

A Sweep over Thresholds Cannot Produce a Plateau in Principle

[F013]

Cutting at "T or above" makes 0.8997 of a neighbouring cell the same observations — so even a synthetic series known to carry no directional information gives an adjacent-cell correlation of 0.5096 — and recutting the same thresholds into exclusive bins drops that correlation to -0.0381

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Abstract

This paper asks whether a "plateau" produced by sweeping a threshold is evidence of a plateau — the answer is that it is not. It claims neither a new mathematical theorem nor a new law.

First, sweeping the condition "the size of the last move is T or above" over 20 steps, **the median overlap between adjacent cells (shared observations $\div$ union) is 0.8997**. The range runs from **0.1606** to **0.9524**, larger at the lower steps (Section 3).

Second, recutting the same thresholds into **exclusive bins** (T or above, below T) makes the adjacent overlap **0.0000** by definition. **The data, the signal and the thresholds are the same; only the cut was changed** (Section 3).

Third, and this is the core of the paper, **on a synthetic series known to carry no directional information, the nested sweep gives an adjacent-cell correlation of 0.5096**. Recut into exclusive bins it is -0.0381 . **The smoothness is made by the nesting, not by an edge** (Section 5).

Fourth,  the plateau measure (the share of the best cell's left and right neighbours that fall in the top half) is **0.6875** nested and **0.6125** exclusive on the synthetic series.  **The gap is small, and even the exclusive version exceeds the 0.5 of chance.** ★ **This paper does not use that measure as its decisive one** (Section 5).

Fifth, in the measurement the median adjacent-cell correlation is **0.3121** nested and **-0.0135** exclusive.

⚠ The per-instrument values scatter from **-0.5391** to **0.7751**, so **four series are not enough precision for the correlation itself** (Section 4).

Sixth, ⚠ the directional information of the sweep's best cell has a median of **0.4061 pips**, against a median spread of **0.7500 pips**. **Even the best cell does not reach the cost** (Section 6).

Scope of this paper (scope note): No new mathematical theorem and no new law is claimed — that nested sets induce correlation, and that the best value of a sweep can be a product of selection, are both known. **No particular product or proponent is discussed** — no real course, author, or vendor is the subject here, and none is named. What is treated is the public practice itself. **Trading is not discussed** — what is measured is counts and directional information, not trading performance including commissions, fills and money management. **The scope is intraday and a small number of instruments** — four series, three years, five-minute bars. Monthly time-series momentum (dozens of markets, holding one to twelve months) is documented in the literature, and this paper does not contradict it. **One swept quantity is fixed** — the size of the last move, over 20 steps. Another quantity or another number of steps gives other figures (Section 7). **Only one plateau measure was tried** — whether the best cell's left and right neighbours fall in the top half. ⚠ **That measure exceeds chance even on the synthetic series and even in the exclusive version, so this paper does not use it as decisive** (Section 5). **No forecast is claimed. Relation to earlier papers:** this series always reports, alongside a rate or a correlation, what it would be by chance. F010 showed that adding conditions only removes count — this paper shows that a face produced by a sweep is not evidence of a face. What is added here is **counting the adjacent overlap, recutting the same thresholds as exclusive bins for comparison, and placing a series known to carry no edge as the control**.

1. Notation and the question

When a sweep over parameters turns up a good cell, it is sometimes read this way.

Reading	The claim
A point is risky	if only one cell is good, it may be chance
A face is safe	if the neighbours are good too, it is a plateau, not chance
What this paper asks	how much of that "neighbour" is different observations

Observation 1.1: ⚠️ the condition "T or above" is nested. The observations in a cell with a slightly higher T are **entirely contained** in those of a cell with a lower one.

Observation 1.2: so a neighbouring cell returning a similar value is **what must happen**. ⚠️ **The same observations are being looked at again; it would be strange if they were not similar.**

Observation 1.3: the question settles by placing two things alongside. One is **exclusive bins** — recut as "T or above, below T", the adjacent overlap becomes 0. The other is **a synthetic random walk** — sweep the same way on a series known to carry no directional information.

