The Smoothed Pork Cutout Signal, Read as the Confirming Trend Reader

Why the 5-day-smoothed pork cutout year-over-year is the slower confirming vote next to the raw daily sibling, and the small-but-real conditional tail asymmetry at the extremes.

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What this signal is

The raw daily pork cutout jumps around on packer reporting quirks, holiday-week distortions, and single-plant transaction timing. The USDA Agricultural Marketing Service publishes a 5-day moving average alongside the daily print, giving the industry a smoothed-trend reference that strips the day-to-day noise.

This signal reads the 5-day-smoothed pork cutout from the USDA LM_PK602 Daily Pork Cutout report, computes year-over-year percent change over 252 trading days, z-scores the growth over roughly two years with 60-day minimum, and bounds with tanh. The engine declares `composite_direction: AS_IS` with `semantic_positive: Bullish LH`. A composite above plus 0.5 means the 5-day cutout is running roughly two standard deviations above year-ago. A composite below minus 0.5 means it is running roughly two standard deviations below.

Over the full 1990 to 2026 window joined through the Lean Hogs reference asset, the signal's Spearman information coefficient against forward-60-day Lean Hogs returns is minus 0.0154 at p = 1.44e-01 across 8,986 trading days. The IC is small and NOT statistically significant. This is the weakest signal in the six-member Lean Hogs batch covered in this delivery. The sixty-day forward return does not reliably rank with the signal.

However, the state-conditional tail readings carry informational content. The High-Cutout tail (composite above plus 0.5), 839 state-days, delivered a mean forward-60-day Lean Hogs return of minus 0.53 percent, roughly 0.9 points below the plus 0.41 percent baseline. The Low-Cutout tail (composite below minus 0.5), 1,016 state-days, delivered mean plus 3.26 percent, 2.8 points above baseline. The empirical direction matches the raw daily cutout sibling (Z3481), which also reads inverted from the engine declaration.

On January 7, 2021, as the 5-day-smoothed cutout had faded through late 2020 after the post-COVID holiday-demand bulge, the composite entered Low-Cutout at minus 0.519 with Lean Hogs at 69.12 cents per pound. Over the next 60 trading days, Lean Hogs rallied 50.21 percent to 103.82. On

May 23, 2023, as both the raw and smoothed cutout readings had faded on fading China African Swine Fever export tempo, the composite entered Low-Cutout at minus 0.507 with Lean Hogs at 80.67. Over the next 60 trading days, Lean Hogs rallied 38.26 percent to 111.57. On May 4, 2020, in the middle of the April 2020 packer-shutdown dislocation when cutout had spiked, the composite entered High-Cutout at plus 0.665 with Lean Hogs at 65.50. Over the next 60 trading days, Lean Hogs fell 32.01 percent to 44.55 as the live-hog pipeline backed up.

Here is the twist. The 5-day smoothing slows the signal enough that its aggregate IC loses statistical significance. The raw daily sibling (Z3481) delivers IC rho = minus 0.0560 at p = 1.85e-07 (strongly significant); this smoothed version delivers IC rho = minus 0.0154 at p = 0.14 (not significant). For composite weighting, this signal should carry one-third the weight of its raw sibling, or be dropped as near-redundant.

Read on for the mechanism, the three signature cases, and the five caveats.

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How the inputs compose

The USDA Agricultural Marketing Service National Daily Pork Report (LM_PK602) publishes a 5-day moving-average pork carcass cutout value as `avg_5day_carcass` key_metric. The pre-smoothing happens upstream in the AMS calculation; this engine does not apply additional smoothing. The signal reads 3,009 daily observations starting January 2015.

The 5-day moving-average flattens the Monday-vs-Friday intra-week pattern (Monday prints typically carry weight from the weekend close and following week's early transactions) and reduces single-day packer-report noise. The resulting signal is slower to turn than the raw daily (Z3481) but less prone to false-breakout tail readings on single-day prints.

The YoY transform (252 trading days as `a 252-trading-day percent change` would under raw; this engine uses `(s - s.shift(252)) / s.shift(252)` for the YoY construction) strips the seasonal pattern. The z-score over 504 trading days with 60-day minimum normalizes to the rolling baseline.

Mechanistically, see the Z3481 brief for the full two-channel analysis (direct wholesale demand channel versus second-order packer kill-rate channel). Z4738 reads the same mechanism as Z3481 at slower cadence. During on-cycle regimes the two correlate strongly; during supply-shock onsets they diverge for about one week before the smoothed version catches up.

The empirical polarity direction matches Z3481: strong-cutout empirically precedes forward Lean Hogs weakness through the packer kill-rate transmission; weak-cutout empirically precedes forward strength through the kill-rate pullback. The engine's declared direction (`AS_IS` with `semantic_positive: Bullish LH.`) is empirically inverted; reader-facing semantics in this brief present the direction as the measured tail readings dictate.

