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Gold seasonality by month: 20 years of XAUUSD returns

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Abstract

Is there a best month for gold? Using month-end XAUUSD closes from 2005 to 2024 (20 returns per calendar month) we compare means, medians and the number of up years, with a sign test. January had the highest average (+3.22%, up in 13 of 20 years) and May the lowest (−0.40%), but no month was reliably up: the best months had 13 up years, short of the 15 a sign test needs at the 5% level (lowest $p = 0.263$). Month-to-month noise (standard deviation 4.80%) is far larger than any seasonal pattern, while gold rose about 500% over the period.

Keywords: gold; XAUUSD; seasonality; monthly returns; calendar anomalies

JEL: G14; Q02

Highlights

- **January had the highest average.** Mean +3.22%, median +3.26%, up in 13 of 20 years (65%). January, April and July were each up in 13 of 20 years.
- **May had the lowest average.** Mean −0.40%, up in 9 of 20 years. March, June and September rose in only 8 of 20 years each.
- **No month is reliably up.** A month needs 15 or more up years out of 20 for a plain sign test to pass at the 5% level. The best months had 13. The lowest p-value was 0.263.
- **The noise is bigger than the pattern.** A typical month moved 4.80% up or down (standard deviation). Every month had at least one year above +6% and one year below −5%.
- **Gold mostly went up anyway.** Over all 240 months the mean was +0.86% and gold rose in 127 months (52.9%). The price went from US\$437.00 to US\$2,624.61, +500.6% in total.

1. Introduction

Is there a best month for gold? We took the month-end close of XAUUSD for every month from January 2005 to December 2024 and measured each month's return. That gives 20 returns for each calendar month. For each month we show the mean, the median, how many years it rose, its best and worst year, and a simple test of whether the up count could be chance.

2. Data and method

Method

1. **Data:** daily XAUUSD bars from the public dataset "xauusd-gold-price-historical-data-2004-2025" on Hugging Face (file XAU_1d_data.jsonl), the same file as notes 08, 09 and 11. Window January 2005 to December 2024, 20 full years and 240 months. 2004 is a part year and 2025 has long gaps, so both are left out.
2. **Month return:** last daily close of the month divided by the last daily close of the month before, minus 1. January 2005 uses the last bar of December 2004 (30 Dec 2004, US\$437.00).
3. **Data holes:** the two known holes (November 2005 and November 2006) fall in mid-month, so every month still has a month-end close. In 6 months the last bar is one day before the last weekday (Good Friday in 2013, 2018

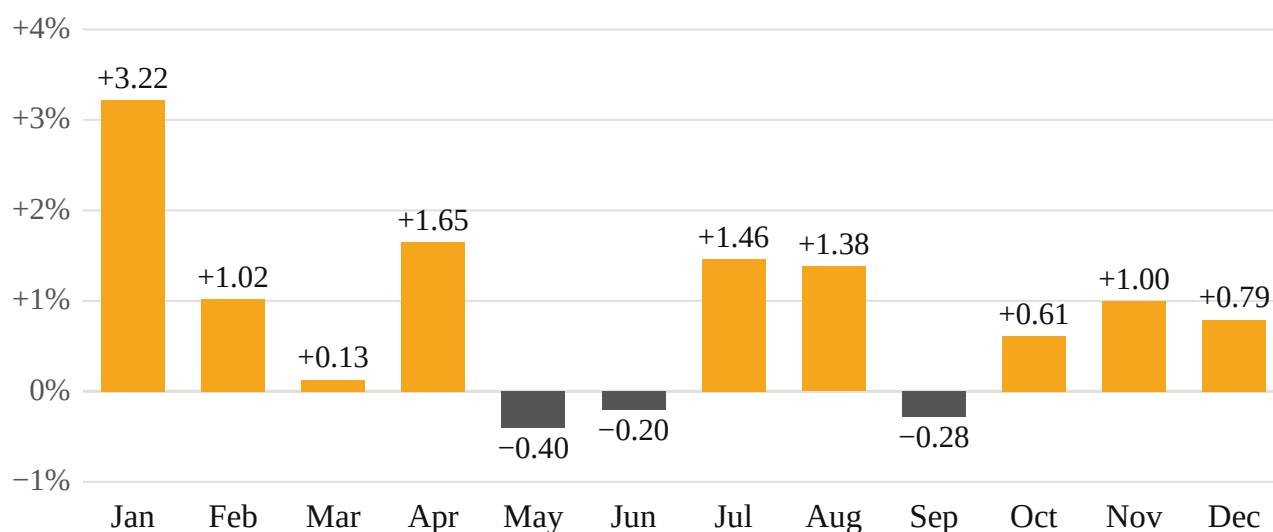
and 2024, the day after Thanksgiving in 2008, and no bar on 31 Dec 2004 or 30 Nov 2005). No month was dropped.

