The KC CPI Inflation Regime Z-Score Signal: Macro Inflation as an Arabica Regime Overlay

Why US CPI year-over-year z-scored on a rolling 5-year window delivers a modest but statistically significant 3.9 pp directional spread on Arabica forward 60-day returns across 36 years.

David Stendahl · Market Lab Analytics · November 5, 2026

The signal with the limits stated upfront

Three things the reader must know before the rest of this brief lands.

First, the full-distribution daily Spearman information coefficient against Arabica forward 60-day returns is minus 0.034 at p-value 0.001 on a sample of 8,947 daily observations spanning 1990 through 2026. Statistically significant on the 36-year window but modest in magnitude. The signal carries macro regime information rather than high-conviction directional edge.

Second, Phase +1 (High Inflation) delivers minus 2.01 percentage points below baseline across 3,102 trading days (34.7 percent of sample) and Phase −1 (Disinflation) delivers plus 1.89 percentage points above baseline across 4,385 days (49.0 percent). 3.90 pp directional spread. The pattern is monotone and symmetric around baseline.

Third, the polarity is contrarian relative to the stagflation thesis the engine was named for. The engine description reads “stagflation equals softs bull setup”; the empirical says high inflation precedes KC weakness, disinflation precedes KC strength. The brief frames the signal on the empirical, not on the a priori mechanism.

The thesis: inflation as a macro regime variable

US consumer price inflation is a macro regime variable that affects every commodity. The transmission channels run through the real-yield channel (Fed tightening response to inflation raises real yields, which compresses commodity valuations), the dollar channel (Fed tightening strengthens the dollar, which pressures dollar-priced commodities), and the risk-rotation channel (high-inflation regimes historically coincide with risk-off commodity complexes).

Arabica is sensitive to this macro backdrop beyond its own supply-demand fundamentals. When inflation runs hot, the Fed tightens, real yields rise, the dollar strengthens, and commodities rotate out of favor. Arabica rolls over. When inflation cools, the opposite backdrop obtains and commodities become easier to hold.

The signal takes CPIAUCSL (US Consumer Price Index for All Urban Consumers, All Items, Seasonally Adjusted) year-over-year change, z-scores on a rolling 5-year window, and tanh-bounds. State thresholds plus or minus 0.2 (moderate) and plus or minus 0.5 (extreme). Phase +1 at composite above +0.3, phase −1 below −0.3. Target: ICE US Coffee C first-nearby back-adjusted close.

Historical window: FRED CPIAUCSL from 1947; engine runs from 1990 onward with 504-bar warmup.

What the firings have actually done

Computed over 8,947 daily observations post-warmup from 1990 onward.

> **Baseline Arabica forward 60-day return:** mean plus 2.32 percent / median minus 0.96 percent across the live-window sample.
>
> **Daily Spearman IC (fwd 60d):** minus 0.034, p-value 0.001, N equals 8,947. Statistically significant but modest.
>
> **Non-overlap IC (60-day step):** minus 0.032, p-value 0.70, N equals 150. Sign-consistent but not independently significant.
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> **Phase-conditional forward 60-day Arabica returns:** Phase +1 (High Inflation, 3,102 days / 34.7 pct): plus 0.30 percent, edge minus 2.01 pp. Phase 0 (On Trend, 1,460 days / 16.3 pct): plus 0.91 percent, edge minus 1.40 pp. Phase −1 (Disinflation, 4,385 days / 49.0 pct): plus 4.21 percent, edge plus 1.89 pp.
>
> 3.90 pp directional spread between Phase +1 and Phase −1 with clean monotone phase pattern.

Three findings. The daily IC is significant but modest; macro regime signals are expected to carry diffuse rather than concentrated directional information. The monotone phase pattern cleanly separates High Inflation from Disinflation regimes with 3.90 pp spread. The 49 percent sample share for Disinflation means the Phase −1 edge is the better-sampled tail.

Three cases that frame how to read the signal

The canonical anchors are the 2022-2023 Fed tightening cycle, the 2008 pre-crisis inflation peak, and the 2015 oil-collapse disinflation.

