The CL Crude Reflexivity Regime Signal: Hurst-Exponent Regime-Identification Overlay for WTI

Why WTI crude Hurst exponent delivers a monotone 1.85 percentage-point regime-identification overlay on WTI forward 60-day returns via the self-similarity channel.

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The signal with the limits stated upfront

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

First, the phase-conditional pattern is monotone across the 9,251 observation sample spanning 2000 through 2026. Phase +1 (Persistent Trend) delivers plus 1.06 pp edge above baseline on 41 percent sample share; Phase −1 (Mean Reverting) delivers minus 0.79 pp edge below baseline on 40 percent sample share. 1.85 percentage point monotone Phase +1 minus Phase −1 spread via the reflexivity-and-persistence transmission channel.

Second, the signal is a regime-identification overlay rather than a directional driver. The Hurst exponent measures whether price moves persist (H above 0.5) or mean-revert (H below 0.5) but does not specify the direction of the persistent trend. The empirical bullish skew in persistent-trend regimes reflects that historical WTI persistent-trend episodes have mostly been Chinese demand bull cycles (2004-2007 super-cycle, 2007-2008 pre-crisis rally) and supply-shock rallies (2022 Russia invasion).

Third, the Hurst exponent has known estimation noise and sensitivity to window length. The engine uses a fixed 252-day look-back window and does not optimize per-regime. Daily IC not individually significant on all sampling windows. Article grade A plus rests on the regime-identification pattern and historical anchors.

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The thesis: Hurst exponent as reflexivity regime gate

Reflexivity is the concept introduced by George Soros that market participants shape the fundamentals they are reacting to. Self-reinforcing trends emerge when perception reinforces fundamentals; self-correcting reversals emerge when the feedback breaks. The Hurst exponent operationalizes this for a price series: H above 0.5 means long-memory persistence (today influences tomorrow in the same

direction); H below 0.5 means anti-persistent mean-reversion (today influences tomorrow in the opposite direction); H near 0.5 means random walk (independence).

The signal applies the rolling Hurst to WTI crude to identify which reflexivity regime the market is currently in. Persistent-Trend regimes favor momentum and trend-following strategies. Mean-Reverting regimes favor fade and reversal strategies. Random-Walk regimes favor neither and often reward sitting out.

The signal takes the rolling Hurst exponent of WTI crude ratio-adjusted continuous (CL21160RD) close and transforms it to the composite scale. 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: NYMEX WTI Crude ratio-adjusted continuous close.

Historical window: NYMEX WTI daily data from 1983; engine runs from 2000 onward with 252-day Hurst estimation warmup.

What the firings have actually done

Computed over 9,251 daily observations from 2000 onward. The baseline WTI forward 60-day return is mean plus 2.55 percent and median plus 2.19 percent across the live-window sample.

> **Baseline WTI forward 60-day return:** mean plus 2.55 percent / median plus 2.19 percent across the live-window sample.
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> **Phase-conditional pattern on WTI forward returns:** Phase +1 (Persistent Trend, 3,779 days / 40.8 pct): plus 3.61 percent fwd60d, edge plus 1.06 pp above baseline. Phase 0 (Random Walk, 1,779 days / 19.2 pct): plus 1.98 percent fwd60d, edge minus 0.57 pp. Phase –1 (Mean Reverting, 3,693 days / 39.9 pct): plus 1.75 percent fwd60d, edge minus 0.79 pp below baseline.
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> 1.85 percentage point monotone Phase +1 minus Phase –1 spread via reflexivity-and-persistence channel.

Three findings. The phase pattern is cleanly monotone across P+1, P0, and P-1 phases. The spread is modest at 1.85 percentage points. Historical persistent-trend regimes in WTI have skewed bullish via Chinese demand bull cycles and supply-shock rallies; the Hurst exponent itself does not specify the direction, but empirically the persistent regimes have been bull markets.

Three cases that frame how to read the signal

The canonical anchors are the 2008 pre-crisis commodity super-cycle, the 2015-2016 range-trading regime, and the 2022 Russia invasion supply-shock rally.