Four confirming features run alongside: five-day velocity, 20-day over 252-day volatility regime, 63-day correlation with Lean Hogs returns, 63-day autocorrelation.

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Three cases that frame how to read this signal

Case 1: January 7, 2021. The post-holiday-fade on-mechanism rally.

Firing date: the composite entered Low-Cutout at minus 0.519 on January 7, 2021. Lean Hogs front-month close: 69.12 cents per pound. Forward 60-day return: plus 50.21 percent. Lean Hogs rallied to 103.82 by early March 2021.

The 5-day-smoothed cutout had faded through late 2020 as the post-COVID holiday-demand bulge dissipated. The signal read the demand softening. Through Q1 2021, the forward slaughter book tightened on the breeding-herd contraction from mid-2020 margin stress plus packer kill-rate pullback on the weaker cutout. Lean Hogs futures rallied on the forward supply tightening.

Lesson: Low-Cutout tail readings catch the regime where sustained wholesale demand softness drives the packer kill-rate pullback. The smoothed signal confirms the raw daily (Z3481) with slower cadence; readers who see both signals in Low-Cutout tail concurrently have higher conviction than from either alone.

Case 2: May 23, 2023. The export-softening confirmation.

Firing date: the composite entered Low-Cutout at minus 0.507 on May 23, 2023. Lean Hogs front-month close: 80.67. Forward 60-day return: plus 38.26 percent. Lean Hogs rallied to 111.57 by late July 2023.

Both the raw daily (Z3481) and the 5-day-smoothed (Z4738) cutout readings had faded through 2023 Q1-Q2 as the China African Swine Fever-driven export tempo wound down. The smoothed signal confirmed the raw sibling with slower cadence. Over the forward sixty days, the forward slaughter book tightened on sustained demand softness. Lean Hogs futures rallied strongly.

Lesson: the two cutout signals in the Lean Hogs composite are not fully redundant. The raw signal reads inflection faster; the smoothed signal confirms the sustained-trend. Concurrent Low-Cutout readings on both strengthen the aggregate composite reading.

Case 3: May 4, 2020. The on-mechanism High-Cutout bearish entry.

Firing date: the composite entered High-Cutout at plus 0.665 on May 4, 2020. Lean Hogs front-month close: 65.50. Forward 60-day return: minus 32.01 percent. Lean Hogs fell to 44.55 by late June 2020.

The 5-day-smoothed cutout had tracked the raw daily cutout's packer-shutdown spike with roughly one-week lag. By early May, the smoothed signal had crossed into High-Cutout territory. The empirical direction read this as bearish forward. Over the forward sixty days, the live-hog pipeline continued backing up as plants ran at reduced capacity, and Lean Hogs futures crashed.

Lesson: on-mechanism bearish-forward reading from the empirical direction. The engine's declared direction (High-Cutout bullish) would have missed this case. The empirical direction (High-Cutout bearish) delivered.

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What the state-conditional returns have actually done

> **Reference baseline (8,986 Lean Hogs trading days, 1990 to 2026)**

> Lean Hogs forward-60-day return baseline (unconditional): mean plus 0.41 percent, median minus 0.03 percent. Standard deviation 11.81 percent. Percent negative 49.8 percent.

The High-Cutout state (composite above plus 0.5), 839 trading days, delivered mean minus 0.53 percent, median minus 2.43 percent. That is minus 0.94 percentage points below the baseline mean. The read is modestly bearish-forward, inverted from the engine's declared direction.

The MODERATE_POS state (composite plus 0.2 to plus 0.5), 267 trading days, delivered mean minus 0.38 percent, median minus 0.56 percent. The band sits mildly below baseline.

The Baseline state (composite minus 0.2 to plus 0.2), 6,587 trading days, delivered mean minus 0.21 percent, median minus 0.15 percent. The band dominates the sample at 73 percent and sits slightly below baseline.

The MODERATE_NEG state (composite minus 0.5 to minus 0.2), 277 trading days, delivered mean plus 3.43 percent, median plus 1.88 percent. The band is above baseline.

The Low-Cutout state (composite below minus 0.5), 1,016 trading days, delivered mean plus 3.26 percent, median minus 0.82 percent. That is plus 2.85 percentage points above the baseline mean on the mean, below baseline on the median. The band's conditional read is modestly bullish-forward on the mean, inverted from the engine's declared direction. The mean-median asymmetry reflects supply-dislocation observations in the sample.

> **State-conditional returns summary (Lean Hogs forward 60-day)**
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> High-Cutout, N=839, mean minus 0.53 percent (minus 0.94 pp below baseline). MODERATE_POS, N=267, mean minus 0.38 percent (minus 0.79 pp below baseline). Baseline, N=6,587, mean plus 2.31 percent, median plus 3.13 percent (minus 0.62 pp below baseline). MODERATE_NEG, N=277, mean plus 3.43 percent (plus 3.02 pp above baseline). Low-Cutout, N=1,016, mean plus 3.26 percent (plus 2.85 pp above baseline). Spearman IC rho equals minus 0.0154 at p equals 1.44e-01 across 8,986 trading days.

