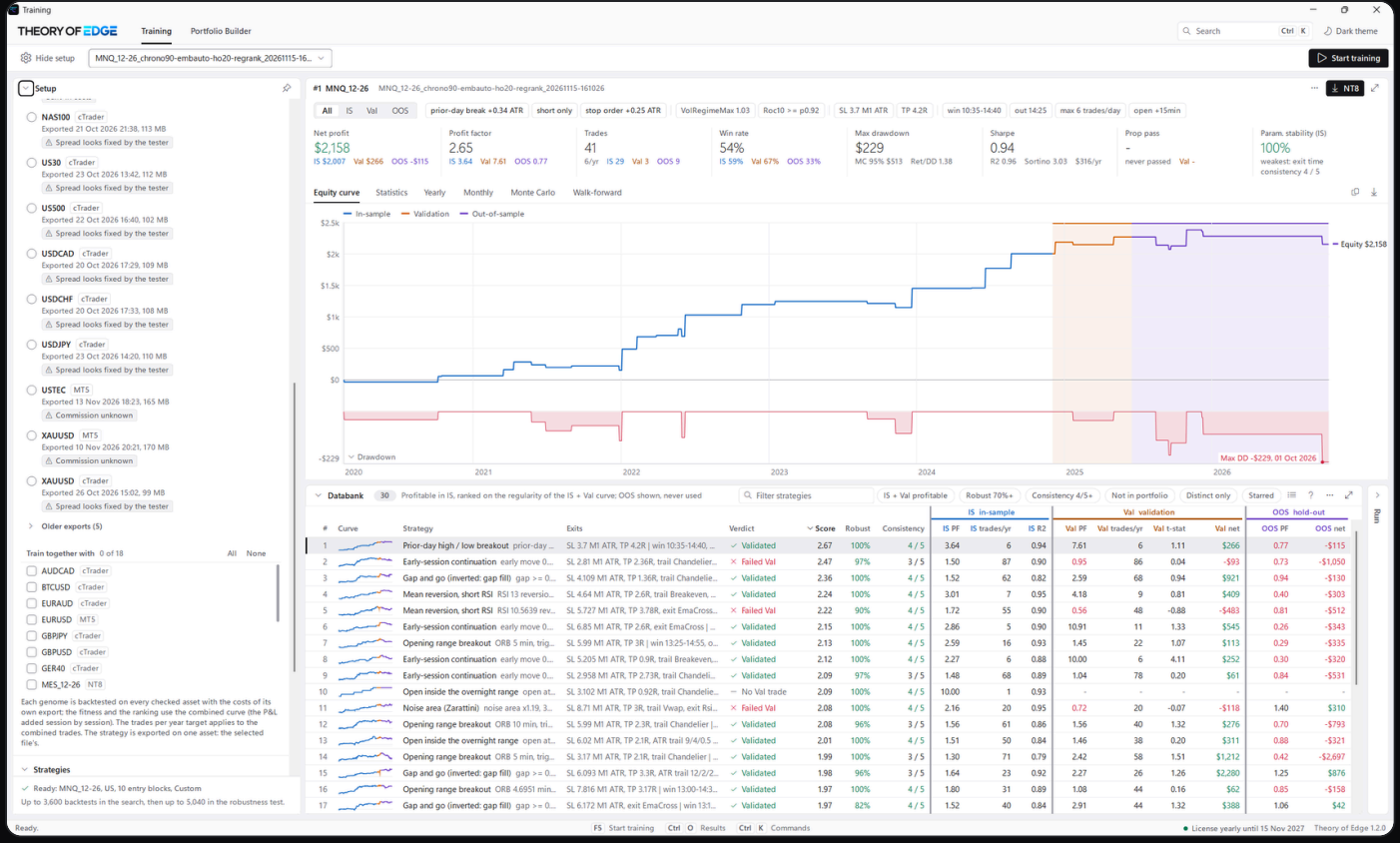


Figure 27. The end of a futures demonstration run (MNQ 12-26 from NinjaTrader 8, US session, Classic 10, 1 seed x 8 generations, keep 30, January 2020 to October 2026): the databank ranked on regularity and strategy #1 with its **NT8** export button. Hypothetical backtest on historical data.

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16 First strategy in NinjaTrader 8

A futures strategy is exported as a NinjaScript strategy that runs the Studio's own core, compiled: the same code, bar by bar, in the Studio and in NinjaTrader 8. On a futures strategy the strategy sheet shows **NT8** where a CFD strategy shows **MT5**.

