The BIS China Credit-Gap Twelve-Month Change Gated By Northern-Hemisphere Copper Seasonality

Why multiplying the BIS China credit-impulse by cosine-encoded day-of-year seasonality produces one of the strongest state-conditional edges in the metals signal estate, how the 2009 Q1 post-GFC stimulus took the composite to its series maximum, and why the 2024 Q2 series minimum did NOT precede a copper collapse.

David Stendahl · Market Lab Analytics · November 5, 2026

What this signal is

China consumes roughly fifty-five percent of global refined copper. Chinese credit cycles drive that consumption on a three-to-six-month lag. But the lag does not operate uniformly across the year. Northern-Hemisphere physical copper restocking concentrates November through March; Northern-Hemisphere destocking weighs May through August. A strong China credit expansion arriving in October has more price impact than the same expansion arriving in May, because the buyers are already active in October.

This signal captures the interaction. The BIS China credit-gap twelve-month change (the standard macro-finance measure of Chinese credit impulse, computed as the trailing year-on-year change in the nonfinancial-private credit-to-GDP gap) is multiplied by a cosine-encoded day-of-year seasonality term that peaks near January first and troughs near July first. The product is z-scored on a 504-day rolling window and bounded through hyperbolic tangent. A reading near plus one is a credit-expansion-meets-restocking regime. A reading near minus one is a credit-contraction-meets-destocking regime.

On March 3, 2009 the composite hit its series maximum at plus 1.0000, exactly during the Q1 2009 copper restocking window as the four-trillion-yuan Chinese stimulus landed through the banking system. Copper rallied from 170 to 450 cents per pound over the following two years, the 2009-2011 copper supercycle. On April 2, 2024 the composite hit its series minimum at minus 0.9753 as weak Chinese credit growth coincided with Q2 destocking. Copper did NOT collapse from here; AI-driven data-center demand and Chilean supply constraints lifted price through 2025 even with the demand signal negative.

Today the composite reads near minus 0.78, in Moderate-Negative territory. The reading reflects continued Chinese credit soft-landing dynamics combined with Northern-Hemisphere autumn seasonality. Copper direction over the next 60 days is unlikely to be driven by China demand alone.

Here is what the engine data says. The Spearman information coefficient of the composite against copper forward 60-day returns is plus 0.23 across 8,206 live-window trading days. State-conditional means: Phase +1 credit-and-seasonal-strong state delivered forward 60-day copper return of plus 6.02 percent; Phase 0 Normal delivered plus 0.66 percent; Phase −1 delivered minus 0.18 percent. The polarity is as-is positive. Read on for the three cases that frame the signal, the state-conditional evidence, and the four caveats that mark the limits of the lens.

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How the inputs compose

BIS (Bank for International Settlements) publishes quarterly credit statistics for the major economies. The “credit-to-GDP gap” is the deviation of the private nonfinancial credit-to-GDP ratio from its long-term trend; it is the standard macro-finance measure of credit stress or excess. The “credit impulse” is the 12-month change in this gap: how much the credit-expansion rate has accelerated or decelerated over the past year.

The engine pulls the BIS China credit-gap quarterly series, computes the trailing 12-month change, and forward-fills to a daily index. This is the demand-side input.

The seasonality term is a cosine function of day-of-year: cos(2 pi (doy - 1) / 365). The function peaks at plus one on January 1 (deep in the restocking window) and troughs at minus one on July 1 (deep in the destocking window). The term crosses zero around April 1 and October 1.

The product of the two inputs is the raw signal. This product is z-scored on a trailing 504-day (approximately two-year) window with 252-day minimum population, then passed through tanh with scale 1.5. The result is a bounded composite between minus one and plus one.

The engine also exposes four confirming features: five-day composite velocity, 60-day volatility regime, 60-day correlation with copper daily returns, and 63-day lag-1 autocorrelation.

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What the state-conditional returns have actually done

The copper forward-60-day return baseline (unconditional) is mean plus 1.30 percent, median plus 0.83 percent. Standard deviation 8.51 percent. Percent negative 44.5 percent. State-conditional means below are expressed as edges relative to this baseline.

> **Reference baseline (8,206 copper-aligned forward-60-day windows from December 1993 through November 2026)**
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> Copper forward-60-day return baseline (unconditional): mean plus 1.30 percent, median plus 0.83 percent. Standard deviation 8.51 percent. Percent negative 44.5 percent. Phase 0 source: Z102090 engine parquet joined with COMEX HG back-adjusted continuous closes.

The Credit-and-seasonal-strong state (Market_Phase_Int = +1), 1,427 trading days or 17.3 percent of sample, delivered a mean forward 60-day copper return of plus 6.02 percent. That is plus 4.72 percentage points above baseline, one of the largest state-conditional edges in the metals signal estate. Percent-negative only 21.3 percent; roughly four in five days in this state preceded positive copper fwd 60-day returns.

The Normal state (Market_Phase_Int = 0), 3,930 trading days or 47.5 percent of sample, delivered mean plus 0.66 percent. That is minus 0.64 percentage points below baseline. Percent-negative 47.8 percent. The modal state where the credit × seasonality interaction is in neither extreme.

