Two Thousand Years Of The Oldest Trader Indicator In Precious Metals, Read As A Daily Tape For Silver

Why the gold-over-silver ratio has fired EXTREME_POS exactly three times in 36 years of modern data (April 2003, October 2008, March 2020), why those three entries delivered silver forward 252-day returns of plus 18.80, plus 35.18, and plus 67.80 percent respectively, and the industrial-demand regime caveat that governs how to read the ratio in the modern era.

David Stendahl · Market Lab Analytics · November 6, 2026

What this signal is

The gold-to-silver price ratio has been a touchstone of precious-metals trading since the Roman Empire. Historical bimetallic coinage set the ratio at approximately 12-to-1 in Rome, 15-to-1 in medieval Europe, 15.5-to-1 in the US Coinage Act of 1792. The 20th century saw the ratio float as silver demonetized globally; the ratio hit lows near 15 during the Hunt brothers' 1980 silver corner (gold 850 dollars, silver 50 dollars) and highs near 125 during the COVID funding crisis of March 2020 (gold 1,500 dollars, silver 12 dollars). Readers using this signal are reading the modern electronic-market expression of an indicator with 2,000-plus years of history.

This signal computes the 504-day trailing z-score of the gold-over-silver price ratio from COMEX front-month continuous settlements, clips to plus-or-minus three sigma, and tanh-bounds into the plus-or-minus one range. The engine applies no further transformation; the composite the reader sees is the tanh-bounded z-score. State-code discretization at plus-or-minus 0.3 produces three phase integers (plus one for EXTREME_POS, zero for NORMAL, minus one for EXTREME_NEG).

On April 1, 2003, as silver sat near 5 dollars per troy ounce and the ratio ran 80 (silver relatively cheap in the pre-2008 regime), the composite reached plus 0.883. Silver delivered plus 18.80 percent forward 252-day return as the 2003-to-2006 bull cycle began. On October 20, 2008, as the GFC panic drove silver harder than gold and the ratio spiked above 85 (silver cheap), the composite peaked near plus 0.987. Silver delivered plus 35.18 percent forward 252-day return as the Fed's QE1 response and the 2008-to-2011 silver bull cycle unfolded. On March 18, 2020, as the COVID funding crisis spiked the ratio to the all-time high of 125 (silver 12 dollars, gold 1,500 dollars), the composite reached plus 0.995. Silver delivered plus 27.01 percent forward 60-day return and plus 67.80 percent forward 252-day return as the 2020 reflation drove silver from 12 dollars to 30 dollars by August 2020. Today the

composite reads plus 0.1914 at the 29th percentile of the available history, in BASELINE state with 11 trading days in current phase.

Here is the twist. The three signature EXTREME_POS entries (April 2003, October 2008, March 2020) delivered silver forward 252-day returns of 18.80, 35.18, and 67.80 percent respectively. Median plus 35 percent at 252 days. This is the signal's base case for the mean-reversion interpretation: when the ratio is extreme-high (silver cheap), silver has historically mean-reverted upward over the following year. Here is the honest caveat. Silver's industrial-demand base has shifted meaningfully since 2020 as photovoltaic (solar) silver consumption has grown from roughly 100 million ounces in 2018 to roughly 200 million ounces in 2026, and electric vehicle silver demand adds another 50 to 80 million ounces per year of structural demand. The ratio's historical range (30 to 125) may be evolving as silver's demand base deepens; readers extrapolating from the three historical signature episodes to future dislocations should know the mechanical base is shifting. Read on for the three complete cases that frame the signal, the state-conditional evidence, and the dual-target polarity audit that distinguishes the SI-aligned signature from the SPY-aligned reading.

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How the inputs compose

The signal is simple: the gold-over-silver price ratio (COMEX front-month gold divided by COMEX front-month silver), 504-day trailing z-score, clipped to plus-or-minus three sigma, tanh-bounded into the plus-or-minus one range. Mathematical specification: ratio = gold_close / silver_close; z = (ratio minus trailing 504-day mean) divided by trailing 504-day standard deviation; z_clipped = clip(z, minus 3, plus 3); signal = tanh(z_clipped). The engine applies no additional post-processing.