Question: is a face produced by sweeping a threshold evidence of a face?

2. Writing the quantity and the design in advance

Design (declared before running and unchanged at run time)

Item	Decision
Lattice	five-minute bars, mid price, completed bars only
Horizon	$h = 12$ (that is, one hour)
Signal	the sign of the last bar's move (with the trend). ★ It carries a sign, so directional information can be measured
Swept quantity	the size of the last bar's move
Steps	20 steps of its quantile, from 0.50 to 0.995
Nested	size at or above T
Exclusive	size at or above T and below T'
Overlap	shared observations ÷ union of observations, for adjacent cells
Adjacent correlation	the correlation between neighbouring values along the sweep
Plateau measure	the share of the best cell's left and right neighbours that fall in the top half
Baseline	synthetic series random down to the movement inside each bar (20 realisations)
Instruments	USDJPY, EURUSD, GBPUSD, XAUUSD
Period	2019–2024. Evaluation 2022–2024

Observation 2.1: ⚠️ **the swept quantity (a size) is symmetric up and down, so it carries no direction itself.** The direction is carried by the signal (the last bar's sign). **Without that separation the sweep is not a test of direction.**

Observation 2.2: ⚠️ **the synthetic series has zero directional information by construction.** That is what makes "does a plateau appear anyway" answerable. **As a control, nothing is better.**

Observation 2.3: ⚠️ the thresholds are identical between nested and exclusive. Only the cut was changed; the data, the signal and the period are the same.

In the evaluation period the bar counts are **214,291** for USDJPY, **214,605** for EURUSD, **214,370** for GBPUSD and **209,799** for XAUUSD; the first step of the sweep holds **106,594**, **106,352**, **107,473** and **104,692** observations, and the twentieth holds **1,063**, **1,064**, **1,060** and **1,047**.

3. With nested cells, a neighbour is almost the same observations

Calculation 3.1 Overlap of adjacent cells (evaluation period)

Instrument	Nested, median overlap	Nested, range	Exclusive, median overlap
USDJPY	0.9007	0.1606 to 0.9509	0.0000
EURUSD	0.8921	0.1620 to 0.9493	0.0000
GBPUSD	0.8988	0.1607 to 0.9524	0.0000
XAUUSD	0.9019	0.1610 to 0.9494	0.0000

Observation 3.2: the nested adjacent overlap has a median of **0.8997**. The range runs from **0.1606** to **0.9524**, and is larger at the lower steps (with many observations, one step up removes a smaller share).

Observation 3.3: the exclusive overlap is **0.0000**. That follows from the definition. ⚠️ With the same thresholds, changing only the cut takes **0.8997** to **0.0000**.

Observation 3.4: ⚠️ an overlap of **0.9** means that **nine of every ten observations in a neighbouring cell are the same ones**. The two cells are measuring almost the same thing.

Observation 3.5: ★ so "the neighbour was good too" is almost the observation that **the same thing was measured again**. ⚠️ It is not a second, independent piece of evidence.

