

That the Sign Changes When You Drop the Top Few Days Is a Property of How You Dropped Them [F023]

Dropping the same number of days, taking them from the top leaves 0.8994 of the cells at or below zero, while taking them at random leaves only 0.0036 — and even on a synthetic random walk with zero directional information, dropping the top 5 days leaves 0.1376 of the cells at or below zero — the contribution share correlates with "spread ÷ mean" at 0.9905 to 0.9995, so it is not a degree of concentration but very nearly a restatement of that ratio

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Abstract

What this paper asks is what a report of "the sign changed when the top few days were dropped" actually says — and the answer is: very nearly just the arithmetic of the dropping. No new mathematical theorem and no new law is claimed.

First, **dropping the top lowers the mean of any series whatsoever**. Among cells whose mean of daily means is positive, dropping the top 5 days leaves 0.3076 of them at or below zero, and dropping the top 10% of days leaves 0.8994 (Section 4).

Second, and this is the core. ★ **Hold the number of dropped days fixed and choose them at random, and almost nothing happens**. It is 0.0000 for a random 5 days and 0.0036 for a random 10%. The value itself barely moves either: 1.2847 becomes 1.2900 (Section 4).

Third, ⚠ even on a synthetic random walk, where the directional information is zero by construction, dropping the top 5 days leaves 0.1376 of the cells at or below zero. ⚠ This test works just as well on a series that is right about nothing (Section 6).

Fourth, **the contribution share is close to a restatement of "spread ÷ mean"**. The correlations are **0.9990, 0.9905, 0.9995 and 0.9983**. ⚠️ **Since the number of days is nearly constant, this is not a discovery but very nearly an identity** (Section 5).

Fifth, ⚠️ **of the predictions written before measuring, "the fewer the days the larger the share" failed**. The correlation between share and number of days is **+0.0649 to +0.1175**, and **the half with more days has the higher share** (Section 5).

Sixth, ⚠️ **the measured share (median 0.6394) is larger than the synthetic random walk's (0.2853)**. ★ **But that is not because the tail is heavier**. The median spread is **55.0426** on the measurement against **59.6483** on the random walk — **larger on the random walk** — and what differs is the level of the mean (**1.7303** against **3.0074**) (Section 6).

Scope of this paper: No new mathematical theorem and no new law is claimed — order statistics, selection bias and random walks are all known. **No real course or its proponent is discussed** — no real teaching material, author, or vendor is the subject here, and none is named. **What this paper inspects is a test the author himself has been using. Trading is not discussed** — what is measured is directional information, not trading performance including commissions, fills and money management. **The scope is intraday and few instruments** — four instruments, six years, one-hour bars. Monthly time-series momentum (dozens of markets, one to twelve month holds) is documented in the academic literature and is not contradicted here. **One sweep is fixed** — four families (Section 7). **Only positive cells are looked at** — so the difference in mean between the measurement and the random walk may be a product of that choice, which is not separated here (Sections 6 and 7). **The overlap is not removed** — horizons of 6, 24 and 72 bars overlap, and no t value is reported (Section 7). **This paper does not say to discard the test** — what it says is that it cannot be read without the control and the baseline beside it (Conclusion). **No forecast is claimed. Relation to earlier papers:** F021 showed that the ranking of a sweep does not carry across periods and F022 that the best value is a function of how many cells were looked at — this paper inspects **the test used to kill candidates** in the same way. What is added is **placing a control that drops the same number of days at random, measuring what the contribution share is a restatement of, and running the same test on a series with zero directional information.**

1. Notation and the question

When killing a candidate, one writes things like: "dropping the top 5 days flipped the sign, so this candidate rides on a handful of days."

What gets reported	What does not
The value after dropping the top few days	What happens when the same number is dropped at random
That the sign changed	How many days there were in all
The share of the total made by the top	What the same test does on a series with no edge

Observation 1.1: ⚠️ **Dropping the top lowers the mean of any series whatsoever.** Remove the largest observations and the rest must average lower, so **this is arithmetic, not the fragility of that candidate.**

Observation 1.2: ★ **A comparison partner is therefore needed.** The natural one is **the same number of days, chosen at random.** Random dropping is unbiased, so **the mean should neither rise nor fall.**

Observation 1.3: **The separator is which days were dropped.** The number of days, the data, the period and the instruments are all held fixed, and **only the choosing is varied.**

Observation 1.4: ⚠️ ★ **And one more thing is needed:** how many cells fall when the same test is run on **a series with zero directional information by construction.**

Question: what does "the sign changed when the top few days were dropped" actually say?