Three mechanical channels drive ratio moves. First, silver industrial demand (photovoltaics, electronics, EV batteries): structural demand drives silver outperformance when industrial activity is strong. Ratio compresses toward silver-rich. Second, investment demand (ETF, physical bullion): silver is a "poor-man's gold" and tends to RALLY harder than gold in bullish precious-metals regimes (higher beta). This is the Hunt brothers 1980 corner pattern, the 2011 Occupy-silver meme-rally, the 2021 WallStreetBets-silver-squeeze. Ratio compresses toward silver-rich. Third, industrial collapse plus safe-haven preference: during deflationary panic (2008 GFC, 2020 COVID initial), silver sells off harder than gold because industrial demand drops and investment demand migrates to gold specifically. Ratio spikes to silver-cheap.

The 504-day window is the two-year baseline against which the current ratio is measured. The three-sigma clip prevents single-day outliers from producing non-reliable composite swings. The tanh bound ensures the composite is in the fixed scale that downstream playbooks consume. The engine parquet runs 9,016 trading days from 1990-11-30 to 2026-10-26 after the 504-day warmup window.

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Three cases that frame how to read this signal

Case 1: April 2003. The 2003-to-2006 silver bull cycle entry.

Firing date: the composite reached plus 0.883 on April 1, 2003. Duration in and around EXTREME_POS: multi-week cluster through Q2 2003. Forward-60-day silver return from April 1:

plus 0.35 percent (immediate consolidation). Forward 252-day silver return: plus 18.80 percent as the 2003-to-2006 bull cycle began. Forward 756-day (three-year) silver return: plus 185 percent as silver's 2003-to-2008 bull cycle extended into the pre-GFC 2008 high at 20 dollars per troy ounce.

Silver sat near 5 dollars per troy ounce in April 2003. The ratio ran 80 (silver relatively cheap in the pre-2008 regime, when the historical mean was closer to 55). The composite captured the setup directly: silver was cheap relative to gold on a two-year rolling basis. The 2003-to-2006 bull cycle ran on broad reflation (Fed held funds rate at 1.00 percent through 2003 to mid-2004, dollar weakened, commodities surged). Silver outperformed gold cumulatively over the subsequent three years as the ratio compressed from 80 to 50.

The lesson is on quiet-regime mean reversion. The April 2003 case did not fire during an acute crisis; it fired during a sustained silver-cheap regime where industrial demand recovery and investment flow combined. Readers interpreting the ratio should know mean-reversion opportunities can present without a panic-crisis trigger.

Case 2: October 2008. The GFC panic trough.

Firing date: the composite reached plus 0.987 on October 20, 2008. Duration in sustained EXTREME_POS state: multi-week cluster. Forward-60-day SPY return from October 20: minus 14.58 percent (as the broader equity bear market continued through March 2009). Forward-60-day silver return: plus 3.31 percent (immediate stabilization). Forward 252-day silver return: plus 35.18 percent. Forward 252-day gold return: plus 35.60 percent.

The GFC panic drove silver harder than gold and the ratio spiked above 85 (silver cheap). Industrial demand collapsed; investors crowded into gold specifically. Silver fell from 20 dollars in May 2008 to 9 dollars in October. The composite captured the acute dislocation. SPY continued to correct through to the March 2009 bottom, but silver stabilized within weeks and began the 2008-to-2011 bull cycle. By September 2011 silver peaked at 49.80 dollars per troy ounce (near the 1980 Hunt all-time high); the ratio compressed to 32 (deep silver-rich).

The lesson is on crisis-trough mean reversion. The 2008 case is the mid-era signature episode: silver was cheap because industrial demand collapsed, not because silver was fundamentally weak. The Fed's response and the subsequent reflation drove silver harder than gold over the following year. Readers interpreting the ratio should know crisis-driven silver-cheap episodes have historically been the strongest mean-reversion setups.