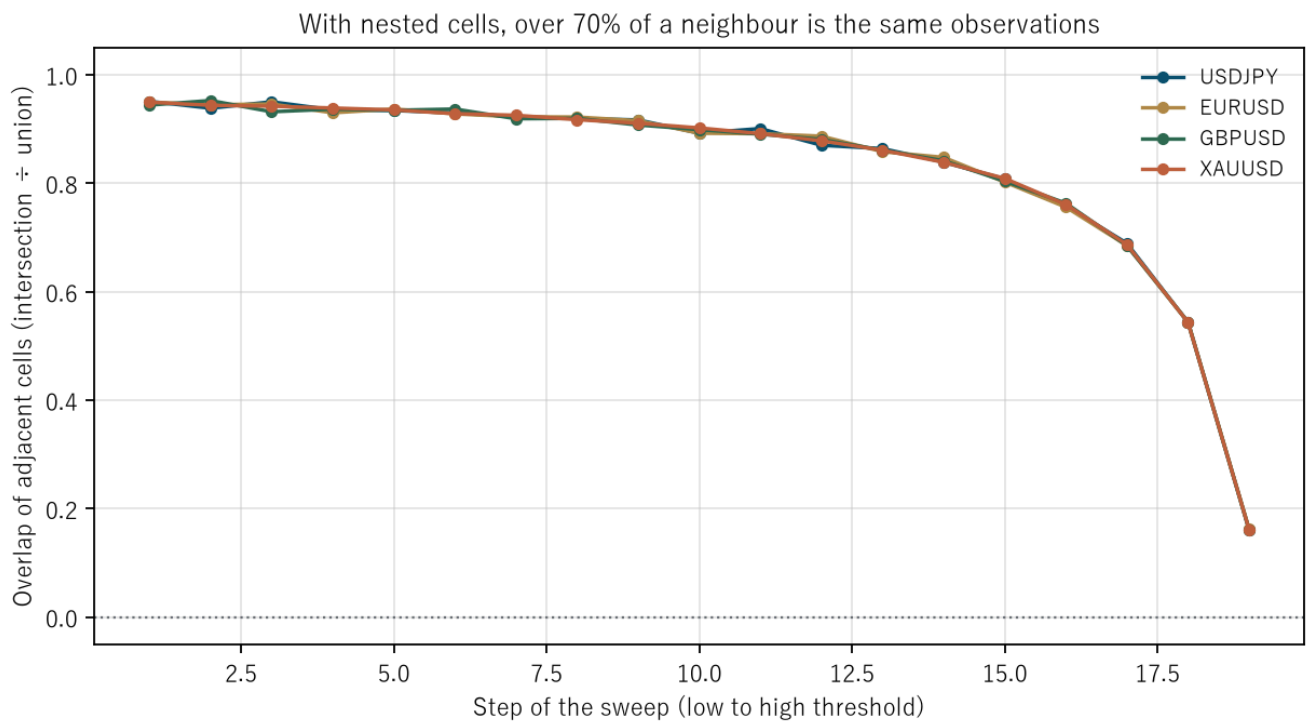


Figure 2: step of the sweep across, adjacent overlap up. Near 0.95 at the low steps, and never below 0.16 to the end.

4. How the sweep's curve changes between nested and exclusive

Calculation 4.1 The sweep (evaluation period, every second step)

Instrument	Step	Threshold (pips)	Nested count	Nested D	Exclusive count	Exclus
USDJPY	1	2.1500	106,594	− 0.1054	5,236	0
USDJPY	3	2.5000	95,094	− 0.1024	4,751	− 0.06
USDJPY	5	2.8500	84,490	− 0.1139	5,572	− 0.01
USDJPY	7	3.3000	73,344	− 0.1420	5,656	− 0.10
USDJPY	9	3.8000	62,217	− 0.1304	5,187	− 0.21
USDJPY	11	4.4500	50,876	− 0.1163	5,052	0
USDJPY	13	5.2500	39,860	− 0.1605	5,433	− 0.43
USDJPY	15	6.3500	28,877	− 0.1024	5,553	− 0.21
USDJPY	17	8.1000	17,680	− 0.0700	5,496	0
USDJPY	19	12.1500	6,620	0.0859	5,557	0
XAUUSD	1	4.7150	104,692	0.0594	5,301	0
XAUUSD	3	5.4300	93,788	0.0713	5,445	− 0.30
XAUUSD	5	6.2000	82,916	0.1069	5,383	0
XAUUSD	7	7.1200	71,965	0.0042	5,381	1
XAUUSD	9	8.2000	61,064	− 0.0550	5,469	0
XAUUSD	11	9.5250	50,139	− 0.0849	5,450	1
XAUUSD	13	11.1850	39,242	− 0.2658	5,463	0

XAUUSD	15	13.4950	28,322	− 0.2228	5,416	− 0.59
XAUUSD	17	17.1500	17,425	0.0981	5,456	0
XAUUSD	19	25.7000	6,503	0.9655	5,456	1

Calculation 4.2 Adjacent correlation and the span of the sweep

Instrument	Nested, adjacent correlation	Exclusive, adjacent correlation	Nested, span of D
USDJPY	0.7751	− 0.0643	− 0.172 to +0.297
EURUSD	− 0.5391	− 0.5130	− 0.433 to +0.516
GBPUSD	0.0918	0.0373	− 0.886 to − 0.134
XAUUSD	0.5323	0.0476	− 0.402 to +0.965

Observation 4.3: ⚠ the nested count falls from 106,594 to 6,620 while the exclusive count stays near 5,236. Because the cuts are quantiles, each exclusive step holds about the same number.