2. State the quantity and the design first

Predictions (written before running)

- ① Dropping the top lowers the mean of any series. **This is arithmetic, not fragility.**
- ② Dropping **the same number** of days at random neither raises nor lowers the mean (unbiased).
- ③ **A synthetic random walk with zero directional information falls by the same amount.**
- ④ The contribution share **grows as the number of days shrinks.**

Design (declared before running and not changed during it)

Item	Decision
Grid	One-hour bars, mid prices, completed bars only
Moving-average cross	Fast 3, 5, 8, 12, 20, 30 × slow 20, 30, 50, 80, 120, 200 (fast < slow)
RSI	Period 7, 14, 21 × threshold 20, 30, 40
Outside a band	Period 10, 20, 40 × multiplier 1.5, 2.0, 2.5, 3.0
High-low breakout	Period 10, 20, 50, 100
Horizon	6, 24, 72 bars
Subject	Only cells whose mean of daily means is positive (what could be called a candidate)
Dropping	Top 5 days / random 5 days / top 10% of days / random 10% of days
Random draws	Mean of 200 draws
Baseline	Synthetic random walk down to within-bar movement (5 series)
Instruments	USDJPY, EURUSD, GBPUSD, XAUUSD
Period	2019–2024 (six years taken as one, to get many days)

Observation 2.1: ⚠️ ★ The number of days dropped is the same whether from the top or at random. All that differs is **how they were chosen**.

Observation 2.2: ⚠️ Days are averaged first and then lined up. This keeps days with many observations from making the whole average, and it is the construction this series uses throughout.

Observation 2.3: ⚠️ Only positive cells are looked at, since a cell that was already negative cannot have its sign change. ⚠️ That this restriction is itself a selection is handled in Sections 6 and 7.

The bar counts are 36,534, 36,554, 36,535 and 34,892.

3. How much of the total do the top few days make?

Calculation 3.1 Contribution share (cells whose mean of daily means is positive)

Instrument	Cells	Median days	Top-5-day share	Top-10%-day share	Spread ÷ mean
USDJPY	137	1864	0.7591	7.8047	40.5226
EURUSD	124	1868	0.3282	4.9793	25.1954
GBPUSD	154	1864	0.7616	8.2757	43.2779
XAUUSD	132	1822	0.5197	6.9777	36.9448

◀  ▶

Observation 3.2: The top-5-day share has a median of 0.6394. ⚠️ The median number of days is 1,864, so 5 days is only 0.2682% of the whole. That 0.2682% makes six tenths of the total.

Observation 3.3: ⚠️ The top-10%-day share has a median of 7.3912, far above 1. ★ The ratio exceeds 1 because the total itself is small. Adding the remaining days gives a negative number, so the sum of the top alone is larger than the total.

Observation 3.4: ⚠️ ★ The contribution share is therefore a quantity that diverges as the total approaches zero. "The top few made ninety per cent of the profit" looks like a statement about the weight of the tail while sometimes being a statement about the smallness of the total.

Observation 3.5: Spread ÷ mean runs from 25.1954 to 43.2779. ⚠️ The mean per day is on the order of 1 pip while the day-to-day spread is tens of pips. That this ratio is large is itself why the top few days stand out.

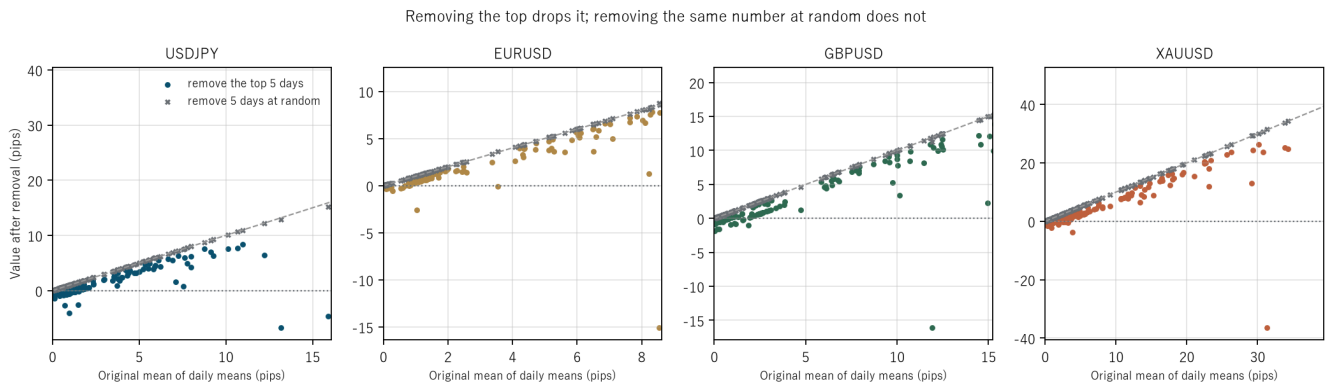


Figure 1: horizontal is the original mean of daily means, vertical is the value after dropping. **Circles** drop the top 5 days; **crosses** drop 5 days at random.