The 3.79 percentage point tail-to-tail spread is the smallest in the six-signal Lean Hogs batch covered in this delivery. The aggregate IC does not reject the null at p less than 0.05. The signal functions as a confirming reader (not leading) alongside Z3481.

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How to use the signal today

The current composite reads minus 0.91 (saturated Low-Cutout tail). The 5-day-smoothed pork cutout has run below year-ago through H2 2026, consistent with the raw daily sibling (Z3481). The empirical direction reads this as modestly supportive on the forward Lean Hogs curve through the packer kill-rate transmission channel.

For a reader asking what the smoothed cutout signal is saying about the next two months: the signal is in a saturated bullish-forward tail reading. The historical Low-Cutout tail delivered plus 2.85 percentage points above baseline forward-60-day on the mean (near-baseline on the median). The current reading confirms the raw daily sibling's Low-Cutout reading. Concurrent tail firing across both cutout signals strengthens the aggregate composite's bullish-forward posture.

Pair with the breeding-herd signal, carcass-weight signal, and margin signals for the full composite picture. The Lean Hogs stack composite reading today is mixed: cutout-channel supportive forward (both cutout signals in Low-Cutout tails), breeding-herd modestly bearish forward, margin signals near baseline. The forward sixty-day outlook favors modest Lean Hogs strength on the cutout-channel vote.

For sizing: this signal should carry one-third of the Z3481 weight in the composite, or be dropped as near-redundant. The informational content is in the confirmation of the raw daily sibling, not in independent signal.

The 5-day cutout updates each trading day at 3:00 PM Central with the AMS LM_PK602 release.

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Methodology notes

The signal's full-sample Spearman information coefficient against Lean Hogs 60-day forward returns is rho equals minus 0.0154 at p equals 1.44e-01 across 8,986 observable trading days. The signal is NOT statistically significant at p less than 0.05. The in-estate 5-day-smoothed pork cutout series carries 3,009 daily observations from January 2015 to October 2026.

Engine fix applied October 28, 2026: the signal-states lambda ordering was corrected so EXTREME_POS and EXTREME_NEG fire before MODERATE_POS and MODERATE_NEG when the composite enters the saturated tails.

Polarity direction discrepancy, documented: the engine's declared `polarity.composite_direction: AS_IS` with `semantic_positive: Bullish LH.` is empirically inverted at the sixty-day horizon. The measured tails read High-Cutout modestly bearish-forward, Low-Cutout modestly bullish-forward, consistent with the raw daily sibling (Z3481) and with the packer kill-rate transmission mechanism. The engine label is retained for upstream ML composite compatibility.

The 504-day z-score window captures roughly two years of trailing cutout history. The 60-day minimum population ensures the composite does not fire on insufficient history. The YoY construction compares like-cadence periods, stripping seasonality.

Three complete Low-Cutout episodes anchor the constructive-tail (empirical) calibration: January 2021 (forward 60-day plus 50.21 percent), May 2023 (plus 38.26 percent), October 2016 (plus 22.93 percent). Three High-Cutout episodes anchor the opposite tail: May 2020 (minus 32.01 percent), April 2019 (minus 19.72 percent), July 2016 (minus 21.39 percent).

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What this signal does not cover

Five caveats on the signal's reach.

First, the aggregate signal IC is not statistically significant (rho equals minus 0.0154 at p equals 0.14). This is the weakest signal in the six-member Lean Hogs batch. Readers should treat this as a confirming signal, not a leading signal.

Second, the engine's declared polarity direction is empirically inverted (same pattern as Z3481). Reader-facing semantics use the measured tail direction; the engine label is retained for upstream ML composite compatibility.

Third, near-redundancy with the raw daily sibling (Z3481). The two cutout signals share source, construction, and empirical direction. In composite weighting, both should NOT receive equal weight. The smoothed signal should carry approximately one-third the weight of the raw.

Fourth, the mean-median asymmetry at the Low-Cutout tail (mean plus 3.26 percent, median minus 0.82 percent) reflects supply-dislocation observation skew. Readers sizing against the mean should expect typical observations near the median.

Fifth, the in-estate data starts January 2015. Pre-2015 state readings in the parquet are mechanical forward-fill artifacts and should not be used.

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The smoothed pork cutout signal is the confirming trend reader next to its raw daily sibling. The aggregate IC is not significant, but the saturated tails carry small empirical asymmetries consistent with the packer kill-rate transmission mechanism. In composite construction, this signal should carry light weight.

The current reading sits at a saturated Low-Cutout tail, consistent with the raw daily sibling.

End of brief. Full disclaimer and methodology at davidstendahl.com/disclaimer. Not investment advice.