Observation 4.4: the nested D stays in a band (−0.172 to +0.297 for USDJPY) while the exclusive D scatters more over the same steps (−0.435 to +0.393). ⚠ The nested version looks "cleaner" because it keeps re-averaging.

Observation 4.5: the median adjacent correlation is 0.3121 nested and −0.0135 exclusive. ⚠ But the per-instrument values scatter from −0.5391 to 0.7751. Four series are not enough precision for the correlation itself.

Observation 4.6: ⚠ that is exactly why the synthetic series of the next section is needed. In the measurement, "smooth because nested" cannot be told from "smooth because the market has structure". On a series known to have zero directional information, it can.

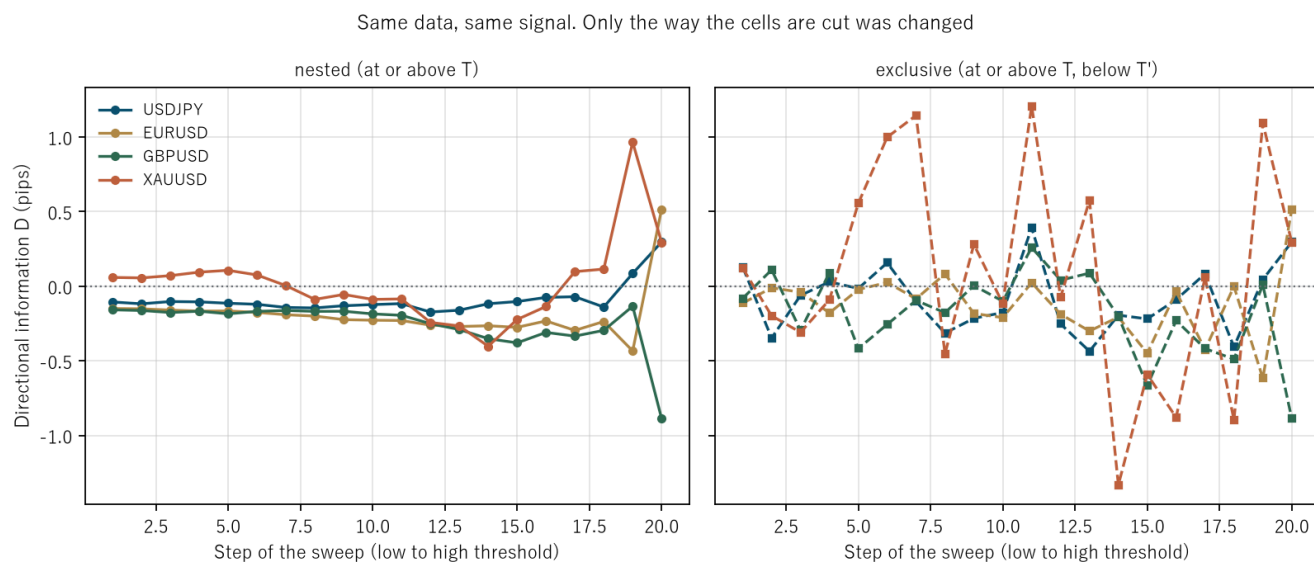


Figure 1: nested on the left, exclusive on the right; step of the sweep across, directional information up. The left moves within a band, the right scatters up and down.