4. Place dropping the top beside dropping the same number at random

Calculation 4.1 Value after dropping (mean of daily means, pips)

Instrument	Original	Top 5 dropped	Random 5 dropped	Top 10% dropped	Random
USDJPY	1.2847	0.4020	1.2900	− 9.6098	
EURUSD	1.4635	0.9849	1.4656	− 5.5055	
GBPUSD	1.9971	0.3595	1.9987	− 9.5015	
XAUUSD	4.7896	2.1833	4.7755	− 25.2823	

Calculation 4.2 Share of cells left at or below zero

Instrument	Top 5 dropped	Random 5 dropped	Top 10% dropped	Random 10% dropped
USDJPY	0.3577	0.0073	0.9489	0.0073
EURUSD	0.2177	0.0000	0.8548	0.0000
GBPUSD	0.4026	0.0000	0.8896	0.0133
XAUUSD	0.2576	0.0000	0.9091	0.0000

Observation 4.3: ★ This is the core. Dropping the top 5 days leaves **0.3076** of the cells at or below zero, and **dropping 5 days at random leaves 0.0000**. For the top 10% it is **0.8994** against **0.0036** for a random 10%.

Observation 4.4: ⚠ The value itself does not move either. USDJPY goes from **1.2847** to **1.2900** with a random 5 dropped and to **1.3500** with a random 10% dropped. **The dropping is unbiased, exactly as predicted.**

Observation 4.5: ⚠ Dropping the top 10% of days gives large negatives, from −5.5055 to −25.2823 pips. ⚠ Given that the originals were +1.4635 to +4.7896, this is not "fragile" — it is that the day-to-day spread is tens of times the mean to begin with.

Observation 4.6: ★ So "the sign changed when the top N days were dropped" says nothing on its own. Only with the version that drops the same number at random beside it does it become a contrast.

Observation 4.7: ⚠ This paper does not say to discard the test. Dropping the top is meant to see whether a result rides on a handful of days, and for that purpose it is fit. **⚠ What it says is that reporting it requires the control and the number of days beside it.**

5. What is the contribution share determined by?

Calculation 5.1 Correlations with the share

Instrument	Share vs number of days	Share vs "spread ÷ mean"	Days vs "spread ÷ mean"
USDJPY	0.0649	0.9990	0.0806
EURUSD	0.1175	0.9905	0.1960
GBPUSD	0.0793	0.9995	0.0858
XAUUSD	0.1015	0.9983	0.1163

Calculation 5.2 Share split by number of days (top 5 days)

Instrument	Fewer-days half	More-days half	Difference
USDJPY	0.3651	1.0385	− 0.6734
EURUSD	0.2162	0.6176	− 0.4014
GBPUSD	0.2622	1.2017	− 0.9395
XAUUSD	0.2775	0.7775	− 0.4999

Observation 5.3: ⚠️ ★ Prediction ④ failed. It said "the fewer the days the larger the share", but the correlation is a weak positive +0.0649 to +0.1175, and the half with more days has the higher share (differences −0.4014 to −0.9395).

Observation 5.4: Instead, the share correlates with "spread ÷ mean" at 0.9905 to 0.9995. ⚠️ ★ But this is not a discovery. The share is "sum of the top 5 days ÷ days × mean", and since the number of days is nearly constant (1822 to 1868), it is very nearly a linear function of spread ÷ mean.

Observation 5.5: ⚠️ A correlation of 0.99 is therefore very nearly an identity. It is not an agreement between two separate quantities. ⚠️ When values agree, whether they are the same quantity must be checked first.

Observation 5.6: ★ Read another way, the share measures not "is it concentrated" but "how many times the mean is the day-to-day spread". ⚠️ In market daily returns that ratio is tens of times to begin with, so a large share is the default.