4. **Sign test:** exact two-sided binomial test with a 50% chance of an up year. No month had a return of exactly zero.

5. **Cross-check:** for every year, the 12 month returns compound to the year return in the year table. December 2024 gives -0.97% , with a last close of US\$2,624.61.

3. Results

Gold return by calendar month



Mean month return in %, XAUUSD, 2005 to 2024 (20 values per bar). Source: our calculation on the Hugging Face daily file (see Method).

Gold (XAUUSD) return by calendar month, 2005 to 2024

Month	Mean	Median	Up years of 20	Best year	Worst year	Sign test p
January	+3.22%	+3.26%	13 (65%)	+11.14% (2008)	-5.38% (2011)	0.263
February	+1.02%	+0.94%	11 (55%)	+10.76% (2016)	-6.16% (2021)	0.824
March	+0.13%	-0.49%	8 (40%)	+9.23% (2024)	-5.93% (2008)	0.503
April	+1.65%	+1.24%	13 (65%)	+12.03% (2006)	-7.49% (2013)	0.263
May	-0.40%	-1.31%	9 (45%)	+10.42% (2009)	-6.22% (2012)	0.824
June	-0.20%	-1.63%	8 (40%)	+8.76% (2016)	-11.01% (2013)	0.503
July	+1.46%	+2.23%	13 (65%)	+10.92% (2020)	-6.52% (2015)	0.263
August	+1.38%	+0.76%	11 (55%)	+12.19% (2011)	-9.04% (2008)	0.824
September	-0.28%	-2.36%	8 (40%)	+10.42% (2007)	-11.01% (2011)	0.503
October	+0.61%	+1.44%	11 (55%)	+7.31% (2023)	-16.90% (2008)	0.824
November	+1.00%	-0.03%	10 (50%)	+12.86% (2009)	-8.16% (2016)	1.000
December	+0.79%	+1.68%	12 (60%)	+6.51% (2020)	-10.42% (2011)	0.503

Month return = last daily close of the month divided by the last daily close of the month before, minus 1. "Up years of 20" = years with a positive return in that month, with the share in brackets. Best and worst = the single best and worst year for that month. Sign test p = chance of an up/down split at least this uneven if each year were a coin flip (two-sided). Source: our calculation, file seasonality_by_month.csv.

Mean or median: which to read?

The mean can be pulled by one big year. January 2008 added +11.14% on its own. The median is the middle year and is harder to move. For January both agree (+3.22% mean, +3.26% median). For other months they do not: September had a mean of -0.28% but a median of -2.36%, and November a mean of +1.00% with a median of -0.03%. 9 of 12 months had a mean above zero, but only 7 had a median above zero.

Is any month a real edge?

With only 20 years per month, small differences are easy to find by chance. If gold were a coin flip each month, a 13 to 7 split would still happen often: its two-sided sign test p-value is 0.263. To pass at the 5% level a month needs at least 15 up years (0.041); 14 up years gives 0.115. No month reached 14. We also tested 12 months at once, which makes a lucky winner more likely, not less.

Across all 240 months, gold rose 127 times and fell 113 times (52.9% up, sign test p 0.401). The gain over 20 years came from a rising trend, not from one season.