Case 1: The 2022-2023 Fed tightening cycle

High Inflation firing anchored the 2022-2023 Fed tightening cycle as US CPI peaked above 9 percent year-over-year. Composite held in Phase +1 territory through the aggressive tightening regime. Arabica traded choppy with net weakness through the regime despite 2022 Brazilian frost concerns; macro headwinds suppressed the fundamental-supply response consistent with the Phase +1 edge.

Case 2: The 2008 pre-crisis inflation peak

High Inflation firing in July 2008 at the peak of the pre-Lehman commodity cycle. Composite held in Phase +1 territory through the peak as oil hit 147 and headline CPI exceeded 5 percent. Arabica rolled

over through late 2008 consistent with the Phase +1 weakness pattern. The subsequent crisis deepened the move but the Phase +1 firing preceded the peak.

Case 3: The 2015 oil-collapse disinflation

Disinflation firing through 2015 as the oil price collapse dragged headline CPI below 1 percent year-over-year. Composite held in Phase −1 territory through the extended disinflation. Arabica delivered material forward returns through 2015-2016 consistent with the Phase −1 edge; low-inflation regimes historically give commodity-friendly backdrops.

How to use this signal today

Composite is currently reading plus 0.720 in the High Inflation band. The HEALTHY phase began August 2026, 62 trading days ago. US CPIAUCSL year-over-year has run above the rolling 5-year z-score mean through 2026 consistent with high-inflation macro regime.

Pair with the following for stacked conviction: real yields (10-year TIPS yield), the dollar index, Fed funds futures (policy expectations), and fundamental Arabica supply signals (ENSO, CHIRPS, Brazil CONAB). This macro regime signal provides the top-down context; pair with bottom-up supply fundamentals for full conviction.

Reader rule: High Inflation firings flag macro-headwind regimes where fundamental KC tightening may fail to translate to price. Disinflation firings flag macro-tailwind regimes where fundamental supply shocks amplify.

Methodology

Data source: FRED CPIAUCSL (US Consumer Price Index for All Urban Consumers, All Items, Seasonally Adjusted). Computation: year-over-year percent change, z-scored on a rolling 5-year window, tanh-bounded to plus or minus one. State thresholds plus or minus 0.2 (moderate) and plus or minus 0.5 (extreme). Phase +1 at composite above +0.3, phase −1 below −0.3. Target: ICE US Coffee C first-nearby back-adjusted close.

Historical window: FRED CPIAUCSL from 1947; engine runs from 1990 onward with a 504-bar warmup for the rolling z-score.

Validation computed on 8,947 post-warmup daily observations. Daily Spearman IC minus 0.034 at p-value 0.001 across 8,947 observations, statistically significant but modest. Phase +1 per-day forward return plus 0.30 percent (minus 2.01 pp below plus 2.32 percent baseline). Phase −1 per-day forward return plus 4.21 percent (plus 1.89 pp above baseline). 3.90 pp directional spread. Non-overlap IC at 60-day sampling minus 0.032 at p-value 0.70 across 150 samples, sign-consistent but not independently significant.

Note on polarity. The engine description reads “stagflation equals softs bull setup” and was named with that a priori thesis. The empirical pattern is the opposite: high inflation precedes KC weakness, disinflation precedes KC strength. The brief frames the signal on the empirical.

What this signal does not cover

The signal does not capture inflation expectations (see TIPS breakevens). It does not capture Fed policy independently of its inflation response (see Fed funds futures). It does not capture Arabica-specific supply conditions (see ENSO, CHIRPS, Brazil CONAB signals). The monthly cadence limits short-horizon use; macro regime shifts can be abrupt and the signal does not capture them with sub-monthly resolution.

Disclaimer

This brief and the signal it describes are for informational purposes only and do not constitute investment, legal, tax, or trading advice. Hypothetical or simulated performance results have certain inherent limitations. Unlike an actual performance record, simulated results do not represent actual trading. Also, since the trades have not been executed, the results may have under- or over-compensated for the impact, if any, of certain market factors, such as lack of liquidity. Simulated trading programs in general are also subject to the fact that they are designed with the benefit of hindsight. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. The phase-conditional forward-return stats reported above are a full-sample unconditional measurement. Readers should consult a licensed financial professional before taking any trading action.

References

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