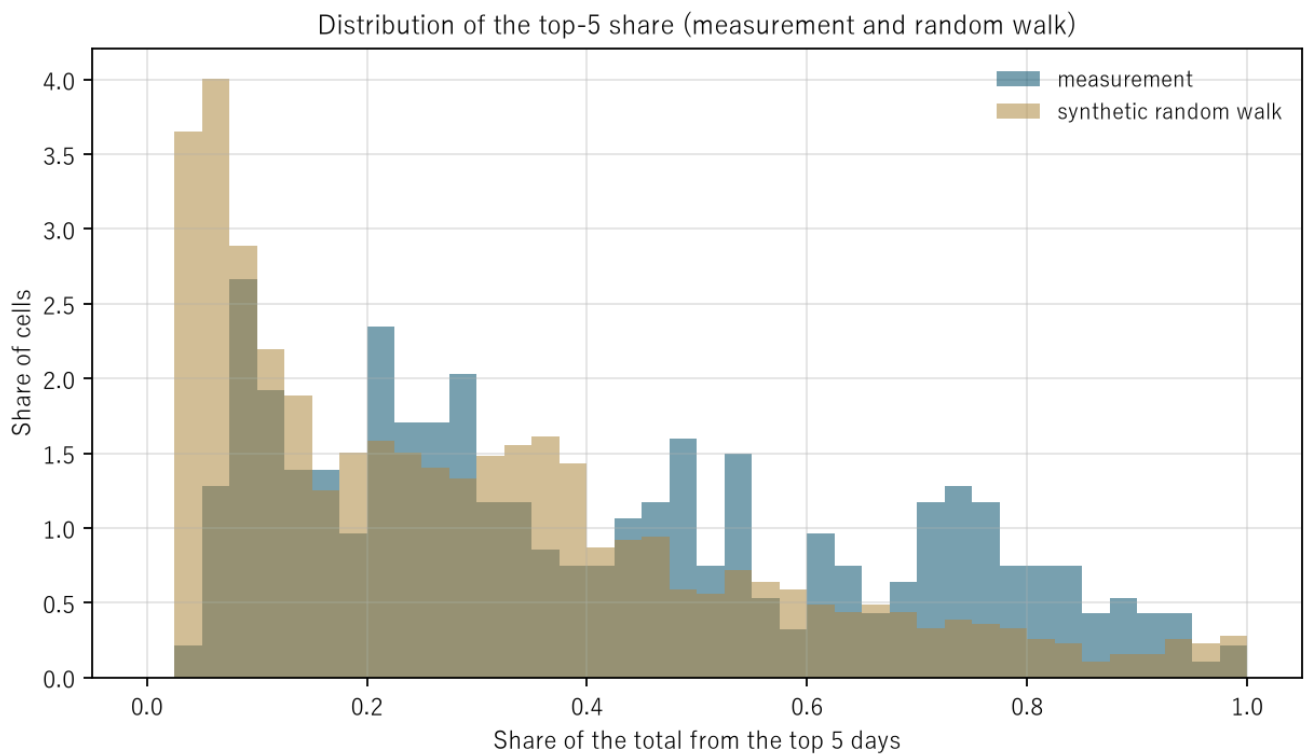


Figure 2: horizontal is the top-5-day share, vertical is the share of cells. The darker histogram is the measurement, the lighter one the synthetic random walk.

6. Baseline — do the same thing on a series with zero directional information

Calculation 6.1 The same test on a synthetic random walk (5 series)

Instrument		Original	Top 5 dropped	Random 5 dropped	Top-5 share	S
USDJPY	measured	1.2847	0.4020	1.2900	0.7591	
USDJPY	random	3.0702	2.0265	3.0533	0.2739	
EURUSD	measured	1.4635	0.9849	1.4656	0.3282	
EURUSD	random	1.9445	1.2248	1.9433	0.3351	
GBPUSD	measured	1.9971	0.3595	1.9987	0.7616	
GBPUSD	random	2.9447	1.9099	2.9099	0.2966	
XAUUSD	measured	4.7896	2.1833	4.7755	0.5197	
XAUUSD	random	9.3234	6.6309	9.4041	0.2607	



Calculation 6.2 Is the difference a heavier tail or a smaller mean?

Instrument		Mean	Spread	Spread ÷ mean
USDJPY	measured	1.2847	56.6532	40.5226
USDJPY	random	3.0702	60.2208	21.3132
EURUSD	measured	1.4635	35.7303	25.1954
EURUSD	random	1.9445	39.9935	26.0347
GBPUSD	measured	1.9971	53.4320	43.2779
GBPUSD	random	2.9447	59.0759	23.6314
XAUUSD	measured	4.7896	142.6234	36.9448
XAUUSD	random	9.3234	143.5704	17.1027

Observation 6.3: ★ Even on a series with zero directional information, dropping the top 5 days leaves 0.1376 of the cells at or below zero, and the median share is 0.2853. ⚠ This test works just as well on a series that is right about nothing.