The Credit-and-seasonal-weak state (Market_Phase_Int = −1), 2,909 trading days or 35.2 percent of sample, delivered mean minus 0.18 percent. That is minus 1.48 percentage points below baseline. Percent-negative 51.6 percent, above the fifty-percent neutral line. The 2015-2016 window and the 2024-2026 window both live here.

The spread between Credit-and-seasonal-strong and Credit-and-seasonal-weak forward returns is plus 6.20 percentage points at 60 days, among the largest state-conditional edges across the signal library. The Spearman information coefficient of the composite against copper forward-60-day returns is plus 0.23 at N 8,206.

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Three cases that frame how to read the signal

Case 1: March 2009 post-GFC Chinese stimulus during Q1 restocking

The Chinese State Council announced a four-trillion-yuan fiscal stimulus in November 2008. The credit transmission arrived through the banking system across Q1 2009. On March 3, 2009 the composite hit its series maximum plus 1.0000 as the credit-impulse term reached its highest reading and the seasonality term was still deep in restocking territory. Copper went on to rally from 170 cents per pound in early 2009 to 445 cents by April 2011, the 2009-2011 supercycle.

This is the canonical demonstration. Both inputs aligned, the composite saturated, and the forward return was enormous.

Case 2: 2015 through 2016 China hard-landing concerns

The 2013-2014 Chinese credit boom reversed through 2015 as regulators tightened and the stock-market correction raised hard-landing fears. The credit-impulse term fell deep into negative territory. The seasonality term could not offset the collapse in credit. Copper fell from 310 cents per pound in May 2014 to 196 cents by January 2016, the worst copper bear market since the dot-com era.

The composite stayed in negative territory across most of the window. Forward returns were muted to negative. The signal caught the regime change.

Case 3: April 2024 series minimum did NOT precede a copper collapse

The composite reached its series minimum minus 0.9753 on April 2, 2024 as the Chinese credit cycle remained weak and Q2 seasonal destocking weighed. But copper did not collapse. The signal was correct about weak demand; it was wrong about the resulting price path because supply-side constraints (Chilean drought, Peru political crisis, DRC permit shifts) tightened the physical market simultaneously.

This is the critical case that defines the signal's limits. The composite is a demand-side read. When supply-side constraints offset weak demand, copper can rally even with this composite deeply negative. Readers must pair with supply signals for a two-sided view.

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How to use the signal today

This is a slow-moving demand-side regime identifier. Peak information coefficient horizon is approximately 60 trading days. The signal moves on quarterly BIS releases and on the daily seasonality rotation.

Three best uses.

First, as a demand-side regime filter for copper exposure sizing. Credit-and-seasonal-strong state has delivered the strongest state-conditional edge in the metals estate: plus 6.02 percent mean fwd 60d. Allocators adjusting copper exposure can read this state as a high-conviction confirming signal for constructive direction.

Second, as a timing filter for China credit news. When the composite is near zero, Chinese credit releases carry limited directional information. When the composite is near plus or minus 0.6, new credit data can push it to extremes and the state transition is the signal.

Third, as the demand-side leg of a two-sided copper framework. Pair with ACLED copper-belt events (supply geopolitical), Chile and Peru water-stress signals (supply physical), and LME inventory or TC/RC charges (physical balance). When demand (this signal) and supply align, conviction is highest.

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Methodology notes

The composite is tanh of a 504-day z-score of the product of (BIS China credit-gap 12-month change) times (cos(2 pi (doy-1) / 365)). The 504-day window was chosen because it captures two full annual cycles while remaining responsive to credit regime shifts; shorter windows amplified seasonality artifacts, longer windows diluted the credit signal.

The BIS data is quarterly and forward-filled to daily. Intra-quarter composite movements come from the seasonality rotation, not from new credit information. Readers should expect the composite to drift smoothly across months within a quarter and to re-anchor at each new BIS release.

The polarity is as-is positive. Higher composite equals credit expansion aligning with seasonal restocking equals constructive copper demand. Full-sample Spearman IC against copper forward 60-day returns is plus 0.23 at N 8,206.

The 1993 start reflects BIS data coverage onset for China; earlier data was unreliable.

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What this signal does not cover

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

First, this is a demand-side read only. Supply-side shocks (Chilean drought, Peru political instability, DRC regulatory shifts, Zambia Copperbelt strikes) can and do override the demand signal. The 2024-2026 window is the canonical demonstration: composite deeply negative, copper rose on supply tightness.

Second, the BIS credit data is quarterly. Intra-quarter composite moves come from the seasonality rotation, not from fresh credit information. Readers should anchor their expectations around the quarterly BIS release dates.

Third, the seasonality term is a fixed cosine function; it does not respond to changes in the seasonal demand pattern itself. The Northern-Hemisphere Q4-Q1 restocking has persisted for decades, but structural changes in Chinese inventory management (strategic stockpile cycles, smelter maintenance scheduling shifts) could in theory weaken the seasonal gate.

Fourth, the credit-impulse concept has multiple definitions across the literature. The engine uses specifically the BIS nonfinancial-private credit-to-GDP gap 12-month change. Other variants (IIF credit impulse, Pettis credit-gap) produce different numeric outputs that would, if substituted, change the state transitions and historical case anchors in this brief.

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 (BIS credit statistics quarterly release; COMEX end-of-day copper back-adjusted continuous settles) 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.