The Texas Hay/Alfalfa Feed-Cost Signal, Read as the Roughage-Side Feedlot-Margin Driver on Live Cattle

Why USDA Texas hay and alfalfa cash prices year-over-year, z-scored on two years, catches the regional roughage-side feed-cost transmission to CME Live Cattle via feedlot margin compression, parallel to the corn-side cycle.

David Stendahl · Market Lab Analytics · October 31, 2026

What this signal is, with the limits stated upfront

Beef cattle feeding is not just corn. Roughage – hay, alfalfa, pasture-based forage – carries 20-30 percent of the backgrounding and finishing diet by dry matter in US feedlots. Texas is the largest US producer of alfalfa and the second-largest producer of hay (behind Montana), and the regional Texas prices track as a representative feed-cost read for the beef-belt feedlot complex.

This signal pulls USDA Texas hay and alfalfa cash prices year-over-year, computes 252-trading-day pct_change, z-scores on a 504-day (two-year) rolling window, and bounds with tanh. State thresholds at plus or minus 0.2 (moderate) and plus or minus 0.5 (extreme). Monthly USDA LMR release cadence.

Here is the honest finding. Daily Spearman IC against LC fwd60d is plus 0.058 at p-value 4.21e-8 across 8,989 trading days – strongly significant. Non-overlapping (every-60-day) IC is plus 0.069 at p-value 0.40 across 150 independent samples – direction consistent, non-significant on the demanding test. Phase +1 (Expensive Feed) delivers +3.15 percent fwd60d, hit rate 74.8 percent, +2.13 pp above the +1.02 percent baseline. Phase –1 (Cheap Feed) delivers +1.57 percent, +0.55 pp above baseline.

This is a Grade B regional roughage-side feed-cost read. The transmission is parallel to the corn-margin cycle (Z15201 LC-Corn Ratio) but operates on the roughage side of the feedlot diet. The 2019 Texas drought and 2011 Texas drought anchors validate the Expensive Feed tail; the 2014 post-drought recovery anchors the Cheap Feed tail.

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How the inputs compose

USDA Livestock Market Reporter (LMR) publishes Texas hay and alfalfa monthly cash prices across multiple grade and bale-size categories. The engine aggregates premium large-bale alfalfa and mid-grade grass hay prices to the regional composite. Monthly cadence is forward-filled to daily.

Roughage is not an optional input to the feedlot diet. Cattle require fiber for rumen health – a feedlot ration that is too grain-heavy causes acidosis and other digestive problems. Standard US feedlot rations run approximately 70-80 percent grain-based energy (corn, distillers grains) and 20-30 percent roughage-based fiber (hay, alfalfa, silage). Both input cost sides matter for feedlot margin economics.

Texas is the 1 US producer of alfalfa and 2 producer of hay. Regional Texas prices reflect Southern Plains supply-demand balance that feeds into the beef-belt feedlot complex (TX, OK, KS, NE). When Texas hay firms year-over-year, roughage input costs rise for the regional feedlot industry. Feedlot operating margins compress through the roughage channel – the same mechanism as corn-margin compression but through the complementary diet component.

The engine z-scores on 504-day (approximately 2-year) rolling window to normalize for secular hay-price trends (hay prices have risen approximately 5x since 1990 vs 3x for CBOT corn, so z-scoring is essential for cyclical signal extraction).

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What the state-conditional returns have actually done

> **Reference baseline – LC fwd60d (unconditional)**
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> CME Live Cattle back-adjusted continuous (LC20040BD) forward-60-day return baseline (unconditional): mean plus 1.02 percent, median plus 1.74 percent, standard deviation 8.01 percent, percent negative 41.8 percent. Sample window 1990-11-29 through 2026-10-30, 8,989 trading days with observable fwd60d.

Phase plus 1 (Expensive Feed, composite greater than plus 0.3) covers 600 trading days – 6.7 percent of the sample. Per-day mean fwd60d is plus 3.15 percent, hit rate 74.8 percent. Edge above baseline: plus 2.13 pp. The transmission mechanism works: elevated Texas hay/alfalfa prices → regional roughage feed costs rise → feedlot margins compress → placements slow → forward supply tightens 6-12 months out.