Observation 6.4: ⚠ The measurement does fall further. The difference in share is a median of **+0.3620** (range **−0.0069** to **+0.4851**), and the difference in the share left at or below zero is a median of **+0.1799** (range **+0.0749** to **+0.2693**).

Observation 6.5: ★ But that difference is not a heavier tail. The median spread is **55.0426** on the measurement against **59.6483** on the random walk — **larger on the random walk**. What differs is the level of the mean, **1.7303** against **3.0074**.

Observation 6.6: ★ With comparable spread and a smaller mean, the share grows automatically, since the share is very nearly a linear function of spread ÷ mean (Section 5). That the measurement looks concentrated is a restatement of its small gain per day.

Observation 6.7: ⚠️ ★ And that difference in mean may itself be a product of the choosing. This paper looks **only at cells whose mean of daily means is positive**. The synthetic series has more cell-to-cell spread, so taking only the positive ones from it gives a higher level. ⚠️ **This confound is not separated here.**

7. Limitations

1. ★ **Prediction ④ failed.** "The fewer the days the larger the share" does not hold; the half with more days was higher. ⚠️ **This paper writes that failure and does not hide it.**
 2. ★ **Only positive cells are looked at.** So the difference in mean between the measurement and the random walk may be a product of that choice. **This confound is not separated here.**
 3. **The correlation of 0.99 between the share and "spread ÷ mean" is very nearly an identity.** With the number of days nearly constant the relation is linear. ⚠️ **It is not an agreement between two independent quantities.**
 4. **One sweep is fixed.** Four families. Other families or granularities give other figures.
 5. **The overlap is not removed.** Horizons are **6, 24 and 72** bars and the observations overlap. ⚠️ No t value is reported and significance is not discussed.
 6. **Only four ways of dropping are used:** top **5** days, random **5** days, top **10%** of days, random **10%** of days.
 7. **The synthetic series uses independent normal increments.** Volatility clustering is not included. ⚠️ **With clustering the random walk's share should rise, which moves the gap against the measurement further toward zero. That was not measured.**
 8. **Four instruments over six years.** Nothing is said about other markets or other periods.
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Conclusion

Dropping the top **5** days leaves **0.3076** of the cells at or below zero, and the top **10%** leaves **0.8994**. **The sign does indeed change often.**

But **dropping the same number of days chosen at random leaves 0.0000 and 0.0036**. The value itself only goes from **1.2847 to 1.2900**.

What fell is the arithmetic of the dropping.

And even on a synthetic random walk with zero directional information, dropping the top 5 days leaves **0.1376** of the cells at or below zero with a median share of **0.2853**. ⚠️ **This test works on a series that is right about nothing.**

The measurement does fall further (a median of **+0.1799** in the share left at or below zero). ★ **But that is not a heavier tail**. The median spread is **55.0426** on the measurement and **59.6483** on the random walk — larger on the random walk — and what differs is the level of the mean (**1.7303** against **3.0074**).

⚠️ **And that difference in mean may itself be a product of looking only at positive cells.**

★ **The contribution share measures not "is it concentrated" but "how many times the mean is the day-to-day spread"**. In markets that ratio already runs from **25.1954** to **43.2779**, so **the top few days standing out is the default**.

⚠️ **This paper does not say to discard the test**. Dropping the top is meant to see whether a result rides on a handful of days, and for that purpose it is fit. **What it says is that a report of it needs the control that drops the same number at random, and the number of days there were in all, beside it.**

Data and reproduction

Data	FX is Dukascopy-derived tick data (from 2019 onward, confirmed identical down to the millisecond, bid and ask). Gold is Dukascopy
Period	2019–2024 (six years taken as one)
Instruments	USDJPY, EURUSD, GBPUSD, XAUUSD
Bars	One-hour bars, mid prices, closes of completed bars only. No bar is made where there are no ticks
Sweep	Moving-average cross, RSI, outside a band, high-low breakout × horizons of 6, 24 and 72 bars
Subject	Only cells whose mean of daily means is positive
Dropping	Top 5 days / random 5 days / top 10% of days / random 10% of days. Random is the mean of 200 draws
Verification	<code>検算/F023.py</code> (<code>--zu</code> also writes the figures). Every figure in the text comes from <code>検算/F023_output.txt</code>
Figures	<code>図/F023_zu1</code> , <code>図/F023_zu2</code> (png, svg, English versions)
Random seeds	Fixed. Re-running gives the same values
Foundation check	<code>_ツール/auditBars.py</code> (bar look-ahead, daylight saving, day boundaries). The record is <code>_土台の検査.txt</code>

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