5. The baseline — a plateau appears even where no edge exists

Calculation 5.1 The sweep on synthetic series (20 realisations, evaluation period)

Instrument	Nested overlap	Nested, adjacent correlation	Exclusive, adjacent correlation
USDJPY	0.9019	0.5096	− 0.0376
EURUSD	0.9019	0.5097	− 0.0400
GBPUSD	0.9019	0.4964	− 0.0385
XAUUSD	0.9019	0.5324	− 0.0378

Observation 5.2: even on the synthetic series the median nested overlap is 0.9019, almost the measured 0.8997. ⚠ The overlap is a property of the cut, not of the market.

Observation 5.3: ★ this is the core of the paper. **On a series known by construction to carry zero directional information, the nested adjacent correlation is 0.5096.** Recut into exclusive bins it is **−0.0381.**

Observation 5.4: ⚠ so the observation "the sweep's curve is smooth" says nothing about an edge. The smoothness is made by the nesting. **What matters is whether it survives the recut into exclusive bins.**

Observation 5.5: ⚠ the plateau measure is **0.6875** nested and **0.6125** exclusive on the synthetic series. **The gap is small. And even the exclusive version exceeds the 0.5 of chance.**

Observation 5.6: ⚠ ★ **this paper does not use that measure as decisive.** The act of picking the best cell itself favours extremes, which moves the measure away from its chance value. **When a measure is invented, what it gives by chance must be measured.** This section is that instance.

6. The plateau measure and the best cell in the measurement

Calculation 6.1 The sweep's best cell against the median of all cells (evaluation period, pips)

Instrument	Nested best D	Nested median D	Nested plateau	Exclusive best D	Exclus
USDJPY	0.2965	−0.1167	1.0000	0.3929	−0.09
EURUSD	0.5157	−0.2255	0.0000	0.5157	−0.09
GBPUSD	−0.1338	−0.1848	0.0000	0.2593	−0.13
XAUUSD	0.9655	0.0302	1.0000	1.2076	−0.00

Observation 6.2: the measured plateau measure has a median of **0.5000** nested and **0.0000** exclusive.

⚠ **With four series it takes only the three values 0, 0.5 and 1, so the median carries almost no information.**

Observation 6.3: ⚠️ the directional information of the sweep's best cell has a median of 0.4061 pips, against a median spread of 0.7500 pips. Even the best cell does not reach the cost.

Observation 6.4: ⚠️ the gap between the best value (0.9655 for XAUUSD, say) and the median over all cells (0.0302) includes the effect of having swept at all. Picking the best of 20 steps gives a positive value even with zero directional information.

Observation 6.5: ★ the best cell's value can therefore only be read beside three things — the median over all cells, the spread, and the best value obtained by running the same sweep on a synthetic series. ⚠️ This paper did not measure the third. That is a limitation in Section 7.

7. Limitations

1. ★ **One swept quantity is fixed**, the size of the last bar's move, over 20 steps. Another quantity (volatility, tick density, session) or another number of steps gives other figures. ⚠️ The nested overlap, however, is set by the cut alone and does not depend on the quantity.
 2. ★ **The best value on the synthetic series was not measured.** Section 6 says the best cell should be read beside the best value on a random series, and this paper does not report it. **That is the gap to fill next.**
 3. **Only one plateau measure was tried.** ⚠️ It exceeds chance on the synthetic series and in the exclusive version alike, so it was not used as decisive. **Another definition could give another conclusion.**
 4. **The adjacent correlation is not precise with four series.** The measured values scatter from **-0.5391 to 0.7751. Only the synthetic side (20 realisations) is stable.**
 5. **The overlap in the observations was not removed.** The horizon is 12 bars, so observations overlap. ⚠️ The subject here (overlap and correlation) is a statement about counts and is unaffected, but **significance of D is not discussed and no t value is reported.**
 6. **The synthetic baseline uses independent normal increments.** Volatility clustering is not included.
 7. **Four instruments over three years.** Nothing is said about other markets or other periods.
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Conclusion

When a sweep over thresholds turns up a good cell, it is read as "the neighbours are good too, so it is a face".

But cutting at "T or above" makes the adjacent overlap **0.8997** at the median. **Nine of every ten observations in the neighbouring cell are the same ones.** Recut the same thresholds into exclusive bins and the overlap is **0.0000**. The data, the signal and the thresholds are the same; only the cut changed.