Phase 0 (Normal, composite between plus and minus 0.3) covers 7,953 trading days – 88.5 percent of the sample. Mean fwd60d is plus 0.83 percent, hit rate 56.2 percent. Edge below baseline: minus 0.19 pp. The vast majority of the sample is Phase 0; the signal fires only occasionally into the directional tails.

Phase minus 1 (Cheap Feed, composite less than minus 0.3) covers 436 trading days – 4.9 percent of the sample. Per-day mean fwd60d is plus 1.57 percent, hit rate 64.0 percent. Edge above baseline: plus 0.55 pp. The Cheap Feed tail is modestly above baseline rather than strongly below – regional roughage ease on its own does not strongly bear LC forward prices, which is a non-standard pattern. The historical interpretation is mixed: cheap feed can signal strong supply recovery after drought (bullish) or cycle-top overcapacity (bearish).

The signal is asymmetric: strong Phase +1 behavior (74.8 percent hit rate, +2.13 pp edge), modest Phase –1 behavior. Phase 0 near baseline. Rare firing (11.6 percent combined phase +/-1), high-signal-when-firing pattern.

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Three cases that frame how to read this signal

Case 1: September 2019. Texas drought-driven Expensive Feed.

Firing date: September 9, 2019 at composite plus 0.85. Forward 60-day LC return from entry: plus 27.97 percent (from 94.20 to 120.57 cents per pound).

Context: through 2019 Q2-Q3 USDA Texas hay and alfalfa prices firmed as drought conditions tightened regional roughage production. Live cattle were at 94.20 at the firing date. Over the next 60 trading days LC rallied 28 percent to 120.57 as the feed-cost margin compression combined with the pre-ASF US export tailwind and the beef-belt drought supply precursor. 2019 Q3 is the canonical Expensive Feed anchor and illustrates how the roughage-side signal aligns with other LC fundamental drivers at drought windows.

Case 2: August 2014. Post-drought Cheap Feed recovery.

Firing date: August 18, 2014 at composite minus 0.70. Forward 60-day LC return from entry: minus 10.95 percent (from 162.40 to 144.60).

Context: through 2014 USDA Texas hay and alfalfa prices deflated as regional production recovered post-2011 Texas drought and the broader Southern Plains forage situation normalized. Live cattle were at 162.40 at a cyclical high reflecting the multi-year post-drought herd-rebuild dynamic. Over the next 60 trading days LC fell 11 percent to 144.60 as the margin recovery enabled feedlot placement expansion into the cycle-top market. The 2014 Q3 case anchors the Cheap Feed tail with a cycle-top-expansion interpretation.

Case 3: July 2011. Texas drought Expensive Feed.

Firing date: July 2011 at composite +0.90+. The historic 2011 Texas drought drove regional hay and alfalfa prices to sample extremes as production collapsed across the state. The drought triggered a multi-year cow herd liquidation across the beef-belt (US beef cow inventory fell to a 60-year low by 2013-2014 before beginning to rebuild). The 2011 feed-cost shock aligned with the simultaneous pasture-stress supply destruction cycle. The 2011-12 window anchors the modern-era structural supply-destruction event where feed-cost compression + pasture degradation combined to force producer liquidation.

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How to use the signal today

As of October 30, 2026, the composite reads minus 0.500 – Cheap Feed moderate-negative, 108 trading days running. USDA Texas hay and alfalfa prices YoY have run below the two-year baseline through Q3-Q4 2026 as regional roughage production recovers. CME Live Cattle trades the $220-230 range through the firing.

The current reading is in the Phase −1 band (below −0.3) in the Moderate NEG sub-band (above −0.5 EXTREME threshold). Historical Phase −1 delivers +0.55 pp above baseline at 64.0 percent hit rate – modestly constructive but the weaker side of the signal. The stronger signal reading is in Expensive Feed firings (+2.13 pp edge, hit 74.8 percent).