1. Select a strategy and click **NT8** on the strategy sheet (or right-click rows of the databank). In the Portfolio Builder: **Export > NinjaTrader 8 strategies (.cs, import .zip)...**, one strategy per genome.
2. Check the **Folder** (default: `exports\nt8`) of the Studio's folder; the Studio never writes into NinjaTrader's folders) and the **Name** (letters, digits and _; several strategies get Name_S1, Name_S2...).
3. Click **Export**. Everything is generated before anything is written.

What you get

File	Content
NAME - NinjaScript import.zip	The strategy and the core, ready for Tools > Import
NAME.cs	The NinjaScript strategy: the genome fixed in it, the contract it was trained on, its session
TheoryOfEdgeCore.cs	The core: the Studio's backtest, compiled

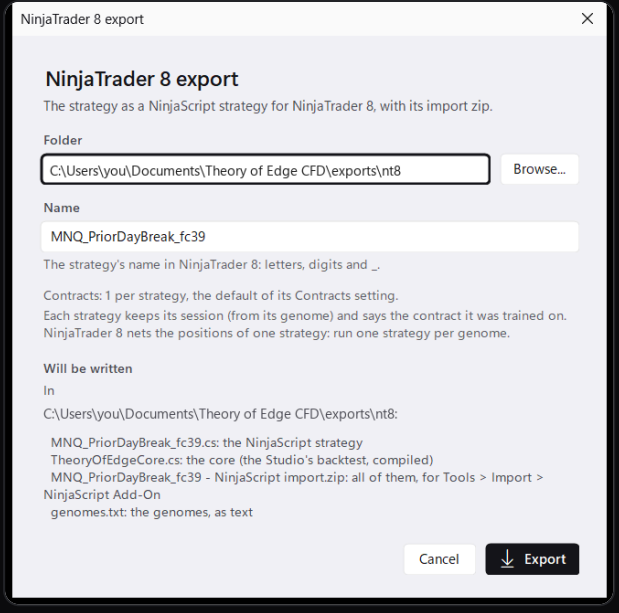


Figure 28. The NinjaTrader 8 export of strategy #1 of the MNQ run (folder path replaced by an example).

genomes.txt	The genome, as text

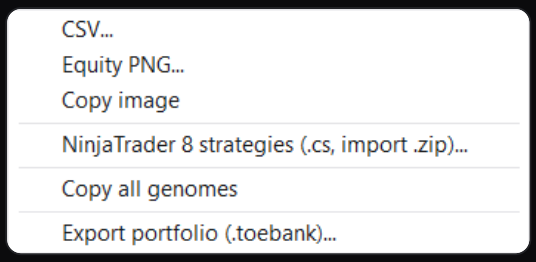


Figure 29. The Export menu of a futures portfolio.

Import and add it to a chart

1. In NinjaTrader 8: **Control Center > Tools > Import > NinjaScript Add-On...**, pick `NAME - NinjaScript import.zip`. NinjaTrader compiles it; accept the replacement of `TheoryOfEdgeCore.cs` if it asks (every export carries the same core).
2. Open a **1 Minute** chart of the contract the strategy was trained on, with the same ETH trading hours template, and load **60 days or more** (Days to load): the strategy reads a long history before its first trade (one month of complete sessions when it uses alpha filters).
3. Right-click the chart, **Strategies...**, add the strategy, set **Contracts** (the default is the number of contracts of the export), choose the account, tick **Enabled**, **OK**.

Setting	What it does
Contracts	The size of each trade, 1 to 100. The only setting: the rules, the session and the exits are fixed in the file.
Session	From the genome (US, EU or ASIA, Chicago time). The strategy closes any position at the end of its session.
Contract	The one of the training (for example MNQ). On another instrument the strategy runs and says so once in the Output window.

- **Strategy Analyzer first.** The same contract, 1 Minute, the same ETH template, at least 60 days before the period you judge; compare with the Studio. Then a simulation account (for example Sim101) for a few weeks, then live, with the size your Monte Carlo drawdown allows.
- NinjaTrader 8 nets the positions of one strategy: run one strategy per genome. Run as many as you like, on different contracts and sessions.
- Each strategy sends its stop (and its target when it has one) with every entry. Keep NinjaTrader connected during the session; after a disconnection, check your positions and orders.
- **Copy genome** still works: the TheoryOfEdgeAlgoV6 strategy and the TheoryOfEdgeSignals indicator of the previous futures Studio take the genome as before.