Case 3: March 2020. The COVID panic trough, all-time ratio high at 125.

Firing date: the composite reached plus 0.995 on March 18, 2020. Duration in and around EXTREME_POS: multi-week cluster through April 2020. Forward-60-day SPY return from March 18: plus 26.75 percent (one of the strongest 60-day SPY mean-reversions in any state-cross). Forward-60-day silver return: plus 27.01 percent. Forward 252-day silver return: plus 67.80 percent. Forward 252-day gold return: plus 8.40 percent.

The COVID funding crisis spiked the ratio to the all-time high of 125. Gold held 1,500 dollars; silver crashed to 12 dollars. Industrial-demand collapse (shuttered factories, supply-chain shock) and funding-crisis liquidation (basis trade implosion, dealer-system seize) drove silver harder than gold. The composite captured the dislocation in near-real-time. The Fed's response (QE Infinity March 23, credit backstop March 23) was swift and overwhelming. Silver mean-reverted dramatically: silver forward

60-day plus 27.01 percent, silver forward 252-day plus 67.80 percent (compared to gold forward 252-day plus 8.40 percent). The 2020 case is the textbook silver-outperformance mean-reversion firing.

The lesson is on the extreme-ratio regime. The 125 reading was anomalous (the historical modal silver-cheap extreme is closer to 85), driven by specific COVID-funding-crisis mechanics. Readers extrapolating should know 125 is NOT a routine extreme; the all-time high reflects a confluence of factors unlikely to recur in the same form.

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What the state-conditional returns have actually done

The silver forward-60-day return baseline (unconditional) is mean plus 1.11 percent, median minus 0.04 percent. Standard deviation 10.50 percent. Percent negative 48.6 percent. State-conditional means below are expressed as edges relative to this baseline.

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> **Reference baseline (8,411 SPY-aligned trading days from November 1990 through August 2026)**
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> silver forward-60-day return baseline (unconditional): mean plus 1.11 percent, median minus 0.04 percent. Standard deviation 10.50 percent. Percent negative 48.6 percent. The engine data covers 9,016 trading days total; the baseline uses the 8,411-day subset where fwd 60d is observable. Phase imbalance is heavy to phase plus one (68.8 percent of sample) reflecting the composite's long-term positive mean. State-conditional means below are expressed as edges relative to this baseline on the SPY target. The SI-aligned forward returns from the three signature EXTREME_POS entries are documented separately.

The signal's phase plus one state (EXTREME_POS, silver cheap, composite above plus 0.3), 6,115 trading days, delivered a mean fwd-60-day SPY return of plus 2.22 percent. That is minus 0.10 percentage points below baseline. Percent-positive forward 60d was 70.4 percent. The phase plus one state is the modal state (68.8 percent of sample share), which reflects the composite's long-term positive mean. The three signature EXTREME_POS entries (April 2003, October 2008, March 2020) are embedded in this large sample but the full-sample mean does not isolate the signature-episode effect.

The phase 0 state (NORMAL, composite between minus 0.3 and plus 0.3), 751 trading days, delivered mean plus 0.46 percent. That is minus 1.86 percentage points below baseline. The phase 0 state is the transition zone and the smallest sample share (8.4 percent); interpretation is less reliable.

The phase minus one state (EXTREME_NEG, silver rich, composite below minus 0.3), 1,545 trading days, delivered mean plus 3.62 percent. That is plus 1.30 percentage points above baseline. Percent-positive forward 60d was 75.4 percent. Interpretation: silver-rich regimes have historically coincided with precious-metals bull cycles that run alongside risk-on broader equity cycles (2011 Occupy-

silver, 2021 WallStreetBets-silver-squeeze). The SPY-aligned signature is positive to neutral on both extremes.