And on a synthetic series known by construction to carry zero directional information, the nested adjacent correlation is **0.5096**. In the exclusive version it is **-0.0381**.

The smoothness is made by the nesting, not by an edge.

The directional information of the sweep's best cell has a median of **0.4061 pips**, short of the median spread of **0.7500 pips**.

And this paper found that its own plateau measure exceeds chance even on a synthetic series, and **chose not to use that measure as decisive.** ⚠ **When a measure is invented, what it gives by chance must be measured.** That is as far as this paper goes.

Data and reproduction

Data	Currency ticks from Dukascopy (agreement to the millisecond, bid and ask, verified from 2019 onward). Gold from Dukascopy
Period	2019–2024 (six years). Evaluation 2022–2024
Instruments	USDJPY, EURUSD, GBPUSD, XAUUSD
Bars	Five-minute, mid price, closing value of completed bars only. Bars with no ticks are not created
Sweep	20 steps of the quantile of the last bar's move size, from 0.50 to 0.995
Verification	<code>検算/F013.py</code> (with <code>--zu</code> it also writes the figures). Every number in the text is taken from <code>検算/F013_output.txt</code>
Figures	<code>図/F013_zu1</code> , <code>図/F013_zu2</code> (png, svg, English versions)
Random seeds	Fixed at 0–19. Re-running gives the same values
Audit of the foundation	<code>_ツール/audit_bars.py</code> (look-ahead in the bars, daylight saving, the day boundary). The record is <code>_土台の検査.txt</code>

References

- Yamagishi, Y. (2026). Inside One Phenomenon Live a Number That Moves with the Lattice and a Number That Does Not [Paper 264]. Zenodo. 10.5281/zenodo.22169720
- Yamagishi, Y. (2026). The Table Is Right and the Trade Still Loses [Paper 423]. Zenodo. 10.5281/zenodo.22700114
- Yamagishi, Y. (2026). The Period a Moving-Average Crossover Finds Is Made by the Ratio of the Two Periods [F001]. Zenodo. 10.5281/zenodo.22880428

- Yamagishi, Y. (2026). The Ichimoku Cloud Is a Past Drawn Twenty-Six Bars Ahead [F002]. Zenodo. 10.5281/zenodo.22880552
- Yamagishi, Y. (2026). The Multiplier of a Bollinger Band Changes How Often Price Leaves It, Not Which Way Price Goes [F003]. Zenodo. 10.5281/zenodo.22881085
- Yamagishi, Y. (2026). The "Overbought 70" of RSI Belongs to the Bar Size You Chose [F004]. Zenodo. 10.5281/zenodo.22881156
- Yamagishi, Y. (2026). The Zero Cross of MACD Is the Same Thing as a Moving-Average Cross [F005]. Zenodo. 10.5281/zenodo.22881227
- Yamagishi, Y. (2026). The %K of Stochastics Is the Position in the Range Itself [F006]. Zenodo. 10.5281/zenodo.22881505
- Yamagishi, Y. (2026). ADX Carries No Direction, So It Cannot Tell You Which Way [F007]. Zenodo. 10.5281/zenodo.22881623
- Yamagishi, Y. (2026). The Fibonacci Ratios Carry No Privilege [F008]. Zenodo. 10.5281/zenodo.22881668
- Yamagishi, Y. (2026). The Probability of Touching a Pivot Level Is a Restatement of the Distance to It [F009]. Zenodo. 10.5281/zenodo.22881708
- Yamagishi, Y. (2026). Aligning Timeframes Only Reduces the Count by as Much as You Aligned [F010]. Zenodo. 10.5281/zenodo.22891380
- Yamagishi, Y. (2026). Round Numbers Do Not Attract Price [F011]. Zenodo. 10.5281/zenodo.22891487
- Yamagishi, Y. (2026). Placing the Take Profit and Stop Loss Forty-Nine Ways Does Not Move the Expectation [F012]. Zenodo. 10.5281/zenodo.22891608