17 Troubleshooting

Message or problem	What to do
"The license server refused the edition of this key"	Contact support with your key (CFD and futures keys both work in this Studio).
"already in use on 3 IP addresses"	Close the Studio on another computer, or wait up to 2 hours after a computer stopped without closing it.
"not been reached for 72 hours"	Connect this computer to the internet.
"No exported bars found"	Export your data (section 04, futures: section 14), then the refresh button of Data.
"A multi-asset run takes CFD or futures, not both"	Uncheck the assets of the other class in Train together with; train them in separate runs.
NinjaTrader 8: "the chart must be 1 Minute"	Set the chart's Data Series to 1 Minute, then add TheoryOfEdgeExport again (section 14).
NinjaTrader 8: few trades or none, "... not available yet"	The chart has too little history before the traded session: load 60 days or more, then F5 on the chart.
NinjaTrader 8: "trained on MNQ, running on ..."	The strategy runs on another contract than its training: move it to its own contract.
NinjaTrader 8: "position out of sync with the strategy"	The strategy found a position it did not expect and closed it. Check the account and restart the strategy.
NinjaTrader 8: the import fails	New > NinjaScript Editor, F5: the Errors tab at the bottom shows the message; send it to support.
"Choose at least one strategy."	Check one entry family in Strategies.
"MT5 does not expose the commission: enter yours"	Type your commission per lot per side in Costs (a warning: the run can start without it).
"The export measured the tester's fixed spread"	Enter your broker's spread in Costs, or export again on real ticks (MT5) or Tick data (cTrader).
Score shows "..."	The score is waiting for the license server: check the connection.
"MetaEditor was not found"	Open the .mq5 in MetaEditor and compile it.
TheoryOfEdgeExport on a chart: "run it in the Strategy Tester"	The export only runs in the Strategy Tester (section 04).
cTrader: the cBot does not appear after an update	Close cTrader, delete the old .algo in Documents\cAlgo\Sources\Robots, restart, open the new file (section 03).

Times differ between the Studio and the platform	The Studio shows Chicago time, your platform its own clock (UTC in cTrader, server time in MT5): the trades are the same.

18 Glossary

IS, in-sample	The sessions the genetic search optimized on.
Val, validation	The sessions after the in-sample, never optimized on; they give the verdict and enter the databank score.
OOS, out-of-sample	The last sessions of the study; never read to search, rank or select.
Embargo	In-sample sessions left out because their lookback holds a validation session.
Genome	The full definition of a strategy, as one line of text (`E=...`).
Seed, generation	One independent run of the search; one round of it.
Profit factor	Gross profit divided by gross loss. 1.0 = break-even.
Max drawdown	Largest fall from a peak of the equity curve.
R2	How close the equity curve is to a straight line, signed by its slope.
t-stat	Mean over standard error of the results: above 2, the edge is unlikely to be luck.
DSR	Deflated Sharpe ratio: probability that the Sharpe ratio is real, corrected for the number of strategies tested.
.toebank	One file with a databank and / or a portfolio, without prices, license or key (section 12).
Train together with	Multi-asset training: one run on several assets, ranked on their combined curve, each strategy exported on one asset (section 13).
Distinct only, Starred	Databank chips: hide the near copies; show only the strategies you starred (section 13).
Re-test, after creation	A new backtest on the newest data; the sessions after the creation dates are the grey part of the curve.
ATR	Average true range: stops, buffers and trails are set in ATR, so they adapt to each market.
Spread	Ask minus bid. The CFD bars are bid prices; the spread is charged on the trades. Futures bars are traded prices: no spread.
Contract	The unit of a futures strategy (whole numbers, at least 1); its costs and P&L are in USD (section 15).
NT8	NinjaTrader 8: the data tag of its exports and the export button of a futures strategy (sections 14 and 16).

19 Limits, help and risk

- A strategy is trained on one data source and one session, on one symbol or several trained together, and is exported on one symbol. Run it on that symbol (CFD: at that broker; futures: on that contract).
- The OOS reduces, it does not remove, the risk of a strategy fitted to the past. Test again in your platform on real ticks, then on a demo account.
- A short run (like the demonstration runs of this guide: 2 seeds x 10 generations, 1 seed x 8 generations on MNQ) explores little and keeps near copies; use Standard or Deep for real work.
- NinjaTrader 8 fills a target placed as a limit order only when the price trades through it, and a bar that touches both the stop and the target can be filled differently: check a strategy in the Strategy Analyzer before running it.
- Whether automated strategies are allowed on an account is between you and your broker or prop firm: read their rules.

Help: reply to the e-mail that brought your license key, or write to contact@theoryofedge.com. Your subscription (card, invoices, cancellation) is managed from the link in that same e-mail.

> Backtests, out-of-sample results and simulations describe the past under the assumptions you chose. They are hypothetical, and markets change. The figures in this guide's screenshots come from a short demonstration run and are not a forecast. CFDs, forex and futures are leveraged products: you can lose more than you expect. Trade on a demo account first, and only risk money you can afford to lose. See the risk disclosure on theoryofedge.com.