The Spearman information coefficient of the composite against SPY 60-day forward returns is minus 0.0359 (p = 1.00e-03, N = 8,411), marginally significant with negative sign. The silver-aligned grader information coefficient (per the firm's data inventory notes) is reported at plus 0.218 for Z6901 against the SI target. The SPY-aligned reading is noisier because gold-silver ratio dynamics are more tightly linked to the SI-GC pair than to broader equity.

The SI-aligned signature episodes anchor the signal's strongest interpretation: the three EXTREME_POS entries (April 2003, October 2008, March 2020) delivered silver forward 252-day returns of 18.80, 35.18, and 67.80 percent respectively. Median plus 35 percent at 252 days. Readers should treat this as the signal's base case for the mean-reversion interpretation.

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How to use the signal today

This is a long-horizon mean-reversion lens. Readers should not treat today's reading as a this-week trade thesis.

Three best uses.

First, as a silver-timing mean-reversion lens. When the composite is in EXTREME_POS state, the gold-silver ratio is at a historical extreme (silver cheap vs gold). The three in-sample EXTREME_POS entries delivered silver forward 252-day returns of 18.80, 35.18, and 67.80 percent respectively. Allocators considering silver exposure can read sustained EXTREME_POS as a mean-reversion setup, with the understanding that the forward return edge is strongest at the 252-day horizon.

Second, as a confirming lens for silver and gold playbooks. The Silver Gold-Silver Ratio Regime Playbook treats this signal as one of six ratio-reading members. When this signal confirms during a mean-reversion episode, it adds to the playbook's conviction state. The playbook's multiple ratio-reading members with mixed polarities (four AS_IS positive, two inverted) build a conviction composite that fires on multi-channel agreement.

Third, as a regime diagnostic for precious-metals cycles. Silver's higher beta compared to gold means the ratio compresses during bull cycles (silver outperforms) and spikes during panic liquidations (silver underperforms). The signal reads this cycle directly. Readers using this as a regime diagnostic should know silver-rich regimes (phase minus one) have historically marked the midpoints of bull cycles, not the ends; the 2011 ratio compression to 32 was followed by a further silver rally to the September 2011 ATH at 49.80 dollars before the full reversal.

For allocators considering silver or equity exposure, today's composite at plus 0.1914 is in BASELINE state with 11 days in current phase. The reading is in the 29th percentile of its 36-year history, below the long-term positive mean. Phase 0 state has delivered minus 1.86 percentage points below baseline SPY forward 60-day returns in sample, but the state is a transition zone and interpretation is less reliable than for the extremes.

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Methodology notes

The signal's SPY-aligned Spearman information coefficient against SPY 60-day forward returns is minus 0.0359 (Spearman rank, N = 8,411, p = 1.00e-03). The sign is negative, marginally significant at the 1 percent threshold. The silver-aligned grader information coefficient is reported at plus 0.218 for Z6901 against the SI target (grader rating PRED B+ DUAL_USE STAB B). State-conditional SPY forward 60-day returns: phase plus one at plus 2.22 percent (N = 6,115), phase zero at plus 0.46 percent (N = 751), phase minus one at plus 3.62 percent (N = 1,545, 75.4 percent positive).

The composite is tanh-bounded at plus or minus one and discretized to three state codes at the plus-or-minus 0.3 thresholds. The engine applies no additional post-processing beyond the trailing z-score, three-sigma clip, and the tanh bound.

The engine's polarity annotation reads: "Bullish SI" with `composite_direction = AS_IS` (high ratio = silver cheap = mean-reversion = bullish SI). The parent playbook wires with polarity sign plus one (sign-aligned). Parquet state-conditional confirms the direction on the SI target: the three signature EXTREME_POS entries (April 2003, October 2008, March 2020) delivered silver forward 252-day returns of 18.80, 35.18, and 67.80 percent respectively, strongly consistent with the engine's silver cheap-to-mean-revert-to-bullish-SI interpretation. The SPY-aligned signature is less clean (phase plus one at baseline, phase minus one above baseline); gold-silver ratio dynamics are more tightly linked to the SI-GC pair than to broader equity, so the SI-target alignment is the correct frame for this signal. The polarity audit result is MATCH on the SI target and NOISY on the SPY target. Readers using this signal should understand it is a silver-aligned mean-reversion lens, not an SPX directional lens.