Gold return by year

Gold (XAUUSD) return by year

Year	Year return	Up months
2005	+17.76%	7 of 12
2006	+23.63%	6 of 12
2007	+30.75%	8 of 12
2008	+4.21%	7 of 12
2009	+26.62%	7 of 12
2010	+28.30%	9 of 12
2011	+11.08%	7 of 12
2012	+7.08%	5 of 12
2013	-27.86%	3 of 12
2014	-1.77%	6 of 12
2015	-10.62%	5 of 12
2016	+8.53%	6 of 12
2017	+13.12%	9 of 12
2018	-1.75%	5 of 12
2019	+18.83%	7 of 12
2020	+24.53%	6 of 12
2021	-3.46%	5 of 12
2022	-0.21%	4 of 12
2023	+13.07%	7 of 12
2024	+27.24%	8 of 12

Year return = last close of December divided by the last close of the December before, minus 1. Gold rose in 14 of 20 years. "Up months" = months with a positive return in that year. Source: our calculation, file seasonality_by_year.csv.

The largest single months were November 2009 (+12.86%) and October 2008 (-16.90%). The year a month falls in matters far more than the calendar month itself.

4. Discussion

What this means for an EA

- A "trade only in January" filter rests on 20 data points. January still lost -5.38% in 2011. Test any month filter on years the rule did not see.
- Do not size risk by month. The spread inside one month (for example October: best +7.31%, worst -16.90%) is much larger than the gap between month averages. For how wide days are in each month, see note 11.

- Compare with simply holding. Holding gold through all 240 months returned +500.6%. A month rule has to beat that after spread and swap.

5. Limitations

Limits

- **One data source.** Not checked against a second feed. Other brokers and futures data close at different times, so month returns differ a little.
- **Broker day.** The month-end close is the close of the broker's last daily bar, not a fixed time such as the London PM fix.
- **Price only.** No spread, swap or storage cost is included.
- **The past only.** Twenty years is a short sample for a calendar effect. The data ends in 2024 for this note. Every number here comes from our own script.

Appendix

Related notes

- The size side of the same months, average daily range by year and by calendar month: XAUUSD average daily range: 20 years of gold data by year and month.
- The single days that make the big months: XAUUSD largest daily moves: 20 years of gold data.
- Why buy-and-hold is a hard benchmark to beat: LLM trading agents vs buy-and-hold: what the 2025-26 benchmarks show.
- The same question by day of the week, which weekdays gold rose or fell from 2005 to 2024: Best day of the week for gold: 20 years of XAUUSD weekday returns.

FAQ

What is the best month for gold?

From 2005 to 2024 January was the best month on average: a mean return of +3.22% and a median of +3.26%, with gold up in 13 of 20 years (65%). January, April and July were each up in 13 of 20 years. None of these counts is strong enough to rule out chance.

What is the worst month for gold?

By mean return it was May at -0.40% (up in 9 of 20 years). March, June and September were up in only 8 of 20 years each, and September had the lowest median at -2.36%.

Is gold seasonality reliable?

Not on this data. With 20 years per month, a month needs 15 or more up years for a plain two-sided sign test to pass at the 5% level. The best months had 13. The typical month moved 4.80% up or down (standard deviation), much more than the gap between the best and worst month means.

How much did gold return per month on average?

Over all 240 months from January 2005 to December 2024 the mean month return was +0.86% and the median +0.41%. Gold rose in 127 months (52.9%). The price went from US\$437.00 to US\$2,624.61, a total of +500.6%.

References

- XAUUSD daily data: Hugging Face, ZombitX64/xauusd-gold-price-historical-data-2004-2025 (file XAU_1d_data.jsonl, revision ff6469dc, downloaded 18 Oct 2026). The dataset card names the Kaggle dataset "novandraanugrah/xauusd-gold-price-historical-data-2004-2024" as its source.

Declarations

- **Author:** Huyen X. Vu, Quantex Research, AlgoTrade Pte. Ltd., Singapore (ORCID 0000-0002-2209-842X).
- **Data availability:** Daily XAUUSD prices from a public dataset (Hugging Face, ZombitX64/xauusd-gold-price-historical-data-2004-2025), as described in the Method section. Our calculation files are available on request.
- **Use of AI tools:** Data processing, analysis code and drafting were assisted by AI tools (Claude, Anthropic). The author checked the results and is responsible for the content.
- **Conflict of interest:** The author is the founder of AlgoTrade Pte. Ltd., which develops and runs systematic trading models.
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