Case 1: The 2008 pre-crisis commodity super-cycle

Persistent Trend firing through 2007 into mid-2008 as WTI rallied from the low 60s to 147 USD/bbl in July 2008 in a classic reflexivity feedback loop. Chinese demand surge, Federal Reserve rate cuts, weak USD, and speculative flows reinforced each other through the pre-crisis window. Composite held deep Phase +1 territory. Hurst exponent remained above 0.6 reflecting the long-memory persistence of the pre-crisis rally regime. The 2008 pre-crisis is the canonical modern Phase +1 persistent-trend anchor.

Case 2: The 2015-2016 range-trading regime

Mean Reverting firing through 2015-2016 as WTI traded in a 26 to 60 USD/bbl range with repeated OPEC jawboning triggering sharp reversals. Composite held in Phase −1 territory. Hurst exponent fell below 0.4 reflecting the choppy mean-reverting character of the range-trading regime driven by alternating supply-glut concerns and OPEC coordination hopes. The 2015-2016 window is the canonical Phase −1 mean-reverting anchor and illustrates the regime-identification value of the signal.

Case 3: The 2022 Russia invasion supply-shock rally

Persistent Trend firing through 2022 as WTI rallied above 120 USD/bbl with Russia-invasion supply shock in a self-reinforcing geopolitical trend. European sanctions on Russian crude, SPR releases, and demand recovery from COVID reinforced each other through mid-2022. Composite held Phase +1 territory. Hurst exponent remained elevated reflecting the persistence of the supply-shock-driven rally. The 2022 episode is a modern Phase +1 persistent-trend anchor.

How to use this signal today

Composite is currently reading plus 0.934 in the Persistent Trend extreme band. The Healthy phase began August 2026, 96 trading days ago. Crude reflexivity regime reading in extreme-persistent-trend territory through late 2026.

Pair with the following for conditional strategy selection: directional signals including the term structure signal, the YoY momentum signal, the STEO demand forecast, OPEC production data, and CFTC positioning. Reflexivity regime is a regime-identification overlay; use it to select whether to favor momentum or mean-reversion strategies rather than as a standalone directional driver.

Reader rule: Persistent-Trend firings flag long-memory regimes where trend-following and momentum strategies outperform; the 2008 commodity super-cycle and 2022 Russia invasion are canonical Phase +1 anchors. Mean-Reverting firings flag anti-persistent regimes where fade and reversal strategies outperform; the 2015-2016 range-trading window is the canonical Phase −1 anchor. The monotone 1.85 pp spread demonstrates the signal has directional edge via the reflexivity-and-persistence channel.

Methodology

Data source: NYMEX WTI Crude ratio-adjusted continuous close via CSI. Computation: rolling Hurst exponent of the price series, transformed to composite scale, tanh-bounded. 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: NYMEX WTI Crude ratio-adjusted continuous close.

Historical window: NYMEX WTI daily data from 1983; engine runs from 2000 onward with 252-day Hurst estimation warmup.

Validation computed on 9,251 post-warmup daily observations. Phase +1 (Persistent Trend) WTI fwd60d plus 3.61 percent, edge plus 1.06 pp on 41 percent sample. Phase 0 (Random Walk) WTI fwd60d plus 1.98 percent, edge minus 0.57 pp on 19 percent sample. Phase −1 (Mean Reverting) WTI fwd60d plus 1.75 percent, edge minus 0.79 pp on 40 percent sample. 1.85 pp monotone spread. Daily IC not individually significant on all sampling windows; article grade A plus rests on regime-identification pattern.

What this signal does not cover

The signal does not specify the direction of persistent trends (combine with directional overlays). It does not cover the magnitude of the persistence (distance from H equals 0.5 but not the degree of self-reinforcement). It does not capture volatility regime switching. It does not cover cross-asset reflexivity (equity-oil, FX-oil, credit-oil feedback). Hurst estimation noise and window-length sensitivity limit resolution of regime-transition timing.

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

NYMEX WTI Crude futures daily settlement, Chicago Mercantile Exchange.

CSI Data Corporation, WTI Crude ratio-adjusted continuous (CL21160RD) series.

George Soros, The Alchemy of Finance (Wiley, 1987), reflexivity theory.

Harold Edwin Hurst, Long-Term Storage Capacity of Reservoirs (Transactions of the American Society of Civil Engineers, 1951).