Pair with four confirming reads for direction:

- **LC-Corn Ratio Signal (Z15201)**. Corn-side feedlot producer-margin cycle. The LC fundamental stack anchor on supply. The two feed-cost reads should be interpreted together – when both are expensive, the combined margin compression is strongest.
- **LC US Beef-Belt Drought Signal (Z3727)**. Pasture-stress supply precursor. Shares drought-year anchors (2019, 2011) with the hay/alfalfa signal. When both fire together in drought environments, the supply destruction cycle is coherent.
- **LC CFTC Positioning Signal**. Commercial NET hedge regime.
- **USDA Cattle-on-Feed monthly reports**. Direct placement-and-marketings confirmation.

For the current Cheap Feed firing, this signal is NOT a strong directional driver. The weaker tail (+0.55 pp) with modest hit rate (64.0 percent) suggests regional feed ease does not strongly transmit to forward LC direction. Monitor for Expensive Feed firings over the coming quarters as the stronger reads.

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Methodology notes

Data source. USDA Livestock Market Reporter (LMR) Texas hay monthly data (USDA_LMR_TX_HAY_MONTHLY) for premium large-bale alfalfa and mid-grade grass hay cash prices. Aggregates to the regional composite. Monthly cadence forward-filled to daily. Target: CME Live Cattle back-adjusted continuous (LC20040BD).

Signal construction. YoY = 252-trading-day pct_change on the regional composite. Z-score on 504-day rolling window (approximately 2 years) with 60-day minimum sample. Tanh-bounded to [−1, +1]. 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.

Validation statistics. Daily Spearman IC against LC fwd60d is +0.058 at p-value 4.21e-8 (n = 8,989 trading days) – strongly significant. Phase +1 state-conditional per-day mean fwd60d plus 3.15 percent, hit 74.8 percent (+2.13 pp above +1.02 percent baseline). Phase 0 mean fwd60d plus 0.83 percent, hit 56.2 percent. Phase −1 per-day mean fwd60d plus 1.57 percent, hit 64.0 percent (+0.55 pp above baseline).

Independence test. Non-overlapping (every-60d) sampling yields Spearman IC +0.069 at p-value 0.40 across 150 independent observations – direction consistent with daily, non-significant on the demanding independence test.

Rare firing high-hit-rate pattern. The signal fires Phase +1 in only 6.7 percent of the sample. When it fires, hit rate is 74.8 percent – strong tail behavior. The small Phase +1 sample (600 days) limits

statistical confidence in exact magnitude, but the directional pattern across 2019, 2011, and 2014 firings is consistent.

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What this signal does not cover

Three things the signal does NOT read, and one broader caveat.

First, the signal does NOT read the corn-side of feedlot feed costs. CBOT corn and grain input cost dynamics are captured by Z15201 LC-Corn Ratio. The two feed-cost reads should be interpreted together as parallel channels of feedlot margin dynamics; this signal alone covers only the roughage side.

Second, the signal is specific to Texas hay/alfalfa. Montana (1 hay producer), California, Idaho, Oklahoma, and other major hay-producing states have their own regional dynamics that can diverge from Texas. A national-average hay signal would miss the beef-belt-specific feedlot cost transmission that drives Texas as a representative read.

Third, the signal has a long-lag transmission (6-12 months through the placement decision cycle). The 60-day forward horizon captures only the near-term signaling effect; the full supply-side transmission plays out over multiple quarters through the breeding-herd response.

Broader caveat: this is Grade B regional roughage overlay. Daily IC strongly significant; non-overlapping independence test non-significant on 150 samples. The signal belongs in the LC stack as the roughage-side feed-cost read complementing the corn-side (Z15201). Pair with pasture-stress overlays (Z3727 beef-belt drought) which share drought-year anchors for coherent supply-cycle reading.

This research brief is for informational purposes only and does not constitute investment advice. Past performance is not indicative of future results. Signal reads reflect historical state-conditional statistics; any decision to act on signal readings is the reader's responsibility. Data sources: USDA Livestock Market Reporter TX hay monthly (USDA_LMR_TX_HAY_MONTHLY); CME Live Cattle back-adjusted continuous (LC20040BD). State-conditional statistics computed through 2026-10-30.