Three complete sample episodes anchor the EXTREME_POS calibration: April 2003 (pre-GFC baseline silver-cheap regime, silver forward 252-day plus 18.80 percent), October 2008 (GFC panic trough, silver forward 252-day plus 35.18 percent), and March 2020 (COVID all-time ratio high at 125, silver forward 252-day plus 67.80 percent). Median across the three is plus 35 percent at 252 days.

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What this signal does not cover

Six caveats on the signal's reach, each stated plainly.

First, silver's industrial-demand base has shifted meaningfully since 2020. Photovoltaic (solar) silver consumption has grown from roughly 100 million ounces in 2018 to roughly 200 million ounces in 2026. Electric vehicle silver demand (contact points, battery technology) adds another 50 to 80 million ounces per year of structural demand. The ratio's historical range (30 at silver-rich extremes, 125 at silver-cheap extremes) may be evolving as silver's demand base deepens. Readers extrapolating from the three historical signature episodes to future dislocations should know the mechanical base is shifting. The post-2020 industrial-demand surge may compress the ratio's mean-reversion tendency compared to the pre-2020 regime.

Second, the 2020 ratio reading of 125 was anomalous. The all-time ratio high was a function of specific COVID-funding-crisis mechanics (silver harder-hit than gold during acute liquidation), not a routine extreme. Readers should not treat 125 as a baseline mean-reversion entry point; the historical

modal silver-cheap extreme is closer to 85. The 2020 case is the strongest in-sample mean-reversion episode but is unlikely to recur in the same form.

Third, silver has roughly 2x the volatility of gold on daily returns, which makes the ratio's mean-reversion dynamics noisier at the daily level than at the monthly level. The 504-day z-score construction filters daily noise but still produces meaningful swings. Readers using this signal for short-horizon directional calls (less than 60 days) will be disappointed; the forward return edge is strongest at the 252-day horizon.

Fourth, phase imbalance is heavy to phase plus one (68.8 percent of sample). This reflects the composite's long-term positive mean (plus 0.41), which is consistent with gold's structural outperformance of silver since 1990. Readers should understand phase plus one is NOT the "unusual" state; it is the modal state in this sample. The three signature EXTREME_POS entries (2003, 2008, 2020) are embedded in a large sample of phase plus one days; the full-sample statistics do not isolate the signature-episode effect.

Fifth, the three signature EXTREME_POS entries all coincided with broader market stress (pre-GFC macro deterioration, GFC panic, COVID funding crisis). The out-of-stress mean-reversion signature is less clear. Readers using this as a quiet-regime mean-reversion signal should know the three signature cases all had meaningful macro context driving them. The 2024-to-2025 304-day phase plus one run (the fifth-longest in the sample) did NOT produce the same magnitude of silver mean-reversion, consistent with the different (non-crisis) macro context.

Sixth, the gold-silver ratio is a two-asset relative-value signal; it does not capture absolute price direction. The signal fires when the ratio is extreme, but the forward return it is reading is RELATIVE (silver outperforms gold) rather than absolute (silver up in dollar terms). In regimes where both metals correct together, silver can underperform gold's correction (deeper drawdown) despite the ratio compressing. Readers should combine this signal with absolute-price lenses (COMEX silver momentum, silver ETF flow, silver physical demand) for a complete read.

Not investment advice. The analysis in this brief is informational and educational. Signal readings, historical case figures, and empirical statistics are derived from publicly available data (gold front-month settlements on COMEX, silver front-month settlements on COMEX, both under the CME Group umbrella, SPY end-of-day closes on NYSE Arca) and are provided without warranty. Hypothetical performance results have inherent limitations. Readers should consult their own financial advisor before making any investment decision. (c) 2026 David Stendahl.